EVALUATION OF GAS REBURNING AND LOW NO_X BURNERS ON A WALL FIRED BOILER

Performance and Economics Report
Gas Reburning-Low NO_x Burner System
Cherokee Station Unit 3
Public Service Company of Colorado

Prepared Under:

U. S. Department of Energy
Cooperative Agreement DE-FC-91 PC90547

Gas Research Institute Contract No. 5090-254-1994

Electric Power Research Institute
Public Service Company of Colorado
Colorado Interstate Gas Company

(EER Project No. 8706)

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Final Report

U.S. DOE patent Clearance is Not Required Prior to the Publication of this Document

July, 1998

Energy and Environmental Research Corporation

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ABSTRACT

Under the U.S. Department of Energy's Clean Coal Technology Program (Round 3), a project was completed to demonstrate control of boiler NO_x emissions and to a lesser degree, due to coal replacement, SO_2 emissions. The project involved combining Gas Reburning with Low NO_x Burners (GR-LNB) on a coal-fired electric utility boiler to determine if high levels of NO_x reduction (70%) could be achieved. Sponsors of the project included the U.S. Department of Energy, the Gas Research Institute, Public Service Company of Colorado, Colorado Interstate Gas, Electric Power Research Institute, and the Energy and Environmental Research Corporation. The GR-LNB demonstration was performed on Public Service Company of Colorado's (PSCo) Cherokee Unit #3, located in Denver, Colorado. This unit is a 172 MW_e wall-fired boiler that uses Colorado Bituminous, low-sulfur coal. It had a baseline NO_x emission level of 0.73 lb/10^6 Btu using conventional burners.

Low NO_x burners are designed to yield lower NO_x emissions than conventional burners. However, the NO_x control achieved with this technique is limited to 30-50%. Also, with LNBs, CO emissions can increase to above acceptable standards. Gas Reburning (GR) is designed to reduce NO_x in the flue gas by staged fuel combustion. This technology involves the introduction of natural gas into the hot furnace flue gas stream. When combined, GR and LNBs minimize NO_x emissions and maintain acceptable levels of CO emissions. A comprehensive test program was completed, operating over a wide range of boiler conditions. Over 4,000 hours of operation were achieved, providing substantial data. Measurements were taken to quantify reductions in NO_x emissions, the impact on boiler equipment and operability and factors influencing costs. The GR-LNB technology achieved good NO_x emission reductions and the goals of the project were achieved. Although the performance of the low NO_x burners (supplied by others) was less than expected, a NO_x reduction of 65% was achieved at an average gas heat input of 18%. The performance goal of 70% reduction was met on many test runs, but at a higher reburn gas heat input. SO_2 emissions, based on coal replacement, were reduced by 18%.

Toward the end of the program, a Second Generation gas injection system was installed. Higher injector gas pressures were used that eliminated the need for flue gas recirculation as used in the first generation design. The Second Generation GR resulted in similar NO_x reduction performance as that for the First Generation. With an improvement in the LNB performance in combination with the new gas injection system , the reburn gas could be reduced to 12.5% of the total boiler heat input to achieve al 64% reduction in NO_x emissions. In addition, the OFA injectors were modified to provide for better mixing to lower CO emissions.

A key issue affecting the implementation of technology is economics. The application of GR-LNB requires modifications to existing power plant equipment. Capital and operating costs depend largely on the following site-specific factors; natural gas availability at the site, the coal-gas price differential, sulfur dioxide reduction requirements and the value of SO_2 allowances. Operating costs are almost entirely related to the differential cost of the gas over the coal as reduced by the value of SO_2 emissions reduction (due to the zero sulfur content of natural gas). Other operating cost factors are related to reductions in ash, mill power and maintenance, and a minor reduction in boiler efficiency, typically 0.0 to 1.0%. Based on the test results, EER expects that GR-LNB installations will achieve at least 60% NO_x control over the uncontrolled level when firing 10-15% gas.

Title IV, Phase 2 of the Clean Air Act Amendments (CAAA) of 1990 specify a NO_x emissions limit of 0.46 $lb/10^6$ Btu for wall-fired boilers. It is expected that this limit will be lowered in the future. The test results show that burners alone will yield a NO_x emission level of 0.46 $lb/10^6$ Btu. Although sufficient to meet the CAAA limit, CO control may not be satisfactory with certain LNBs unless low levels of GR are utilized. Also, any future more stringent limits will not be met with burners alone. For the Cherokee unit, it was demonstrated that GR could be an economic technology due to its low capital and operating cost (low levels of natural gas consumption). Based on the success of the project, the host utility has elected to purchase the GR-LNB equipment for future use.

ACKNOWLEDGMENTS

The Energy and Environmental Research Corporation wishes to express its appreciation to the project sponsors and their project managers for the fine assistance and support provided to the GR-LNB demonstration:

U. S. Department of Energy - Mr. Harry Ritz
Gas Research Institute - Mr. Paul Bautista
Electric Power Research Institute - Mr. George Offen
Colorado Interstate Gas Company - Mr. John Grossman
Public Service Company of Colorado - Mr. Charles Bomberger

The assistance and cooperation of the operations and maintenance personnel of Public Service Company of Colorado's Cherokee Station is also greatly appreciated.

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TABLE OF CONTENTS

TABLE OF CONTENTS (con't)

Section | Page

TABLE OF CONTENTS (con't)

LIST OF TABLES

LIST OF FIGURES

LIST OF FIGURES (con't)

LIST OF ABBREVIATIONS

AFT	Ash Fusion Temperature
AHT	Ash Hemispherical Temperature
APCD	Air Pollution Control Division
ASME	American Society of Mechanical Engineers
AST	Ash Softening Temperature
ASTM	American Society of Testing Materials
B&W	Babcock & Wilcox
BPMS	Boiler Performance Monitoring System
BPR	Bypass Pressure Regulator
CAAA	Clean Air Act Amendment
CCT	Clean Coal Technology
CEMS	Continuous Emissions Monitoring System
CIG	Colorado Interstate Gas
CRT	Cathode Ray Tube
CSA	Coal Stoichiometric Air
DOE	U.S. Department of Energy
EER	Energy and Environmental Research Corporation
EPA	Environmental Protection Agency
EPRI	Electric Power Research Institute
EMP	Environmental Monitoring Plan
ESP	Electrostatic Precipitator
FD	Forced Draft
FF	Fouling Factors
FFDC	Fabric Filter Dust Collector
FGR	Flue Gas Recirculation
GR	Gas Reburning
GR-LNB	Gas Reburning with Low NO_x Burners
GRI	Gas Research Institute
GSA	Natural Gas Stoichiometric Air
HGI	Hardgrove Grindability Index
HHV	Higher Heating Value
HVT	High Velocity Temperature
IDT	Initial Deformation Temperature
ISO	International Standards Organization
LHV	Lower Heating Value
LNB	Low NO_x Burner
NG	Natural Gas
NPDES	National Pollution Discharge Elimination System
NSPS	New Source Performance Standards
OFA	Overfire Air
OTR	Ozone Transport Region
PC	Pulverized Coal
PID	Proportional Integral Derivative

LIST OF ABBREVIATIONS (con't)

PSCo	Public Service Company of Colorado
QA	Quality Assurance
RSD	Relative Standard Deviation
SNCR	Selective Non-catalytic Reduction
SCR	Selective Catalytic Reduction
SR	Stoichiometric Ratio
TA	Total Combustion Air
TSS	Total Suspended Solids
U.S.	United States
UT	Ultrasonic Thickness
WDPF	Westinghouse Distributed Process Family
WQCD	Water Quality Control Division
w/o	Without

LIST OF UNITS

acfm	Actual Cubic Feet per Minute
Btu	British Thermal Unit
cfm	Cubic Feet per Minute
cm	Centimeter
db	Decibel
dscf	Dry Standard Cubic Foot
ft	Feet
g	Gram
gal	Gallon
gr	Grain
hr	Hour
J	Joule
kg	Kilogram
kJ	Kilojoule
klb	Thousand Pounds
kPa	Kilopascal
kscfm	1,000 Standard Cubic Feet per Minute
kW	Kilowatt
l	Liter
lb	Pound
m	Meter
10^6 Btu	Million Btu
MJ	Million Joules
mg	Milligram
MGD	Million Gallons per Day
min	Minute
MW_e	Megawatts Electric
Nm	Normal Cubic Meter
pH	Measure of acidity of a solution
ppm	Parts per Million
psi	Pounds per Square Inch
psig	Pounds per Square Inch (Gauge)
rpm	Revolutions per Minute
sec	Second
scfm	Standard Cubic Feet per Minute
scf	Standard Cubic Foot
TPY	Tons per Year
W.C.	Water Column
µg	Micro-gram
°C	Degrees Centigrade
°F	Degrees Fahrenheit
%	Percent

GLOSSARY OF TERMS

Chemical Symbols:

Al_2O_3	Aluminum Oxide (Alumina)
C_2H_6	Ethane
C_3H_8	Propane
Ca	Calcium
CaO	Calcium Oxide
CH	Hydrocarbon Radical
CH_2	Hydrocarbon Radical
CH_4	Methane
CO	Carbon Monoxide
COS	Carbonyl Sulfide
co.	Carbon Dioxide
Fe	Iron
FeS	Ferrus (II) Sulfide
Fe_2O_3	Ferric Oxide
HCl	Hydrogen Chloride
HCN	Hydrogen Cyanide
H_2O	Water
H_2S	Hydrogen Sulfide
K_2O	Potassium Oxide
Mg	Magnesium
MgO	Magnesium Oxide
N_2	Nitrogen (Diatomic)
Na_2O	Sodium Oxide
NH_3	Ammonia
NO_x	Nitrogen Oxides
N_2O	Nitrous Oxide (Colorless Gas)
NO	Nitric Oxide (Colorless Gas)
NO_2	Nitrogen Dioxide (Brownish-red Gas)
O_2	Oxygen (Diatonic)
PM_{10}	Particulate matter less than 10 microns in size
P_2O_5	Phosphorous Pentoxide
SiO_2	Silicon Dioxide (Silica)
SO_2	Sulfur Dioxide
SO_3	Sulfur Trioxide
SR	Stoichiometric Ratio
THC	Total Hydrocarbons
TiO_2	Titanium Dioxide

EXECUTIVE SUMMARY

Under the U.S. Department of Energy's Clean Coal Technology Program (Round 3), a project was completed by the Energy and Environmental Research Corporation to demonstrate control of boiler flue gas emissions, specifically NO_x. The project involved Gas Reburning (GR) used in combination with low NO_x burners (LNBs) on an electric utility wall-fired coal boiler. This GR-LNB demonstration was sponsored by:

- U.S. Department of Energy (DOE)
- Gas Research Institute (GRI)
- Electric Power Research Institute (EPRI)
- Colorado Interstate Gas (CIG)
- Public Service Company of Colorado (PSCo)
- Energy and Environmental Research Corporation (EER)

Low NO_x burners (LNB) are designed to produce less NO_x emissions than conventional burners. This is accomplished by mixing the air with the coal in such a way to yield lower flame temperatures (lower thermal NO_x) and in-flame zone combustion staging (lower fuel bound NO_x). GR is designed to reduce NO_x in the flue gas by staged combustion, converting NO_x that has formed in the burner zone to diatomic nitrogen. GR involves the introduction of natural gas into the hot furnace flue gas stream. When combined, GR-LNB work together to minimize NO_x emissions and maintain acceptable levels of CO emissions and carbon burnout. Several benefits are derived by adding GR to LNB's, including:

- Low capital cost
- Compatibility with high sulfur coal
- Incremental reduction in SO_2 emissions
- No adverse effects on boiler thermal performance
- Minimal system operating complexity

The objective of the project was to demonstrate the commercial readiness of the GR-LNB technology for application to pre-NSPS (New Source Performance Standards) utility boilers. These older boilers have one of several common firing configurations with the wall-fired type being the most common. The specific goal was to demonstrate that high levels of NO_x reduction (70%) could be achieved with minimal impacts to other areas of unit operation including carbon burnout, furnace slagging or corrosion, convective pass fouling, steam capacity and steam conditions, and other areas of unit performance.

Site

The site for this demonstration was PSCo's Cherokee Station, located in Denver, Colorado. The Cherokee Station is PSCo's largest electric power generating station, containing four steam generating units that generate a total of some 775 MW_e. The GR-LNB was applied to Cherokee Unit #3. The unit was constructed in 1962 and was not required to meet NSPS required under the Clean Air Act Amendments (applies to units constructed after 1971). Unit #3 is a wall-fired unit with the original conventional burners being Babcock and Wilcox's flare-type pulverized coal (PC) burners. It has a nominal rating of 172 MW_e gross (158 MW_e net). It fires Colorado Bituminous coal, with 0.40% sulfur and 10% ash. The unit has 16 burners that are located on the front wall of the furnace.

Project Schedule

The project, awarded in October, 1990 was completed in three phases:

- Phase I — Design and Permitting
- Phase II — Construction and Startup
- Phase III — Operation, Data Collection, Reporting and Disposition

Construction and startup was completed in November, 1992. Following parametric/optimization testing, a one-year long term test program began in May, 1993. Testing was interrupted to install the Second Generation GR technology, and testing with this design was completed in January, 1995.

Technology Description

The technology is a co-application of two previously demonstrated technologies, GR and LNBs. The application of GR-LNB yields higher NO_x emission reductions than that achievable with either technology alone. LNBs reduce emissions of NO_x by staging the mixing of coal and air, resulting in a fuel-rich region within long flames and low peak flame temperatures. While LNBs reduce NO_x, they may result in higher levels of unburned carbon and higher emissions of CO. Incomplete combustion can occur as a result of the burner air staging.

GR involves reducing the levels of coal and combustion air in the burner area and injecting natural gas into a reburn zone above the burners. Following this overfire air (OFA) is injected above the reburn zone. This three-zone process creates a reducing or reburn zone in the furnace wherein NO_x created in the primary zone is reduced to diatomic nitrogen. Each zone has a unique stoichiometric ratio (SR, ratio of air to that theoretically required for complete fuel combustion) as determined by the flow rates of coal, burner air, natural gas, and OFA. Flue gas recirculation (FGR) may be used to provide momentum to the injected natural gas. FGR has a low O_2 content and as such has a minor impact on reburn and burnout zone SR's.

In this demonstration, FGR was used initially to provide momentum to the natural gas to achieve optimum penetration into the furnace flue gas. However, during long term testing it was determined that FGR had minimal effect on NO_x emissions. Cherokee Unit #3 has a reburn zone residence time of 0.50 seconds which is sufficient to yield good NO_x reduction without the need for FGR.

A second series of tests were added to evaluate the modified configuration and evaluate its impact. The natural gas injectors were re-designed to operate at higher pressure to increase the velocity of gas injection and the OFA ports were modified to enhance upper furnace flue gas/air mixing. This modified configuration is referred to as Second Generation Gas Reburning. FGR adds substantially to the capital cost of the GR system requires a slight increase in superheat attemperation water spray rates. Elimination of FGR is therefore a benefit to the economics of the GR technology.

Demonstration Program

The GR-LNB test program was developed to first optimize the system with short parametric tests and then operate it over a one-year demonstration period. The objective of the GR-LNB parametric/optimization test program was to define the relationships that exist between the controlling parameters and the boiler outputs. These relationships were then used to approximate the boiler set points required for optimum reburning performance. Optimization testing was then completed to fine tune the system.

A one-year period of long-term GR-LNB testing was completed, with the unit operating under normal dispatch by the PSCo staff. The data from the testing were used to establish the impacts of GR-LNB on long term boiler performance and economics. These impacts included furnace conditions such as slagging and waterwall corrosion rates, bottom ash characteristics and sluicing requirements, convective pass fouling, steam generation and final steam temperatures and pressures, process auxiliary power requirements, impacts on the fabric filter dust collector, and process economics.

Technical Performance

The new LNB's, installed by Foster Wheeler, reduced NO_x emissions from a pre-construction baseline of 0.73 lb/10^6 Btu to 0.46 lb/10^6 Btu at 3.5% O_2. This was a reduction of 37%, not meeting the targeted 45% reduction. Also, the carbon-in-ash and CO could not be maintained at acceptable levels.

When GR was introduced, the NO_x emissions dropped to an average of 0.25 lb/10^6 Btu at 3.25% O_2, yielding an overall GR-LNB reduction of 66%. The gas heat input for this level of reduction was 18%. Both carbon-in-ash and CO were at acceptable levels. Due to the substandard performance of the LNBs, the 70% reduction target could not be achieved without significant levels of reburn gas heat input.

Following installation of the Second Generation GR equipment and tune up of the LNBs, the system achieved similar reductions in NO_x emissions (64%), but with only 12.5% reburn gas heat input. Again, both carbon-in-ash and CO were at acceptable levels.

The reburning zone operates under reducing or slightly fuel rich conditions. This suggests the possibility of increased tube wastage due to removal of the protective oxide layer and/or sulfide attack. Accordingly, the field evaluations included a comprehensive program of non-destructive (ultrasonic tube thickness) evaluations. The evaluations showed no evidence of increased tube wastage attributable to GR.

Although not part of the planned demonstration, the opportunity presented itself to perform testing with natural gas as the primary fuel coupled with GR. The Gas/Gas Reburning testing demonstrated a reduction in NO_x emissions of 43% (0.30 lb/10^6 Btu reduced to 0.17 lb/10^6 Btu) when using 7% gas heat input.

Economics

The cost and performance data from the Cherokee project were used to estimate the costs of a retrofit installation, operation and NO_x reduction performance for commercial installation of a Second Generation GR-LNB on a 300 MWe power plant. The estimate is based on mature technology; i.e., a so-called "nth" plant which incorporates process improvements resulting from experience gained in earlier installations. The results of the economic analysis are as follows:

	GR-LNB
Total installed cost	\$7.48 million
Capital requirement	\$7.80 million
Operation and maintenance cost	\$2.14 million
NO_x removal cost - current dollars	\$1,027/ton
NO_x removal cost - constant dollars	*\$ 786/ton*

The analysis is based on a coal-to-gas differential of \$1.00/10^6 Btu, a 64% NO_x removal efficiency with 12.5% gas heat input, and a \$95/ton SO_2 allowance credit.

Commercial Potential and Plans

The market for the GR technology is difficult to assess at the present time in light of the recent Northeast State filings (states within the Northeast Ozone Transport Region) regarding NO_x emissions from other states. The Northeast States petitioned other states (AL, AR, DE, GA, IL, IN, IA, KY, LA, MA, MD, MI, MN, MS, MO, NC, NH, NY, PA, OH, RI, SC, TN, VA, WV & WI) to reduce power plant (units $\geq$250 million Btu/hr) NO_x emissions. The petitions vary, but most ask that the named states reduce their NO_x emissions by 85% or down to a level of 0.15 lb/10^6 Btu, whichever is less stringent. If the targeted states implement regulations to meet these requested levels it could open a market for GR;

however, the NO_x emission level is so low that GR would have to be used in combination with other technologies such as selective catalytic reduction (SCR) or selective non-catalytic reduction (SNCR). It is unlikely that the combined GR-LNB technology would be used in this case for the combined technologies could not meet the requested NO_x emission levels. A third technology such as SCR or SNCR would have to be added.

In addition to the state implementation plan (SIP) call, there are proposed new National Ambient Air Quality Standards (NAAQS) that would reduce ambient ozone levels by 50%. If these proposed regulations become law there will be more ozone non-attainment areas in the U.S. putting added pressure on the electric utilities to reduce NO_x emissions (a precursor to ozone production).

These three NO_x reduction initiatives have created a great deal of confusion regarding the standards that electric utilities will have to meet. It has also delayed the electric utility industry from making decisions regarding NO_x emissions reductions.

Conclusions

The following results can be highlighted from the GR-LNB demonstration:

- GR-LNB can be installed and operated successfully on a wall-fired unit
- 70% NO_x reduction can be achieved
- The system can be operated consistently and reliably
- Carbon-in-ash and CO can be controlled to acceptable levels
- Boiler equipment experienced no mechanical degradation or failure

1.0 INTRODUCTION

1.0 INTRODUCTION

1.1 Purpose of the Project Performance and Economics Report

The Project Performance and Economics Report is a designated deliverable under U.S. Department of Energy Agreement No. DE-FC22-90PC90547, Attachment C (Federal Assistance Reporting Checklist). The purpose of this report is to discuss the technology performance results and to present economic analyses for evaluation of the commercial viability of the demonstrated technology, Gas Reburning with Low NO_x Burners (GR-LNB). The report provides performance results for LNB, First Generation GR-LNB, and Second-Generation GR-LNB in regard to their impact on NO_x control, thermal performance (i.e. steam conditions, efficiency, heat rate), and the environment (air emissions and aqueous discharges). The report also includes updated information made since the issuance of the Public Design Report.

The GR-LNB project goal at PSCo was to demonstrate that combined GR-LNB could be successfully used on wall-fired boilers to achieve significant reductions in NO_x emissions. The total value of the GR-LNB project was $17.8 million. This GR-LNB demonstration complements two other full-scale GR demonstrations completed by EER, in a CCT Round 1 program. These involved the co-application of GR with furnace Sorbent Injection (SI) at Illinois Power's Hennepin Station Unit 1 located in Hennepin, Illinois and at City Water, Light and Power's Lakeside Station Unit 7, located in Springfield, Illinois. These units have tangential and cyclone firing configurations respectively.

1.2 Overview of the Project

As part of the U.S. Department of Energy's Clean Coal Technology Program (Round 3), a project was completed by Energy and Environmental Research Corporation to demonstrate control of boiler emissions that comprise acid rain precursors, specifically

NO_x. The project involved combined Gas Reburning and Low NO_x Burners (GR-LNB) on a coal-fired utility boiler to determine its potential for reducing NO_x emissions. Low NO_x burners are designed to create less NO_x than conventional burners. However, the NO_x control achieved is limited to 30-50%. Also, CO emissions tend to be at levels above acceptable standards.

Gas Reburning (GR) is designed to reduce the level of NO_x in the flue gas by staged fuel combustion. This technology involves the introduction of natural gas into the flue gas stream downstream of the primary coal burners (reburn zone) followed by the addition of overfire air to complete the combustion process. When combined, gas reburning and low NO_x burners work in harmony to both minimize NO_x emissions and maintain an acceptable level of CO emissions. Several additional benefits are also derived from adding GR to LNBs including:

- Low capital cost relative to more expensive scrubbers
- Compatibility with high-sulfur coal
- Incremental reduction in SO_2 emissions, since natural gas contains no sulfur
- No adverse effects on boiler thermal performance
- Minimal system operating complexity

1.2.1 Background and History of Project

The development of gas reburning technology has been underway in various laboratories since the 1970's. EER, with the support of the EPA and GRI, began extensive bench and pilot-scale testing in 1981 to characterize the fundamental process variables. These tests provided valuable scale-up information needed for the development of commercial applications under industrial conditions.

1.2.2 Project Organization

The GR-LNB demonstration was sponsored by:

- U.S. Department of Energy (DOE)
- Gas Research Institute (GRI)
- Electric Power Research Institute (EPRI)
- Colorado Interstate Gas (CIG)
- Public Service Company of Colorado (PSCo)
- Energy and Environmental Research Corporation (EER)

Figure 1-1 presents the Project Management Structure describing the contributions of the various sponsors and their relationships to each other and to DOE.

1.2.3 Project Description

Gas reburning involves the injection of natural gas, typically accounting for 15 to 25% of the total heat input, into the furnace region above the coal burners. In First Generation GR systems, such as the original GR system retrofitted to Unit 3, recirculated flue gas (FGR) was used as a carrier gas to add momentum to the reburning fuel to enhance mixing with the furnace flue gas.

The injected natural gas forms a slightly fuel-rich zone in which NO_x from the burner region is reduced to a series of nitrogenous intermediates such as NH_3 and HCN and finally to diatomic nitrogen, N_2. Overfire air (OFA) is added higher up in the furnace to burn out combustible matter under a normal excess air level.

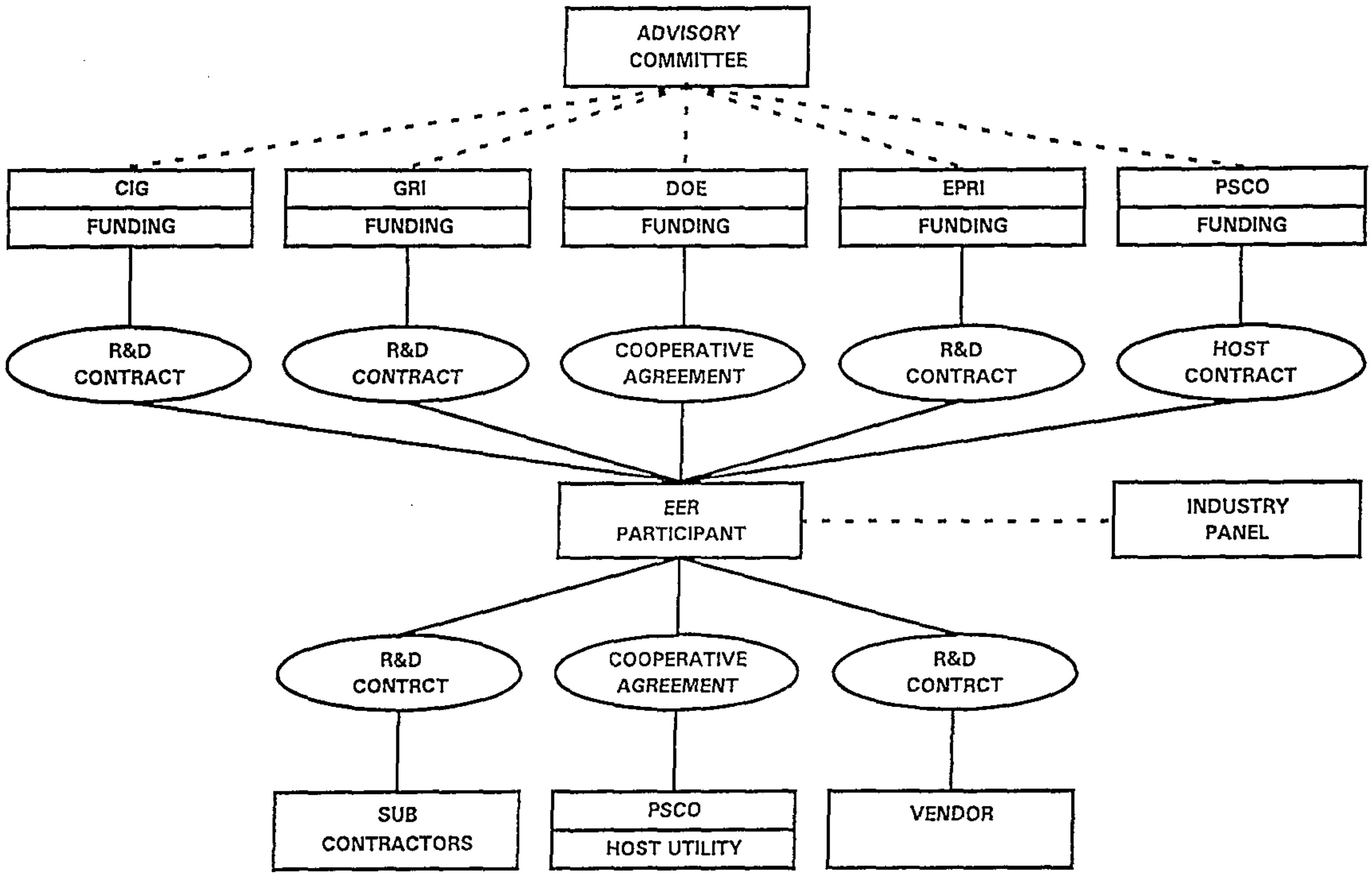


Figure 1-1. Project management structure

Low NO_x burners operate by delaying the mixing of coal and air and hence creating a fuel-rich reducing zone at their core. They typically have secondary (in some cases tertiary) air zones, with the air split impacting the final NO_x level. They also create longer flames with lower peak flame temperatures. This reduces NO_x formation from fuel bound nitrogen and from thermal fixation of N_2 in the flame. Typically, LNBs achieve NO_x reductions in the 30 to 50% range.

The GR-LNB project was completed in three planned project phases as described below:

- Phase I — Engineering Design
Permitting
- Phase II — Construction
Startup
- Phase III — Optimization Testing
Long Term Testing
Second Generation Gas Reburning Testing
Reporting and Disposition

Following long term testing, it was determined that the system could operate effectively without a flue gas recirculation system and the GR system was modified. The modified configuration is referred to as Second Generation Gas Reburning and was tested in conjunction with an extension to the program granted by the DOE. Specific modifications included the removal of the FGR system, installation of high velocity natural gas jets, and installation of double concentric overfire air ports for enhanced CO burnout.

1.2.4 Site

The demonstration was performed at PSCo's Cherokee Unit 3, located in Denver, Colorado. This unit is a 172 MW_e wall-fired boiler that uses Colorado Bituminous, low-sulfur coal. The PSCo unit is larger than the previous units that demonstrated GR and provided an excellent scale-up from laboratory testing. PSCo voluntarily agreed to reduce boiler NO_x emissions as a public relations move in response to the unique political environment of the Denver area (i.e., the "brown cloud" phenomenon) and proved to be both a forward thinking utility and a very cooperative Host.

The target for the project was a reduction of 70 percent in NO_x emissions. The gas reburning system was designed by EER and the low NO_x burners were provided by Foster Wheeler Energy Corporation. Based on the successful results of the program, the installed equipment was retained by PSCo.

1.2.5 Project Schedule

Figure 1-2 is a schedule of the GR-LNB demonstration. The key dates from the schedule were as follows:

October, 1990	Initiated project
November, 1992	Construction and startup completed
April, 1993	Optimization testing completed
January, 1994	Long term testing completed
August, 1994	Second generation GR testing initiated
January, 1995	Second generation GR testing completed

During the second generation testing, approximately two weeks of 100% gas firing was completed using Gas/Gas Reburning. The low NO_x burners were capable of firing either 100% coal or 100% natural gas up to full load.

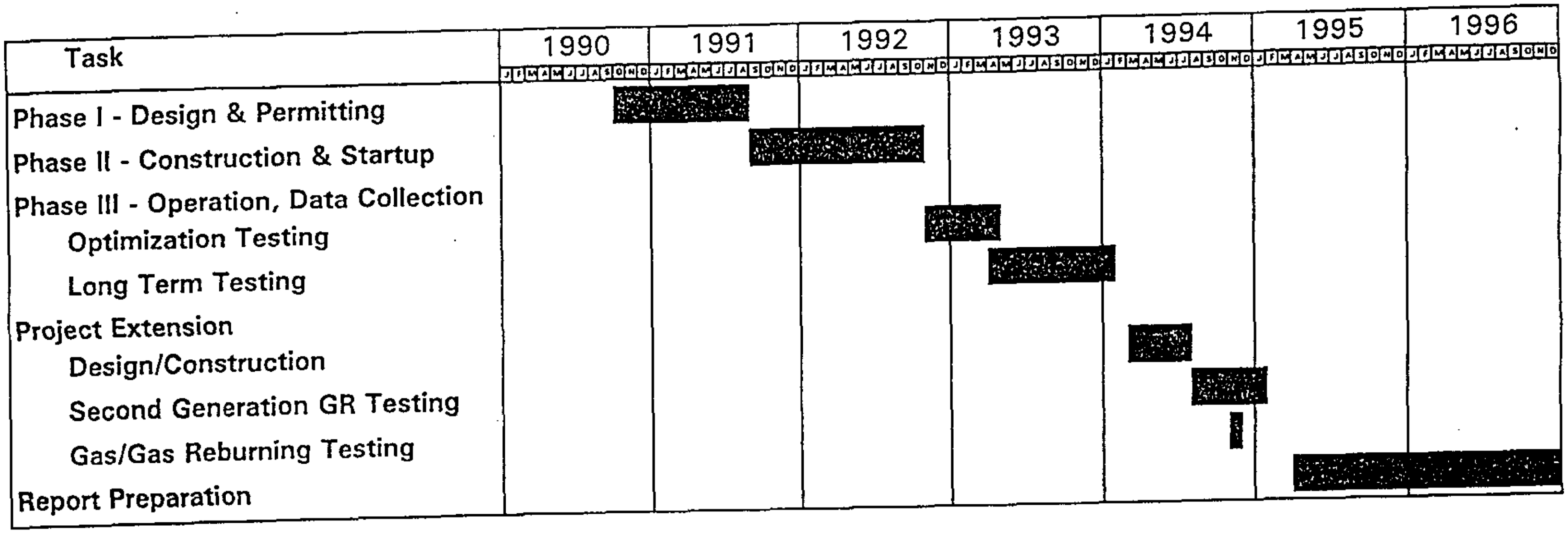


Figure 1-2. Schedule for GR-LNB demonstration

1.3 Objectives of the Project

The objective of the project is to demonstrate the commercial readiness of the GR-LNB technology for application to older pre-NSPS utility boilers. These older boilers have one of several common firing configurations with the wall-fired type being the most common. The specific goal was to demonstrate that high levels of NO_x reductions could be achieved over the long term with minor impacts on other areas of unit operation including combustion completion (quantified by unburned carbon-in-ash), furnace slagging or corrosion, convective pass fouling, steam capacity and final steam conditions, and other areas of unit performance. To achieve this goal the GR-LNB system was optimized through parametric tests to evaluate each process parameter individually, then the GR-LNB system was operated over an extended period with the unit under dispatch load control. During this period the boiler and GR-LNB system was operated by regular plant personnel. Ultrasonic Thickness (UT) mapping of the waterwall and convective pass tubes was conducted to determine the impact of GR-LNB on tubewall wastage rates.

1.4 Significance of the Project

This project demonstrated a co-application of two NO_x control technologies which are at different stages of commercial readiness. Gas Reburning is a relatively new technology, which has only recently been applied at full scale in the U.S. Low NO_x Burners is a far more common NO_x control technology which has been widely applied, especially in response to regulatory mandates outlined in Title IV of the Clean Air Act Amendments of 1990. The combined technologies can yield NO_x control exceeding 70%, which is also achieved by the far more costly technology, Selective Catalytic Reduction (SCR). Hence, the demonstration of GR-LNB aids the electric utility industry by offering an alternate cost effective NO_x control technology.

2.0 TECHNOLOGY DESCRIPTION

2.0 TECHNOLOGY DESCRIPTION

2.1 Description of the Demonstrated Technology

The technology evaluated for Cherokee Station Unit #3 is a co-application of two previously demonstrated technologies, GR and LNB. The GR system was designed and constructed by EER, which previously completed demonstrations of the technology at boilers with other firing configurations in conjunction with a DOE CCT (Round 1) program. GR has been demonstrated at the following units:

- Illinois Power
  Hennepin Station Unit 1
  71 MW_e (net) tangentially-fired unit
  GR reduced NO_x by 67% using 18% gas heat input

- City Water Light and Power
  Lakeside Station Unit 7
  33 MW_e cyclone-fired unit
  GR reduced NO_x by 66% using 22% gas heat input

Following an evaluation of major burner suppliers, PSCo selected Foster Wheeler Energy Corporation's Controlled Flow/Split Flame burners for the LNBs.

2.1.1 Overview of GR-LNB Technology

The co-application of GR and LNB yields a higher NO_x emissions reduction than either technology can achieve alone. LNBs nominally reduce NO_x by 30 to 50%, while GR nominally achieves a 50 to 60% reduction. The targeted NO_x reduction for this demonstration was 70%. The technology is compared on economic and performance bases to selective catalytic reduction (SCR) and selective non-catalytic reduction (SNCR). SCR is more efficient but has high capital and operating costs. SNCR is low in capital cost but NO_x reductions are not as great and it has a potential ammonia slip problem that can result in fouling of the air heater.

In addition to NO_x reduction, the co-application of GR and LNB results in reductions in SO_2 by 18% and CO_2 by 8% plus some reduction in particulate emissions when the natural gas heat input is 18%. The reductions in species other than NO_x are due to differences between the fuels cofired. Natural gas is free of sulfur, fuel-bound nitrogen, and ash and has a higher hydrogen-to-carbon ratio than coal.

LNBs reduce emissions of NO_x by staging the mixing of coal and air resulting in a fuel-rich region for char combustion, longer flames, and lower peak flame temperatures. They generally use dual air registers in parallel to delay the mixing of air with coal injected through a coal nozzle in the center of the burner. LNB retrofits involve modification of the coal nozzle, air registers, and the burner throat. The burner throat is formed by the bending of furnace tubewalls, then addition of refractory lining. If the LNB burner throat diameter is the same as that the original burners, then minor modifications such as that associated with a change in refractory is sufficient. However, wider burner throat diameters generally favor more gradual coal/air mixing, so that new tubewall sections necessitating pressure part modifications may be required.

While LNBs reduce NO_x, they may result in higher levels of unburned carbon and higher emissions of CO. These are formed by incomplete combustion which may result from the staging of coal/air mixing. LNBs do not affect the emissions of other species such as CO_2, SO_2, and particulate matter.

GR involves reducing the levels of coal and combustion air in the burner area and injecting natural gas above the burners followed by the injection of overfire air (OFA) above the reburn zone as shown in Figure 2-1.

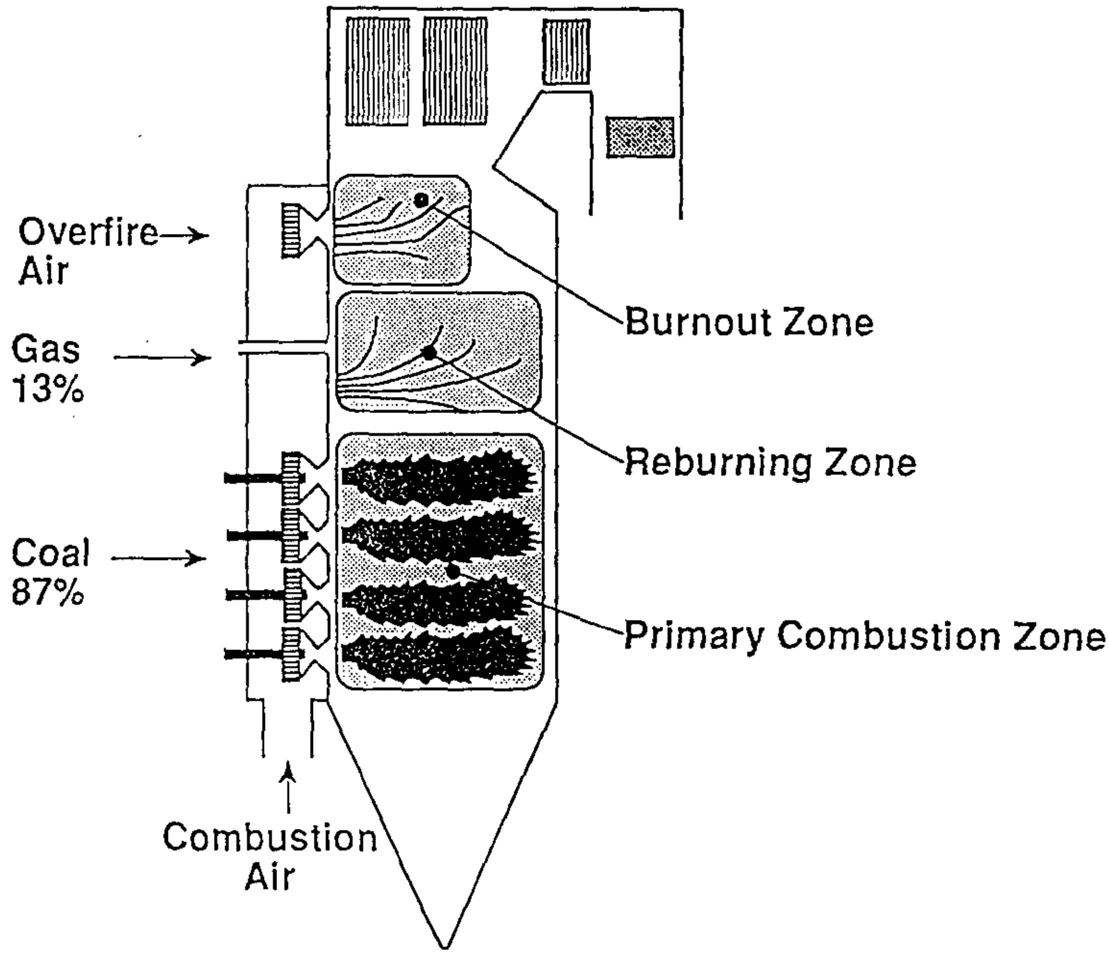


Figure 2-1. Schematic of Gas Reburning System

This three-zone process creates a reducing area in the boiler furnace within which NO_x created in the primary zone is reduced to elemental nitrogen and other less harmful nitrogen species. Each zone has a unique stoichiometric ratio (SR, ratio of air to that theoretically required for complete combustion) as determined by the flow of coal, burner air, natural gas, and OFA. Flue gas recirculation (FGR) may be used to provide momentum to the injected natural gas. FGR has a low O_2 content and therefore has a minor impact on reburn and burnout zone SR's. The descriptions of the zones are as follows:

- Primary (burner) Zone: Coal is fired at a rate corresponding to 75 to 90 percent of the total heat input, under low excess air. NO_x created in this zone is limited by the lower heat release and the reduced excess air level. The burner zone is nominally operated at a stoichiometric ratio (SR_1) of 1.10 (10% excess air) forming a balance between NO_x formation and carbon conversion. The flow of combustion air to the burners is reduced to create this condition.

- Reburn Zone: Reburn fuel (natural gas in this case) injection creates a fuel-rich region within which carbon monoxide and hydrogen are formed and methane breaks down to hydrocarbon fragments (CH, CH_2, etc.), all three of which react with NO_x, reducing it to atmospheric nitrogen. The optimum reburn zone stoichiometric ratio (SR_2) is 0.90, achieved by injecting natural gas at a rate corresponding to 10 to 25 percent of the total heat input. At this condition there exists insufficient oxygen to complete the combustion of the fuel in the zone. The injection of natural gas must be optimized with respect to rapid dispersion and mixing with the furnace flue gas since typically the residence time in the upper furnace is limited. Analyses of these conditions are used to select the number and size of injectors, their placement and the quantity of carrier gas (FGR) used.

- Burnout (exit) Zone: OFA is injected higher up in the furnace to complete the combustion. OFA is typically 20 percent of the total air flow, maintaining a minimum excess air of 15 percent. The burner zone stoichiometric ratio (SR_3) is optimized to minimize CO emissions and carbon-in-fly ash.

In general, the SRs in all three zones should be at the lowest acceptable values to maintain the highest possible boiler efficiency consistent with gas reburning technology.

The GR-LNB system was controlled by a Westinghouse Distributed Process Family system (WDPF). The WDPF provides integrated modulating control, sequential control and data acquisition for a wide variety of system applications. All start/modulation/stop operations are performed in the control room using a keyboard-CRT with custom graphics. The control system was designed to accommodate operation of the boiler with or without GR.

FGR was used initially to provide momentum to the natural gas to achieve good furnace flue gas penetration and mixing. However, during the long term testing phase of the project, it was determined that the FGR had minimal effect on NO_x emissions. Therefore, a second series of tests was added to the project to evaluate a modified configuration and measure its impact. This technology is referred to as Second Generation Gas Reburning and is described as follows:

- The FGR system, originally designed to provide momentum to the natural gas, was removed. The change will result in reduced capital costs on future designs.

- Natural gas injection was optimized at about 13% gas heat input, compared to the First Generation operating value of 18%. FGR elimination required incorporation of high velocity injectors, which made greater use of the available natural gas pressure. The change resulted in reduced operating cost due to the lower gas usage.

- The OFA ports were modified to provide higher jet momentum, especially at low total flows.

- The OFA ports were also modified to provide air swirl capability and velocity control. The modification was designed to improve lateral coverage of the furnace and turbulence in mixing with unburned fuel. This change provided CO control at lower gas levels, which was a concern with the First Generation design.

2.1.2 Process Design Tools

The design of the GR-LNB system was completed according to a standardized methodology developed by EER. It includes the use of tools such as an isothermal physical flow model, computational heat transfer model, and kinetics (NO_x reduction) model. The overall approach to the GR system design is illustrated in Figure 2-2. The process design began with site characterization of the host unit in a brief field test. The data generated in this test included emissions (normal NO_x and O_2 levels), furnace gas temperatures and velocities (taken through available ports), and detailed boiler operating and steam cycle data. These were used with the extensive data base developed for the GR to devise preliminary GR process and injector specifications.

A three dimensional heat transfer code was used to evaluate the impacts of GR on the boiler gas temperature profile and heat transfer characteristics. The heat transfer code in conjunction with a boiler performance code evaluated the mean gas temperature profile, heat absorptions by the heat exchangers, temperatures of the deposit surface, steam generation rate, and final steam temperature. A reduced scale isothermal physical flow

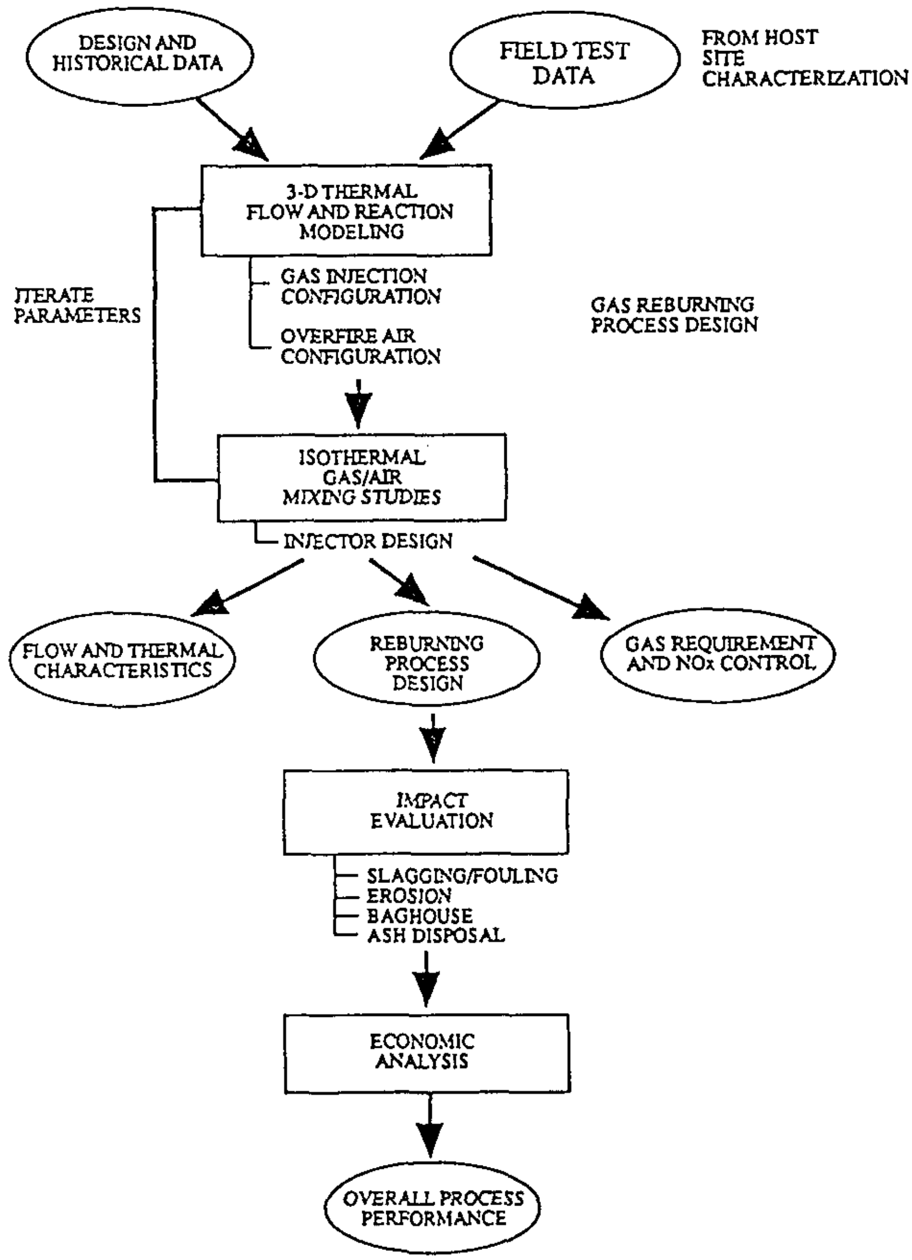


Figure 2-2. Technical approach to process design

model was built and fitted with the preliminary GR injection scheme. The natural gas/FGR and OFA injector configurations were evaluated for dispersion and mixing and optimized for these parameters through an iterative procedure. After flow rates and injection details of the reburn fuel and OFA were finalized, the kinetics code was run to predict the final NO_x level. The process design was completed by evaluating potential impacts on various areas of boiler performance such as slagging/fouling, tubewall wastage, baghouse performance, ash disposal, and overall power cost impacts.

A $^{1}/_{15}$ scale isothermal physical flow model of the Cherokee Unit #3 boiler was constructed. This Plexiglas model was designed to match the velocity profile and pressure drop coefficient of each heat exchanger to those of the full-scale unit. The injection configurations for the reburn fuel/FGR and OFA were evaluated for dispersion and mixing using visual and tracer dispersion mapping techniques. Visual jet mixing patterns were observed using either smoke or neutrally buoyant soap bubbles. Tracer dispersion was determined through injection of a species such as methane and final tracer mapping at selected planes of interest.

A two dimensional steady state heat transfer code was used to evaluate the impacts of GR on the heat transfer characteristics. The model divided the furnace into a grid of radial/axial zones. The heart of the code was a radiation heat transfer model which used a semistochastic approach to follow the radiative beams through the processes of emission, reflection and absorption within a prescribed numerical tolerance. The model also calculated convective heat transfer in the sections of the boiler where radiation heat transfer was dominant. A boiler performance code performed a steam side energy balance, but also calculated flue gas side temperature changes in parts of the boiler where convective heat transfer dominated. The output of both codes was the mean gas temperature profile in the furnace, heat absorption by each heat exchanger, temperature of deposit surfaces, and impacts on steam flow rate and temperature.

A NO_x control code was run using the temperature profile and mixing rate data as inputs. This code was programmed with the kinetics of reactions for hydrocarbon combustion and fixed nitrogen reactions to yield final NO_x emissions/reductions. It has representation of 200 fundamental reactions and has been extensively validated with field measurements.

2.2 Description of the Demonstrated Facilities

2.2.1 Detailed Site Description

The site for this demonstration was PSCO's Cherokee Station, located in Denver, Colorado. The Cherokee Station is PSCO's largest electric power generating station, containing four steam generating boilers, with a total capacity of 775 MW_e. Unit # 3 served as the host boiler for the GR-LNB demonstration. The unit was constructed in 1962 and therefore is not required to meet New Source Performance Standards (NSPS) required by the Clean Air Act Amendments (CAAA) for units constructed after 1971. The boiler is a balanced draft wall-fired unit, the original burners being Babcock and Wilcox (B&W) flare-type PC burners. It has an electric power rating of 172 MW_e gross, or 158 MW_e net. It fires pulverized Western U.S. bituminous coal, with a sulfur content of 0.4% and an ash content of 10%, through 16 burners on the front wall of the unit.

Coal is pulverized with four Riley Stoker No. 556 duplex drum pulverizers to specified fineness of 70% passing 200 mesh U.S. Standard sieve (74 micron) and 98.5% passing 50 mesh (297 micron) sieve. Pulverized coal is conveyed by 160°F (71°C) primary air to the burners and combusted with 600°F (316°C) secondary air in the 4x4 burner array. Combustion occurs in the furnace. The flue gas flows up through the furnace then through a secondary superheater, reheat superheater, primary superheater, economizer, and two rotary air preheaters. The flue gas then is ducted to a baghouse fabric filter dust collector (FFDC) for particulate collection. Figure 2-3 is a schematic of the boiler; boiler and baghouse design specifications are listed in Table 2-1.

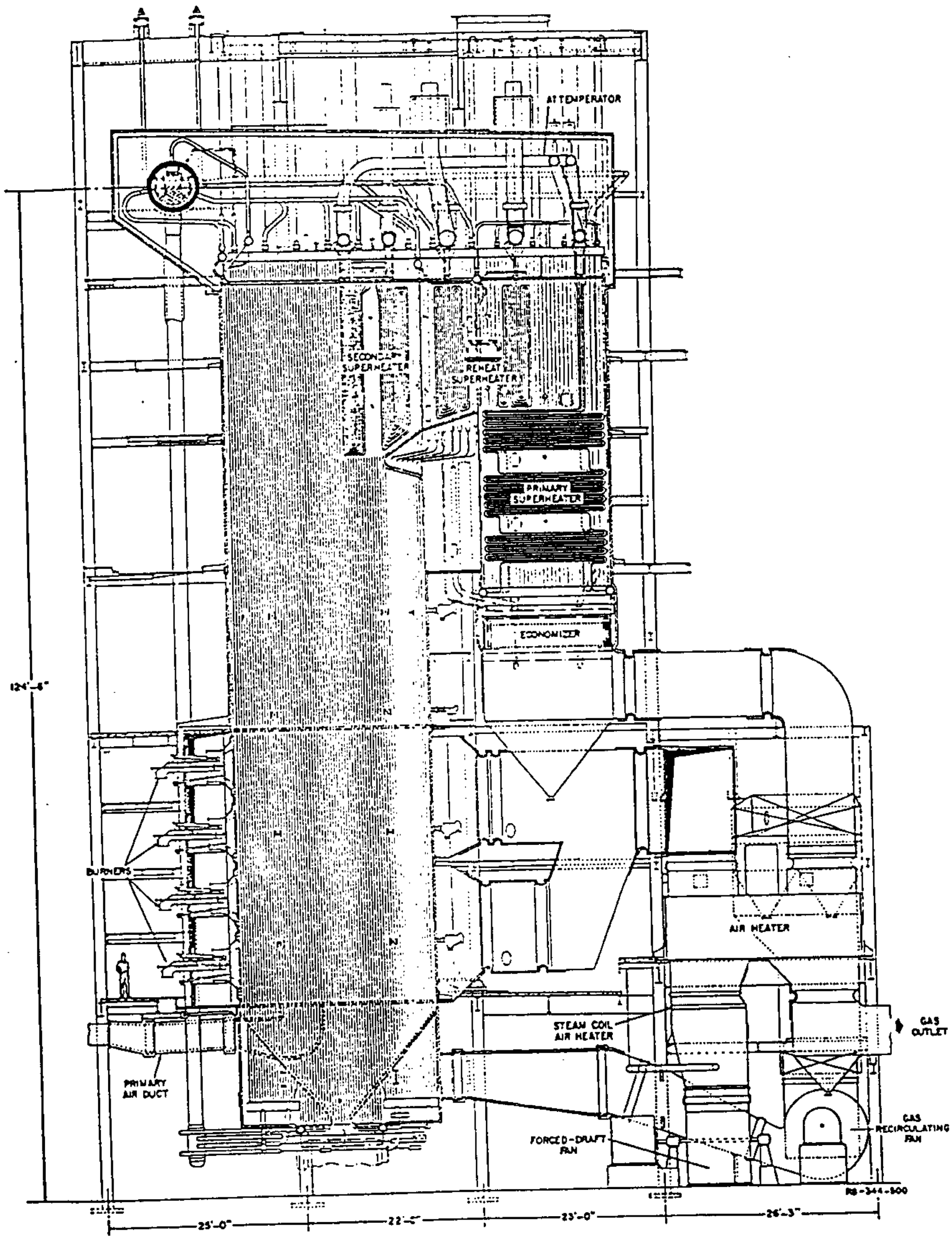


Figure 2-3. Schematic of Cherokee Station Unit 3

TABLE 2-1. BOILER AND BAGHOUSE SPECIFICATIONS FOR CHEROKEE Unit #3

Boiler	
Year Installed	1962
Manufacturer	Babcock & Wilcox
Fuel Type	Pulverized Coal, Western U.S. Bituminous
Boiler Firing Configuration	Front Wall-Fired, Balanced Draft
Number of Pulverizers	4, with 4 Burner Elevations
Superheat Steam Flow	1,140,000 lb/hr
Steam Temperature	1005°F
Steam Pressure	1925 psig
Reheat Steam Flow	932,000 lb/hr
RH Steam Temperature	1005°F
Furnace Dimensions	42' Width, 24' Depth, 104' Height
Furnace Volume	91,320 ft^3
Furnace Heat Release Rate	1,637,000 Btu/ft^2
Heat Exchanger Surface Area	
— Furnace	16,362 ft^2
— Primary Superheater	62,939 ft^2
— Secondary Superheater	11,963 ft^2
— Reheat Superheater	23,806 ft^2
— Economizer	14,020 ft^2
Baghouse	
Year Installed	1980
Manufacturer	Buell
Gross Air/Cloth Ratio	2.03
Design Flue Gas Flow	825,000 acfm
Design Flue Gas Temperature	290°F

At its capacity Cherokee Unit #3 produces 1,140,000 lb/hr (143.7 kg/s) of main steam, at a temperature of 1005°F (541°C) and pressure of 1925 psig (13,270 kPa). It reheats 932,000 lb/hr (117.5 kg/s) steam to the same design temperature. The design full load heat input is 1.65 x 10^9 Btu/hr (483.6 MW_e), for a net heat rate of 10,400 Btu/kWhr (10,970 kJ/kWhr). Steam temperature is controlled by attemperation sprays in both the main and reheat cycles and by recirculation of flue gas over the load range. FGR is typically employed as load drops in order to improve flue gas mass velocity and thereby enhance convective heat transfer to the superheaters. The FGR system has a capacity to recycle 20% of the total boiler exit flue gas at full load.

The baghouse was erected by Buell in 1980, replacing an electrostatic precipitator (ESP) and wet scrubber system used for particulate collection. It was designed to treat 825,000 cfm (389 m^3/s) of flue gas at a temperature of 290°F (143°C). It also has a gross cloth to air ratio of 2.03 and a design maximum pressure drop of 7.6" W.C (1.9 kPa). The bag house has a guarantee outlet grain loading of 0.007 gr/dscf (0.016 g/m^3); testing has verified that the guarantee is being met.

2.2.2 Baseline NO_x and CO Emissions

Boiler emissions and combustion characteristics were evaluated through a field test performed during July, 1991. The test measured unit performance over a wide range of loads and excess air levels and included boiler emissions at the economizer outlet and measurements of furnace heat flux, furnace exit gas temperatures (with local CO and O_2 concentrations), and unburned carbon-in-ash. The emissions of NO_x and CO at full load are shown as a function of boiler O_2 in Figure 2-4. NO_x emissions at a medium O_2 level of 3.5% were approximately 0.73 lb/10^6 Btu (314 mg/10^6 J). The peak NO_x emissions rate was 0.83 lb/10^6 Btu (357 mg/10^6 J), measured at boiler O_2 levels above 4.2%. Emissions of CO varied significantly with O_2, as typically observed in coal-fired boilers. CO emissions

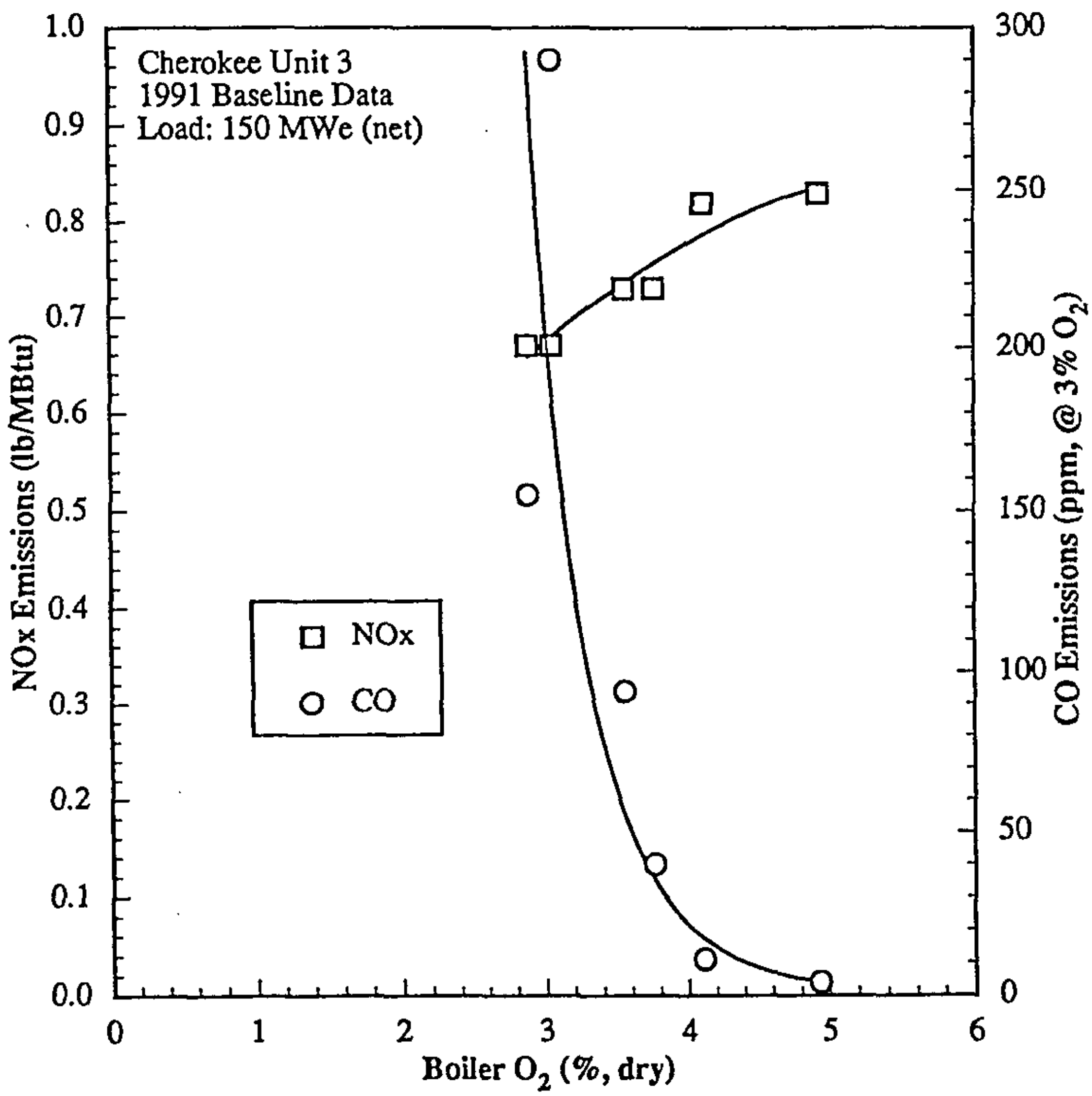


Figure 2-4. Pre-project baseline NO_x and CO data

were under 200 ppm at boiler O_2 levels above 3.0% and under 50 ppm at boiler O_2 levels above 3.7%.

2.3 Retrofit Description

Figure 2-5 is an overview of the GR system equipment. Cherokee Unit #3 had been capable of firing natural gas up to 100% of full load prior to initiation of the project. Natural gas for the reburning system was routed through a 6-inch (15 cm) line from the existing natural gas header to a metering and control station. From there, natural gas piping is divided into two 8-inch (20 cm) lines, through valve trains to meter and modulate the flow, then to sixteen injection nozzles, eight each on the boiler front and rear walls. Flue gas is extracted from the existing FGR header, then routed to a multiclone for particulate matter removal, a high static fan to boost the pressure to that required for injection, through two venturis for flow measurement, and then to the nozzles on the furnace walls. OFA is extracted from two secondary air ducts, routed to an OFA fan to boost the pressure to the needed level, then directed to six injection ports on the front wall of the unit.

2.3.1 GR-LNB Design Criteria

The process design criteria for the GR-LNB system and expected performance are discussed in this section. The primary goal of the design was to reduce emissions of NO_x by 70%. This was to be accomplished while minimizing potentially harmful impacts such as furnace wall corrosion and superheater tubewall erosion and maximizing beneficial impacts such as reduction in emissions of particulates, SO_2 and CO_2. The design conditions for GR-LNB are presented in Table 2-2.

The boiler was expected to achieve its design capacity of 158 MW_e (net) with a net heat rate of 10,400 Btu/kWhr (11,000 kJ/kWhr) and a boiler efficiency of 87%, while operating GR-LNB. It was also expected that the main and reheat steam conditions could be

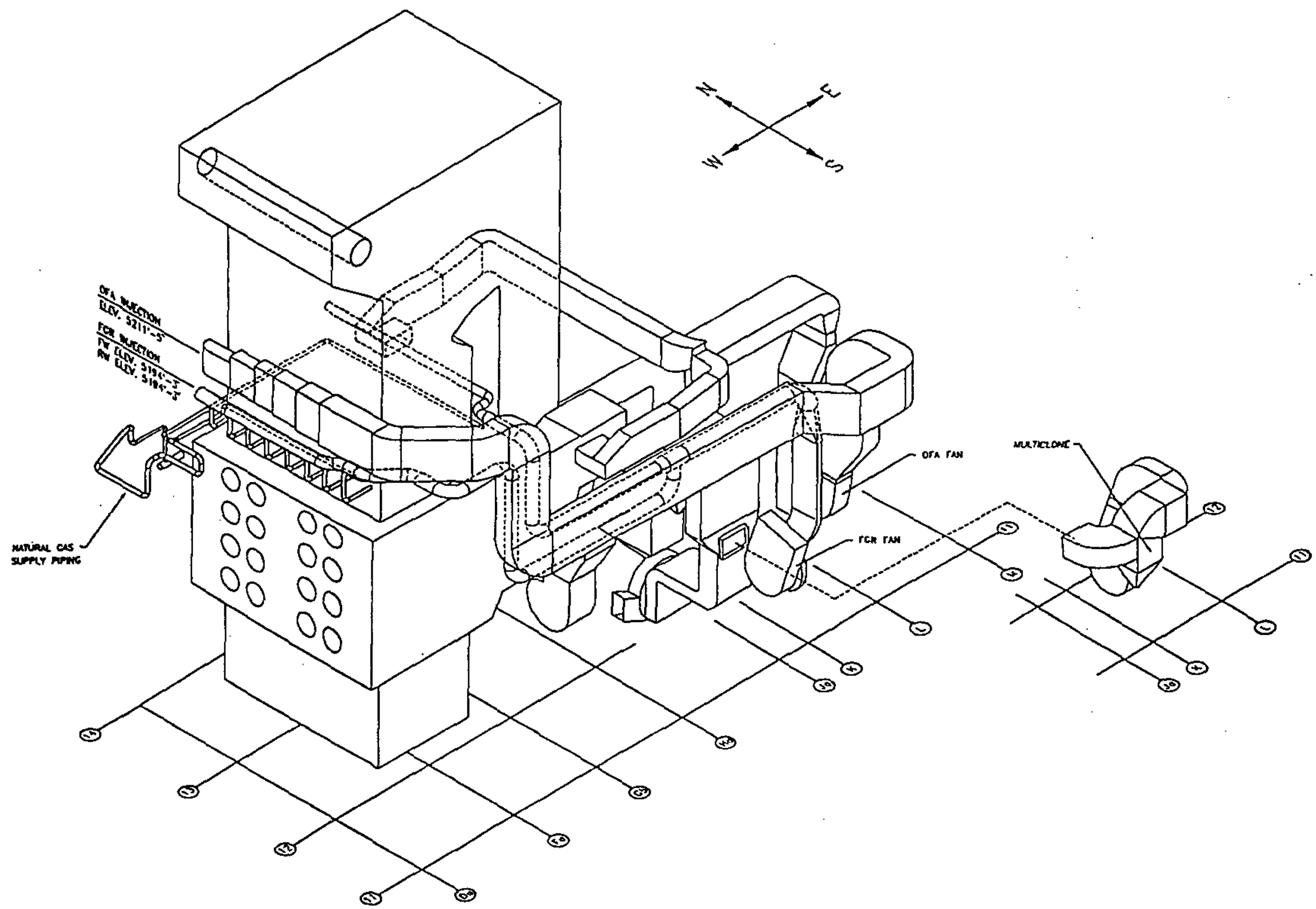


Figure 2-5. Cherokee Unit 3 GR-LNB system isometric.

TABLE 2-2. DESIGN CRITERIA FOR CHEROKEE GR-LNB SYSTEM

Boiler Net Load	
Nominal Capacity (MWe)	158
Boiler Thermal Efficiency (%)	87
Net Heat Rate (Btu/kW-hr)	10,400
Steam Conditions (Nominal Capacity)	
Main Steam Flow (klb/hr)	1,140
Secondary Superheater Outlet Temperature (°F)	1,005
Reheat Steam Flow (klb/hr)	930
Reheat Superheater Outlet Temperature (°F)	1,005
Gas Reburning System	
NOx Reduction w/LNB (%)	70
Uncontrolled NOx Emissions At Full Load (lb/MBtu)	0.73
Natural Gas Heat Input (% of Total)	18
Minimum Reburning Zone Residence Time (sec)	0.50
Burner Stoichiometry	1.10
Reburning Zone Stoichiometry	0.90
Burnout Zone Stoichiometry	1.16
Overfire Air (% of Total Combustion Air)	22
Flue Gas Recirculation (% of Total Flue)	3.4
Ash Distribution	
Bottom Ash (%)	23
Economizer Hopper (%)	2
Baghouse (%)	75

maintained at their design level of 1,140,000 lb/hr (143.7 kg/s) of main steam and 930,000 lb/hr (117.3 kg/s) of reheat steam at a temperature of 1005°F (541°C). In practice this temperature is generally not attained; the steam temperatures are maintained up to 20°F (11°C) below this point to ensure safe metal temperatures.

The GR-LNB system was expected to achieve 70% NO_x control from the 0.73 lb/10^6 Btu (314 mg/10^6 J) baseline measured at a normal boiler O_2 level of 3%. The system was designed to inject natural gas at a rate corresponding to 18% of the total heat input. While the burners operate nominally at 10% excess air (SR_1 = 1.10), the reburn zone would be reduced to a SR of 0.90. The placement of the reburn fuel injectors and the OFA ports allowed a reburn zone residence time of 0.50 seconds, sufficient for reactions to occur. FGR flow corresponding to 3.4% of the total boiler exit flue gas helped propel the reburn fuel into the furnace. The GR injection system is illustrated in Figure 2-6. Reburn fuel was injected through a total of sixteen injectors, eight each on the front and rear walls which are spaced equally from the side walls. OFA was injected higher up in the furnace, providing nominally 22% of the total combustion air. The 600°F (316°C) secondary air was diverted from the burners and injected through six ports mounted on the front wall of the boiler.

The coal supply was, by rank, a high volatile C Bituminous coal. The coal composition used in the design phase of the project is shown in Table 2-3. It had a sulfur content of approximately 0.4%, corresponding to a theoretical SO_2 emissions rate of 0.80 lb/10^6 Btu (344 mg/10^6 J). It had relatively low moisture and ash content and relatively high heating value, all of which are characteristics of this rank of coal. The coal ash fusion temperatures, under oxidizing and reducing conditions, indicated a medium slagging propensity. Therefore, minimal slag buildup would be expected under normal oxidizing conditions in a relatively large furnace. The natural gas composition considered in the design phase is also shown in Table 2-3. As expected, methane and ethane constitute approximately 90% of the gas on a volume basis. The higher heating value was 966 Btu/scf (36,000 kJ/m^3) and the specific gravity relative to air was 0.665.

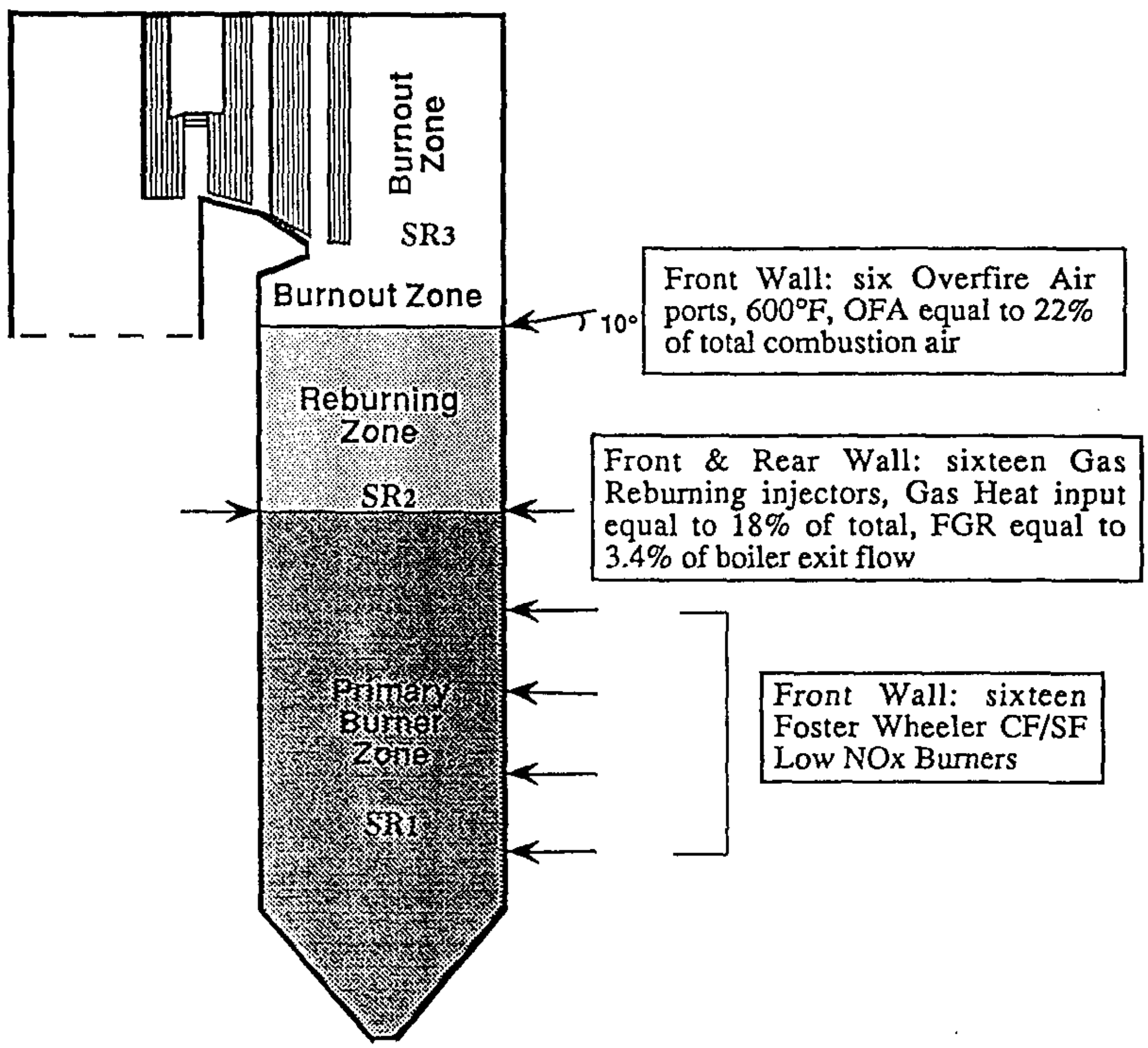


Figure 2-6. Cherokee Unit 3 Gas Reburning system injector specification

TABLE 2-3. COAL AND NATURAL GAS COMPOSITION

COAL (As Received)			
Mine: Empire Energy	Location: Moffat County, State of Colorado		
Proximate Analysis (%):		Ultimate Analysis (%):	
Total Moisture	12.67	Moisture	12.67
Volatile Matter	35.34	Carbon	60.36
Fixed Carbon	43.59	Hydrogen	4.12
Ash	8.40	Oxygen	12.98
		Nitrogen	1.12
HHV (Btu/lb)	10,604	Sulfur	0.36
		Ash	8.40
Ash Chemical Analysis (%):			
SiO2	52.53	Ash Fusion Temperatures (°F):	
Al2O3	27.01	Reducing	
TiO2	0.86	IDT	2380
Fe2O3	5.11	AST	2400
CaO	4.06	AHT	2480
MgO	0.98	AFT	2590
Na2O	2.54	Oxidizing	
K2O	0.87	IDT	2410
P2O5	1.04	AST	2480
SO3	3.13	AHT	2590
Undetermined	1.87	AFT	2680

NATURAL GAS			
Constituent (Volume %):			
CH4	80.81	N2	6.37
C2H6	7.70	O2	1.90
C3H8	1.15	Specific Gravity	0.665
CO2	2.07	HHV (Btu/SCF)	966

2.3.2 Low NO_x Burners

Installation of the LNBs was the responsibility of the Public Service Company of Colorado. EER had no direct involvement in the selection, procurement, or installation of the LNBs. After considering several burner suppliers, including Babcock & Wilcox and Riley Stoker Corporation, Foster Wheeler Energy Corporation Controlled Flow/Split Flame burners were selected. The burner has dual air registers to stage the coal/air mixing and thereby control NO_x emissions. It has a unique coal nozzle which splits the coal flow into four streams. Coal ignition and initial combustion take place in a fuel rich core. Air from the outer register is added to burnout the coal char under a normal burner excess air level. This arrangement of air input allows independent control of ignition and flame shaping. The burner has been installed on numerous other commercially operating utility boilers and was expected to achieve a minimum of 40% NO_x reduction.

2.3.3 Gas Reburning System

The GR system was comprised of three subsystems: natural gas injection system, FGR injection system, and OFA injection system. These systems were integrated to provide the proper fuel, FGR and air flows into the appropriate regions of the furnace to reduce NO_x and to supply the heat needed for steam generation at the units rated capacity.

In this application, the normal design natural gas flow was 5,600 scfm (2.64 Nm^3/s) with a maximum of 7,300 scfm (3.45 Nm^3/s). These flows corresponded to a normal reburning gas heat input of 327 x 10^6 Btu/hr (96 MW_e) and maximum heat input of 430 10^6 Btu/hr (126 MW_e). A 6" (15 cm) tie-in to the main natural gas header transported the reburn natural gas to a flow metering and control station. The gas was then routed into two headers which delivered it to either the boiler front or rear wall injectors. The natural gas valve trains included manual shut-off valves, flow control valves, relief vent valves, flow meters, etc. Automatic safety shut-off and vent valves were located in a common pipe supplying both headers. The natural gas was then routed to sixteen feed lines, each of which were equipped with a manual shut-off valve to its corresponding injector. Natural gas, supplied at a pressure of 20 psig (138 kPa) to the injector control valves, was then let down through the valves and mixed with FGR prior to injection into the furnace.

Design calculations indicated that a reburn zone gas temperature of 2200°F to 2600°F would be the most effective for GR operation. The higher temperatures produce higher chemical reaction rates which result in more rapid formation of hydrocarbon fragments and free radicals. This leads directly to higher rates of NO_x destruction. The level of completeness of the primary zone coal combustion process is indicated by the primary zone gas temperature of the combustion gas entering the reburn zone and SR_1.

FGR was withdrawn from the breaching before the air heater inlet. This location was selected since the flue gas there is relatively low in O_2, being upstream of the point of air heater leakage. The gas was routed to a multiclone which removed approximately 70% of particulate matter. The grain loading was decreased from approximately 2.5 to 3 gr/dscf (5.7 to 6.9 g/m^3) to 0.75 to 0.9 gr/dscf (1.7 to 2.1 g/m^3). The flue gas was then routed to the high static fan, which boosted the pressure from approximately -7" W.C. (-2 kPa) to +17" W.C. (+4 kPa). This relatively high pressure was needed to inject the reburn fuel at sufficient velocity to penetrate fully into the furnace. The FGR fan was a centrifugal type with a speed of 1200 rpm, ensuring low erosion of the blades and housing. Shut-off dampers were placed at both upstream and downstream locations. The downstream damper was equipped with seal air supply to ensure worker safety during maintenance. FGR was then routed into two headers which supply the nozzles on the front and rear walls. Modulating dampers were used to balance the flow in these headers and each FGR nozzle supply line was equipped with a manually controlled damper.

OFA at a temperature of approximately 600°F (316°C) was withdrawn from two secondary air ducts. It was then routed to an OFA fan which boosted the pressure from 2" W.C. (0.5

kPa) to 12" W.C. (3 kPa). Shut-off dampers were located both upstream and downstream of the OFA fan. The OFA was then routed to six ports located on the front wall of the furnace. Dampers were used to balance the flow to each port. The OFA injectors were tilted down at a 10° angle to provide better penetration of the air into the furnace combustion gas, and to increase the furnace gas residence time in this burnout zone in order to enhance CO conversion to CO_2. The OFA ports were cooled with an air supply from a small fan.

Pilot scale studies were conducted by EER to determine the effect of penetration and mixing in the reburn zone and the burnout zone. In the reburn zone, the study indicated that the natural gas had to be injected in such a way so that it would cover the cross-sectional area normal to flue gas flow in order for the reburn process to be most effective. If the injection momentum of the natural gas is not of sufficient magnitude, the injected fuel simply follows a flow path adjacent to the boiler wall through which it was injected. This is much less effective in producing the uniform fuel-rich condition required for efficient NO_x destruction. For the initial design of the gas injection system, recirculated flue gas was used as the carrier medium to inject the reburn gas into the furnace with sufficient momentum. The reburn gas injection system was designed with a sufficiently large range of recirculated flue gas flow rates in order to obtain good penetration and mixing performance at all boiler operating loads. The nominal reburn gas injection pressure of 3.83 inches W.C. was required in order to produce the desired system performance results.

The pilot scale studies also showed that to obtain the minimum CO emission levels leaving the burnout zone, the penetration and mixing of the OFA also had to cover the entire cross-sectional area of the furnace perpendicular to the upward flowing furnace gas. To obtain the necessary penetration, the OFA injection pressure was increased to a nominal pressure of 3.95 inches W.C. by a booster fan and the angle of injection was set downward at negative 10°. The injection angle provided a longer time for penetration and mixing of the OFA into the upward flowing furnace gas.

2.3.4 Control System

A Westinghouse Distributed Process Family (WDPF) control system was used to modulate the GR system and monitor/record process parameters. The control system included a series of permissives, specified conditions under which GR may be operated, and trips, conditions under which the GR system is shut-down.

2.4 Expected Impacts of GR-LNB

2.4.1 Thermal Impacts

The impacts of GR-LNB on boiler thermal performance were projected in the process design study. The projection included steam generation rate, steam temperature, attemperation spray rate, heat absorption by each heat exchanger, gas side temperatures, and boiler heat-loss efficiency. Table 2-4 summarizes heat transfer modeling results at 100% load under Baseline (prior to LNB retrofit), LNB and GR-LNB operation. Each case considered the coal higher heating value; the GR-LNB case considered 19% gas heat input.

Relatively minor changes in the main and reheat steam flows were calculated but the attemperation spray flow was expected to nearly double. The reduction in steam flows under GR are due to changes in the location of heat input to the furnace. These result from injection of reburn fuel (heat input) higher up in the furnace. GR was expected to roughly double attemperation spray flows in both the secondary superheat and reheat superheater cycles. This is again due to heat input higher up in the furnace, which leads to higher upper furnace gas temperatures. The changes in attemperation spray were well within the capacity of the attemperators. In each case, the final main steam temperature was projected to be 986°F (530°C), with a reheat steam temperature of 1002°F (539°C).

TABLE 2-4. PROJECTED IMPACTS OF GR-LNB ON THERMAL PERFORMANCE

	Baseline 100% Load	LNB 100% Load	GR-LNB 100% Load
Steam/Water Mass Flow (klb/hr)			
Main Steam	1,129	1,131	1,110
Reheat Steam	926	931	919
Attemperation Spray (klb/hr)			
Secondary Superheater	10.7	22.0	41.3
Reheat Superheater	2.7	5.7	10.9
Steam Side Temperature (°F)			
Economizer Inlet	488	487	487
Economizer Outlet	500	500	502
Primary Superheater Inlet	637	637	637
Primary Superheater Outlet	793	799	819
Secondary Superheater Attemp. Outlet	783	777	775
Secondary Superheater Outlet	986	986	986
Reheat Attemperator Outlet	644	639	630
Reheat Superheater Outlet	1,002	1,002	1,002
Heat Transfer to Steam (MBtu/hr)			
Furnace	726	720	692
Secondary Superheater	157	162	160
Reheat Superheater	178	181	184
Primary Superheater	228	231	238
Economizer	17	17	18
Gas Side Exit Temperatures (°F)			
Reheater	1,294	1,305	1,314
Primary Superheater	750	754	759
Economizer	709	712	716
Air Preheater	313	315	315

Minor changes in heat absorption profiles were expected. GR results in a reduction in furnace heat absorption, but an increase in heat absorbed in the convective pass. This shift results in an increase in the heat absorbed by the reheat and primary superheaters and economizer. The upward shift in gas temperature under GR is also reflected in the flue gas exit temperatures listed. Relatively minor increases in temperature result with the air preheater exit temperature being roughly the same. The temperature at this location is used in the dry gas heat loss calculation; therefore, it has direct relevance to boiler efficiency.

Table 2-5 presents the impacts of Baseline, LNB, and GR-LNB on boiler efficiency. The boiler efficiency was projected to decrease by 1.0% using GR-LNB compared to LNB only operation. This is mainly due to an increase in heat loss associated with moisture from combustion. As long as the moisture is in the vapor phase its latent heat is a loss. A minor increase in unburned carbon-in-ash was also expected due to an expected small reduction in lower furnace gas temperature. A slight improvement in the moisture from fuel (coal) offsets these increases in heat loss. The total increase in heat loss is 1.0%. The expected trend in the furnace gas temperature profile is shown in Figure 2-7. GR results in a decrease in the gas temperature in the burner region, then an upward shift in the reburn zone. Addition of OFA causes a significant dip in temperature, with the temperature in the convective pass being roughly equal under both conditions.

2.4.2 Environmental Impacts

Expected environmental impacts of applying GR-LNB to Cherokee Unit 3 were addressed in an Environmental Monitoring Plan (EMP), which called for a variety of measurements to ensure environmental acceptability of the project. The major environmental impacts were in the area of boiler emissions. Expected reductions in the emissions were 70% for NO_x, 18% for SO_2, 8% for CO_2, and up to 18% in particulate matter. Some of which result from a change in characteristics of fuels co-fired, since natural gas is free of sulfur, fuel

TABLE 2-5. PROJECTED IMPACT OF GR-LNB ON GROSS BOILER EFFICIENCY

	Baseline 100% Load	LNB 100% Load	GR-LNB 100% Load
Heat Loss (%)			
Dry Gas	5.11	5.12	5.02
Moisture from Fuel	1.69	1.70	1.38
Moisture from Combustion	4.15	4.15	5.38
Combustible in Refuse	0.44	0.38	0.60
Radiation *	0.22	0.22	0.22
Unmeasured *	1.50	1.50	1.50
Total Losses	13.12	13.08	14.09
Gross Efficiency (%)	86.88	86.92	85.91

* Note: Value Taken From Design Data Sheet

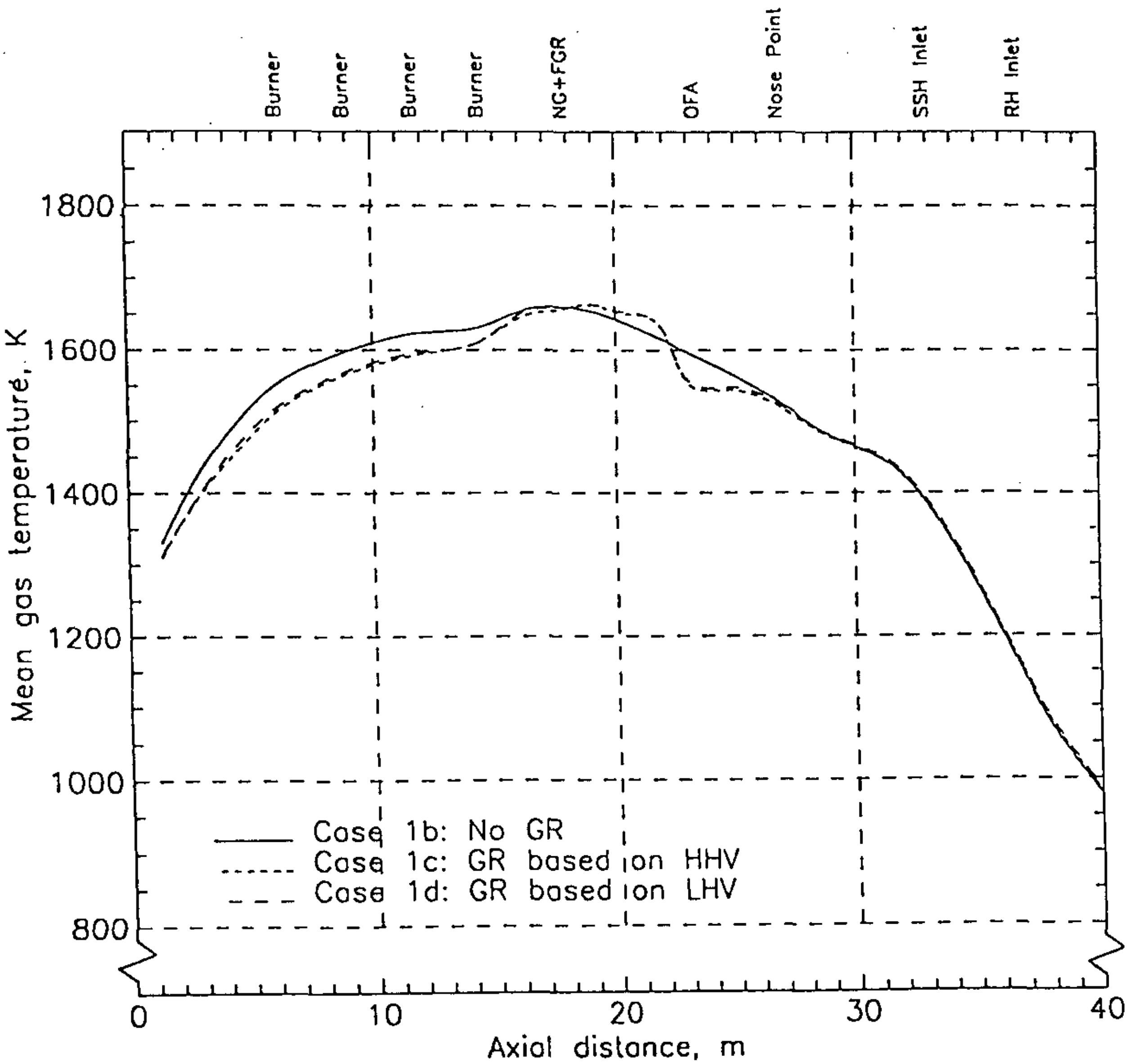


Figure 2-7. Predicted mean gas temperature profile for Unit #3 with LNB and GR-LNB

bound nitrogen, and ash and has a lower carbon-to-hydrogen molar ratio than coal. No change in emissions of CO was expected. Natural gas typically forms CO_2 at a rate of 115 lb/10^6 Btu (49.5 g/10^6 J), compared to approximately 205 lb/10^6 Btu (88.2 g/10^6 J) for coal. Therefore, firing natural gas at a rate corresponding to 18% of the heat input was expected to reduce CO_2 by 8%.

GR-LNB was expected to change the quantity but not the characteristics of fly ash from the boiler. A slight reduction in fly ash was expected to yield less stack particulate matter emissions, but the magnitude of the change was not predicted since baghouses are nearly constant removal devices. If particulate collection efficiency were to remain constant like that for ESPs, under GR operation a direct reduction in stack particulate emissions of 18% would be expected with 18% gas heat input.

No change in the rate of sluice water required to mix and carry fly ash to the polishing pond was expected. The makeup of this aqueous stream was not expected to change; therefore, the water discharged to the South Platte River was expected to have the same levels of constituents.

The plant operates under air emissions limits of 1.2 lb SO_2/10^6 Btu (516 mg/10^6 J) and opacity of 20% for six minute averages. These limits are imposed by the Colorado Air Pollution Control Division, and necessitate continuous flue gas monitoring to verify compliance. No problems in meeting these limits were anticipated.

The Colorado Water Quality Control Division imposes limits on the aqueous discharge including maximum temperature, pH, oil & grease, total suspended solids, ammonia, nitrate, phosphorus, chromium, zinc, copper, chlorine, and total flow. No change in these constituents was expected therefore full compliance with the limits was expected.

2.5 Proprietary Information

The detail and control information on the GR-LNB technology concerning GR and OFA injection locations, orientations, and velocities, and furnace residence times between zones, are considered proprietary to the Energy and Environmental Research Corporation.

Reburning NO_x reduction performance depends on a range of different process parameters, which include the following: initial NO_x level, temperature at the reburn and burnout zones, SR_1, SR_2, SR_3, residence times in the reburn and OFA zones, and mixing rates of the reburn fuel and OFA.

Data gathered during EER's various reburning demonstration programs have been reported in graphical format, where measured NO_x reduction performance has been compared with most of the above variable parameters, and where reasonably good correlations with individual parameters can be seen. However, given the rather complex inter-relationship between the various controlling parameters and reburning system performance, EER has elected not to present statistical correlations of the data.

EER believes that the use of such correlations can be misleading, particularly with respect to extrapolating system performance to other boilers and boundary conditions. To successfully correlate the data requires more complex process models, such as those used by EER during the development of designs for each of the different boiler applications.

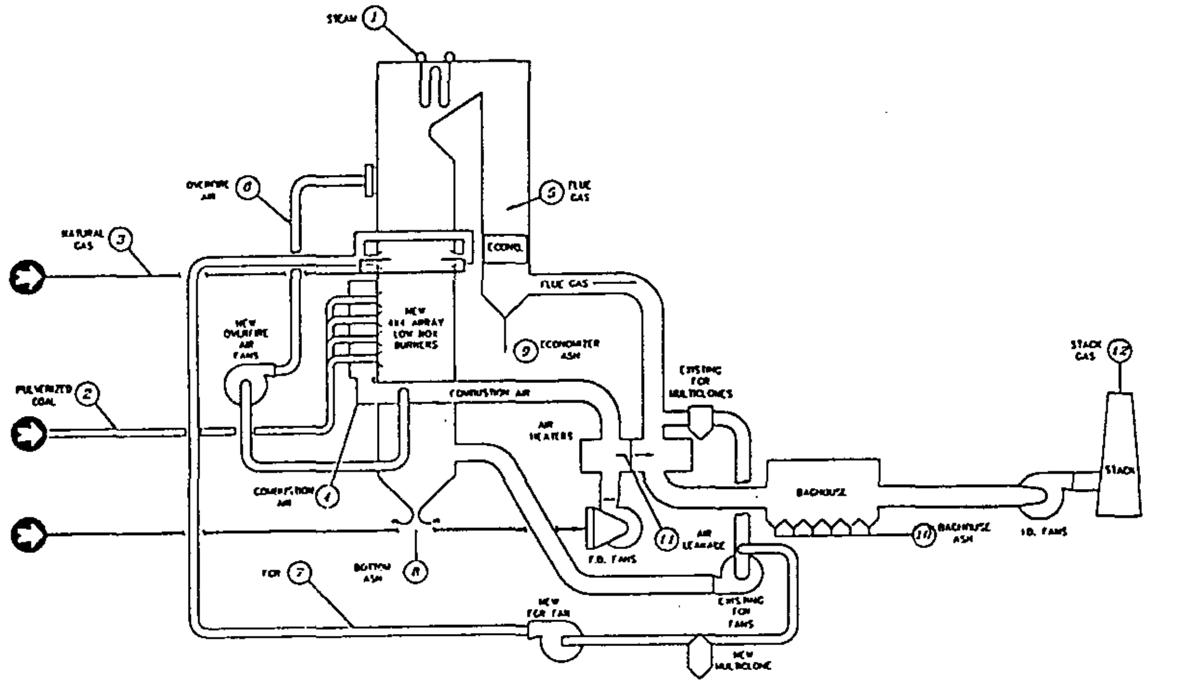
These process/design models have been validated during the course of the demonstration project, and have been shown to accurately reflect performance trends as a function of the various process parameters for boilers of very different designs. For business reasons, and because of their importance in developing commercial guarantees, EER prefers not to make public any details of the process models.

2.6 Simplified Process Flow Diagram

Figure 2-8 is a material balance for the GR process at full load. It considers a full load heat input of 1,660 10^6 Btu/hr (487 MW_e), for a net heat rate of 10,500 Btu/kWhr. In this case, the natural gas heat input is 20%, requiring a flow of 5,617 scfm (2.65 Nm^3/s). A FGR flow rate of 10,230 scfm (4.83 Nm^3/s) is used to inject the natural gas. The coal flow needed for 80% of the total heat input is 122,223 lb/hr (15.41 kg/s). The coal higher heating value is 10,904 Btu/lb (25,345 kJ/kg), as determined by bomb calorimetry for Yampa Valley Coal. The coal stoichiometric air requirement is 8.40 lb air/lb coal; therefore, the burner air flow needed for 10% excess air operation is 1,129,340 lb/hr (142.4 kg/s). An OFA flow of 72,160 scfm (34.08 Nm^3/s), corresponding to 23% of the total combustion air, is used to burnout coal and reburn fuels. The ash input is 10% of the total coal flow, with 80% of the ash leaving the furnace as fly ash and 20% as bottom ash. Air heater air leakage is approximately 7.5% of the total combustion air flow.

2.7 Stream Data

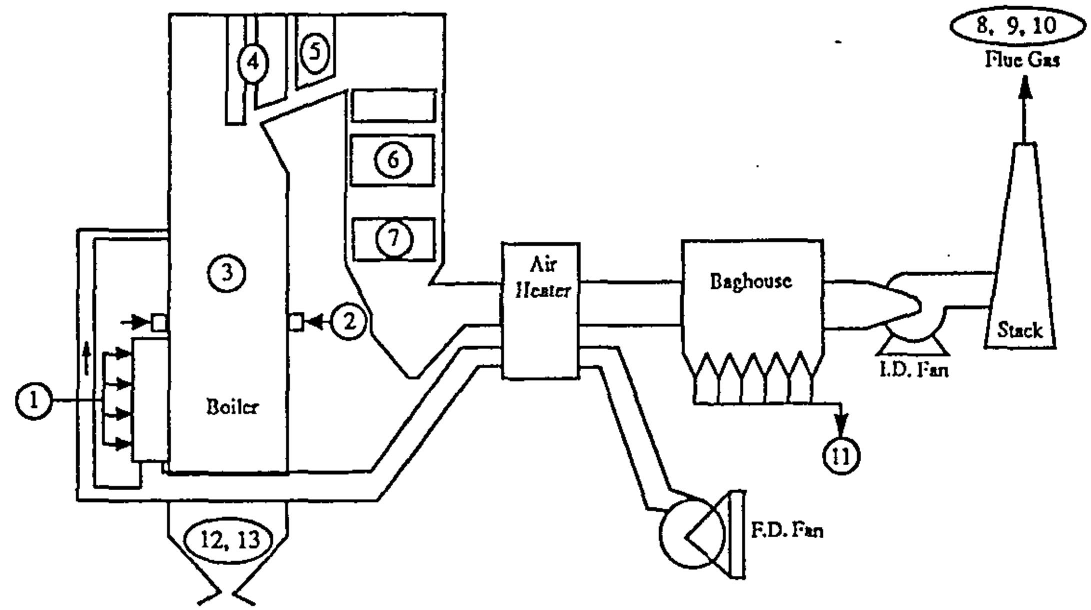
The heat energy balance presented in Figure 2-9 was performed with the computational heat transfer model, making use of a reduced heat input of 1,590 × 10^6 Btu/hr (466 MW_e). The final steam and feedwater conditions indicate that 86.83% of the total heat input is absorbed by steam/water. Approximately 47% is absorbed through the waterwall, 27% is transferred to the primary/secondary superheater, 11% is absorbed by the reheater, and 2% is absorbed by the economizer. The heat-loss method which does not consider the steam condition, but gross process parameters such as boiler exit temperature, fuel and ash composition, etc., indicates a boiler efficiency of 86.71%. The most significant source of heat loss is associated with dry gas flow, accounting for a loss of 5.48%. Moisture from combustion heat loss is also significant at 5.42%. Other major sources of heat loss are associated with moisture in the coal, carbon-in-ash, and radiation. The total percentage of heat lost, i.e. not absorbed by steam, is 13.29%.



Gas Reburning-Low NOx Burner Material Balance: 172 MWe Gross

Stream Number	1	2	3	4	5	6	7	8	9	10	11	12
Description	Steam Flow	Coal Flow	Natural Gas Flow	Coal Combustion Air	Flue Gas	Overfire Air	FGR Gas Injection	Bottom Ash	Economizer Ash	Baghouse Ash	Air Leakage	Stack Gas
Gas Side												
Air (lb/hr)				1,129,340		331,288					110,000	
Air (scfm)				245,990		72,160					23,960	
Natural Gas (lb/hr)			16,450									
Natural Gas (scfm)			5,617									
Flue Gas (lb/hr)					1,587,042		47,611					1,475,803
Flue Gas (scfm)					340,980		10,230					317,405
SO2 (lb/hr)					1,208							1,208
SO2 (lb/MBtu)					0.75							0.75
NOx (lb/hr)					338							338
NOx (lbMBtu)					0.21							0.21
H2O	1,280,000											
Solid Side												
Coal (lb/hr)		109,964										
Coal Inerts (lb/hr)		12,259						2,452	613	9,194		
Total Solids (lb/hr)		122,223										
Temperature (°F)	1005			602	727	602	727					270
Pressure	1925 psig			2.75"	-3.6"	10"	40"					Atmos.

Figure 2-8. Cherokee Unit 3 GR material balance



No.	Source/ Device	Heat Input (MBtu/hr)	Heat Input (% of Total)	Steam Heat Absorption (MBtu/hr)	Steam Heat Absorption (% of input)	Heat Loss (MBtu/hr)	Heat Loss (% of input)
1	Coal	1304	82				
2	Natural Gas	286	18				
3	Waterwall			741	46.60		
4	Secondary Superheater			184	11.57		
5	Reheat Superheater			180	11.32		
6	Primary Superheater			246	15.47		
7	Economizer			30	1.89		
8	Dry Gas					87	5.48
9	Moisture in Fuel					15	0.92
10	Moisture from Combustion					86	5.42
11	Carbon in Ash					8	0.50
12	Radiation					3	0.18
13	Unmeasured					13	0.79
Total		1590	100	1381	86.86	211	13.29

Figure 2-9. Gas reburning heat energy balance

2.8 Piping and Instrumentation Diagrams

The piping and instrumentation diagrams for the GR are presented in Figures 2-10 through 2-12. During Second Generation GR, the system was modified by removing the FGR system. The piping and instrumentation diagrams for the modified system are presented in Figures 2-13 through 2-15.

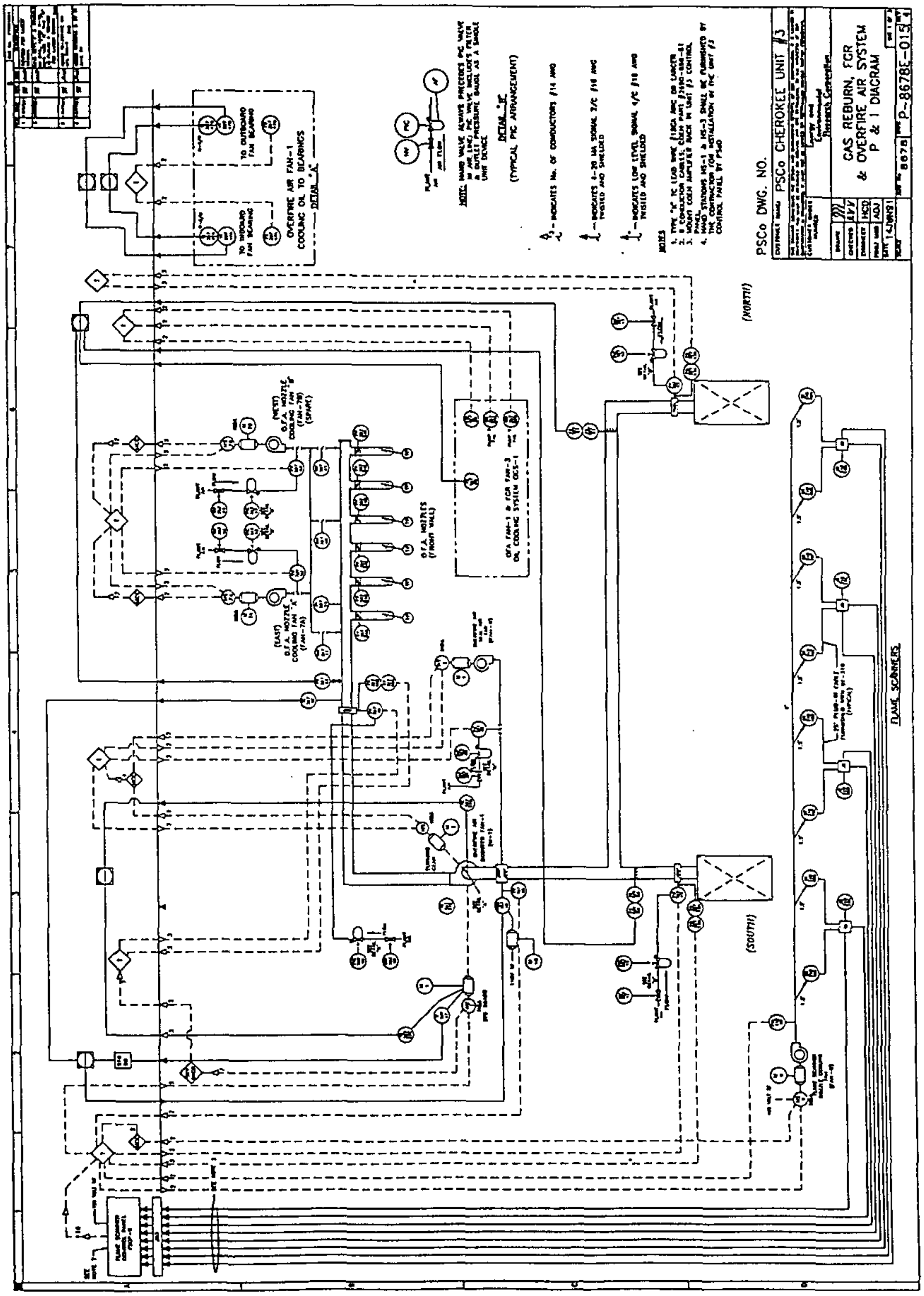


Figure 2-10. Piping and instrumentation diagram, First Generation gas reburning

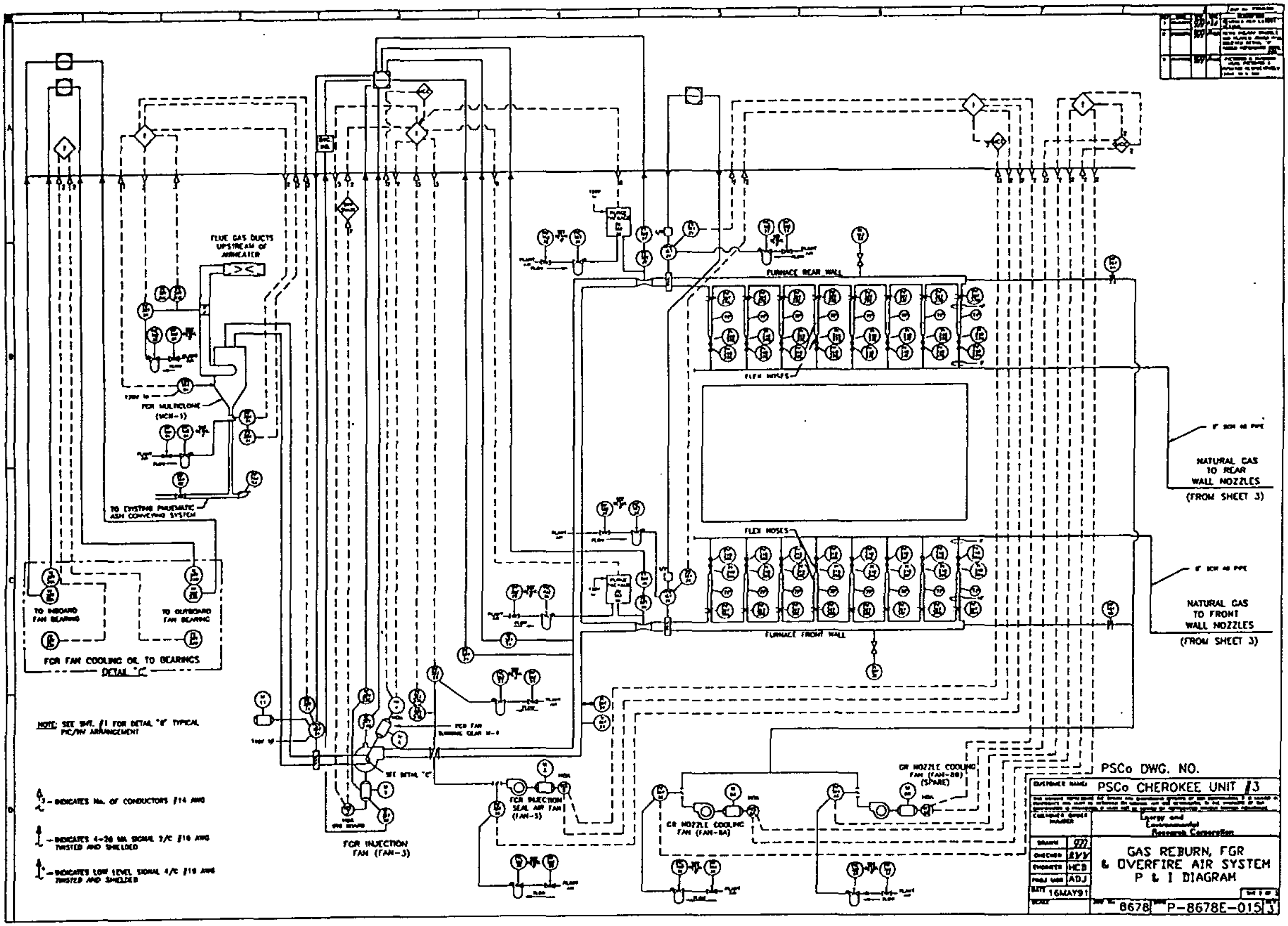


Figure 2-11. Piping and instrumentation diagram, First Generation gas reburning

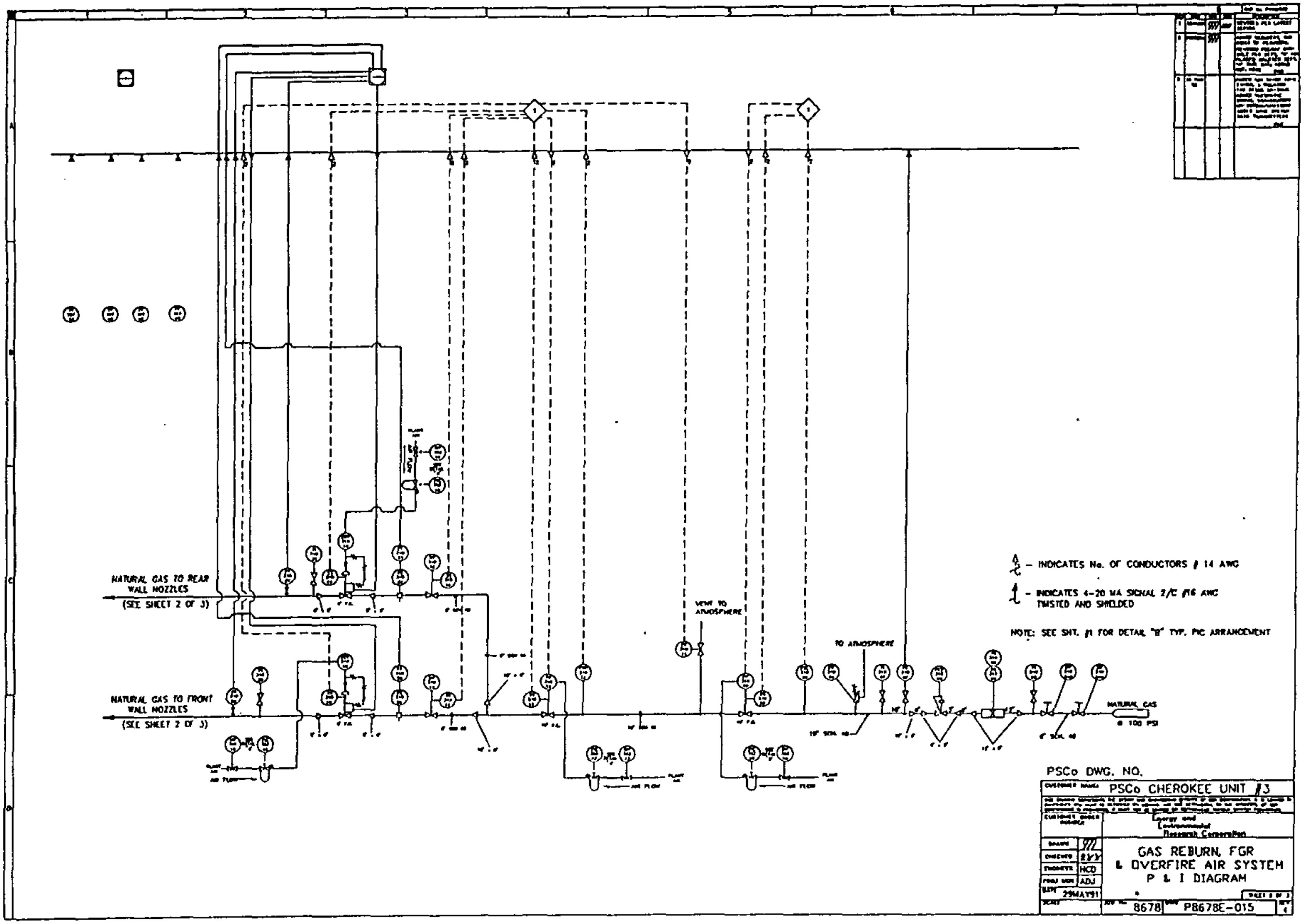


Figure 2-12. Piping and instrumentation diagram, First Generation gas reburning

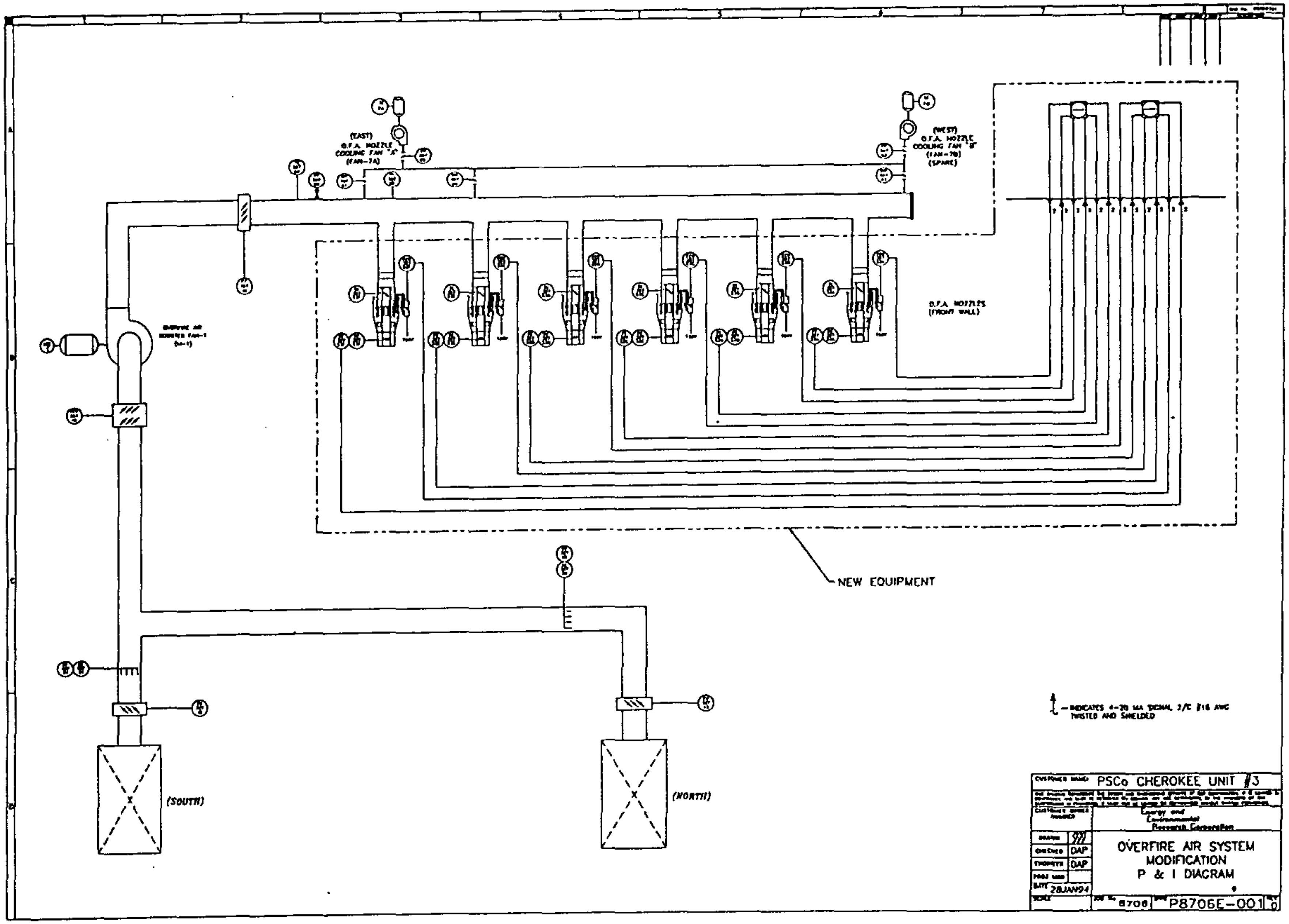


Figure 2-13. Piping and instrumentation diagram, Second Generation gas reburning

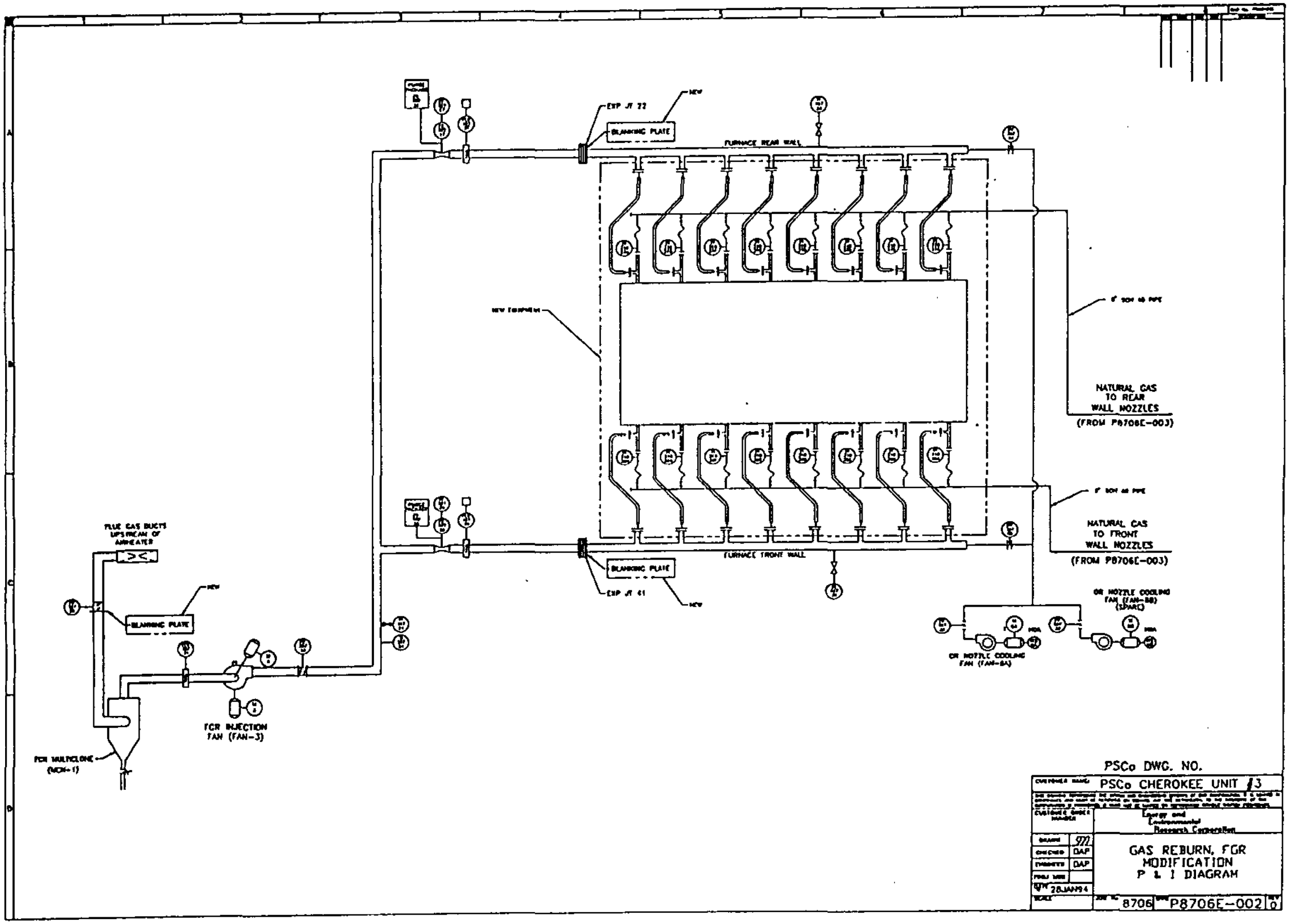


Figure 2-14. Piping and instrumentation diagram, Second Generation gas reburning

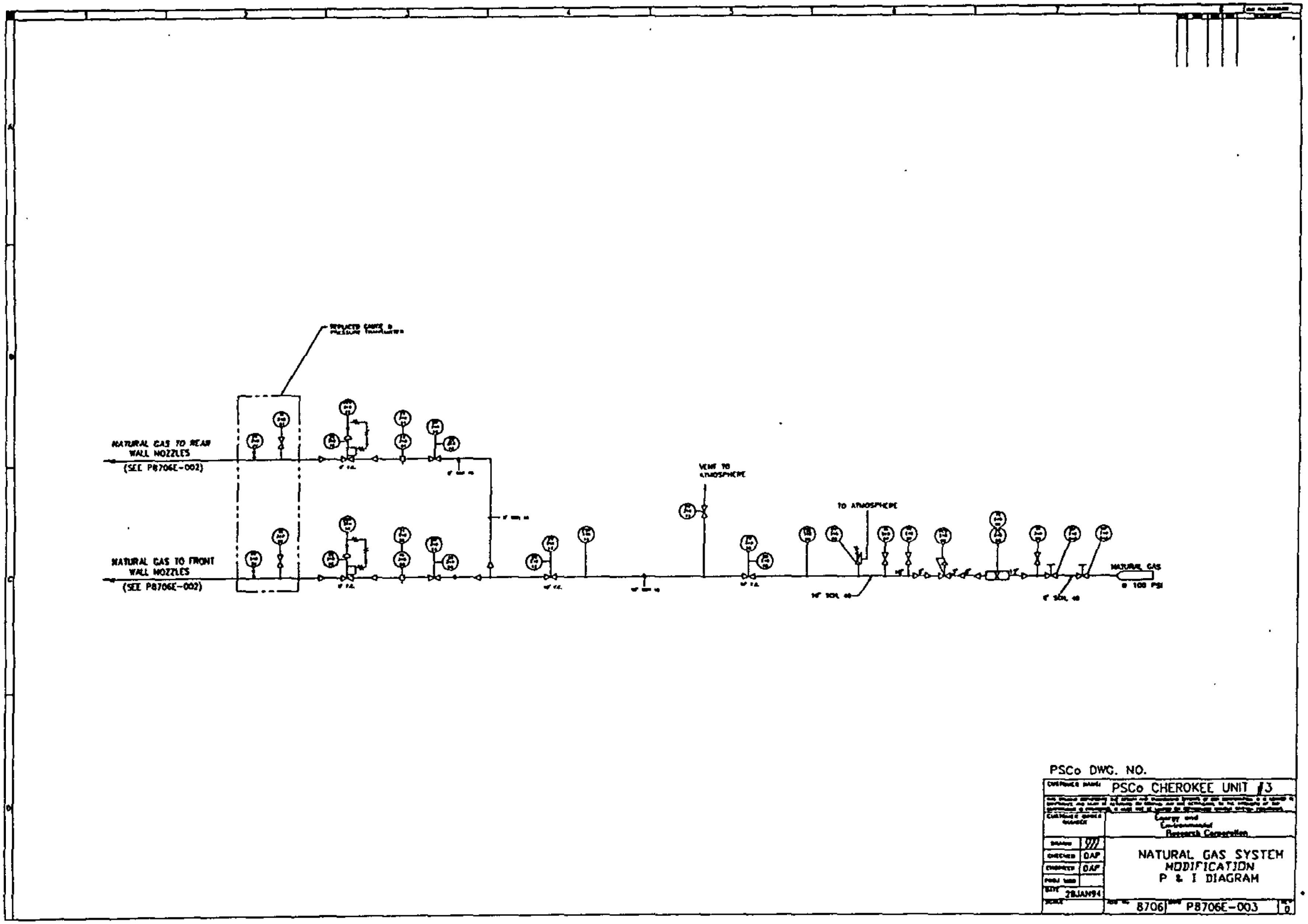


Figure 2-15. Piping and instrumentation diagram, Second Generation gas reburning.

3.0 UPDATE OF THE PUBLIC DESIGN REPORT

3.0 UPDATE OF THE PUBLIC DESIGN REPORT

3.1 Design and Equipment Changes

There is a significant amount of resistance in the utility industry to operating FGR systems. This attitude resulted from several serious accidents involving high temperature flue gas fans and the maintenance and operating cost issues associated with those fans. Testing has provided data that suggest a redesigned reburning fuel injector may perform quite well with greatly reduced or zero FGR. There would be no compromise made to the overall safety of the GR system if the FGR system were not utilized.

The GR-LNB system performance at Cherokee was evaluated continuously throughout the Optimization and Long-Term testing periods. The analyses focused on NO_x reduction, process economic efficiency, combustion completion (CO emission and carbon-in-ash), thermal efficiency/heat rate, and other areas of boiler performance/operation. The analyses revealed that (1) NO_x reduction did not improve significantly at gas heat inputs above 10%, (2) FGR had only a minor impact on NO_x reduction, and (3) CO emissions were significant in the "off-design" case of gas heat input below 18%. The reason for elevated CO emissions was that under low gas inputs the OFA flows and injection velocities are also greatly reduced, preventing full burnout of fuels. EER therefore submitted a proposal to DOE to extend the project by incorporating modifications to the system to improve process economics and commercial attractiveness of GR. The economics were optimized by limiting the quantity of gas input in light of the gas-to-coal cost differential of $\$1.61/10^6$ Btu at this site.

3.1.1 Disposition of Flue Gas Recirculation System

In the original GR system, FGR was used to enhance the penetration of the natural gas injected into the furnace. This was thought to be necessary since the total mass of natural gas was very small in comparison to the mass of flue gas from the burner region. The data analyses however revealed that FGR had relatively little impact on NO_x reduction for FGR flows of 4,000 to 14,000 scfm (1.9 to 6.6 Nm^3/s). This was most likely due to high process efficiency achieved by localized reducing areas in the furnace; i.e., uniform fuel rich conditions throughout the reburning zone were not necessary. Also, the reburn zone residence time was 0.50 seconds. EER has found that a residence time of this length is usually sufficient to obtain good NO_x reduction. With GR, as the residence time increases the effectiveness of FGR decreases.

For the reasons listed, the FGR system was eliminated from the GR system design. Elimination of FGR was expected to have minimal impact on NO_x control. It was also expected to have beneficial impacts on two areas: the steam attemperation spray rate and the total economics of the process. Since FGR increases the flue gas mass flow through the upper furnace and convective pass, the result is higher heat transfer to the superheaters that necessitates a greater attemperation water spray rate. Therefore, elimination of FGR would reduce the attemperation spray requirement at full load. Since the FGR system adds significantly to the capital cost of GR systems, its elimination would provide an installed cost savings of approximately 34% for GR applications. The equipment eliminated included ductwork, high static fan, control dampers, multiclone, and other miscellaneous small components.

3.1.2 Reburning Fuel Injector Modification

The reburning fuel injectors were replaced by high velocity gas jet injectors. The new injectors were designed with smaller flow areas to provide for a higher pressure drop, making greater use of the available natural gas pressure. The control system was also modified so that any combination of sixteen injectors could be selected for service. The gas heat input for the Second-Generation GR-LNB system would range from 5 to 10%. In light of the gas-to-coal price differential, this significantly reduces the GR operating cost.

3.1.3 OFA System Modification

First Generation GR testing demonstrated that a majority of the NO_x reduction could be obtained with reburning gas consumption well below the 20% design value. Nearly 90% of the NO_x reduction achieved with 20% reburning gas could be achieved by operating with only half that amount of reburning fuel (10%). However, the installation could not be operated at the reduced reburning fuel inputs due to large amounts of carbon monoxide which were formed in the burnout zone due to poor mixing of the OFA with the reburning zone products. This was a result of the OFA jet velocity decreasing proportionally to the reburning fuel flow.

OFA ports were modified to allow on-line variation of the cross-sectional flow area of the port to provide optimum air jet velocities as the air flow rates changed. The goal of the OFA modification was to improve CO burnout over a wide range of OFA flows. The modified ports were of a double concentric design, with the inner port nominally supplying OFA up to 5% of the total combustion air. Any additional OFA flow would be added through the outer port. The design would achieve sufficient injection velocity and rapid mixing over a wide range of OFA flows. Improvement in the burnout of fuels, as indicated by CO emissions, was expected.

3.2 Demonstration Plant Capital Cost Update

The capital cost of the initial GR installation was as follows:

Project Management	$ 326,381
Engineering	623,522
Materials	4,707,282
Installation	5,032,928
Total	$10,690,113

The additional cost to convert the installation to Second Generation GR is as follows. Note that the cost includes removal of the FGR system:

Project Management	$ 60,424
Engineering	336,278
Material	95,563
Installation	314,055
Total	$806,320

These costs are not considered indicative of future, similar installations due to test-related equipment associated with the installation and design optimizing techniques employed.

The reader should refer to Section 7.0 for a detailed discussion of the current cost to install a GR system based on the Second Generation GR optimized technology.

3.3 Demonstration Plant Operating Costs Update

Table 3-1 presents the total annual fixed and variable operating costs for the reburning installation at Cherokee Unit 3. The fixed costs include operator labor, maintenance, and administrative support. The variable costs include gas-to-coal fuel cost differential and auxiliary power. The total annual fixed operation and maintenance cost is $59,169. The total variable operating cost is $297/hr using a fuel differential of $\$1.60/10^6$ Btu and a natural gas heat input of 10%. Assuming a 65% capacity factor, the annual total variable operating cost would be $1,689,152.

TABLE 3-1. SUMMARY OF ESTIMATED OPERATING COSTS

Base year 1993

ANNUAL FIXED OPERATING COST	
Operating Labor Cost Details Number of Operators per Shift ________ Number of Shifts per Week ________ Operating Pay Rate per Hour ________	**Cost/yr**
1. Total Annual Operating Labor Cost	$2,928
2. Total Annual Maintenance Labor Cost	$54,274
3. Total Annual Maintenance Material Cost	(incl.)
4. Total Annual Administrative and Support Labor Cost	$1,967
5. **TOTAL ANNUAL FIXED O&M COST**	**$59,169**

VARIABLE OPERATING COST				
Commodity	**Unit**	**$/Unit**	**Quantity/yr****	**Cost/yr**
Fuel Differential (gas to coal)	10^6 Btu	$1.60	935,638	$1,497,021
Auxiliary Power				$199,290
Waste Disposal*	ton	$9.29	(695)	($6,459)
TOTAL VARIABLE OPERATING COST				**$1,689,852**

Total Planned Operating Time for Demonstration	**2,090 hrs**

* Credit based on 10% of total heat input as natural gas

* Based on a net heat rate of 10,400 Btu/kWhr, 10% gas and a 65% capacity factor

4.0 DEMONSTRATION PROGRAM

4.0 DEMONSTRATION PROGRAM

The GR-LNB test program was designed initially to optimize the system with short parametric tests then operate it over a one-year demonstration period with the unit under dispatch load control. Testing was conducted according to a Phase III test plan prepared by EER and approved by project funders. In the midst of the long term testing, the GR system was modified to utilize Second Generation Reburning technology. The long term testing program was then completed.

4.1 Test Plans

The objective of the parametric/optimization test program was to identify the boiler set points or range of set points required to achieve both the targeted and optimal levels of NO_x emissions reduction through the full load range of operation. This testing being done within the operability limits of the boiler. Parametric tests were performed to identify and quantify the impacts of various boiler and reburning system operating parameters. The information generated was used to fine tune (optimize) the reburning system in terms of NO_x reduction and operating costs. Further, boiler master curves were developed for the control system. The GR-LNB test plan sequence was as follows:

- Pre-construction baseline testing
- Post-construction baseline testing
- LNB optimization testing
- GR-LNB optimization testing (First Generation)
- Ultrasonic thickness inspection of tubes
- Long term testing
- GR-LNB optimization testing (Second Generation)
- Long term testing
- Ultrasonic thickness inspection of tubes

Preliminary field tests were performed to identify the test conditions and procedures necessary to characterize the baseline operating conditions of the unit. The data documented the emissions and boiler performance characteristics and provided a basic set of boiler performance/operating data which were used in the process design studies and thermal performance analyses. Baseline unit performance and baseline emissions data were also obtained prior to the GR-LNB retrofit.

Following installation of the reburning equipment, a second baseline test was performed to assess the impact of the added equipment on boiler performance and flue gas emissions. Specifically, the NO_x and CO emissions were measured to determine the changes from the original baseline condition. Also, the impact of the OFA cooling air flow was assessed.

The performance of LNBs is very furnace specific. The degree of NO_x emissions reduction achievable with a burner retrofit to an existing furnace depends not only on the burner design, but also on other factors including:

- Initial NO_x level
- Coal type (fuel bound nitrogen and coal reactivity)
- Furnace burner spacing and firing depth
- Furnace volumetric heat release
- Retrofit constraints (e.g., diameter of original burner throat)

The manufacturer of the LNBs installed at Cherokee, Foster Wheeler Energy Corporation, (FWEC) conducted optimization tests of their burners. The focus of these tests was to adjust the combustion air registers to control the fuel/air distribution at the burner. This report documents only the LNB NO_x emissions reduction performance, since the FWEC burner adjusting techniques are proprietary and were not relayed on to EER.

In GR there are several operating parameters that impact the NO_x reduction performance including:

- Primary zone stoichiometric ratio
- Reburn zone stoichiometric ratio
- Burnout (OFA) zone stoichiometric ratio
- Coal burner balance
- Reburn fuel distribution
- OFA distribution

A change in the primary zone stoichiometric ratio yields two separate effects on GR: a variation in initial NO levels and changes in the amount of reburning fuel (natural gas) that must be injected to achieve the targeted reburn zone stoichiometric ratio. Reburning data have shown that higher NO_x removal efficiencies occur with an increase in the initial NO_x concentration entering the reburn zone. At lower primary zone stoichiometric ratios, the initial NO_x concentration entering the reburn zone decreases but as a system the overall NO_x reduction increases. When the primary stoichiometric ratio is high, a higher percentage of reburning fuel must be used to drive the reburn zone stoichiometric ratio down to the target value to achieve the NO_x emission level desired. This negatively affects the economics of the GR technology for the purchase price of natural gas will normally be quite higher than the parent coal.

Past tests have shown that for the GR technology, as the reburn zone stoichiometric ratio drops below 0.90, the improvement in NO_x reduction levels off. In addition, the lower the stoichiometric ratio, the greater the potential for corrosion in the furnace, Therefore, the optimum reburn zone stoichiometric ratio was targeted at about 0.90.

The burnout zone stoichiometric air to fuel ratio was established through injection of OFA to control CO and boiler efficiency. Higher ratios will result in greater dry gas losses, lowering the boiler efficiency. However, high ratios also result in better carbon burnout, increasing boiler efficiency. The parametric testing goal was to balance these two effects.

The furnace tubewalls could be susceptible to increased wastage due to the slightly fuel rich conditions in the reburn zone. To determine the wastage rate, ultrasonic thickness (UT) testing was performed on the tubes prior to and following long term GR-LNB testing. All areas of the boiler were tested including the waterwall, bullnose and division wall.

4.1.1 Parametric/Optimization Testing

The purpose of parametric testing was to define the relationships that exist between the controlling parameters and the boiler outputs. These relationships were then used to approximate the boiler set points required for optimum reburning performance. Optimization testing was used to fine tune the system. The test approach utilized a formalized test matrix consisting of a series of pre-planned tests that vary one parameter at a time (see Table 4-1). The parameters were as follows:

Load This parameter was varied from 60 MW_e to 150 MW_e. The purpose of the variation was to establish the relationship between load and boiler emissions and performance with the reburning system in operation.

Boiler Excess O_2 This parameter was varied from 2.50% to 4.00% (14% - 24% excess air) at full load and higher levels at reduced loads (steam generation units are operated at increased excess air as load is reduced to increase the mass flow through the convective pass, thereby enhancing convective heat transfer). The purpose of the variation was to determine the minimum excess air operating point. Note that GR is most economical at lower primary zone stoichiometric ratios. However, the ratio must be balanced with respect to combustion completion, flame stability, slagging, and corrosion potential.

TABLE 4-1. GR-LNB PARAMETRIC TEST MATRIX

Test ID	Test Description	Load (MWe)	Mills in Service	Gas Heat Input (%)	FGR (%)	OFA Flow (scfm)	Excess Oxygen (%)	Test Duration (min)	Measurements			
									CEMS	HVT	Carbon in Ash	N2O
LNB - 1A	Determine Minimum	150	ABCD	OFF	Cooling	Cooling	2.50	60	X			
LNB - 1B	Excess Air	150	ABCD	OFF	Cooling	Cooling	3.00	120	X	X	X	
LNB - 1C	Operating Point	150	ABCD	OFF	Cooling	Cooling	3.50	120	X		X	
LNB - 1D		150	ABCD	OFF	Cooling	Cooling	4.00	60	X		X	
LNB - 2A	Determine Minimum	120	ABCD	OFF	Cooling	Cooling	2.75	60	X			
LNB - 2B	Excess Air	120	ABCD	OFF	Cooling	Cooling	3.25	120	X	X	X	
LNB - 2C	Operating Point	120	ABCD	OFF	Cooling	Cooling	4.00	120	X		X	
LNB - 2D		120	ABCD	OFF	Cooling	Cooling	4.50	60	X		X	
LNB - 2E		120	BCD	OFF	Cooling	Cooling	2.75	60	X			
LNB - 2F		120	BCD	OFF	Cooling	Cooling	3.25	60	X			
LNB - 2G		120	BCD	OFF	Cooling	Cooling	4.00	60	X			
LNB - 2H		120	BCD	OFF	Cooling	Cooling	4.25	60	X			
LNB - 3A	Determine Minimum	90	BCD	OFF	Cooling	Cooling	3.50	120	X	X	X	
LNB - 3B	Excess Air	90	BCD	OFF	Cooling	Cooling	4.00	120	X		X	
LNB - 3C	Operating Point	90	BCD	OFF	Cooling	Cooling	4.50	60	X		X	
LNB - 3D		90	ABC	OFF	Cooling	Cooling	3.50	60	X			
LNB - 3E		90	ABC	OFF	Cooling	Cooling	4.00	60	X			
LNB - 3F		90	ABC	OFF	Cooling	Cooling	4.50	60	X			
LNB - 4A	Determine Minimum	60	BCD	OFF	Cooling	Cooling	4.50	120	X	X	X	
LNB - 4B	Excess Air	60	BCD	OFF	Cooling	Cooling	5.00	120	X		X	
LNB - 4C	Operating Point	60	BCD	OFF	Cooling	Cooling	5.50	60	X		X	
LNB - 4D		60	ABC	OFF	Cooling	Cooling	4.50	60	X			
LNB - 4E		60	ABC	OFF	Cooling	Cooling	5.00	60	X			
LNB - 4F		60	ABC	OFF	Cooling	Cooling	5.50	60	X			

TABLE 4-1. GR-LNB PARAMETRIC TEST MATRIX (con't)

Test ID	Test Description	Load (MWe)	Mills in Service	Gas Heat Input (%)	FGR (%)	OFA Flow (scfm)	OFA Vane Position	Burner Zone Stoich SR1	Reburn Zone Stoich SR2	Burnout Zone Stoich SR3	Test Duration (min)	Measurements CEMS	HVT	Carbon in Ash	N2O
LNB-OFA 5A	OFA Variation	150	ABCD	OFF	Cooling	OFF	Normal	1.16	1.16	1.16	60	X			
LNB-OFA 5B		150	ABCD	OFF	Cooling	Cooling	Normal	1.14	1.14	1.16	60	X			
LNB-OFA 5C		150	ABCD	OFF	Cooling	10	Normal	1.12	1.12	1.16	120	X	X		
LNB-OFA 5D		150	ABCD	OFF	Cooling	20	Normal	1.08	1.08	1.16	120	X		X	
LNB-OFA 5E		150	ABCD	OFF	Cooling	30	Normal	1.05	1.05	1.16	120	X	X		
GR-LNB 6A	OFA Variation	150	ABCD	20	3.4	65	Normal	1.15	0.92	1.16	120	X			
GR-LNB 6B	w/Gas Reburning	150	ABCD	20	3.4	70	Normal	1.12	0.90	1.16	120	X		X	
GR-LNB 6C		150	ABCD	20	3.4	75	Normal	1.10	0.88	1.16	120	X	X		
GR-LNB 7A	Reburn Fuel	150	ABCD	5	3.4	As Reqd	Normal	1.10	1.04	1.16	120	X		X	
GR-LNB 7B	Optimization	150	ABCD	10	3.4	As Reqd	Normal	1.10	0.99	1.16	120	X			
GR-LNB 7C		150	ABCD	15	3.4	As Reqd	Normal	1.10	0.93	1.16	120	X	X	X	
GR-LNB 7D		150	ABCD	20	3.4	As Reqd	Normal	1.10	0.88	1.16	120	X			
GR-LNB 8A	FGR Variation	150	ABCD	18	1	As Reqd	Normal	1.10	0.90	1.16	60	X			
GR-LNB 8B		150	ABCD	18	2	As Reqd	Normal	1.10	0.90	1.16	60	X			
GR-LNB 8C		150	ABCD	18	3	As Reqd	Normal	1.10	0.90	1.16	60	X			
GR-LNB 8D		150	ABCD	18	Max.	As Reqd	Normal	1.10	0.90	1.16	120	X		X	
GR-LNB 9A	OFA Vane	150	ABCD	Optim	Optim	As Reqd	Min	Optim	Optim	Optim	60	X			
GR-LNB 9B	Variation	150	ABCD	Optim	Optim	As Reqd	Max	Optim	Optim	Optim	60	X			
GR-LNB 10A	OFA Variation	120	BCD	20	3.4	60	Normal	1.17	0.93	1.21	120	X		X	
GR-LNB 10B	w/Reburning	120	BCD	20	3.4	65	Normal	1.14	0.91	1.21	120	X		X	
GR-LNB 10C		120	BCD	20	3.4	70	Normal	1.11	0.89	1.21	120	X	X		
GR-LNB 11A	Reburn Fuel	120	BCD	5	3.4	Optim	Normal	1.12	1.06	1.21	120	X		X	
GR-LNB 11B	Optimization	120	BCD	10	3.4	Optim	Normal	1.12	1.01	1.21	60	X			
GR-LNB 11C		120	BCD	15	3.4	Optim	Normal	1.12	0.95	1.21	120	X		X	
GR-LNB 11D		120	BCD	20	3.4	Optim	Normal	1.12	0.90	1.21	120	X			

TABLE 4-1. GR-LNB PARAMETRIC TEST MATRIX (con't)

Test ID	Test Description	Load (MWe)	Mills in Service	Gas Heat Input (%)	FGR (%)	OFA Flow (scfm)	OFA Vane Position	Burner Zone Stoich SR1	Reburn Zone Stoich SR2	Burnout Zone Stoich SR3	Test Duration (min)	Measurements CEMS	HVT	Carbon in Ash	N2O
GR-LNB 12A	OFA Variation	90	BCD	20	3.4	45	Normal	1.22	0.97	1.24	120	X			
GR-LNB 12B	w/Reburning	90	BCD	20	3.4	50	Normal	1.18	0.94	1.24	60	X			
GR-LNB 12C		90	BCD	20	3.4	55	Normal	1.14	0.91	1.24	120	X			
GR-LNB 12D		90	BCD	20	3.4	60	Normal	1.10	0.88	1.24	120	X	X		
GR-LNB 13A	Reburn Fuel	90	BCD	10	3.4	Optim	Normal	1.14	1.03	1.24	120	X		X	
GR-LNB 13B	Optimization	90	BCD	15	3.4	Optim	Normal	1.14	0.97	1.24	60	X			
GR-LNB 13C		90	BCD	20	3.4	Optim	Normal	1.14	0.91	1.24	120	X		X	
GR-LNB 13D		90	BCD	25	3.4	Optim	Normal	1.14	0.85	1.24	120	X			
GR-LNB 14A	OFA Variation	60	BCD	20	3.4	38	Normal	1.26	1.00	1.33	120	X		X	
GR-LNB 14B	w/Reburning	60	BCD	20	3.4	43	Normal	1.20	0.96	1.33	60	X			
GR-LNB 14C		60	BCD	20	3.4	48	Normal	1.15	0.92	1.33	120	X		X	
GR-LNB 14D		60	BCD	20	3.4	52	Normal	1.10	0.88	1.33	120	X	X		
GR-LNB 15A	Reburn Fuel	60	BCD	10	3.4	Optim	Normal	1.18	1.06	1.33	120	X		X	
GR-LNB 15B	Optimization	60	BCD	15	3.4	Optim	Normal	1.18	1.00	1.33	60	X			
GR-LNB 15C		60	BCD	20	3.4	Optim	Normal	1.18	0.94	1.33	120	X		X	
GR-LNB 15D		60	BCD	25	3.4	Optim	Normal	1.18	0.88	1.33	120	X			

Gas Reburn Heat Input Natural gas was varied from 5% to 25% of the total heat input. During these tests, the primary zone stoichiometric ratio was fixed at 1.10. The reburn zone stoichiometric ratio increases as the gas heat input increases and creates reducing conditions. Overall NO_x reductions are optimum when the reburn zone stoichiometric ratio is in the region of 0.90. The purpose of varying the reburn fuel rate was to establish the relationship between the fuel rate and the boiler NO_x emissions.

FGR Flowrate This parameter was varied from 1% to maximum capability. The FGR provides added momentum to the natural gas entering the furnace to aid in the mixing process with the flue gas from the primary zone. The purpose of the variation was to determine the impact on GR process efficiency.

OFA Flowrate This parameter was varied from 0 to 30 kscfm. Air was diverted from the LNBs to the OFA system, thereby reducing the primary zone stoichiometric ratio. It was desirable to minimize the overall excess air level in order to maintain the thermal efficiency of the unit. However, the OFA is required to minimize CO emissions and carbon-in-ash. The purpose of the variation was to establish the relationship between OFA flow and boiler emissions (NO_x, CO, etc.). Carbon-in-ash was also evaluated.

OFA Vane Position This parameter was varied from the maximum to minimum position. The purpose of varying the OFA vanes was to assess its impact on CO emissions and carbon burnout.

Following the parametric test program, optimization was performed to determine the reburning set points for optimum operation of the system. The testing was performed over the full range of boiler loads.

4.1.2 Long Term Testing

A one year period of long-term GR-LNB testing was planned, with the unit operating under normal dispatch by PSCo staff. The data from the testing were used to establish the impacts of GR-LNB on long term boiler performance and economics. These impacts included furnace conditions such as slagging and waterwall corrosion rates, bottom ash characteristics and sluicing requirements, convective pass fouling, steam generation and final steam temperatures and pressures, process auxiliary power requirements, and impacts on the fabric filter dust collector (FFDC).

4.1.3 Second Generation GR System Testing

During long term testing, it was determined that the performance of the LNBs was not as good as expected, but could be improved with modifications. Also, it was determined that the performance and economics of the reburning system might be enhanced by converting it to Second Generation GR technology. Following adjustments to the LNBs and modifications to the GR system, the testing resumed with a parametric test program followed by load-following testing.

The parametric testing was based on a formalized test matrix consisting of a series of tests wherein one parameter was varied at a time (see Table 4-2). The parameters were as follows:

Load This parameter was varied from 90 MW_e to 150 MW_e. The purpose of the variation was to establish the relationship between load and boiler emissions and performance with the reburning system in operation.

OFA Flowrate (w/o GR) -- This parameter was varied from 0 to 42 kscfm at 150 MW_e and 0 to 33 kscfm at 120 MW_e. As OFA flow increased, the secondary air to

TABLE 4-2. SECOND GENERATION GR-LNB PARAMETRIC TEST MATRIX

Test ID	Test Description	Load (MWe)	Mills in Service	Gas Heat Input (%)	Reburning Gas Configuration ID #	OFA Flow (kscfm)	OFA Vane Position	Burner Zone Stoich SR1	Reburn Zone Stoich SR2	Burnout Zone Stoich SR3	OFA (%, totl)	Test Dur. (min)	Measurement CEMS	HVT	Carbon in Ash	N2O
LNB-OFA 100A	FULL LOAD W/O GR	150	ABCD	OFF	OFF	OFF	Normal	1.22	1.22	1.22	0.0	60	X		X	
LNB-OFA 100B	OFA VARIATION	150	ABCD	OFF	OFF	10	Normal	1.18	1.18	1.22	3.3	60	X		X	
LNB-OFA 100C		150	ABCD	OFF	OFF	21	Normal	1.14	1.14	1.22	6.6	120	X	X	X	X
LNB-OFA 100D	Performance Parameters:	150	ABCD	OFF	OFF	31	Normal	1.10	1.10	1.22	9.8	60	X		X	
LNB-OFA 100E	NOx, CO & Carbon-in-ash	150	ABCD	OFF	OFF	42	Normal	1.10	1.10	1.26	12.7	60	X		X	
LNB-OFA 110A	FULL LOAD OFA STAGING W/O GR	150	ABCD	OFF	OFF	21	Min	1.14	1.14	1.22	6.6	60	X		X	
LNB-OFA 110B	AIR SWIRL VARIATION	150	ABCD	OFF	OFF	21	Max	1.14	1.14	1.22	6.6	60	X		X	
	Performance Parameters: CO & C-in-ash															
LNB-OFA 120A	MID LOAD W/O GR	120	ABCD	OFF	OFF	OFF	Normal	1.24	1.24	1.24	0.0	60	X		X	
LNB-OFA 120B	OFA VARIATION	120	ABCD	OFF	OFF	8	Normal	1.20	1.20	1.24	3.2	60	X		X	
LNB-OFA 120C		120	ABCD	OFF	OFF	17	Normal	1.16	1.16	1.24	6.5	120	X	X	X	X
LNB-OFA 120D	Performance Parameters:	120	ABCD	OFF	OFF	25	Normal	1.12	1.12	1.24	9.7	60	X		X	
LNB-OFA 120E	NOx, CO & Carbon-in-ash	120	ABCD	OFF	OFF	33	Normal	1.12	1.12	1.28	12.5	60	X		X	
LNB-OFA 130A	MID LOAD OFA STAGING W/O GR	120	ABCD	OFF	OFF	17	Min	1.16	1.16	1.24	6.5	60	X		X	
LNB-OFA 130B	AIR SWIRL VARIATION	120	ABCD	OFF	OFF	17	Max	1.16	1.16	1.24	6.5	60	X		X	
	Performance Parameters: CO & C-in-ash															

TABLE 4-2. SECOND GENERATION GR-LNB PARAMETRIC TEST MATRIX (con't)

Test ID	Test Description	Load (MWe)	Mills in Service	Gas Heat Input (%)	Reburning Gas Configuration ID #	OFA Flow (kscfm)	OFA Vane Position	Burner Zone Stoich SR1	Reburn Zone Stoich SR2	Burnout Zone Stoich SR3	OFA (%, totl)	Test Dur. (min)	Measurement CEMS	HVT	Carbon in Ash	N2O
GR-LNB 140A	FULL LOAD GAS REBURNING	150	ABCD	10	14	50	Optim	1.14	1.03	1.22	15.9	60	X		X	
GR-LNB 140B	SR1 & OFA VARIATION	150	ABCD	10	14	55	Optim	1.12	1.01	1.22	17.4	60	X		X	
GR-LNB 140C	Performance Paramters:	150	ABCD	10	14	60	Optim	1.10	0.99	1.22	18.9	60	X		X	
GR-LNB 140D	NOx, CO, C-in-ash, slagging, flame stability	150	ABCD	10	14	64	Optim	1.08	0.97	1.22	20.3	60	X		X	
GR-LNB 150A	FULL LOAD GAS REBURNING	150	ABCD	4	1	43	Optim	1.10	1.06	1.22	13.4	60	X		X	
GR-LNB 150B	GAS HEAT INPUT AND INJECTOR-IN-	150	ABCD	4	2	43	Optim	1.10	1.06	1.22	13.4	60	X		X	
GR-LNB 150C	SERVICE VARIATION	150	ABCD	6	3	48	Optim	1.10	1.03	1.22	15.2	60	X		X	
GR-LNB 150D		150	ABCD	6	4	48	Optim	1.10	1.03	1.22	15.2	60	X		X	
GR-LNB 150E	SR1 NOMINALLY SET AT 1.10	150	ABCD	10	9	60	Optim	1.10	0.99	1.22	18.9	60	X		X	
GR-LNB 150F	ACTUAL SR1 DETERMINED FROM	150	ABCD	10	10	60	Optim	1.10	0.99	1.22	18.9	60	X		X	
GR-LNB 150G	TESTS GR-LNB 140A -140D	150	ABCD	14	12	71	Optim	1.10	0.95	1.22	22.5	120	X	X	X	X
GR-LNB 150H	Performance Paramters:	150	ABCD	14	13	71	Optim	1.10	0.95	1.22	22.5	60	X		X	
GR-LNB 150I	NOx, CO, & C-in-ash	150	ABCD	18	14	83	Optim	1.10	0.90	1.22	26.1	120	X	X	X	X
GR-LNB 160A	FULL LOAD GAS REBURNING	150	ABCD	10	Optim	65	Optim	1.10	0.99	1.24	20.2	60	X		X	
GR-LNB 160B	SR3 VARIATION	150	ABCD	10	Optim	70	Optim	1.10	0.99	1.26	21.4	60	X		X	
GR-LNB 160C	SR1 NOMINALLY SET AT 1.10	150	ABCD	10	Optim	75	Optim	1.10	0.99	1.28	22.7	60	X		X	
GR-LNB 160D	ACTUAL SR1 FROM TESTS 140A - 140D	150	ABCD	10	Optim	80	Optim	1.10	0.99	1.30	23.8	60	X		X	
	Performance Parameters: NOx, CO, C-in-ash															
GR-LNB 170A	FULL LOAD GAS REBURNING	150	ABCD	8	7	54	Optim	1.10	1.01	1.22	17.0	60	X		X	
GR-LNB 170B	SIDE TO SIDE GAS INPUT TEST	150	ABCD	8	8	54	Optim	1.10	1.01	1.22	17.0	60	X		X	
	Performance Parameters: NOx, CO, C-in-ash															
GR-LNB 180A	3 MILL - MAX LOAD GAS REBURNING	Max	ABC	14	Optim	As Req	Optim	1.10	0.95	1.22	22.5	60	X		X	
GR-LNB 180B	GAS HEAT INPUT VARIATION	Max	ABC	10	Optim	As Req	Optim	1.10	0.99	1.22	18.9	60	X		X	
GR-LNB-180C	Performance Paramters: NOx, CO, C-in-ash	Max	ABC	4	Optim	As Req	Optim	1.10	1.06	1.22	13.4	60	X		X	

TABLE 4-2. SECOND GENERATION GR-LNB PARAMETRIC TEST MATRIX (con't)

Test ID	Test Description	Load (MWe)	Mills in Service	Gas Heat Input (%)	Reburning Gas Configuration ID #	OFA Flow (kscfm)	OFA Vane Position	Burner Zone Stoich SR1	Reburn Zone Stoich SR2	Burnout Zone Stoich SR3	OFA (%, totl)	Test Dur. (min)	Measurement: CEMS	Measurement: HVT	Measurement: Carbon in Ash	Measurement: N2O
GR-LNB 190A	GAS REBURNING MID LOAD	120	ABCD	10	14	41	Normal	1.16	1.04	1.24	15.8	60	X		X	
GR-LNB 190B	SR1 & OFA VARIATION	120	ABCD	10	14	44	Normal	1.14	1.03	1.24	17.3	60	X		X	
GR-LNB 190C	Performance Paramters:	120	ABCD	10	14	48	Normal	1.12	1.01	1.24	18.7	60	X		X	
GR-LNB 190D	NOx, CO, C-in-ash, slagging, flame stability	120	ABCD	10	14	52	Normal	1.10	0.99	1.24	20.2	60	X		X	
GR-LNB 200A	GAS REBURNING MID LOAD	120	ABCD	4	1	34	Normal	1.12	1.08	1.24	13.3	60	X		X	
GR-LNB 200B	GAS HEAT INPUT AND INJECTOR-IN-	120	ABCD	4	2	34	Normal	1.12	1.08	1.24	13.3	60	X		X	
GR-LNB 200C	SERVICE VARIATION	120	ABCD	6	3	39	Normal	1.12	1.05	1.24	15.1	60	X		X	
GR-LNB 200D		120	ABCD	6	4	39	Normal	1.12	1.05	1.24	15.1	60	X		X	
GR-LNB 200E	SR1 NOMINALLY SET AT 1.12	120	ABCD	10	9	48	Normal	1.12	1.01	1.24	18.7	60	X		X	
GR-LNB 200F	ACTUAL SR1 DETERMINED FROM	120	ABCD	10	10	48	Normal	1.12	1.01	1.24	18.7	60	X		X	
GR-LNB 200G	TESTS GR-LNB 190A -190D	120	ABCD	14	12	57	Normal	1.12	0.96	1.24	22.3	60	X		X	
GR-LNB 200H	Performance Paramters:	120	ABCD	14	13	57	Normal	1.12	0.96	1.24	22.3	60	X		X	
GR-LNB 200I	NOx, CO, & C-in-ash	120	ABCD	18	14	67	Normal	1.12	0.92	1.24	25.9	60	X		X	
GR-LNB 210A	3 MILL - MID LOAD GAS REBURNING	120	ABC	14	Optim	57	Normal	1.12	0.96	1.24	22.3	60	X		X	
GR-LNB 210B	GAS HEAT INPUT VARIATION	120	ABC	10	Optim	48	Normal	1.12	1.01	1.24	18.7	60	X		X	
GR-LNB 210C	Performance Paramters: NOx, CO, & C-in-ash	120	ABC	4	Optim	34	Normal	1.12	1.08	1.24	13.3	60	X		X	
GR-LNB 220A	GAS REBURNING LOW LOAD	90	ABCD	10	14	42	Normal	1.18	1.06	1.33	20.2	60	X		X	
GR-LNB 220B	SR1 & OFA VARIATION	90	ABCD	10	14	45	Normal	1.16	1.04	1.33	21.5	60	X		X	
GR-LNB 220C	Performance Paramters:	90	ABCD	10	14	47	Normal	1.14	1.03	1.33	22.9	60	X		X	
GR-LNB 220D	NOx, CO, C-in-ash, slagging, flame stability	90	ABCD	10	14	50	Normal	1.12	1.01	1.33	24.2	60	X		X	
GR-LNB 230A	GAS REBURNING LOW LOAD	90	ABCD	4	1	37	Normal	1.14	1.09	1.33	17.7	60	X		X	
GR-LNB 230B	GAS HEAT INPUT AND INJECTOR-IN-	90	ABCD	4	2	37	Normal	1.14	1.09	1.33	17.7	60	X		X	
GR-LNB 230C	SERVICE VARIATION	90	ABCD	8	5	44	Normal	1.14	1.05	1.33	21.1	60	X		X	
GR-LNB 230D	SR1 NOMINALLY 1.14, USE PREVIOUS TESTS	90	ABCD	8	6	44	Normal	1.14	1.05	1.33	21.1	60	X		X	
GR-LNB 230E	ACTUAL FROM TESTS 220A - 220D	90	ABCD	12	11	51	Normal	1.14	1.00	1.33	24.6	60	X		X	
GR-LNB 230F	Performance Paramters: NOx, CO, & C-in-ash	90	ABCD	18	14	62	Normal	1.14	0.93	1.33	29.7	60	X		X	

the LNBs decreased, which reduced the primary zone stoichiometric ratio from 1.22 to 1.10. The purpose of the variation was to assess the impact of OFA staging on NO_x control and the extent of fuel burnout (CO emissions and carbon-in-ash). Additional testing was performed to evaluate the impact of OFA air swirl. The OFA ports were equipped with swirl vanes, which would improve lateral coverage of the furnace flow field. The swirler position was varied from the minimum to maximum setting.

Gas Injector Configuration The number of reburning fuel injectors in service was varied using configurations 1 through 14 (Figure 4-1) to see which combination gave the best NO_x reduction. The natural gas heat input was varied from 4 to 18% depending on the number of injectors in service. Generally, even numbers of gas injector combinations were selected for evaluation since even numbers are required to maintain side-to-side symmetry in gas heat input.

OFA Flowrate (w/GR) This parameter was varied from 50 to 80 kscfm at 150 MW_e and 41 to 57 kscfm at 120 MW_e. The purpose of the variation was to establish the relationship between OFA flow and CO emissions. Carbon-in-ash was also evaluated.

Gas Injection Bias Tests were performed to determine if the injection of more gas into one side of the furnace than the other improved GR system performance. The same level of gas was input into either of two configurations to determine if NO_x reduction could be improved with gas injection into either the right or left side of the furnace.

Three Mill Operation Tests were performed to evaluate various levels of gas heat input under the maximum load achieved with three mills in service. Gas heat input was varied between 4 and 14% and the injectors placed in service were determined from the previous test series. While unit operators generally have all four mills in

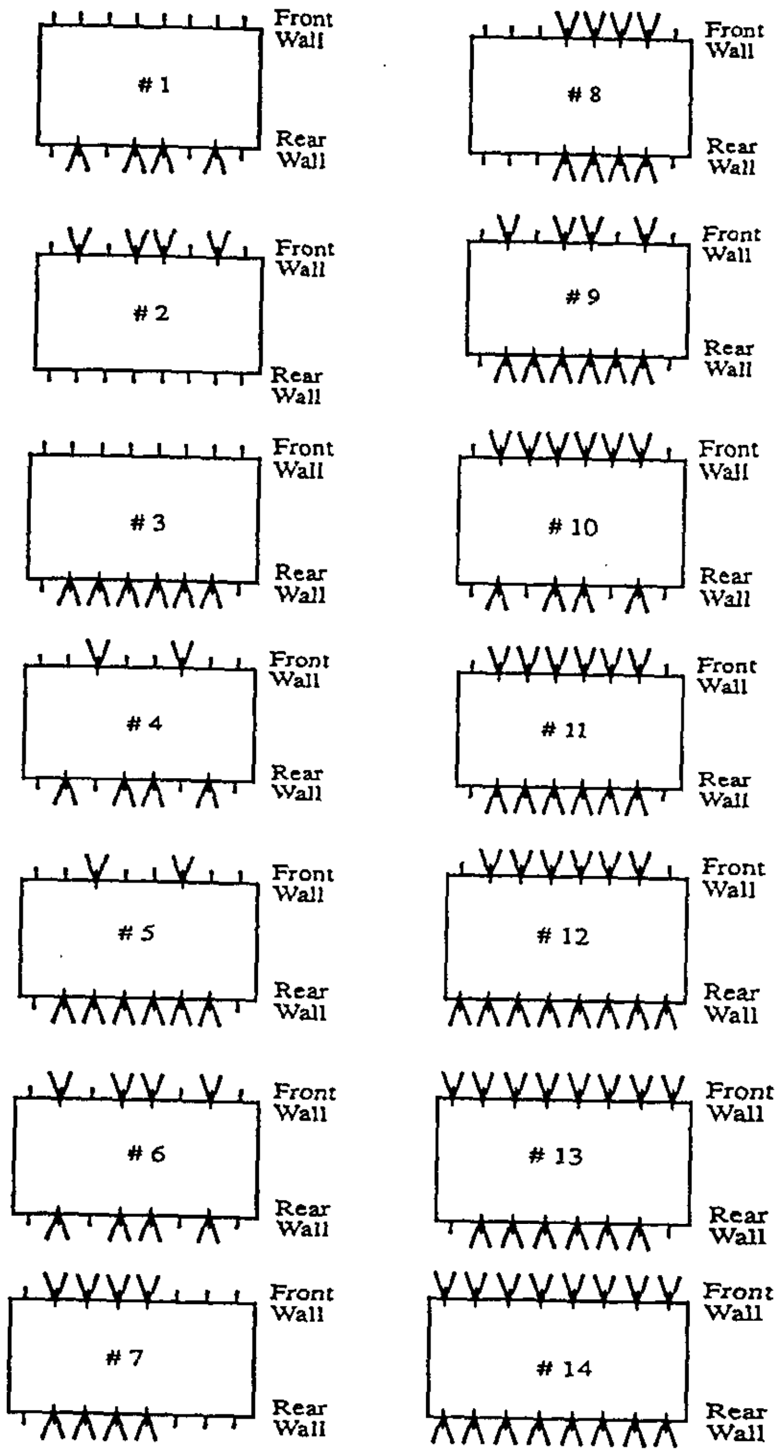


Figure 4-1. Reburn gas injector configurations

service over a wide range of load, there are times when one is out of service for routine maintenance or due to an emergency trip. Under baseline operation the bottom row of burners (A mill) are taken out of service at loads of 90 MW_e and less.

4.1.4 Gas Firing and Gas/Gas Reburning Testing

Table 4-3 presents the parametric test matrix for the 100% gas firing and Gas/Gas Reburning testing. Significant reductions in boiler emissions including NO_x, SO_2, CO_2, and particulate matter were expected from firing a clean fuel such as natural gas.

In general, the primary and burnout zone stoichiometric ratios were much lower than that under coal firing. Burners firing natural gas typically operate at 5 to 10% excess air, compared to 15 to 20% for coal. The parameters were as follows:

Load This parameter was varied from 90 MW_e to 150 MW_e. The purpose of the variation was to establish the relationship between load and boiler emissions and performance with the reburning system in operation.

Primary Zone Stoichiometric Ratio (SR) The SR was varied from 1.04 to 1.10 at full load and higher levels at reduced loads. The purpose of the variation was to determine the minimum excess air operating point as determined by carbon burnout.

Gas Reburn Heat Input Natural gas was varied from 5% to 25% of the total heat input. During the tests, the primary zone stoichiometric ratio was fixed at 1.06. In this case the economic consideration of firing gas was eliminated, since there is no change in reburning fuel. However, a constraint against using higher levels of reburning gas is the formation of a fuel rich conditions in the furnace providing a

TABLE 4-3. 100% GAS FIRING AND GAS FIRING w/GR TEST MATRIX

Test ID	Test Description	Load MWe (MWe)	Reburning Gas Heat Input (%)	Reburning Gas Injectors In Service	OFA Flow (kscfm)	OFA Vane Position	Burner Zone Stoich SR1	Reburn Zone Stoich SR2	Burnout Zone Stoich SR3	OFA (%, totl)	Test Dur. (min)	CEMS
GLNB 100A	FULL LOAD W/O GR	150	OFF	OFF	OFF	Optim	1.10	1.10	1.10	0.0	60	X
GLNB 100B	EXCESS AIR VARIATION	150	OFF	OFF	OFF	Optim	1.07	1.07	1.07	0.0	60	X
GLNB 100C	Performance Parameters: NOx & CO	150	OFF	OFF	OFF	Optim	1.05	1.05	1.05	0.0	60	X
GLNB-OFA 110A	FULL LOAD W/O GR	150	OFF	OFF	OFF	Optim	1.08	1.08	1.10	1.8	60	X
GLNB-OFA 110B	OFA VARIATION	150	OFF	OFF	10	Optim	1.06	1.06	1.10	3.6	60	X
GLNB-OFA 110C	Performance Parameters: NOx & CO	150	OFF	OFF	16	Optim	1.04	1.04	1.10	5.5	60	X
GLNB-GR 120A	FULL LOAD GAS REBURNING	150	20	All	61	Optim	1.08	0.86	1.10	21.5	60	X
GLNB-GR 120B	SR1 & OFA VARIATION	150	20	All	65	Optim	1.06	0.85	1.10	22.9	60	X
GLNB-GR 120C	Performance Parameters: NOx, CO, flame stability	150	20	All	70	Optim	1.04	0.83	1.10	24.4	60	X
GLNB-GR 130A	FULL LOAD GAS REBURNING	150	5	Optim	24	Optim	1.06	1.01	1.10	8.5	60	X
GLNB-GR 130B	GAS INPUT VARIATION	150	10	Optim	38	Optim	1.06	0.95	1.10	13.3	60	X
GLNB-GR 130C	SR1 NOMINALLY AT 1.06, ACTUAL FROM TESTS 120	150	15	Optim	52	Optim	1.06	0.90	1.10	18.1	60	X
GLNB-GR 130D	Performance Parameters: NOx & CO	150	25	Optim	79	Optim	1.06	0.80	1.10	27.7	60	X
GLNB-GR 140A	FULL LOAD GAS REBURNING	150	20	All	55	Optim	1.06	0.85	1.06	20.0	60	X
GLNB-GR 140B	EXCESS AIR VARIATION	150	20	All	60	Optim	1.06	0.85	1.08	21.5	60	X
GLNB-GR 140C	Performance Parameters: NOx & CO	150	20	All	71	Optim	1.06	0.85	1.12	24.3	60	X

Note: Optimum Reburning Gas Injectors In Service and OFA Swirl Position Determined From Coal/Gas Reburning Tests

TABLE 4-3. 100% GAS FIRING AND GAS FIRING w/GR TEST MATRIX (con't).

Test ID	Test Description	Load (MWe)	Reburning Gas Heat Input (%)	Reburning Gas Injectors In Service	OFA Flow (kscfm)	OFA Vane Position	Burner Zone Stoich SR1	Reburn Zone Stoich SR2	Burnout Zone Stoich SR3	OFA (%, totl)	Test Dur. (min)	CEMS
GLNB 150A	MID LOAD W/O GR	120	OFF	OFF	OFF	Optim	1.14	1.14	1.14	0.0	60	X
GLNB 150B	EXCESS AIR VARIATION	120	OFF	OFF	OFF	Optim	1.11	1.11	1.11	0.0	60	X
GLNB 150C	Performance Parameters: NOx & CO	120	OFF	OFF	OFF	Optim	1.08	1.08	1.08	0.0	60	X
GLNB-OFA 160A	MID LOAD W/O GR	120	OFF	OFF	OFF	Optim	1.10	1.10	1.14	3.5	60	X
GLNB-OFA 160B	OFA VARIATION	120	OFF	OFF	12	Optim	1.08	1.08	1.14	5.3	60	X
GLNB-OFA 160C	Performance Parameters: NOx & CO	120	OFF	OFF	17	Optim	1.06	1.06	1.14	7.0	60	X
GLNB-GR 170A	MID LOAD GAS REBURNING	120	20	All	54	Optim	1.10	0.88	1.14	22.8	60	X
GLNB-GR 170B	SR1 & OFA VARIATION	120	20	All	57	Optim	1.08	0.86	1.14	24.2	60	X
GLNB-GR 170C	Performance Parameters: NOx, CO, flame stability	120	20	All	61	Optim	1.06	0.85	1.14	25.6	60	X
GLNB-GR 180A	MID LOAD GAS REBURNING	120	5	Optim	24	Optim	1.08	1.03	1.14	10.0	60	X
GLNB-GR 180B	GAS INPUT VARIATION	120	10	Optim	35	Optim	1.08	0.97	1.14	14.7	60	X
GLNB-GR 180C	SR1 NOMINALLY AT 1.08, ACTUAL FROM TESTS 170	120	15	Optim	46	Optim	1.08	0.92	1.14	19.5	60	X
GLNB-GR 180D	Performance Parameters: NOx & CO	120	25	Optim	69	Optim	1.08	0.81	1.14	28.9	60	X
GLNB 190A	LOW LOAD W/O GR	90	OFF	OFF	OFF	Optim	1.18	1.18	1.18	0.0	60	X
GLNB 190B	EXCESS AIR VARIATION	90	OFF	OFF	OFF	Optim	1.14	1.14	1.14	0.0	60	X
GLNB 190C	Performance Parameters: NOx & CO	90	OFF	OFF	OFF	Optim	1.10	1.10	1.10	0.0	60	X
GLNB-OFA 200A	LOW LOAD W/O GR	90	OFF	OFF	OFF	Optim	1.12	1.12	1.18	5.1	60	X
GLNB-OFA 200B	OFA VARIATION	90	OFF	OFF	12	Optim	1.10	1.10	1.18	6.8	60	X
GLNB-OFA 200C	Performance Parameters: NOx & CO	90	OFF	OFF	16	Optim	1.08	1.08	1.18	8.5	60	X
GLNB-GR 210A	LOW LOAD GAS REBURNING	90	20	All	44	Optim	1.12	0.90	1.18	24.1	60	X
GLNB-GR 210B	SR1 & OFA VARIATION	90	20	All	47	Optim	1.10	0.88	1.18	25.4	60	X
GLNB-GR 210C	Performance Parameters: NOx, CO, flame stability	90	20	All	49	Optim	1.08	0.86	1.18	26.8	60	X

Note: Optimum Reburning Gas Injectors In Service and OFA Swirl Position Determined From Coal/Gas Reburning Tests potential for increased wastage of the waterwall. The purpose of the variation was to establish the relationship between reburn fuel level and boiler emissions.

OFA Flowrate This parameter was varied from 55 to 71 kscfm. During the tests, the natural gas heat input was fixed at 20%. The purpose of the variation was to establish the relationship between OFA flow and boiler emissions (NO_x, CO, etc.). Carbon in the fly ash was also evaluated.

Gas Injection Bias Tests were completed to see if the injection of more gas on one side of the furnace would improve the GR system performance. The same level of gas was input into two configurations to see if improved NO_x reduction could be achieved with gas flowrate biasing to either the right or left side of the furnace.

4.2 Operating Procedures

The GR system is composed of three integrated systems: (1) natural gas injection, (2) FGR, and (3) OFA injection. The natural gas flow rate was controlled to the desired value for optimum NO_x destruction. The FGR flow was controlled to a value to give the natural gas momentum for optimum distribution in the furnace. The OFA was controlled to a value to complete combustion of all unburned fuel leaving the reburning zone. The three integrated systems were interlocked, operated and monitored by a Westinghouse Distributive Process Family (WDPF) control system.

The control logic for natural gas injection consisted of a flow controller which received a calculated set point from the boiler master and the natural gas flow transmitter. A comparison was made in the fuel controller between the set point and feedback signals and the controller output modulated the natural gas control valve to reduce any error to zero. The boiler master controlled gas flow with coal flow to obtain the heat input needed over the load range. A percentage of the boiler master signal was calculated and became the set point for the desired natural gas flow.

The desired FGR flow control set point was a calculated value determined from the boiler master signal. This set point signal was compared with the actual value of FGR flow rate in a PID controller which acted on any detected error signal. The WDPF automatically adjusted the FGR fan to reduce the error to zero.

Control of the OFA system consisted of sending a set point signal calculated from the boiler master signal to a controller where it was compared with the total of the two OFA air flows (one on each side of the boiler). The OFA nozzles were modulated to reduce any detected difference in the set point and total OFA flow to zero. The WDPF compared the two signals from the OFA flow transmitters to balance the flow of air.

Another control feature of the GR system was the cross limit between the OFA flow and natural gas flow. The set point for natural gas was compared with the OFA flow. If the natural gas flow set point was greater than the amount of OFA flow required for complete combustion of natural gas, the WDPF would decrease the natural gas set point to a value that permits complete combustion of the natural gas by the OFA. If the natural gas flow was greater than the OFA flow, the set point signal for OFA was increased to a value that would permit complete combustion of the natural gas. The above sequence is called cross limiting between the fuel (natural gas) and OFA and is very similar to the cross limiting features in the main combustion control between the coal feed and secondary air flow.

There was another cross limit between the FGR flow and the natural gas flow. If the FGR flow fell below a value that insured optimum penetration of the natural gas into the boiler (i.e., good mixing with the products of the coal combustion process), the set point for natural gas flow would be reduced to a safe value. Appendix C contains the startup/shutdown procedures and the operator checklist.

4.2.1 Instrumentation and Data Acquisition

Control and monitoring of the GR-LNB system was accomplished with a WDPF system. The system consisted of a variable mix of functional units (drops) communicating freely and rapidly via the WDPF data highway. The WDPF sent and received signals from various components in the GR-LNB system, in addition to interfacing with other microprocessors. The design of the GR-LNB control system was based on the following criteria:

- All normal operations that are required to start, stop, or modulate the various pieces of equipment shall be performed in the control room.

- Sufficient information shall be displayed in the control room to enable the operator to determine the status of all equipment. The operator interface shall be designed so that the above information is displayed in a manner to enable rapid understanding of system status.

- Certain operations shall be interlocked to prevent inadvertent operation of equipment when such operation may present an operating hazard or other undesirable condition.

- Certain shut-down procedures shall be initiated automatically by the control system when such operations are deemed necessary for safety or good operating practice.

- Microprocessor based technology shall be used for the controls and interlocks.

- Operator interface shall be of the Keyboard-CRT type with custom graphics.

- The system will readily interface with existing plant instrumentation and be of a design that will enable operator familiarity and understanding with a minimum of training.

Interlocks were included which were designed to start the equipment in an orderly fashion and prevent the operator from allowing the unit's safety to become compromised either through erroneous operation or due to equipment failure. All major commands issued by the WDPF control system were verified by a feedback signal. Trip signals were continuously monitored by the WDPF and would prevent startup or shutdown of equipment already in operation.

A Boiler Performance Monitoring System (BPMS) was used to monitor operating conditions, GR-LNB system performance, and unit thermal/steam production performance. The BPMS, developed by EER, is a state-of-the-art PC-based system which takes up to 300 inputs, updates these as often as every five seconds, and performs a variety of process calculations.

The Cherokee BPMS was customized to the GR-LNB application. The BPMS received data from plant instrumentation, GR system instrumentation, and continuous gas monitors, performed a series of calculations, and then output data in a prescribed format. The inputs to the Cherokee BPMS are listed in Table 4-4, while the outputs are listed in Table 4-5. The inputs included fuel characteristics (composition and heating value), design radiation and unmeasured heat losses for the boiler, ambient conditions, flue gas conditions at several locations, reburning gas and OFA flows, continuous flue gas analyses, combustion air temperature, superheat and reheat steam cycle data, and gross/net power generation. These data were then used to calculate heat absorption by each heat exchanger, heat loss efficiency, heat absorption ratios relative to baseline operation, furnace zone stoichiometries, and emissions in the form of volume concentration and on a mass per heat

TABLE 4-4. INPUTS TO BPMS HEAT TRANSFER/COMBUSTION MODEL

Class of Input	Input Data
Fuel characteristics	Proximate analysis Ultimate analysis Heating value
ASME heat loss method	Combustible in refuse Radiation heat loss * Unmeasured heat loss *
Ambient conditions	Relative humidity Barometric pressure Ambient temperature
Boiler instrumentation - flue gas side	Total coal flow Coal temperature Combustion air temperature Economizer outlet gas temperature Air heater gas outlet temperature FGR flow rate (hopper bottom) Plant O2
GR instrumentation	Reburning FGR flow rate Natural gas flow rate Natural gas temperature Overfire air flow rate
Continuous emissions monitoring	Gaseous concentrations of: CO2, CO, NOx, SO2, O2, and HCl
Combustion air instrumentation	Air heater air inlet temperature Air heater air outlet temperature
Boiler instrumentation - water/steam side	Superheated steam Feedwater pressure to economizer Feedwater temperature to economizer Feedwater flow rate to economizer Outlet temperature of backpass to economizer wall Boiler drum pressure Outlet pressure of primary superheater Outlet temperature of primary superheater Superheater attemperator feedwater pressure Superheater attemperator feedwater flow Superheater attemperator outlet temperature Steam pressure to turbine Steam flow to turbine

* From boiler design performance data sheet

TABLE 4-4. INPUTS TO BPMS HEAT TRANSFER/COMBUSTION MODEL (con't).

Class of Input	**Input Data**

Boiler instrumentation - water/steam side	Reheat steam
	  Cold reheat pressure
	  Cold reheat temperature
	  Cold reheat flow rate
	  Reheater attemperator feedwater pressure
	  Reheater attemperator feedwater flow
	  Reheater attemperator outlet temperature
	  Low temperature reheat inlet pressure
	  Low temperature reheat inlet temperature
	  High temperature reheat inlet pressure
	  High temperature reheat inlet temperature
	  Hot reheat steam flow

Power generation	Generator gross power Generator net power

TABLE 4-5. OUTPUT DATA FROM BPMS HEAT TRANSFER/COMBUSTION MODEL

Class of Input	**Output Data**
Heat rate	Total heat input Heat input to burners Reburn gas heat input
Heat absorption	Furnace Secondary superheater Reheat superheater Primary superheater Economizer Air heater
Boiler efficiency based on ASME heat loss method	Heat loss due to dry gas Heat loss due to moisture in fuel Heat loss due to H2O from combustion of H2 Heat loss due to combustible in refuse Heat loss due to radiation Heat loss due to unmeasured sources
Boiler efficiency based on heat absorption method	Efficiency based on gross heating value Efficiency based on lower heating value
Heat absorption ratio (relative to baseline case)	Furnace Secondary superheater Reheat superheater Primary superheater Economizer Air heater
Stoichiometric ratio	Primary zone Reburn zone Burnout zone
Emissions control data	Gaseous species concentrations of CO2, CO, NOx, O2, SO2, and HCl in the form of: Volume % (ppm) dry; corrected to 3% O2 and pounds per million heat input.

input basis. The BPMS output average, maxima and minima for each performance parameter in reports with prescribed formats.

The Continuous Emissions Monitoring System (CEMS) is illustrated in Figure 4-2. Flue gas samples were drawn from a 16 point grid installed in twin economizer outlet ducts, as illustrated in Figure 4-3. Flue gas was withdrawn through stainless steel probes, then transported by heated sampling lines to individual rotameters in a heated enclosure. The rotameters were used to ensure even gas flow from each point of the gas extraction grid. The gas was then mixed in a manifold and carried by a heated Teflon sampling line into the test trailer. There moisture was removed with a chiller, then the gas was filtered and routed through a bypass pressure regulator to the analysis manifold. The gas was analyzed by the instruments listed in Table 4-6. These instruments were calibrated at least daily with zero and span gases.

4.2.2 Test Methods

EER measured a wide range of parameters using standard EPA, ASTM and ASME procedures as well as special procedures developed during previous boiler field evaluations. Measurement data obtained by EER were supplemented by available plant instrumentation.

The schedule of measurements performed on mills, coal and boiler are shown in Table 4-7. Coal sulfur, ash, moisture and higher heating values were determined by the plant using their normal methods. However, in addition to the daily samples extracted by the plant (which are difficult to relate precisely to a burn time) composite samples were extracted from the mill feeders. Special coal tests were performed by a commercial laboratory using ASTM procedures.

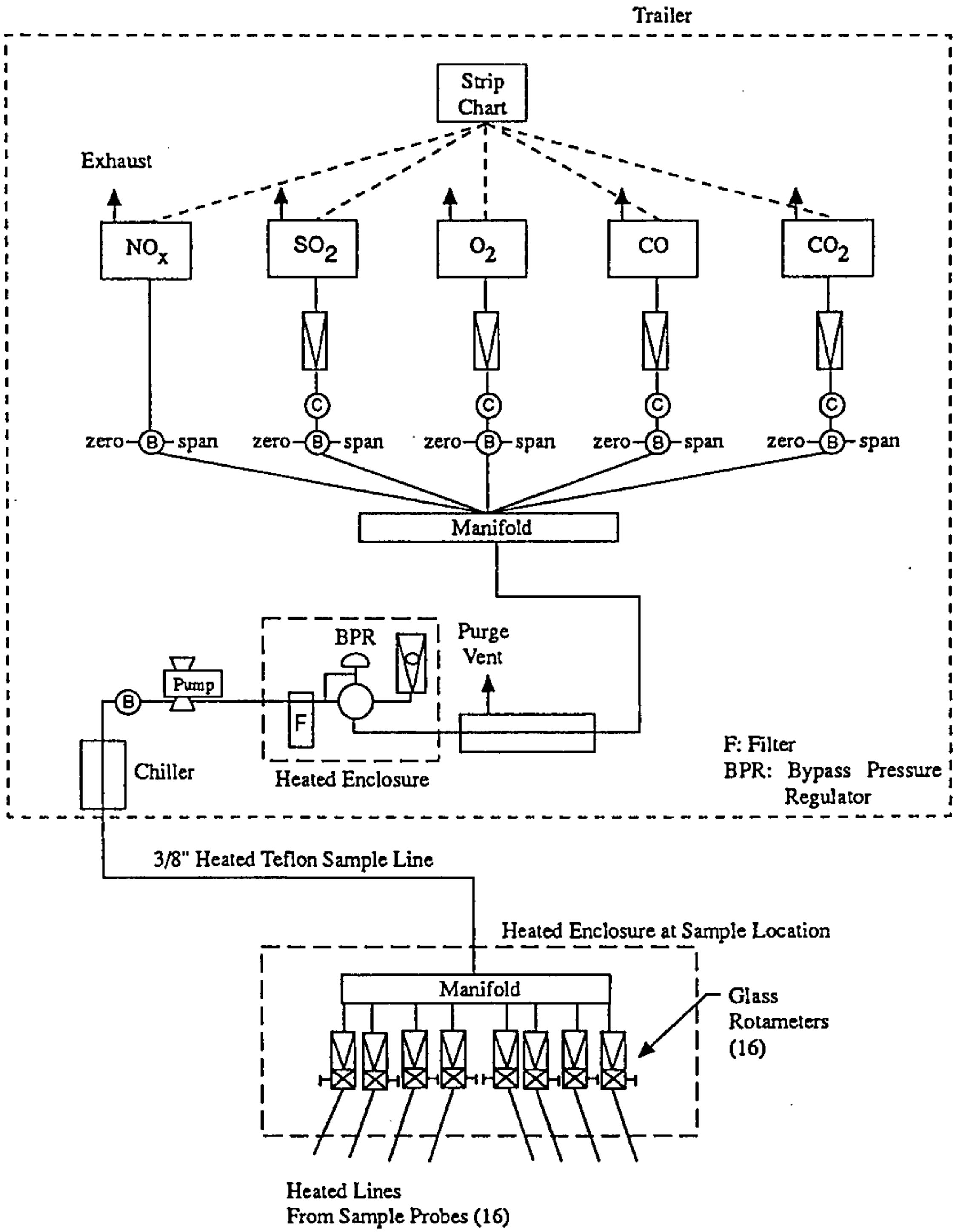


Figure 4-2. Schematic of continuous emissions monitoring system

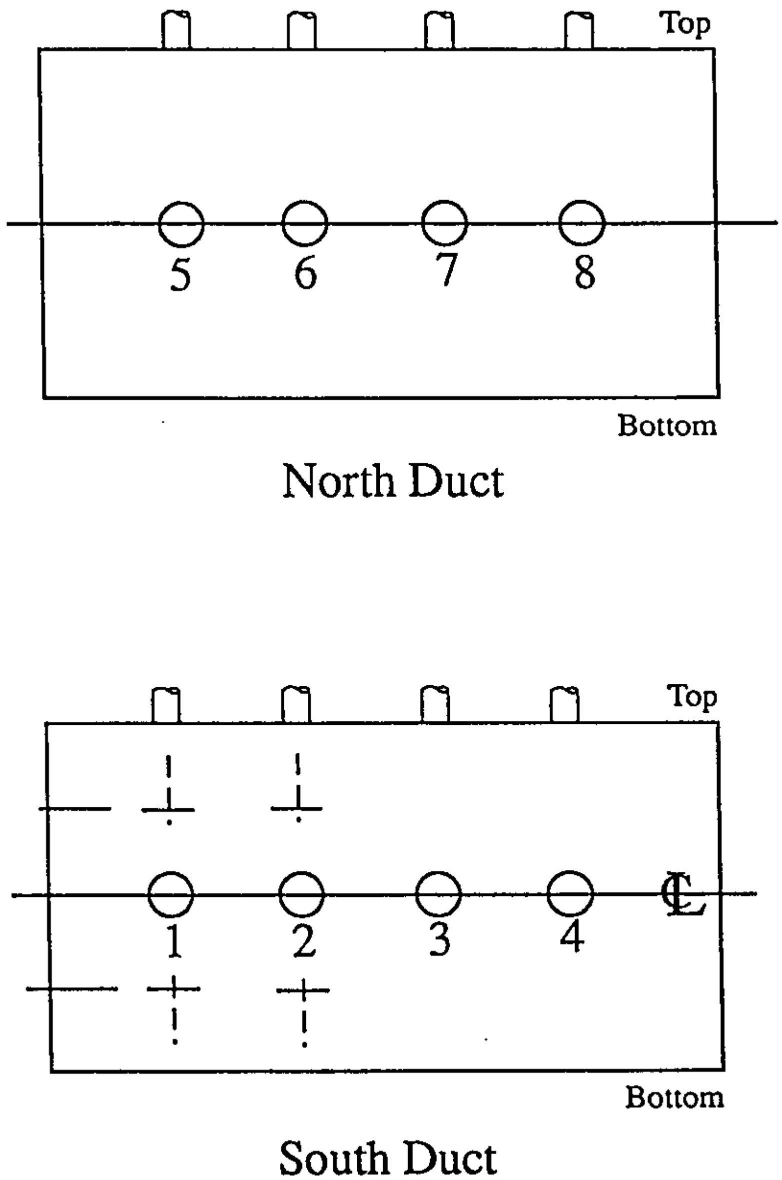


Figure 4-3. Economizer exit gas sampling grid

TABLE 4-6. CONTINUOUS EMISSIONS MONITORING SYSTEM (CEMS)

Parameter	Instrument Manufacturer	Model Number	Detection Principle	Measurement Ranges
NOx	Thermo Electron	10A	Chemilumiescence	0 - 2.5 ppm to 0 - 10,000 ppm
CO	ANARAD	5000R	Infrared	0 - 500 ppm 0 - 2000 ppm 0 - 2%
CO2	ANARAD	5000R	Infrared	0 - 25%
SO2	Western Research	721AT	Ultraviolet	0 - 100 ppm to 0 - 5000 ppm
O2	Taylor-Servomex	OA572	Paramagnetism	0 - 5% 0 - 10% 0 - 25%
Hydrocarbons	Beckman	402	Flame Ionization	0 - 5 ppm to 0 - 25%

TABLE 4-7. SAMPLING SCHEDULE

Measurement Parameter	Sampling Location	Sampling Procedure	Parametric Frequency	Long Term Reference
Coal				
Raw sample	At each mill	Grab sample	1 per mill per test	1 per mill per day
Proximate and ultimate analysis and grindability	"	ASTM Procedures	1 per month	1 per month
Pulverized coal size and flowrate to each burner	"	RotoProbe	1 per month	1 per month
Mill setting	"	Manual recording	Each test point	Daily
Furnace measurements				
Gas temperature	Selected locations	Suction pyrometer	Selected condition	None
Gas velocity	"	Pitot tube	"	"
Fouling rate	"	Air cooled fouling probe	"	"
Gas composition				
O2	Boiler outlet	Extractive	Continuous	Continuous
SO2	or breeching	"	"	"
CO	"	"	"	"
CO2	"	"	"	"
NO, NO2	"	"	"	"
THC	"	"	"	"
Hopper flyash				
Elemental	Slag tank, boiler	Composite grab	Weekly	
Ash	outlet hopper,	sample	"	
Elemental	and BH hopper	"	"	
Fusion Temp.	"	"	"	
In-situ flyash				
Loading	BH inlet and outlet	EPA Method 5 or 7	Daily	1 per week
Particle size distribution	BH outlet	Cascade impactor	As required	1 per week
Resistivity	BH outlet	Resistivity probe	As required	1 per week
Carbon	Economizer inlet	Modified EPA Method 17	Daily during GR	1 per week
Boiler performance		BPMS Calculation	Continuously	Continuously
N2O		Portable meter	As needed	As needed

TABLE 4-7. SAMPLING SCHEDULE (con't).

Measurement Parameter	Sampling Location	Sampling Procedure	Parametric Frequency	Long Term Reference
Control room readings		Manual recording	Each test point	Daily
Flame stability		Visual observation	Each test point	Daily
Economizer particulate		24-point traverse	As needed	As needed
Furnace velocities		Cooled pitot probe	As needed	As needed
Incident heat flux at 12 furnace locations		Land fluxprobe	Selected condition	1 per month
Furnace wall CO and O2 at 12 locations		Portable meter	Selected condition	1 per month
Temperature at gas and overfire air injection planes		Suction pyrometer	Selected condition	1 per month

The boiler measurements made were divided into four classes: input measurement, boiler performance measurements, emissions measurements, and durability and operability measurements. Each of these categories is described below.

4.2.2.1 Input Measurements

Input are obtained by recording the parameters that dictate the unit operation. These parameters consisted of coal and natural gas properties and flow rates, the unit operation, and the GR-LNB operation.

A combined sample of the crushed coal being fed to each of the pulverizers was extracted at least ten times per week during the entire program and more frequently (at least twice daily) during optimization testing. Once per week a sample was analyzed for nitrogen and heat contents. Pulverized coal size and mass distribution to the individual burners was determined using the International Standards Organization Draft Standard ISO/TC27/SC 4/WG N25 sampling method plus sieve analysis (50, 100 and 200 mesh) of the samples. The rotating ISO-type probe, illustrated in Figure 4-4, extracts near-isokinetic samples from 64 equal-area points on a cross-section of each coal pipe. The results of these tests were used to determine whether the coal was being adequately pulverized and evenly distributed between the burners. A complete set of control room and boiler data were obtained at least once per hour during each steady-state test point and at least once per day during the long term demonstration. The data consisted mainly of:

- Sootblowing cycle
- Gross and net load
- Auxiliary power usage
- Fuel and air flow rates and excess air level
- Baghouse differential pressure

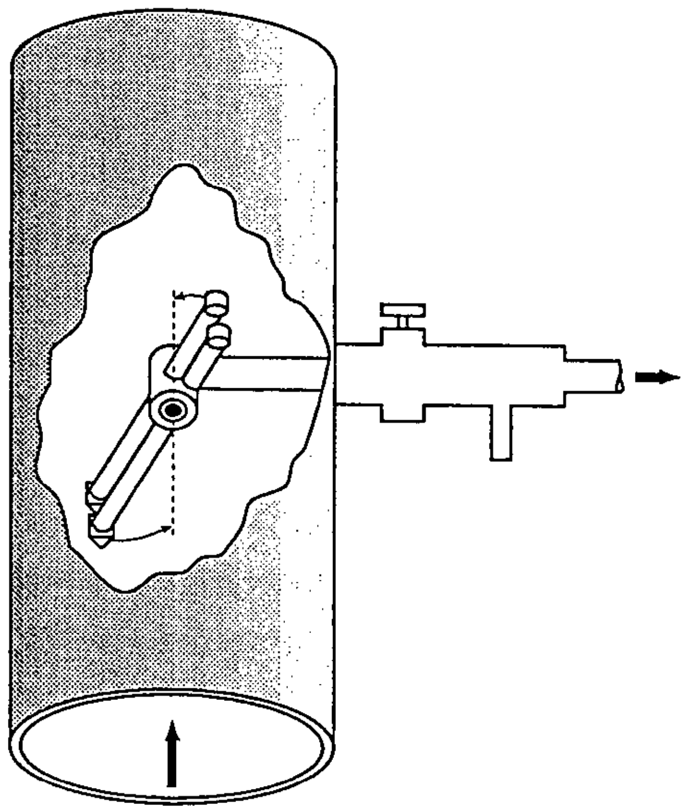


Figure 4-4. EER RotoProbe™ pulverized coal sampling probe

The purpose of the data was to thoroughly record the operating conditions (1) for comparison between baseline and GR-LNB conditions, (2) to check for and diagnose variations in performance from day to day, and (3) to provide necessary inputs for the calibration of boiler performance.

The following GR-LNB conditions were monitored:

- Primary zone stoichiometric ratio (LNB setting)
- Reburn zone stoichiometric ratio (natural gas flow rate)
- Burnout (OFA) zone stoichiometric ratio
- *Gas and air injector setting (mixing)*
- FGR flow rate

The LNB setting was simply recorded and the measured excess O_2 without the reburning was used to calculate the primary zone stoichiometric ratio. The reburn zone stoichiometric ratio was established by the natural gas flow rate. The gas flow rate was measured by a rate-of-flow meter, calibrated using a totalizing meter and stopwatch. The *burnout zone stoichiometric ratio was controlled by the OFA flow rate and was measured* by an Air Monitor® honeycomb flow meter with pitot rake. Overall uniformity of the fuel/air ratio was determined by traversing the economizer exit to determine excess oxygen.

4.2.2.2 Boiler Performance Measurements

The temperatures at the top of the furnace were measured once per hour throughout a full cycle from one routine sootblowing cycle until the next during baseline and optimization tests using a suction pyrometer with a radiation-shielded thermocouple (Figure 4-5). During the baseline tests temperatures were measured during normal unit dispatch including both steady state and transient conditions. During GR-LNB optimization tests, measurements were made under both steady state and load ramp conditions.

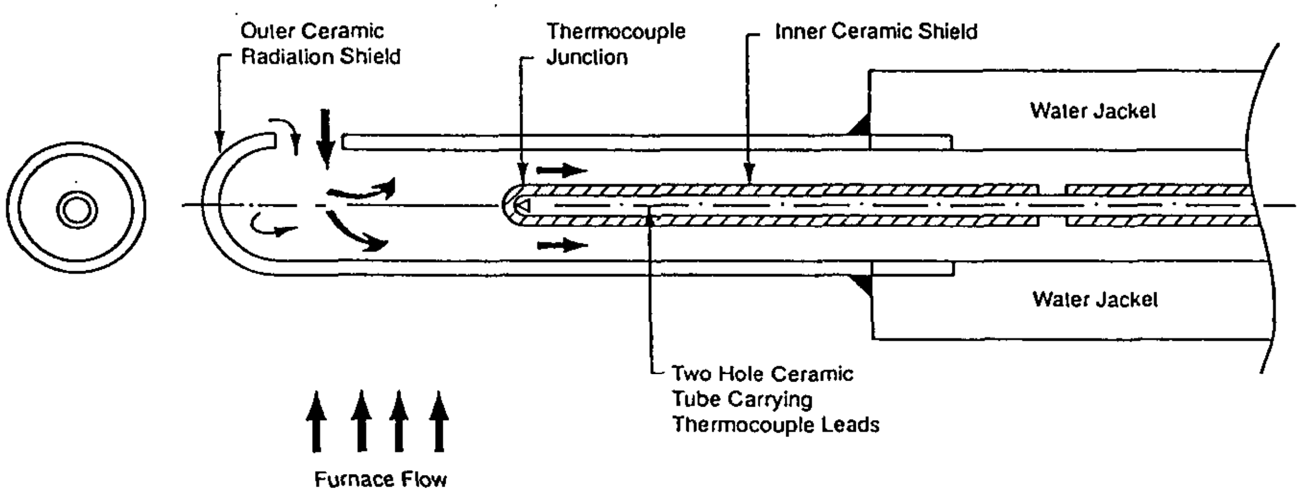


Figure 4-5. Suction pyrometer tip

Concentrations of CO and O_2 next to the furnace walls were measured in the reburn zone at maximum load for both baseline and GR conditions using a water-cooled probe. This information was used to assist in the tubewall wear analysis. Corrosion of furnace tubes is thought to be associated with low-melting ash components (particularly those containing iron) which exist under reducing conditions, and particularly in the presence of H_2S. The concentration of CO was measured using the same continuous monitoring system employed for other gas analyses. For zones having CO concentrations over 500 ppm next to the furnace wall, EPA Method 11 was used to determine H_2S concentration.

In addition to manual recording of control room data, boiler data were continuously logged by the BPMS. The data were used to estimate any changes in heat rate, ASME heat loss efficiency, and heat absorption distribution caused by GR-LNB.

Ash deposition amount and location in the furnace section of the boiler was recorded. Representative samples of the bottom ash collected in these tests were analyzed for carbon burnout. Fouling factors were calculated for furnace sections in the boiler and displayed as a function of time.

At least three times per shift while optimization tests were being conducted, visual observations of deposits on the furnace walls were recorded. Deposition on boiler fireside heat transfer surfaces were quantified in terms of decreased heat transfer to those surfaces. This information was calculated on-line by the BPMS.

Although convective pass cleanliness was not expected to be affected by GR-LNB, fouling factors (FF) were calculated for individual heat transfer segments in the boiler and displayed as a function of time. Deposition was also inspected during boiler outages and deposition locations recorded.

Fly ash size, composition and quantity was measured to provide an indication of combustion completeness. Mass balances of carbon, ash and sulfur were also performed.

4.2.2.3 Emissions Measurements

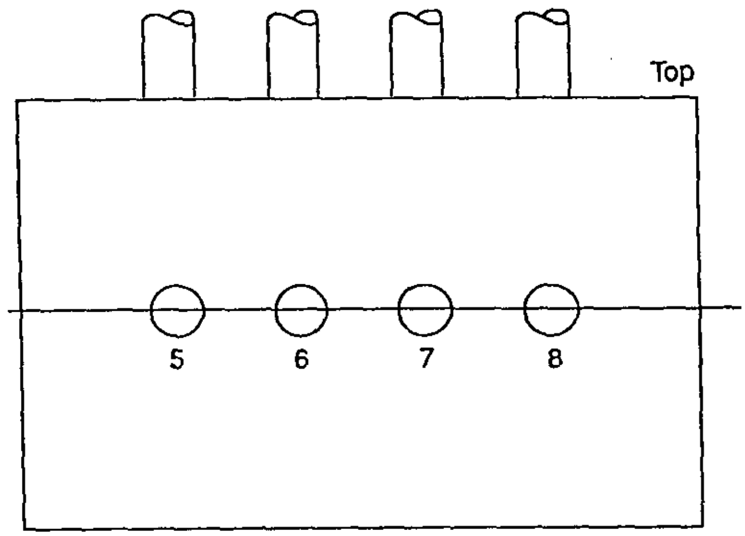
At selected test points, the conditions at the economizer exit were determined by analyzing samples extracted from a 16-point traverse of the flue gases at the economizer exit. The sampling ports are shown in Figure 4-6. The following species were measured:

- O_2
- CO_2
- CO
- SO_2
- NO_x
- Hydrocarbons

$SO_3^=$ and N_2O were also determined on occasion. The ash samples were extracted isokinetically at each location. This information was used to determine the following:

- Local stoichiometric ratio (indicative of overall fuel:air mixing)
- Local combustion efficiency

Although a certain amount of mixing occurred in the convective section of the boiler, nonuniformities remaining at the economizer exit often provided useful indications of mixing deficiencies in the furnace, where the combustion and reburning reactions predominantly occurred. This information was used for diagnostic purposes and to determine how closely ideal mixing had been achieved.



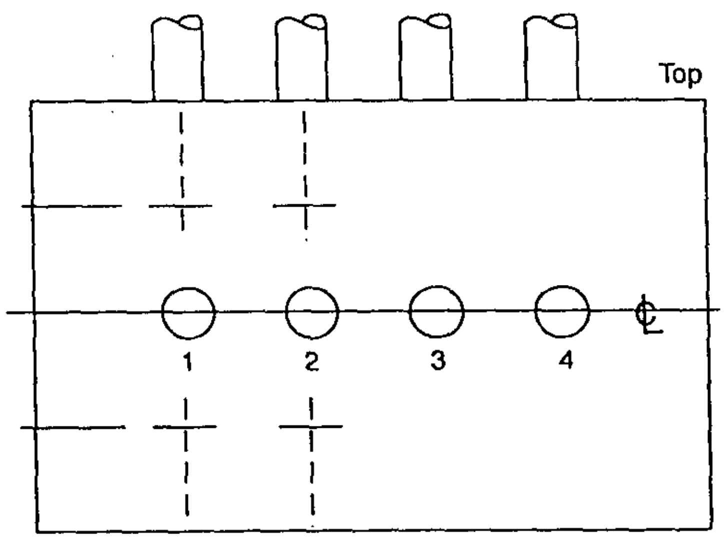


Figure 4-6. Economizer exit gas sampling grid

Table 4-6 summarizes the continuous emissions monitoring system (CEMS). The O_2 in the flue gas provided an indication of the boiler excess air and was used to convert the other emissions concentrations to a standard condition. The CO_2 provided a means of checking the O_2 measurements based on the fuel composition and a carbon mass balance. Carbon monoxide concentration provided a relative indication of combustion efficiency. The concentration of CO was typically below 200 ppm in coal-fired boilers. It was monitored to determine whether GR-LNB caused a change in emissions or combustion completeness. Carbon monoxide and O_2 stratification across the boiler exit was used as an indication of fuel/air mixing. Also, SO_2 stratification combined with excess O_2 was used as an indicator of fuel distribution.

A schematic diagram of the CEMS system used at Cherokee is shown (see Figure 4-2). The key features of the system included:

- Multiple probes
- Rotameters to provide accurate flow rate balancing
- Heating of components upstream of moisture removal equipment
- Sample filtration to remove fine particulate matter
- Use of a permeable membrane drier for moisture removal

A multiple array of sixteen probes was plumbed to a mixing manifold to obtain a representative sample. Glass rotameters were used to provide an on-line indication of each probe flow rate. Phase discrimination probes were used to provide inertial separation of particulate at the probe tip while minimizing the contacting of the gas with the particulate. All components outside the duct were heated to 250 °F minimum and insulated to eliminate the possibility of condensation in the sample system.

EPA Reference Methods were used to verify the emissions measurements obtained with the CEMS. EPA Method 3 was used to verify CO_2 and O_2 measurements. Measurements of SO_2 were verified using EPA Method 6 and NO_x measurements were verified with EPA Method 7. The Method 3 and Method 6 sampling was performed at both the air heater inlet (economizer outlet) and stack to verify the CEMS measurements.

The test port locations at the baghouse inlet are shown in Figures 4-7 and Figure 4-8. Both are consistent with U.S. EPA Method 1. Resistivity of the gases with particulate entering the baghouse was measured using a Wahlco cyclonic flow probe. Particulate loading at the inlet was measured using EPA Method 17. The velocity at the inlet was measured using EPA Method 2. The velocity information was used as input to Method 17 and to check the uniformity of flow.

The size of the particulate at the baghouse inlet was determined by single-point sampling with a Brinks cascade impactor, which is suitable for high dust loadings. The measurements were used to determine the efficiency of the baghouse and/or diagnose problems of baghouse efficiency.

Particulate emissions at the baghouse outlet were measured using EPA Method 17. Particulate emissions, together with particulate mass flux measured at the baghouse inlet, were used to calculate baghouse collection efficiency. Particulate size at the baghouse outlet was measured using an Andersen Mark-III cascade impactor.

4.2.2.4 Durability and Operability

U.T. testing was performed on the boiler tubewalls to collect data for the wear analysis following the recommendations in EPRI Report CS4633, "Fossil-Fired Boiler Tube Inspection." A digital thickness gauge and an oscilloscope were used to survey 4,150 points along the furnace wall.

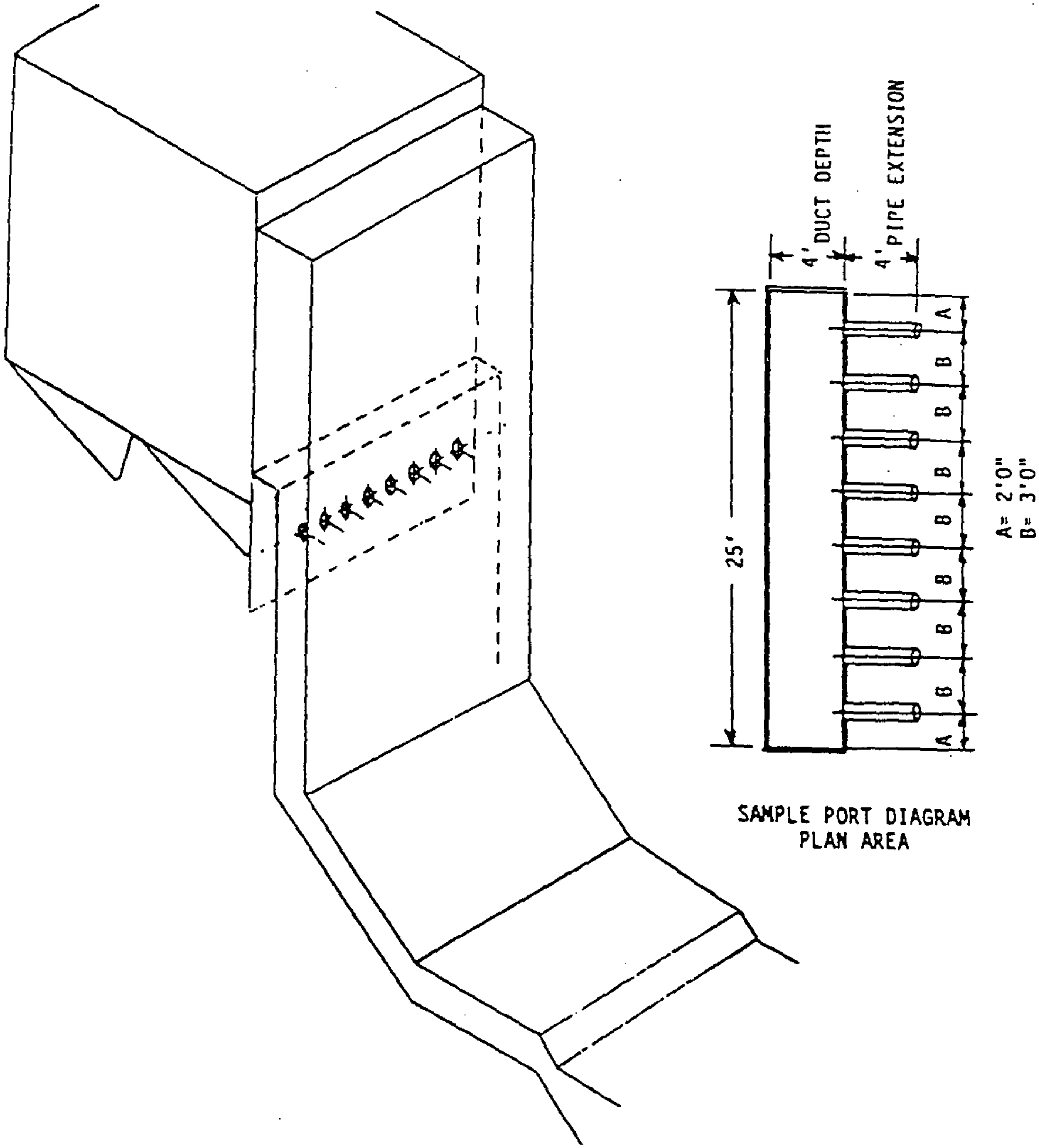


Figure 4-7. Baghouse inlet duct arrangement

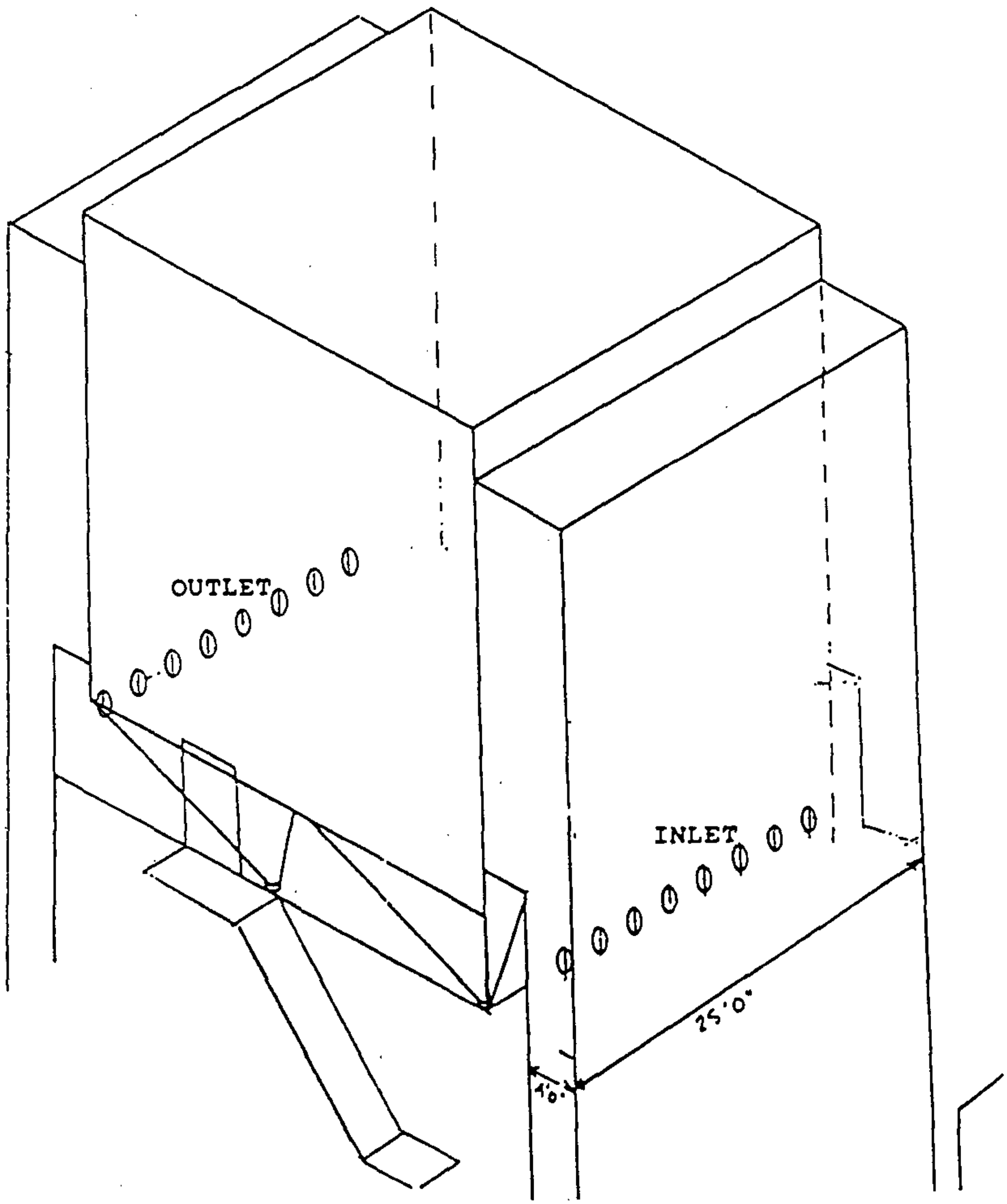


Figure 4-8. Baghouse sampling locations

4.3 Analyses of Feed Stocks, Products and Reagents

The Cherokee Station fires coals from four Colorado mines. Ninety percent of the coal fired is from either the Yampa Valley or Empire Energy Mines (Table 4-8) operated by Cyprus Coal Company. These coals have a High Volatile C Bituminous ranking. They typically contain 0.4 to 0.5% sulfur, 1.1 to 1.4% nitrogen, and have higher heating values of 10,600 to 10,900 Btu/lb. They have good ignition characteristics as indicated by the fixed carbon/volatile matter ratio below 2.0.

They have medium slagging propensity, as determined by ash fusion temperatures, and medium fouling propensity, as determined by the mineral content (sum of Ca, Mg, Fe in ash). They have relatively low grindability however, with an HGI of 41 to 47. They have relatively low moisture and ash content and relatively high heating value, all of which are characteristics of this rank of coal. The coal ash fusion temperatures under oxidizing and reducing conditions indicate a medium slagging propensity. Therefore, minimal slag buildup would be expected under normal oxidizing conditions in a relatively large furnace.

The composition of the natural gas is shown in Appendix B.

4.4 Data Analysis Methodology

The performance of the GR system in controlling NO_x was evaluated through a standard technique described in this section. The three furnace stoichiometric ratios (SR_1, SR_2, and SR_3) are used to evaluate the GR process under fixed conditions. The process was fixed by holding process parameters constant, as will be illustrated.

TABLE 4-8. ANALYSIS OF EMPIRE COAL FIRED ON CHEROKEE UNIT #3

PARAMETER	VALUE
As Received	
Btu/lb	10,604
Moisture	12.67
Ash	8.40
Fixed Carbon	43.59
Volatiles	35.34
Ultimate Analysis	
Carbon	60.36
Hydrogen	4.12
Nitrogen	12.98
Sulfur	0.35
Oxygen (by difference)	12.57
Mineral Analysis of Ash	
Silica SiO_2	52.53
Alumina Al_2O_3	27.01
Titania TiO_2	0.86
Ferric Oxide Fe_2O_3	5.11
Calcium Oxide CaO	4.06
Magnesia MgO	0.98
Potassium Oxide K_2O	0.87
Sodium Oxide Na_2O	2.54
Sulfur Trioxide SO_3	3.13
Phosphorus Pentoxide P_2O_5	1.04
Ash Fusion Temperature	
(Reducing Atmosphere)	
Soft (H=W)	2654
Fluid	2700
Grind	46.9

The stoichiometric ratios (SR_1, SR_2, and SR_3) are defined by the following equations:

$$SR_1 = (TA - OFA)/CSA$$
$$SR_2 = (TA - OFA)/(CSA + GSA)$$
$$SR_3 = TA/(CSA + GSA)$$

Where:

TA = Total Combustion Air, scfm
OFA = Overfire Air, scfm
CSA = Coal Stoichiometric Air, scfm
= (Coal Theoretical Air, scf/lb) x (Coal Flow, lb/min)
GSA = NG Stoichiometric Air, scfm
= (NG Theoretical Air, scf/scf) x (NG Flow, scfm)

Several approximate equations may be derived from the above set of equations/definitions. These are only approximate but are useful in correlating results.

Coal Fraction = CSA/(CSA + GSA) = SR_2/SR_1
NG Fraction = 1 - Coal Fraction = $(SR_1 - SR_2)/SR_1$
Coal Air Fraction = (TA - OFA)/TA = SR_2/SR_3
OFA Fraction = OFA/TA = $(SR_3 - SR_2)/SR_3$

The above four equations relate seven variables (SR_1, SR_2, SR_3, Coal Fraction, NG Fraction, Coal Air Fraction, and OFA Fraction). Therefore, for a given load the GR system is fixed if three of these process variables are fixed. Examples of sets of variables which fix the system are (SR_1, SR_2, and SR_2), (SR_1, NG Fraction, and SR_3), or (SR_1, NG Fraction, and OFA Fraction). When NO_x emissions are plotted as a function of one of these variables, two other variables must be held constant to see the effect of the variable. The following illustrates how NO_x data should be graphically displayed:

Plot	Variables to be Fixed
NO_x vs. SR_2	(SR_1, SR_3), (NG Fraction, OFA Fraction) (SR_1, OFA Fraction), or (NG Fraction, SR_3)
NO_x vs. NG Fraction	(SR_1, SR_3), (SR_2, SR_3) (SR_1, OFA Fraction), or (SR_2, OFA Fraction)

The percentage of a parameter can be used in place of the fraction of a quantity (i.e. gas heat input may be used in place of NG Fraction).

The program quality assurance (QA) objectives for precision, accuracy and completeness are listed in Table 4-9 for each critical measurement. These QA objectives were based on the program requirements and the precision and accuracy levels achievable by the selected measurement methods. The results of previous methods evaluation studies and EER's experience were used to determine the anticipated precision and accuracy limits of each method. The values for precision are defined as the relative standard deviation (RSD), the ratio of the standard deviation to the mean, expressed as a percentage. Accuracy is the relative difference (expressed as a percentage) between the measured value and a known, or standard, reference value. Completeness is the percentage of the total data set which is accepted as valid.

4.5 Data Summary

Operating data collected during the parametric and long term testing are presented in Appendix A. The following data are included:

- LNB and LNB-OFA emissions data
- LNB and LNB-OFA operating conditions and steam data
- LNB and LNB-OFA heat transfer data
- GR-LNB emissions data
- GR-LNB operating conditions and steam data
- GR-LNB heat transfer data
- Modified LNB and LNB-OFA emissions data
- Modified LNB and LNB-OFA operating conditions and steam data
- Modified LNB and LNB-OFA heat transfer data
- Second Generation GR-LNB emissions data

TABLE 4-9. PROGRAM OBJECTIVES FOR CRITICAL MEASUREMENT DATA

Measurement Parameter	Reference	Precision RDS	Accuracy	Completeness
Coal				
Proximate				
Volatiles	ASTM D-3172	10%	10%	90%
Fixed Carbon	ASTM D-3172	10%	10%	90%
Moisture	ASTM D-3172	10%	10%	90%
Ash	ASTM D-3172	10%	10%	90%
Ultimate				
Carbon	ASTM D-3176	2%	2%	90%
Hydrogen	ASTM D-3176	5%	5%	90%
Nitrogen	ASTM D-3176	10%	10%	90%
Ash	ASTM D-3176	10%	10%	90%
Sulfur	----------	10%	10%	90%
Coal Ash				
Elemental	ASTM D-2795	10%	10%	90%
Fusion Temp.	ASTM D-1857	10%	10%	90%
Heating Value	ASTM D-2015	2%	2%	90%
Furnace measurements				
Gas temperature	----------	5%	5%	90%
Gas velocity	----------	10%	10%	90%
Fouling rate	----------	10%	----------	90%
Gas composition				
O2	EPA Method 3A	2%	20%	90%
SO2	EPA Method 6C	2%	20%	90%
CO	----------	2%	20%	90%
CO2	EPA Method 3A	2%	20%	90%
NO,NO2	EPA Method 7E	2%	20%	90%
THC	EPA Method 25B	5%	20%	80%
Hopper flyash				
Elemental	ASTM D-2785	10%	10%	90%
Carbon	ASTM D-3176	10%	10%	90%
Ash	ASTM D-3174	10%	10%	90%
Elemental	ASTM D-2795	10%	10%	90%
Fusion Temp.	ASTM D-1875	10%	10%	90%
In-situ flyash				
Loading	EPA M5 or M17, 40 CFR 60, App. A	10%	10%	90%
Carbon	EPA M17 and ASTM D-3172	10%	10%	10%

- Second Generation GR-LNB operating conditions and steam data
- Second Generation GR-LNB heat transfer data
- 100% gas firing emissions data
- 100% gas firing operating conditions and steam data
- 100% gas firing heat transfer data

Coal and natural gas analyses are presented in Appendix C. Graphs and analysis of the data are presented in Section 5.0.

4.6 Operability and Reliability

Following the parametric test program, the reburning system was converted to automatic mode. Hence, the system was operated with load following capability. The unit operated as designed in both manual and automatic modes. No problems were experienced. During long term testing, one incident caused the reburning system to be taken out of service for a duration of one week. Slag deposits were forming around the FGR/natural gas ports. Slagging was occurring around some of the FGR ports, however, the ports were not plugged. It was found that the shutoff damper on the discharge of a cooling air fan to the FGR ports (used when FGR is out of service) was not fully closing. The leakage of cold air was causing the slagging. The damper was subsequently repaired and testing resumed.

The LNBs, when operated without GR, did not reduce NO_x emissions to degree anticipated by the utility. The average NO_x reduction was 37% compared to an expected 45%. When EER terminated its activities at the site, Foster Wheeler (supplier of LNBs) was designing a system to route additional combustion (tertiary) air to the burners to improve the performance. There are currently no data available to assess the modification in this report.

4.6.1 Critical Component Failure Analysis

All equipment in the GR system functioned as planned. There were no critical component failures. During the testing a fire destroyed some of the natural gas injection equipment, but the cause was unrelated to the reburning system.

5.0 TECHNICAL PERFORMANCE

5.0 TECHNICAL PERFORMANCE

The objective of the test program was to demonstrate the effectiveness of combined GR-LNB technology in reducing NO_x emissions from a wall-fired power generating unit. This section presents the results of the demonstration using data from both short-term parametric/optimization tests and long-term tests. The presentation includes First Generation and Second Generation GR plus the results of gas/gas reburning tests.

5.1 Pre-Construction Baseline Testing

Baseline testing of the Cherokee unit was conducted on July 9-26, 1991. The testing was designed to monitor daily operation of the boiler and auxiliary equipment during predetermined load conditions in a manner consistent with normal operation. The parameters which were varied during testing were excess O_2 and load. No attempt was made to optimize the operation of the boiler before testing since the purpose was to document the "as found" condition.

A detailed Baseline Test Report was prepared during Phase I and submitted for record. The data from the report are summarized in Figures 5-1 through 5-3 which present NO_x, carbon-in-ash and CO results for the full load range, adjusted to a dry 3 percent O_2 basis.

At full load (150 MW_e net) the average emissions measured were:

NO_x	541 ppm (0.73 lb/10^6 Btu)
SO_2	355 ppm
CO	67 ppm
Carbon-in-ash	4.4 wt %

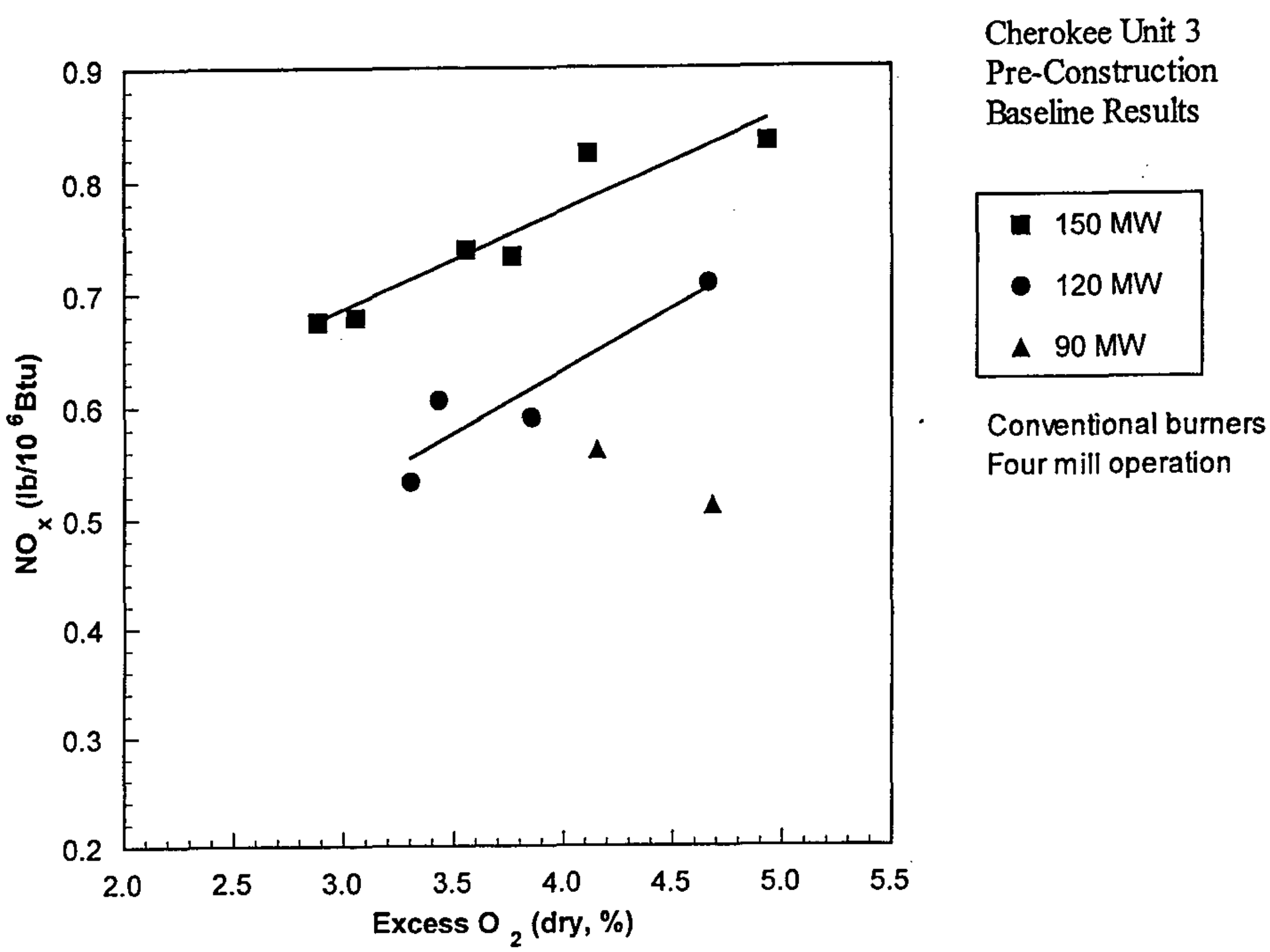


Figure 5-1. Pre-construction baseline NO_x versus furnace exit flue gas O_2

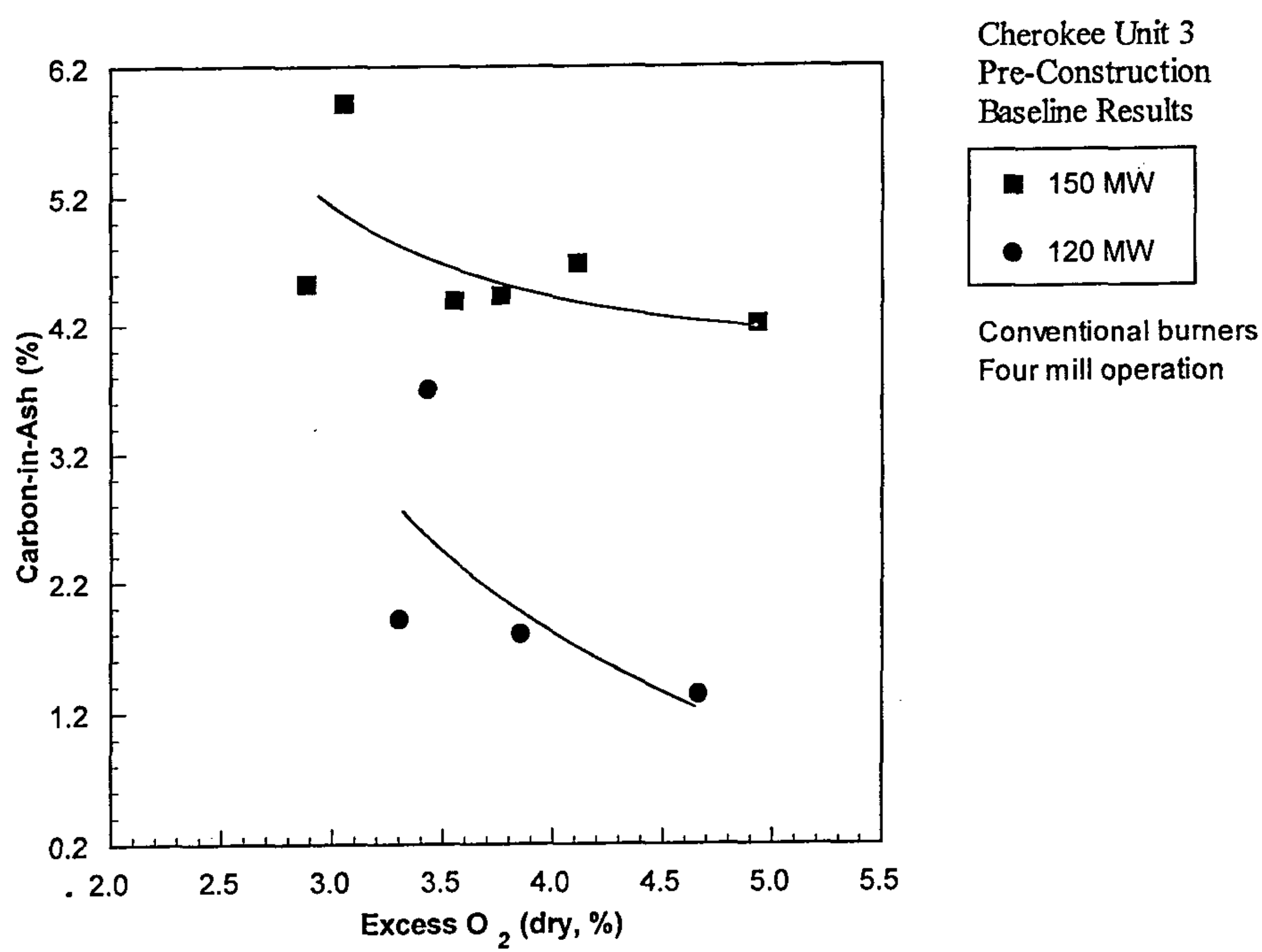


Figure 5-2. Pre-construction baseline fly ash carbon versus furnace exit flue gas O_2

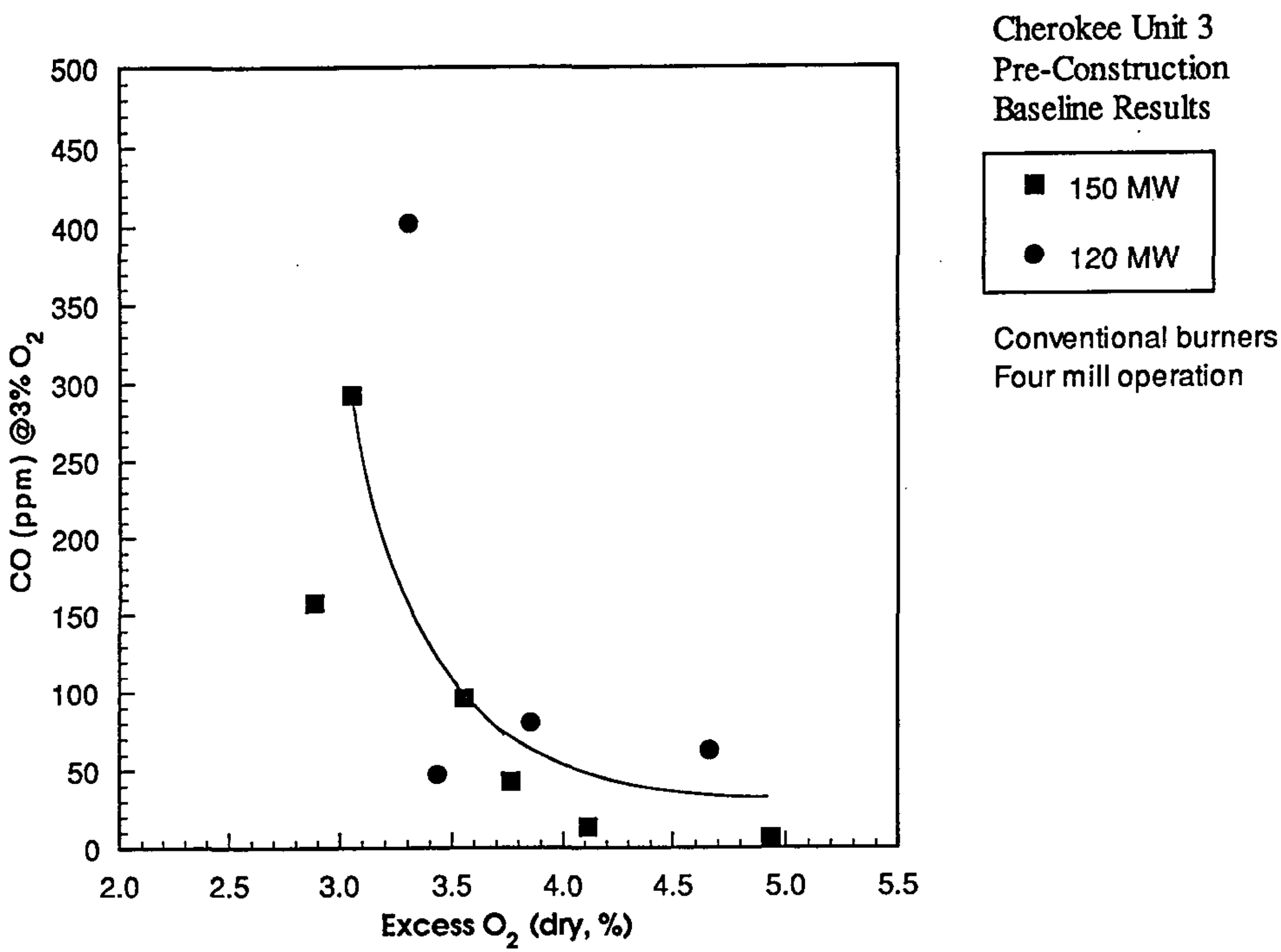


Figure 5-3. Pre-construction baseline CO versus furnace exit flue gas O_2

$\underline{NO_x}$ The baseline NO_x emission levels were considered reasonable and comparable to other wall-fired units of similar design, size and age. As expected, NO_x emissions increased as excess O_2 increased.

$\underline{SO_2}$ The baseline SO_2 emission levels were reflective of the low-sulfur coal that was fired.

$\underline{CO}$ The baseline CO emission levels increased as excess O_2 was decreased. During the tests, in some cases, the CO emission rates were high. It was believed that the high CO levels were caused by coal fineness out of specification on three of the four mills and the use of wet coal due to rain occurring during the test program.

$\underline{CO_2}$ The CO_2 levels were typical for the fuel fired.

Carbon-in-ash The carbon-in-ash levels increased with decreasing excess air, but were generally less than 5%.

5.2 GR-LNB Optimization Testing (First Generation GR)

The test program was designed to (1) evaluate the impacts of GR-LNB on gaseous emissions, boiler performance and operability, and operating costs, and (2) to determine the boiler set points required to reduce the NO_x emissions to the program goal of 70%. This section presents the results of the parametric/optimization tests performed on the First Generation GR system. The plan for the testing was presented in Section 4.1.1.

Optimization of the GR system was accomplished by systematically varying the process parameters of the system which affect overall NO_x emissions. The results of each parametric variation was used to establish the basis for the next parametric variation in succession. Thus the testing proceeded in logical fashion until all parameters were varied and their effects evaluated.

The sequence of testing was as follows:

- LNB emissions were measured without GR in operation and compared to the original baseline.

- The excess air fired in the burners was varied to determine the minimum excess air level at which the burners could be operated commensurate with maintaining acceptable carbon loss and CO emissions. These tests were performed with and without the OFA system in operation.

- The natural gas was varied to determine the relationship between NO_x emissions and gas heat input. The impact on carbon-in-ash was also assessed. The test series was used to study the effects of changes to the reburn zone stoichiometric ratio on reburn performance.

- The OFA was varied to determine the relationship between CO and excess air. The test series was used to identify the optimum overall excess air levels for reburn operation.

The majority of the tests were performed at full load (150 MW_e). However, a significant number of tests were performed at reduced load (120 and 90 MW_e).

5.2.1 Low NO_x Burners

The existing sixteen burners were replaced with FWEC internal fuel-staging LNBs. The burners employ dual combustion air registers which allow for control of air distribution at the burner, providing independent control of the ignition zone and flame shape. A NO_x reduction of 45% from baseline was projected at the full load condition.

5.2.1.1 LNB Baseline

The purpose of the test series was to (1) compare the performance with that of the original boiler equipment, and (2) establish stabilized conditions at the start of each GR-LNB parametric test. Prior to each GR-LNB test, the performance of the boiler was recorded (see Appendix B).

The results of the test series are presented in Figures 5-4 through 5-6. NO_x, carbon-in-ash and CO are plotted against excess air. The following table summarizes the average results and compares them to the original equipment baseline:

Furnace exit O_2	3%	4%	5%
NO_x (lb/10^6 Btu)			
baseline	0.68	0.77	0.86
LNB	0.42	0.49	0.54
% change	-38%	-36%	-37%
Carbon-in-ash			
baseline	5%	5%	4%
LNB	8%	5%	2%
CO (ppm)			
baseline	<300	<50	<50
LNB	<1000	<500	<100

The data show that the LNBs reduced NO_x emissions by about 37%. However, carbon-in-ash and CO could not be maintained at acceptable levels at the normal excess air level (~3%O_2). By boosting the excess air, the carbon-in-ash and CO could be lowered to approximately baseline conditions, but at the expense of higher NO_x emissions. Note that the targeted reduction in NO_x emissions of 45% was not achieved.

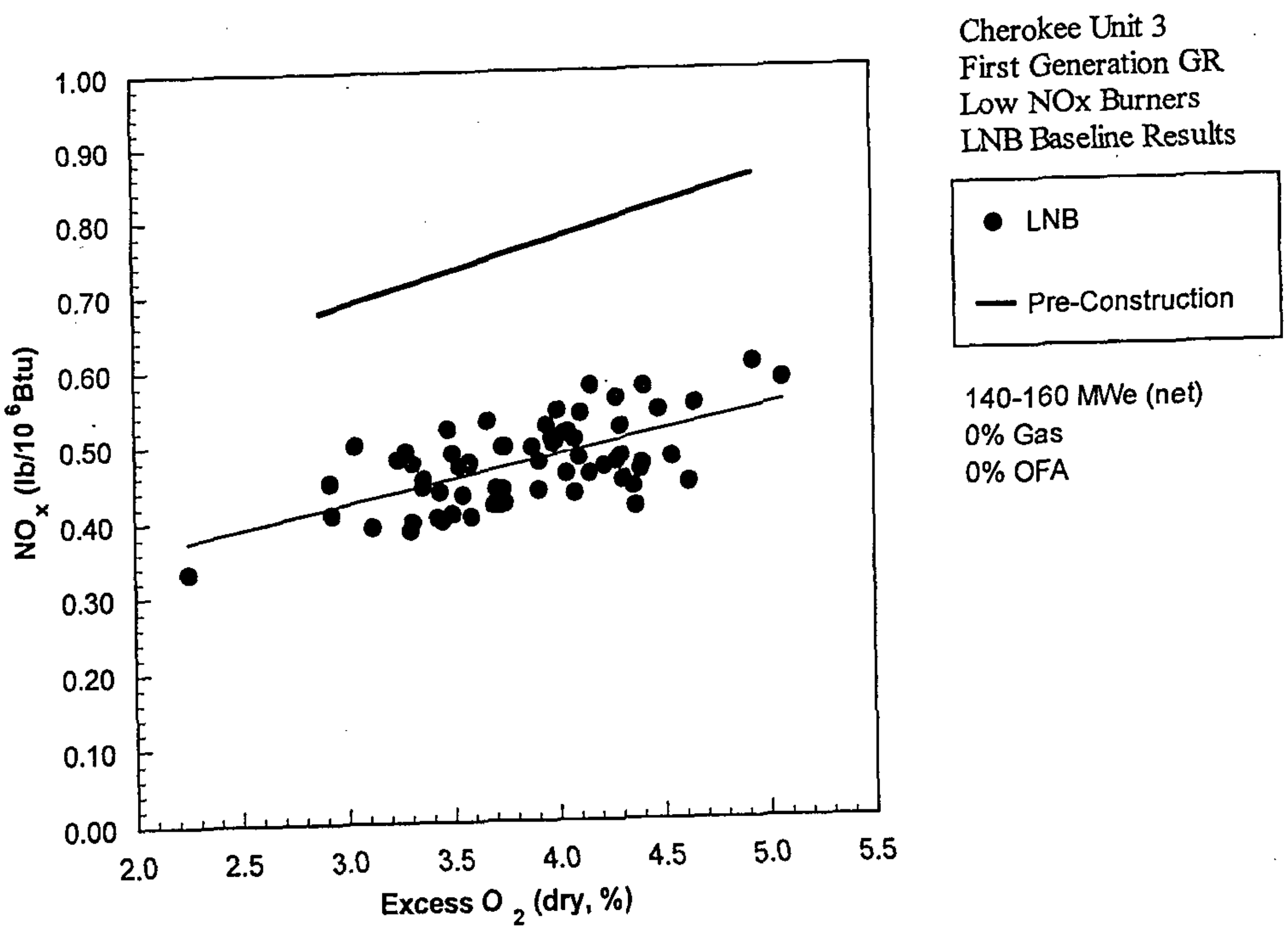


Figure 5-4. LNB baseline NO_x versus furnace exit flue gas O_2

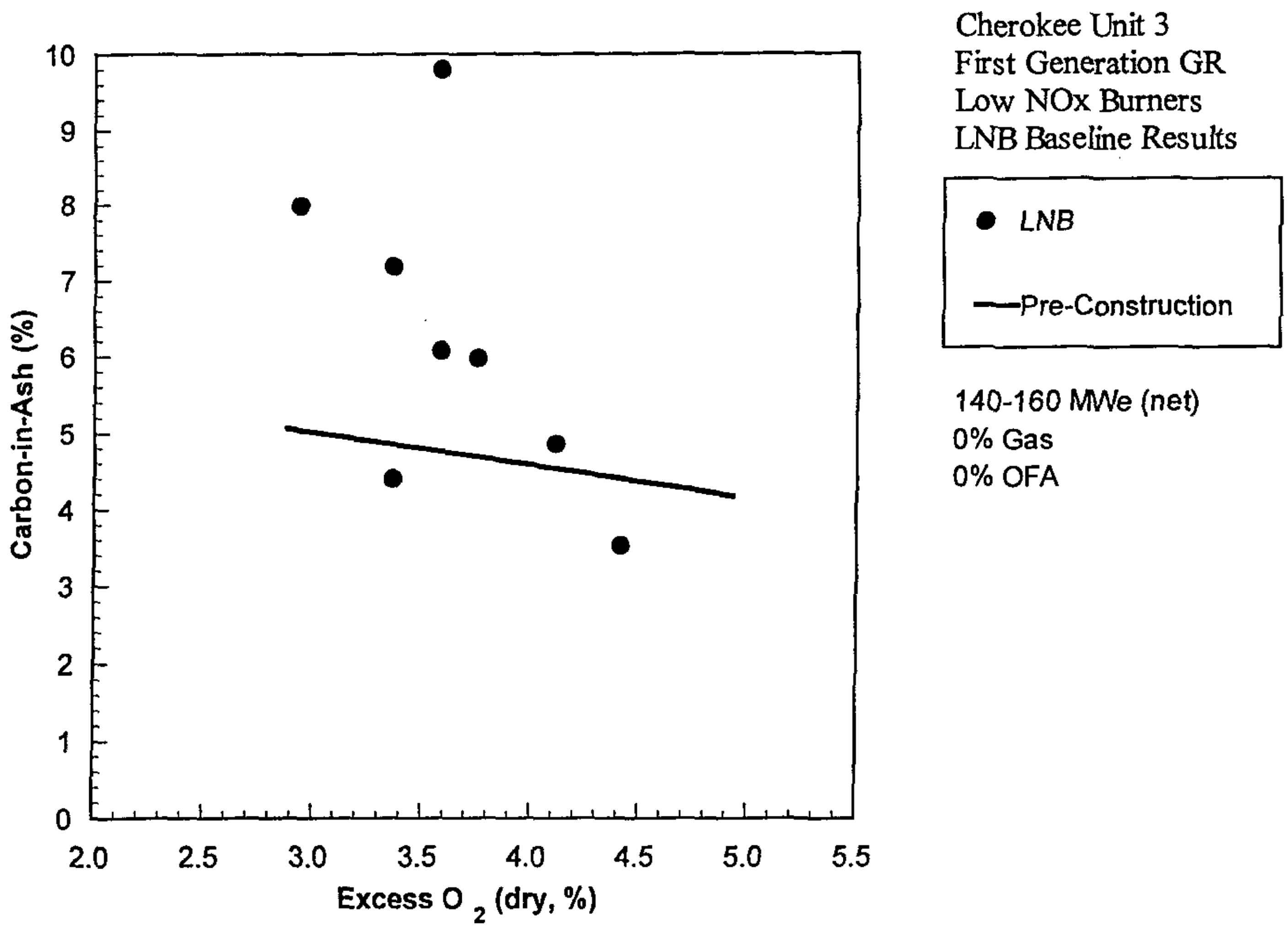


Figure 5-5. LNB baseline fly ash carbon versus furnace exit flue gas O_2

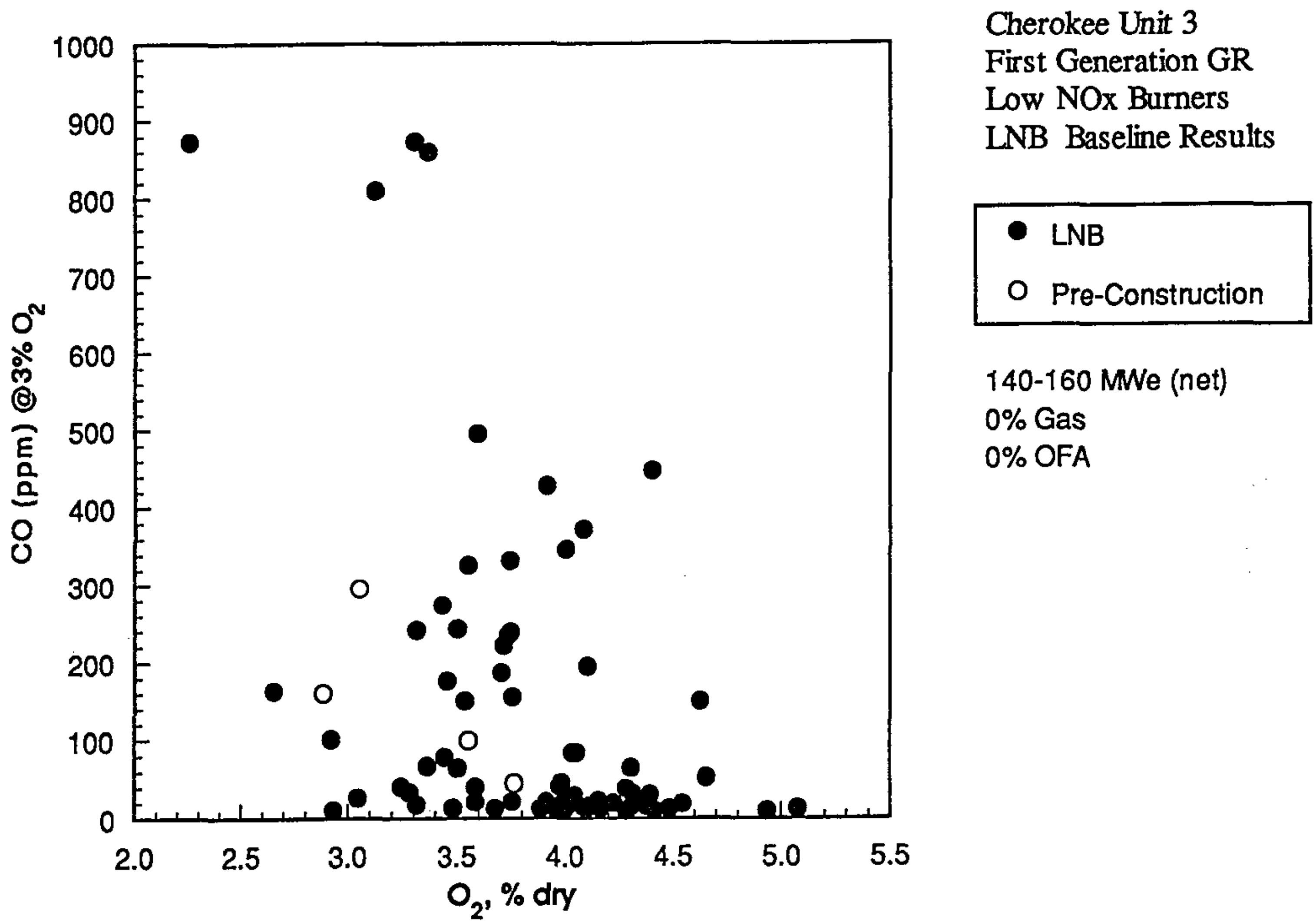


Figure 5-6. LNB baseline CO versus furnace exit flue gas O_2

5.2.1.2 Combustion Air Variation

The purpose of varying combustion air to the LNBs was to establish the relationships between primary zone stoichiometric ratio (SR_1) and boiler emissions and performance. If this ratio could be reduced, the level of NO_x reduction per amount of reburn fuel added would increase. In addition, reducing SR_1 results in lower NO_x emissions from the burners.

The normal operating SR_1 for the LNBs was approximately 1.23. If this ratio could be lowered, the result will be a reduced level of oxygen available to form fuel bound NO_x and thermal NO_x in the primary zone. SR_1 has a lower limit (unique for each boiler) to avoid localized pockets of oxygen deficient flue gas, otherwise known as reducing atmospheres, which could result in accelerated corrosion in the lower furnace. It should be noted that there were no indications of reducing atmospheres in the burner zone of the furnace and no evidence of accelerated boiler tube corrosion rates at any time during the test program.

The results of the test series are displayed in Figures 5-7 and 5-8 for NO_x, carbon-in-ash and CO versus SR_1. As expected, NO_x emissions were lower when SR_1 was reduced. The rate of reduction tapered off as SR_1 fell below 1.10. CO for the most part remained below 150 ppm, demonstrating that as SR_1 is reduced, CO can be controlled by the OFA ports. A negative impact was the higher level of carbon-in-ash (greater than 7%). A goal of the GR technology was to avoid increasing the unburned carbon.

5.2.2 Gas Reburning with Low NO_x Burners

This section discusses the impact of operating the gas reburning system with low NO_x burners. Included in this section are discussions of the effects of varying the levels of gas heat input, OFA and FGR.

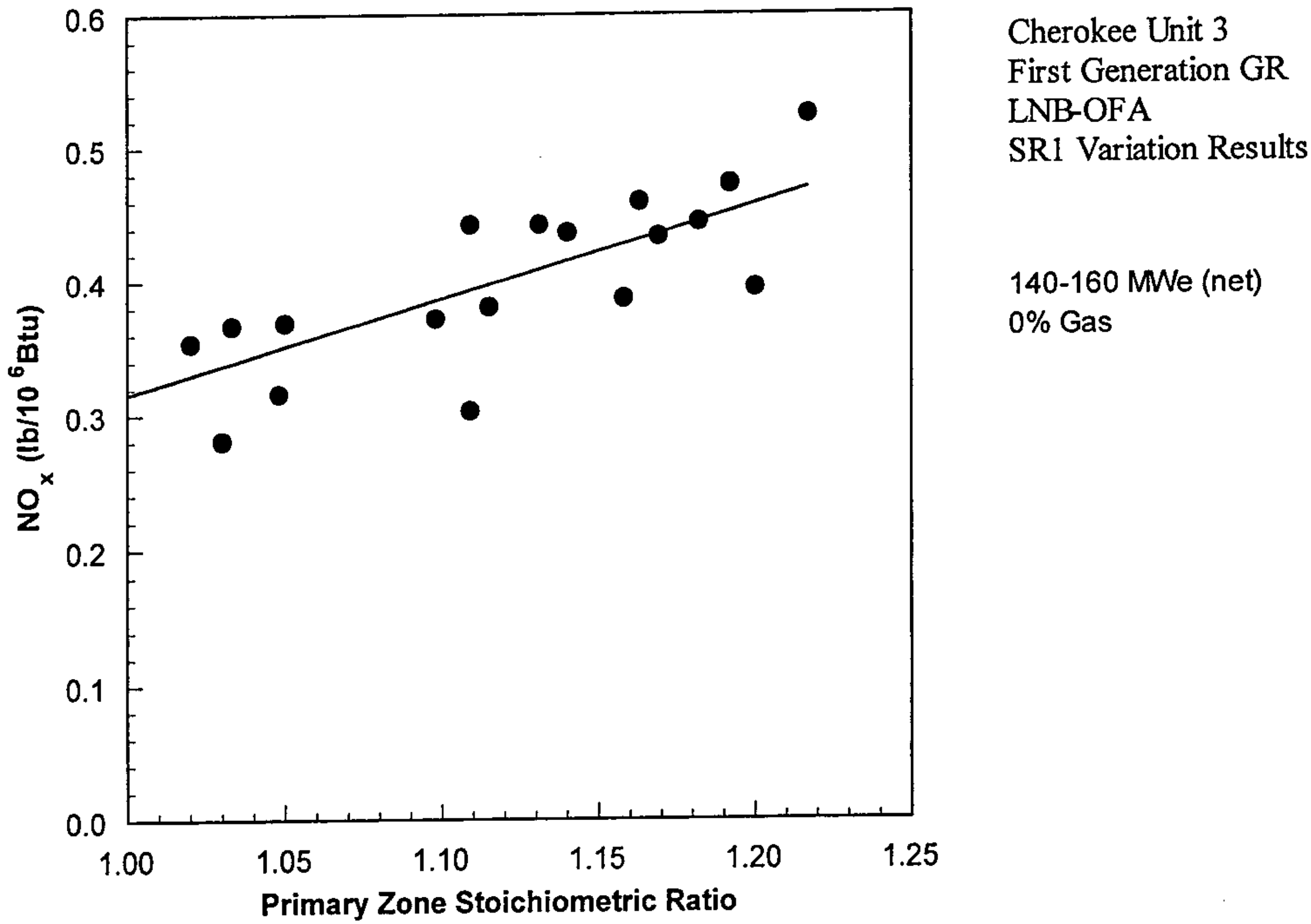


Figure 5-7. LNB w/OFA NO_x versus primary zone stoichiometric ratio (SR_1)

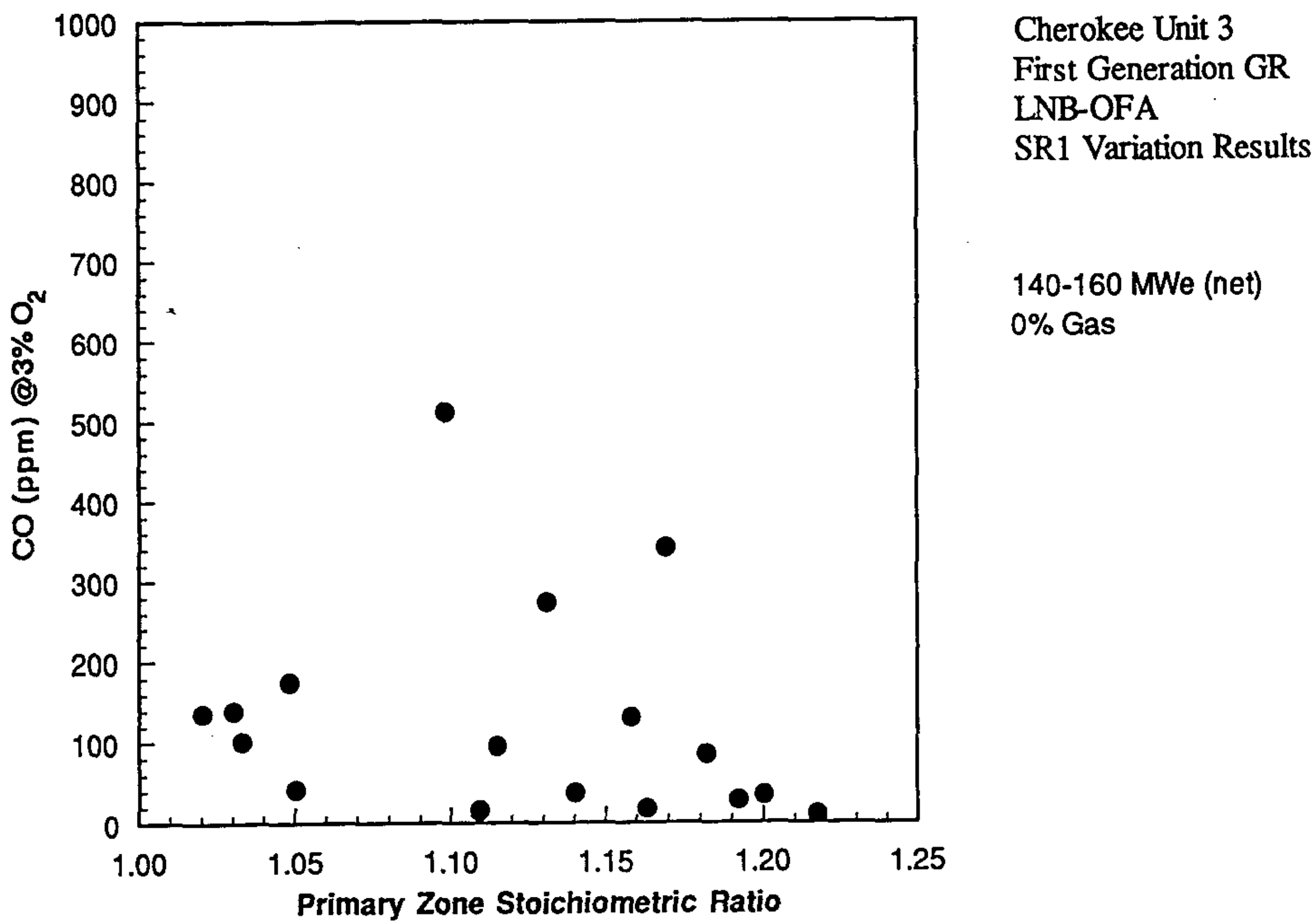


Figure 5-8. LNB w/OFA CO versus primary zone stoichiometric ratio (SR_1)

5.2.2.1 Gas Heat Input Variation

The tests of variable gas heat input were designed to establish its relationship with NO_x emissions. SR_2 is influenced by the amount of combustion air directed into the primary zone and the amount of gas injected into the reburn zone, measured as a percentage of total heat input to the boiler. Normally, the stoichiometric ratio of the flue gas exiting the primary zone is greater than 1.0. As natural gas is injected into the boiler, this ratio decreases and eventually creates a substoichiometric zone ($SR_2 < 1.0$) that is conducive to NO_x reduction. The lower the stoichiometric ratio entering the reburn zone, the less gas required to reach the optimum reburn zone stoichiometric ratio. Note that SR_2 is directly proportional to the gas heat input.

Small scale results have shown that overall NO_x reductions are highest when SR_2 is in the region of 0.90. Reducing the stoichiometric ratio below this level does not generally produce a significantly higher NO_x reduction. The natural gas flow rate is determined by (1) the lowest attainable operating SR level of the LNBs (including mills out-of-service), and (2) the boiler load.

Figure 5-9 presents the relationship between NO_x emission and gas heat input. Increasing the amount of reburn fuel lowers NO_x emissions. However, the greatest reburning benefit occurs within the first 10% of gas heat input. Figure 5-10 presents the relationship between SO_2 emissions and gas heat input. The emission reduction here is due solely to replacement of coal with gas. Figure 5-11 shows the relationship between CO emissions and gas heat input. This chart is provided for information only, since final CO levels are controlled with OFA.

Limited carbon-in-ash data are available. However, the results show that at the more desirable (lower) SR_1 the carbon-in-ash is no worse than that of the LNBs. Also, lower values of carbon-in-ash were observed at the higher gas heat input levels.

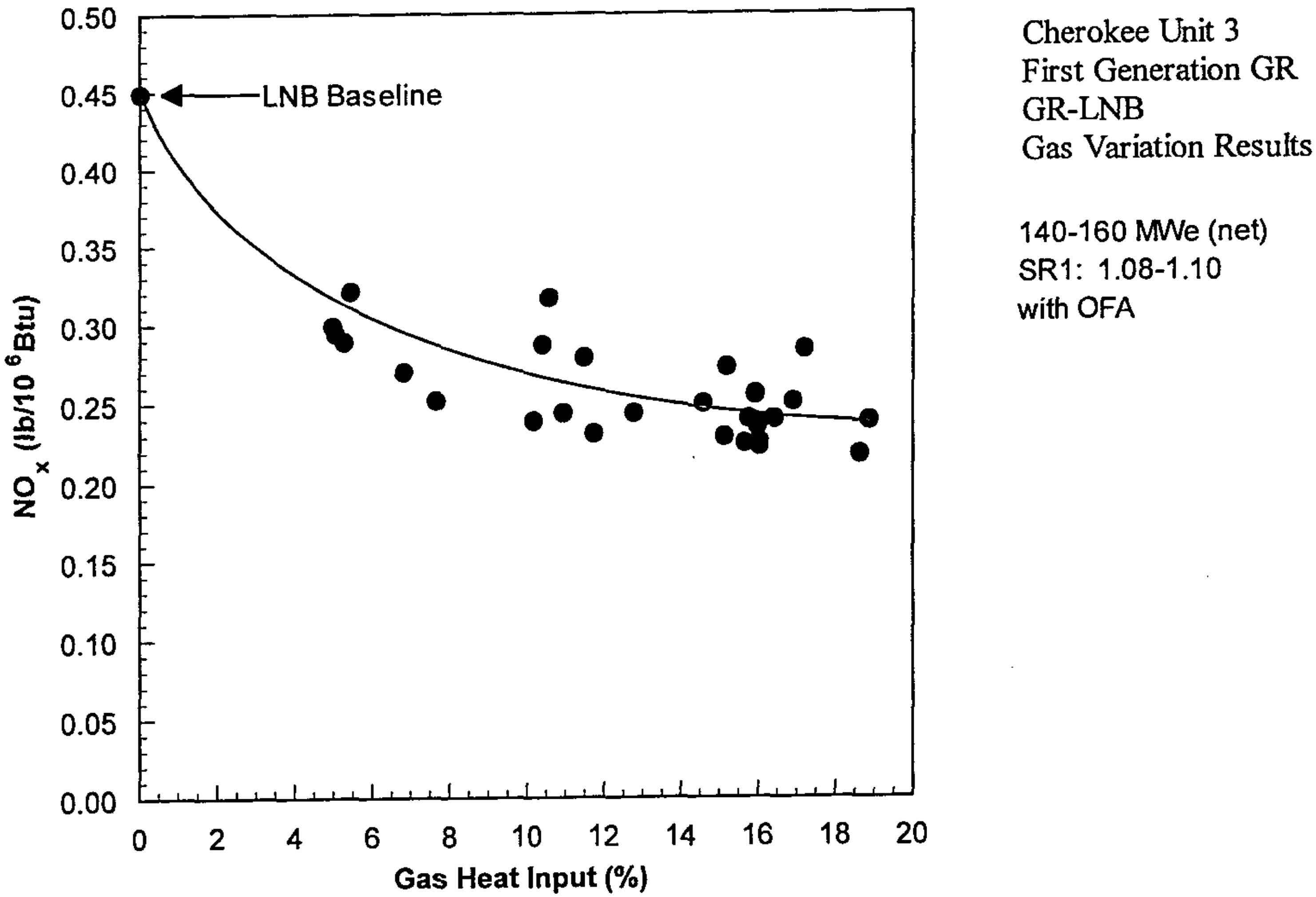


Figure 5-9. GR-LNB NO_x versus natural gas heat input reburn fuel

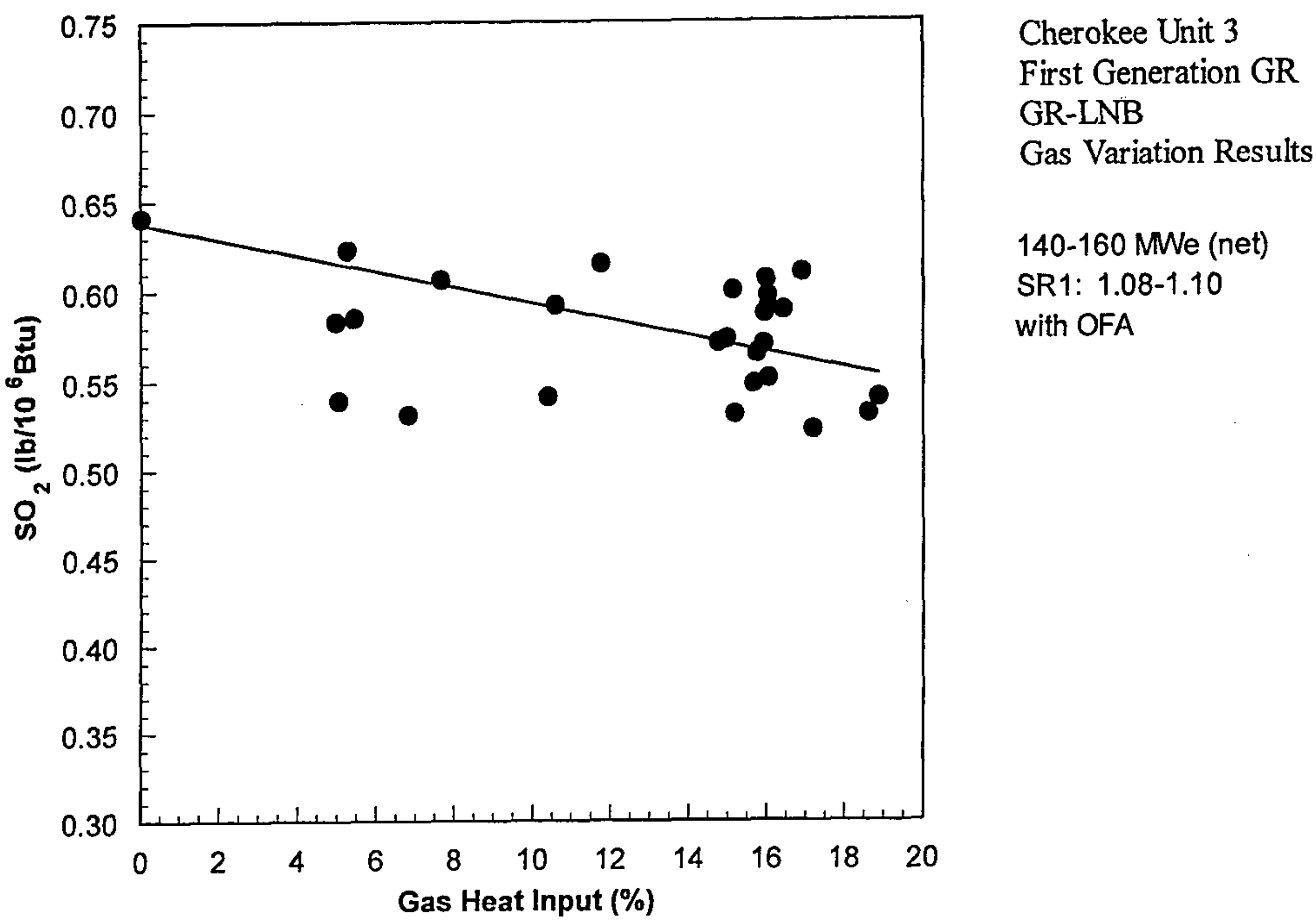


Figure 5-10. GR-LNB SO_2 versus natural gas heat input reburn fuel

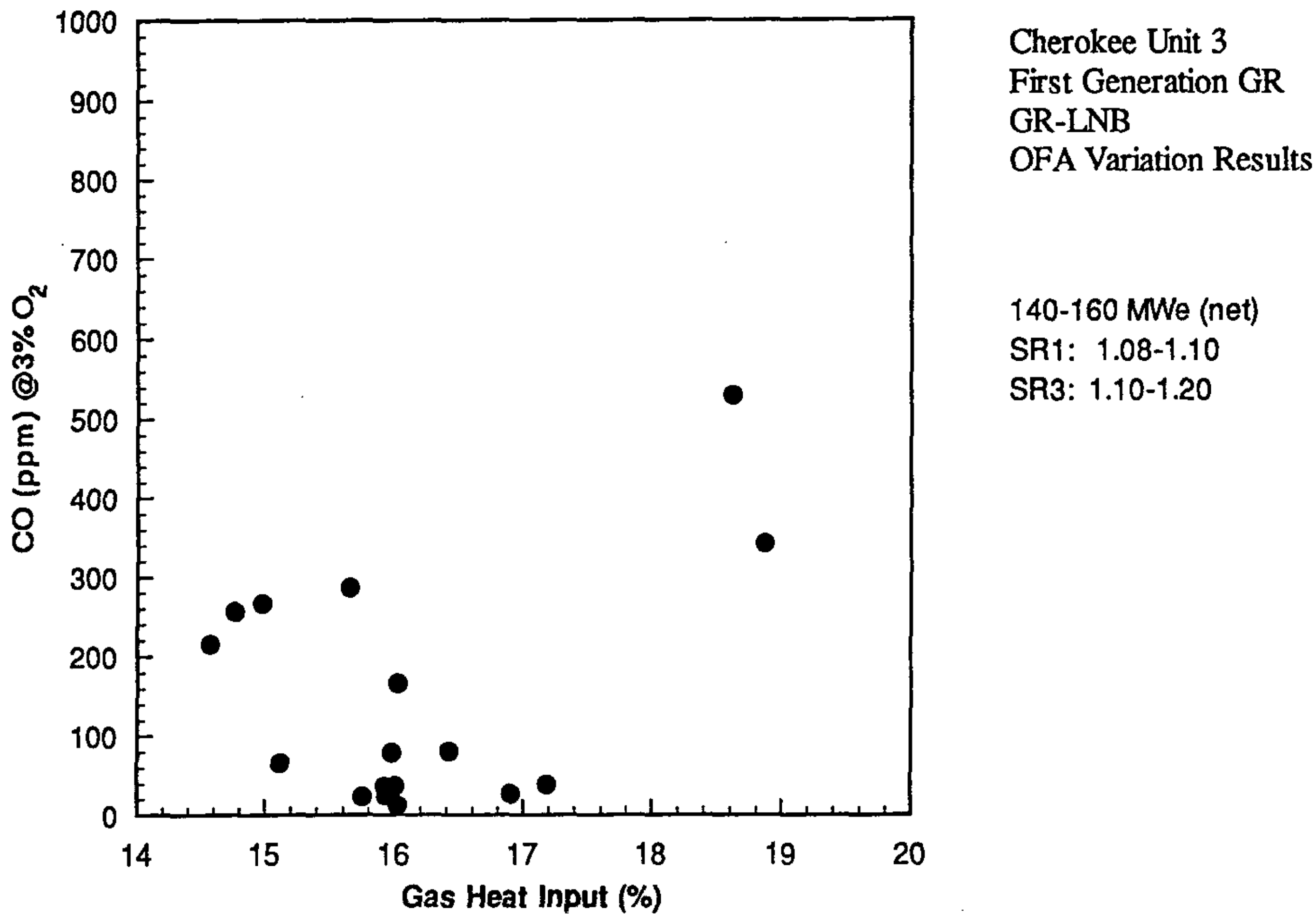


Figure 5-11. GR-LNB CO versus natural gas heat input reburn fuel

5.2.2.2 Overfire Air Variation

OFA is injected into the boiler to complete combustion of the reburn fuel. OFA is typically 15-20 percent of the total air flow. When applying reburning, it is desirable to minimize the overall excess air level to maintain high thermal efficiencies. However, the OFA must also be adjusted to minimize CO emissions. The OFA flow capacity is bound by (1) the minimum air requirements to consume the remaining combustibles and (2) the maximum air available from the windbox.

Figures 5-12 through 5-14 present the results of the OFA variation tests. As anticipated, changes in O_2 exhibited minimal effects on NO_x emissions. Although NO_x emissions were reduced with lower O_2, CO began to increase.

5.2.2.3 Flue Gas Recirculation (FGR) Variation

In the parametric tests the rate of carrier flue gas was varied from 4,000 to 14,000 scfm. The maximum design flow for the reburn fuel carrier flue gas was 3.4% of total boiler flue gas flow, nominally 12,000 scfm.

The effects of the FGR variation are displayed in Figure 5-15. The data show that the quantity of FGR which was injected into the reburn zone had little effect on NO_x emissions. In the initial stages of the parametric test program, 10,000 scfm was identified as the optimum amount of FGR, but later tests showed that 4,000 scfm was sufficient for good penetration of the reburn fuel into the furnace. Use of the minimum 4,000 scfm rate of FGR resulted in only slightly less NO_x reduction. It was demonstrated that any FGR rate in the range of 4,000 scfm to 14,000 scfm (maximum obtainable) could be used for the purpose of reburn fuel injection and for cost reasons, the lower the rate the better. The use of FGR resulted in higher steam attemperation water flow due to the release of heat higher up in the furnace.

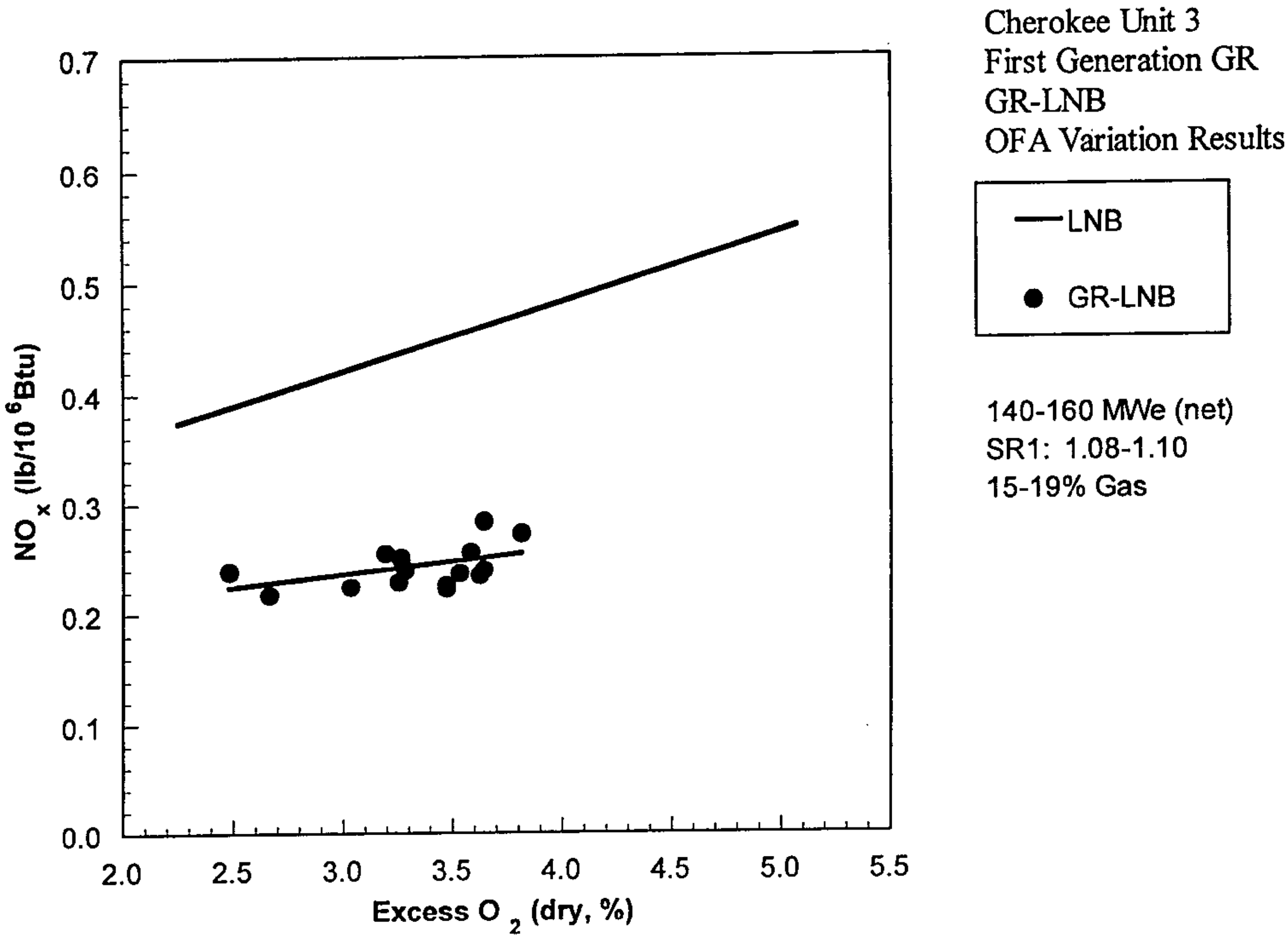


Figure 5-12. GR-LNB NO_x versus furnace exit flue gas O_2

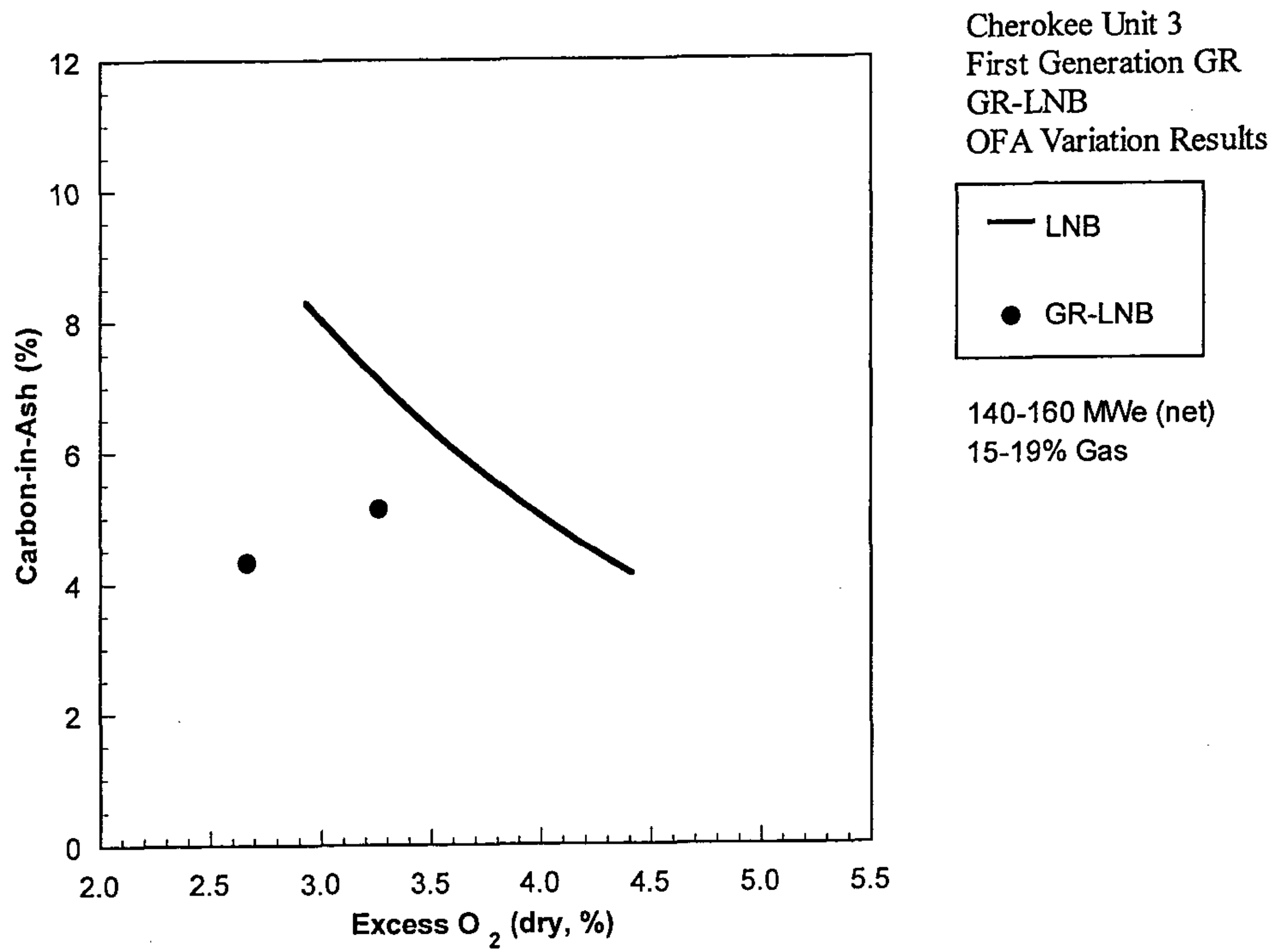


Figure 5-13. GR-LNB fly ash carbon versus furnace exit flue gas O_2

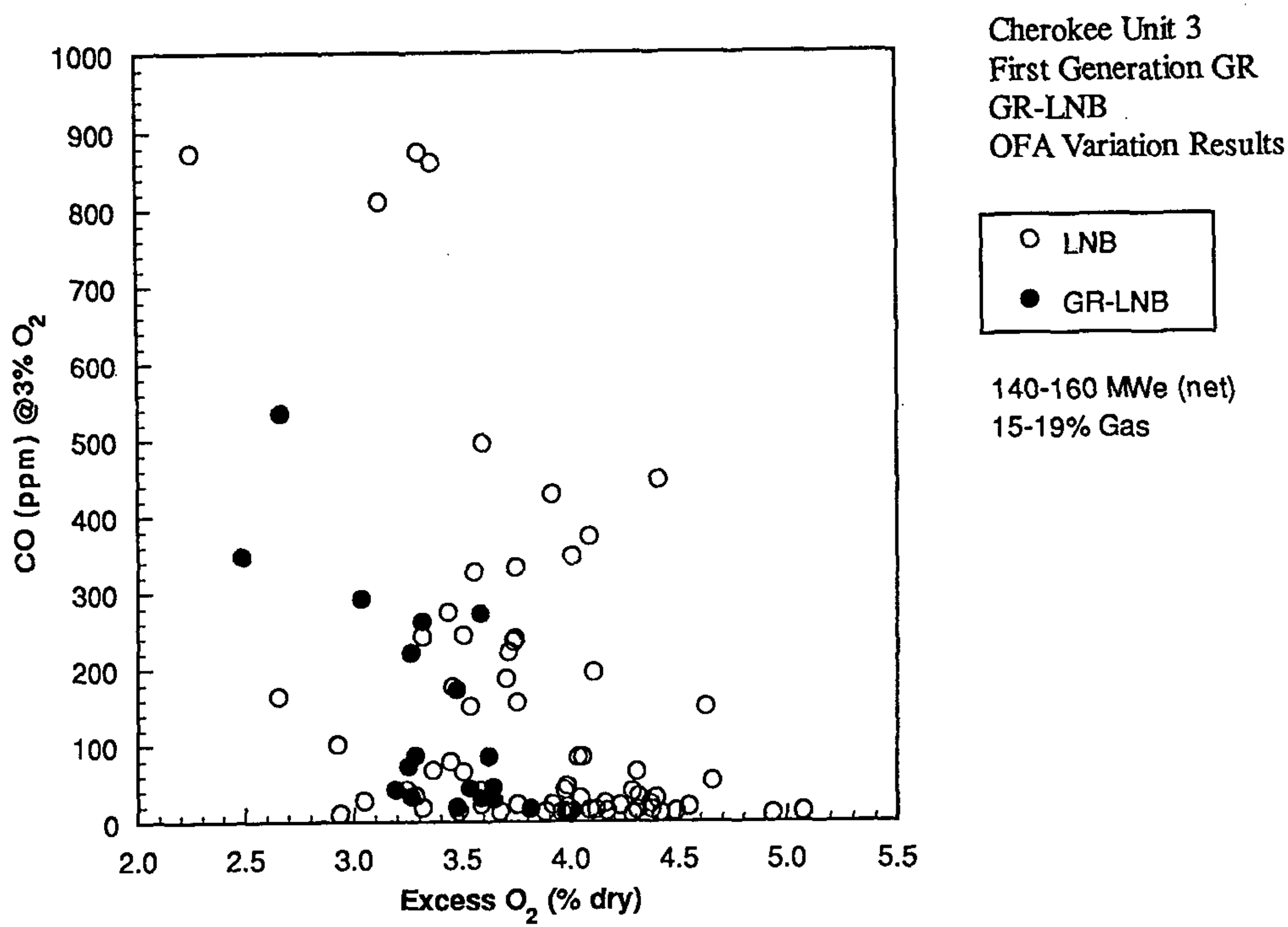


Figure 5-14. GR-LNB CO versus furnace exit flue gas O_2

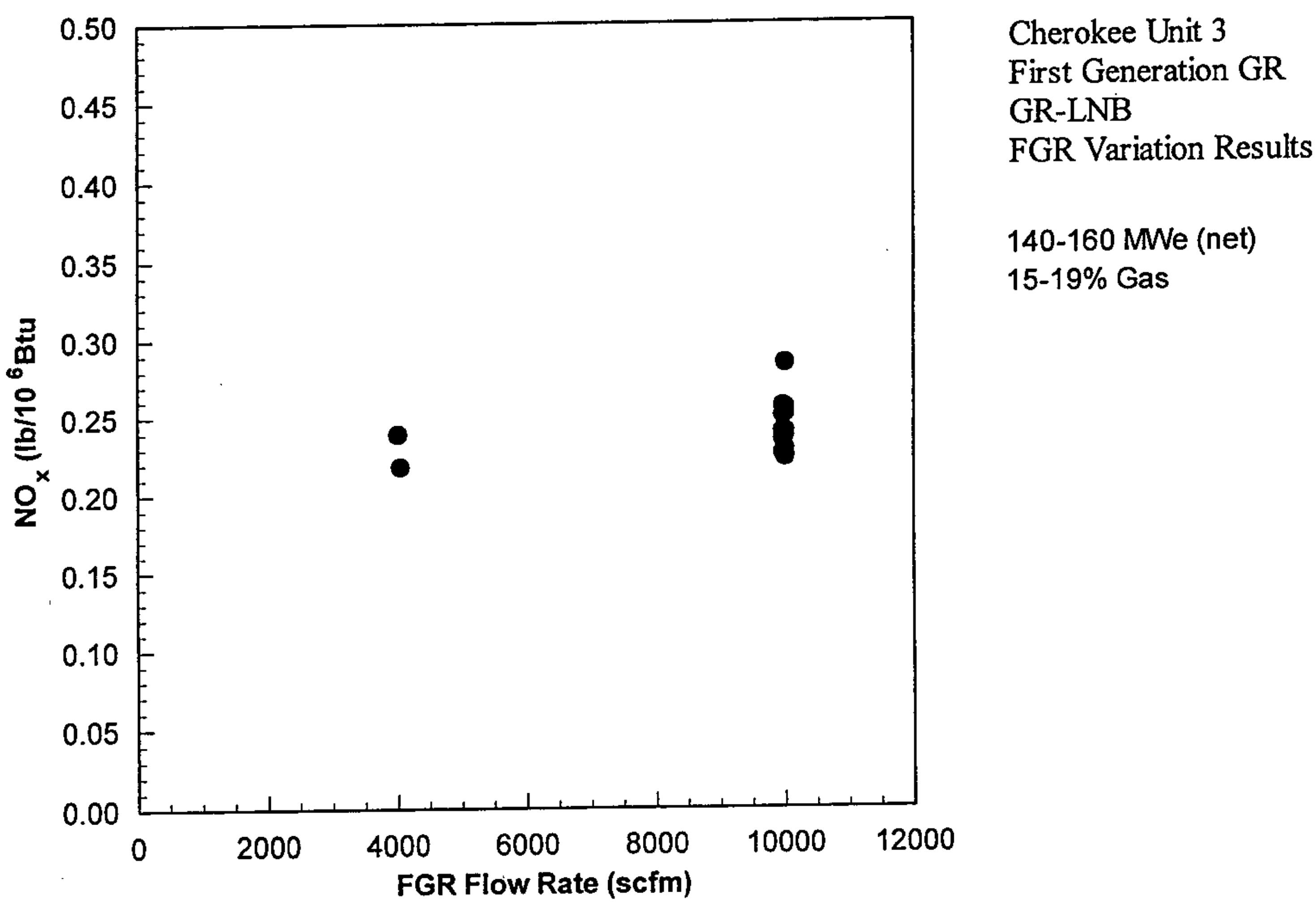


Figure 5-15. GR-LNB NO_x versus FGR flowrate

5.2.3 Assessment of Results

The goals of the GR-LNB project are as follows:

- Reduce NO_x emissions by 70% from baseline which corresponds to a NO_x emissions level of 0.22 lb/10^6 Btu (94 mg/MJ).
- Maintain the operational integrity of the unit during operation of the GR-LNB system.
- Hold CO emissions to acceptable levels (100 ppm or lower).
- Verify the long term operability of the combined technology while operating in the normal power generating mode of unit control by load dispatch over long periods of time.

A series of parametric tests were performed to determine the optimum boiler set points that would achieve these goals. The parametric test results are discussed as they were used to establish these set points.

A series of tests were performed with LNBs only and with GR-LNB to determine the lower limit of SR_1. Note that the lowest attainable level of SR_1 results in the minimum natural gas usage required to reach the optimum SR_2. However, SR_1 is lowered at the expense of higher carbon-in-ash. The results of these tests indicated that the optimum SR_1 was 1.08 with a carbon-in-ash level of 4.5 wt %.

As expected, higher gas levels (15-19%) were required to achieve the NO_x reduction goal. Carbon-in-ash levels were also lower at higher gas levels. To achieve the targeted SR_2 level of 0.90, a gas heat input of 18% (4,850 scfm) was required. Although a 70%

reduction in NO_x was achieved for short periods of time, the average was 65%. Significantly higher gas heat inputs were required to consistently maintain a 70% reduction.

Tests of the OFA system indicated that CO was controllable to less than 100 ppm with a SR_3 of approximately 1.15. This corresponds to an air flow of 68,000 scfm, which is about 30% of total air flow to the unit. At low gas flow, CO emissions were found to be high. Low gas operation requires reduced OFA flow, leading to reduced jet penetration and mixing and elevation of CO emissions. CO emissions were also high during operation with LNBs only.

The SR in each zone could vary by about ± 0.02 with equally effective NO_x reduction results. The variation in SRs is primarily attributable to the process control systems on the unit. The output of the forced draft (FD) fans that supply combustion air to the unit could easily vary by ± 2% which could produce a variance of ± 0.02 in the furnace zone SR's. This is not considered an abnormal condition and could occur in most power plants. During the controlled parametric tests, process outputs such as combustion air flow from the FD fans could be adjusted manually. In this way, the desired furnace SRs could be controlled to a target average. The results of the parametric testing were used to establish the operating conditions that would yield the desired test objectives. For full load, these conditions were as follows:

SR_1	1.08
SR_2	0.90
SR_3	1.15
Gas heat input	18%
FGR	4,000 - 10,000 scfm
OFA	68,000 scfm
O_2	3.25%
NO_x	0.25 lb/10^6 Btu (107 mg/MJ)
NO_x reduction	66%
CO	43 ppm
Carbon-in-ash	4.50%

The combined technology GR-LNB proved to be effective, but the total NO_x reduction was not as great as could have been achieved with better LNB performance. LNBs reduced NO_x emissions by 37% but never achieved the anticipated reduction of 45% over the normal load range of 80 to 150 MW_e. This diminished the potential NO_x reduction that could be obtained for the combined GR-LNB system. An estimated 5% to 10% decline in the overall system NO_x reduction potential was attributable to the substandard LNB performance.

Also, the sluggish action of the combustion air control valve (old pneumatic type) did not keep the excess air at or near the desired levels during the long term test phase. This resulted in higher than desired excess air levels at times that yielded higher NO_x emissions. Based on the results of the parametric tests, nominal operating conditions for long term testing were established as follows:

SR_1	1.10
SR_2	0.90
SR_3	1.20
Gas heat input	18%

The long term test series lasted for approximately nine months. During this time the average NO_x reduction was 65% (Figure 5-16), while CO was maintained below an emission level of 100 ppm. The goal of 70% NO_x reduction was achieved for short periods when the combustion controls were in manual mode for better control of excess air to the unit. When the unit was operated in the load-following mode, the nominal operating parameters were difficult to maintain and there was a continual variation from the desired operating conditions. The reaction time for changes in the GR set points was about 20 minutes after the demand signal was received. As mentioned, this was due to an antiquated pneumatic bellows arrangement on the combustion air flow valve that did not react quickly enough to changes in air flow demand.

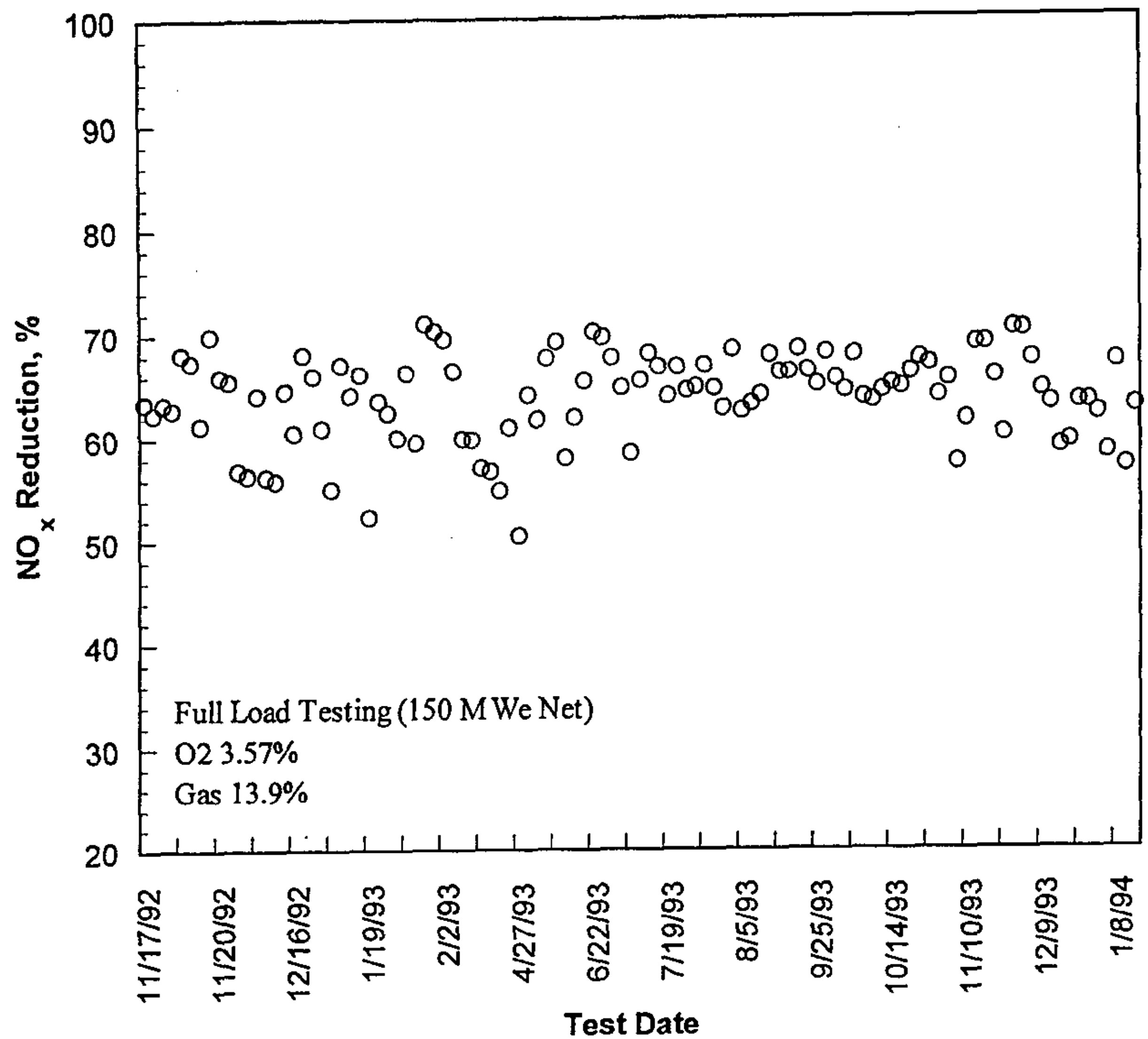


Figure 5-16. GR-LNB NO_x reduction versus time

5.2.4 Reduced Load Testing

One objective of this project was to demonstrate a GR system that would be effective for NO_x reduction throughout the entire operating range of the boiler while in load-following mode under dispatch control. Optimization tests were conducted at loads from 60 to 150 MW_e, but it became apparent that the effective operating load range of the boiler was at loads of 70 MW_e and higher. The boiler load range for the practical operation of the GR system was 80 to 150 MW_e. This was due to the difficulty in maintaining stable loads while operating below 80 MW_e and the necessity to operate the boiler at high levels of excess air to maintain final superheat and reheat steam temperatures.

Boiler load impacts GR performance in terms of the primary zone NO_x emission level and the furnace gas temperature profile. As load was reduced, the NO_x formation in the primary zone was reduced as a result of less fuel being burned, and temperatures throughout the furnace were lower due to the reduced thermal input to the boiler. In order for the control room operators to maintain the main and reheat steam outlet temperatures at reduced loads, excess air was increased, shifting some of the heat transfer within the boiler from the radiant section (furnace tube walls) to the convection pass section (superheat and reheat tube banks).

Design data showed that lower NO_x levels and lower gas temperatures entering the reburning zone resulted in a decrease in the overall GR system NO_x reduction performance on a percentage basis from baseline levels. This was confirmed during the optimization testing.

Figure 5-17 shows NO_x emission levels as a function of gas heat input for the boiler operating load range. The results show that the percentage of NO_x emissions reduction decreased as load was reduced. However, NO_x emission levels remained near 0.20 lb/10^6 Btu.

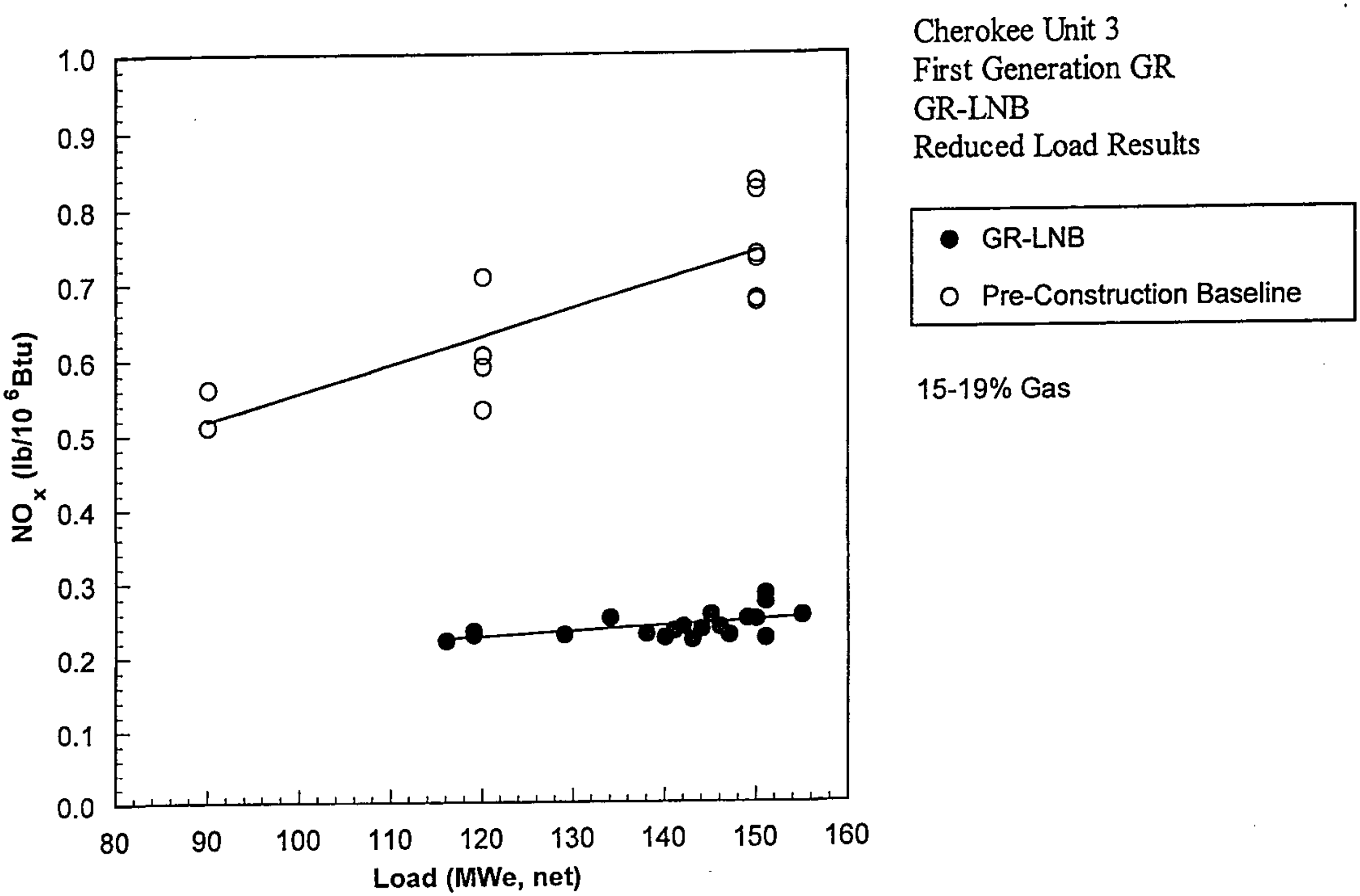


Figure 5-17. NO_x versus load

At Cherokee Unit #3, the normal mode of operation is to have all four mills in service at full load and to have three mills in service for loads below 120 MW_e. Operation with less than three mills resulted in unstable boiler operating conditions. The burners are fed by mills D to A, from the top row to the bottom row. Tests were conducted at 120 MW_e and 150 MW_e with D mill and its associated top row of burners out of service to determine the operational effects of combustion staging in combination with GR. To obtain full load with D mill out of service, it was necessary to inject a total of about 20% natural gas in the GR system. The effect of combustion staging at full load was about a six percent improvement in NO_x reduction, from 66% with four mill operation to 72% with three mill operation. A greater NO_x reduction was expected from combustion staging with GR, but the previously discussed performance problems with the LNBs probably prevented combustion staging from being more effective in reducing NO_x emissions. Also, excess air fluctuations were experienced during testing which probably had a negative impact on the results. An indication of combustion problems during the three mill operation test was high carbon-in-ash which ranged from 6 to 9%.

Limited testing was conducted at three mill operation because of Unit #3 operational problems and the requirement by dispatch management for full load operation during the time period scheduled for this testing.

5.3 GR-LNB Optimization Testing (Second Generation GR)

FGR was used initially to provide momentum to the natural gas to achieve optimum boiler penetration and mixing. However, as described in Section 5.2.2.3, it was determined that the FGR had minimal effect on NO_x emissions. Certain problems (see Section 5.6) associated with the FGR ash removal system made it attractive to consider a re-design of the gas injection system in order to eliminate the need for FGR altogether. The small amount of FGR required to transport the gas into the boiler, along with the lower amount of gas required for effective NO_x reduction, led to this decision.

It was determined that a gas injection pressure in the range of 1 to 5 psig would adequately penetrate and cover the cross-sectional area of the furnace to provide the necessary reducing conditions in the reburn zone. This eliminated the need for the FGR booster fans, duct work, and the multiclone dust collectors. The elimination of FGR will result in significant cost savings on future GR system installations.

A second series of tests was added to evaluate the modified configuration and judge its impact (Section 4.1.3). This technology is referred to as Second Generation Gas Reburning and is described as follows:

- The FGR system, originally designed to provide momentum to the natural gas, was removed. The change would result in reduced capital costs on future designs.

- Natural gas injection was optimized at 13% gas heat input, compared to the First Generation operating value of 18%. FGR elimination required incorporation of high velocity jet injectors that made good use of the available natural gas pressure. The change resulted in reduced operating cost due to lower gas usage.

- The OFA ports were modified to provide higher jet momentum, especially at low total flows.

- The OFA ports were also modified to provide air swirl capability and velocity control. The modification was designed to improve lateral coverage of the furnace and turbulence in mixing with unburned fuel. This change provided CO control at lower gas levels, which was a concern with the First Generation design.

Prior to startup of the modified system, Foster Wheeler performed some modification work on the LNBs in an attempt to improve their NO_x reduction performance. The first tests following restart were to characterize the LNBs without GR in operation.

5.3.1 Low NO_x Burners

At the start of each Second Generation GR parametric test, the conditions of the boiler were stabilized before the data were taken. Data taken at the end of these startup periods were used as baseline data, since only LNBs were in operation during the start of each test. The results were used to compare the performance of originally-installed LNBs (see Section 5.2.1.1) with the modified LNBs.

Figure 5-18 presents a chart of NO_x versus excess air for LNB operation. Compared to the originally-installed LNB's and at an excess air level of 3.5%, the NO_x emissions showed a favorable improvement of 11%. Also, compared to the pre-construction burners at the same excess air, the NO_x emissions were reduced by 44%, which was an improvement from the LNB baseline (see Section 5.2.1.1). However, the CO (see Figure 5-19) and carbon-in-ash levels were still unacceptably high. CO was in the 100-200 ppm range and carbon-in-ash was as high as 8%. Also, long flames persisted in the upper furnace region.

Although the burner modifications now reduced NO_x emissions to the near target level of 45%, the performance was unacceptable from a CO and carbon-in-ash standpoint.

5.3.2 Gas Reburning with Low NO_x Burners

The results of the Second Generation GR-LNB test series are displayed in Figures 5-20 through 5-23. The NO_x vs. gas heat input plot shows increased NO_x reduction as the level of gas increases, again similar to First Generation GR. At a gas heat input level of 12.5%, the NO_x level was 0.26 lb/10^6 Btu (64% reduction). Carbon-in-ash levels were at or below

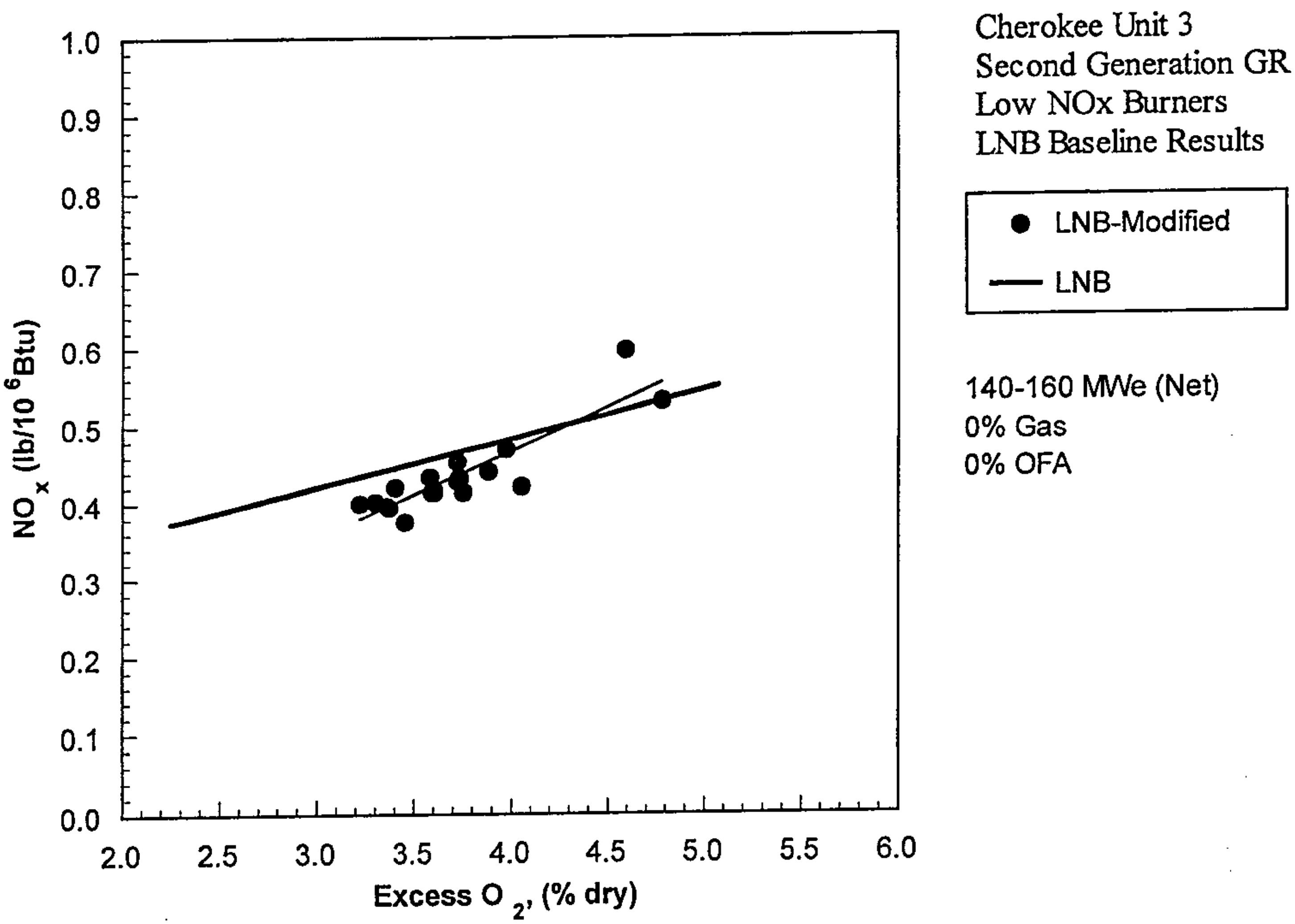


Figure 5-18. LNB-Modified baseline NO_x versus furnace exit flue gas O_2

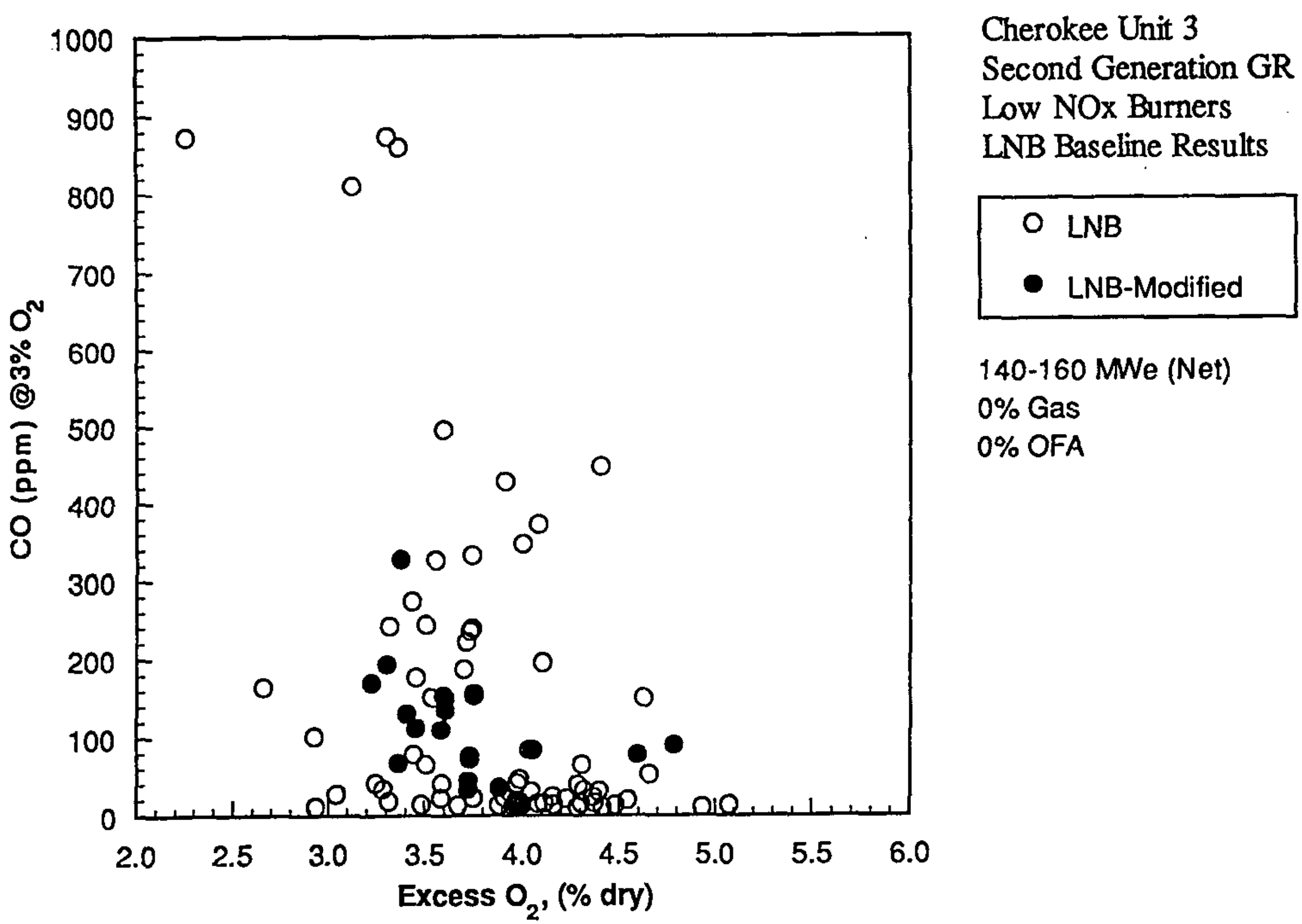
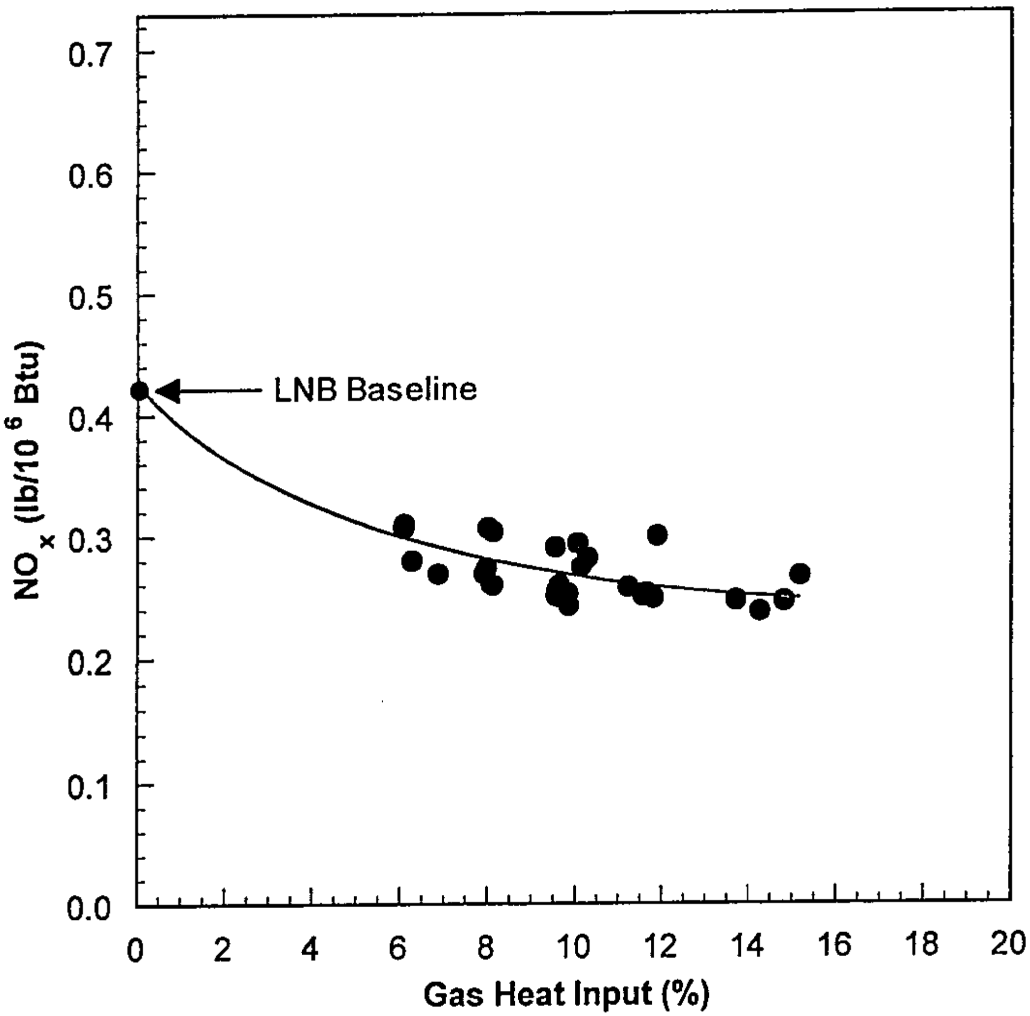


Figure 5-19. LNB-Modified baseline CO versus furnace exit flue gas O_2



Cherokee Unit 3
Second Generation GR
GR-LNB
Gas Variation Results

140-160 MWe (Net)

Figure 5-20. Second Generation GR-LNB NO_x versus gas heat input

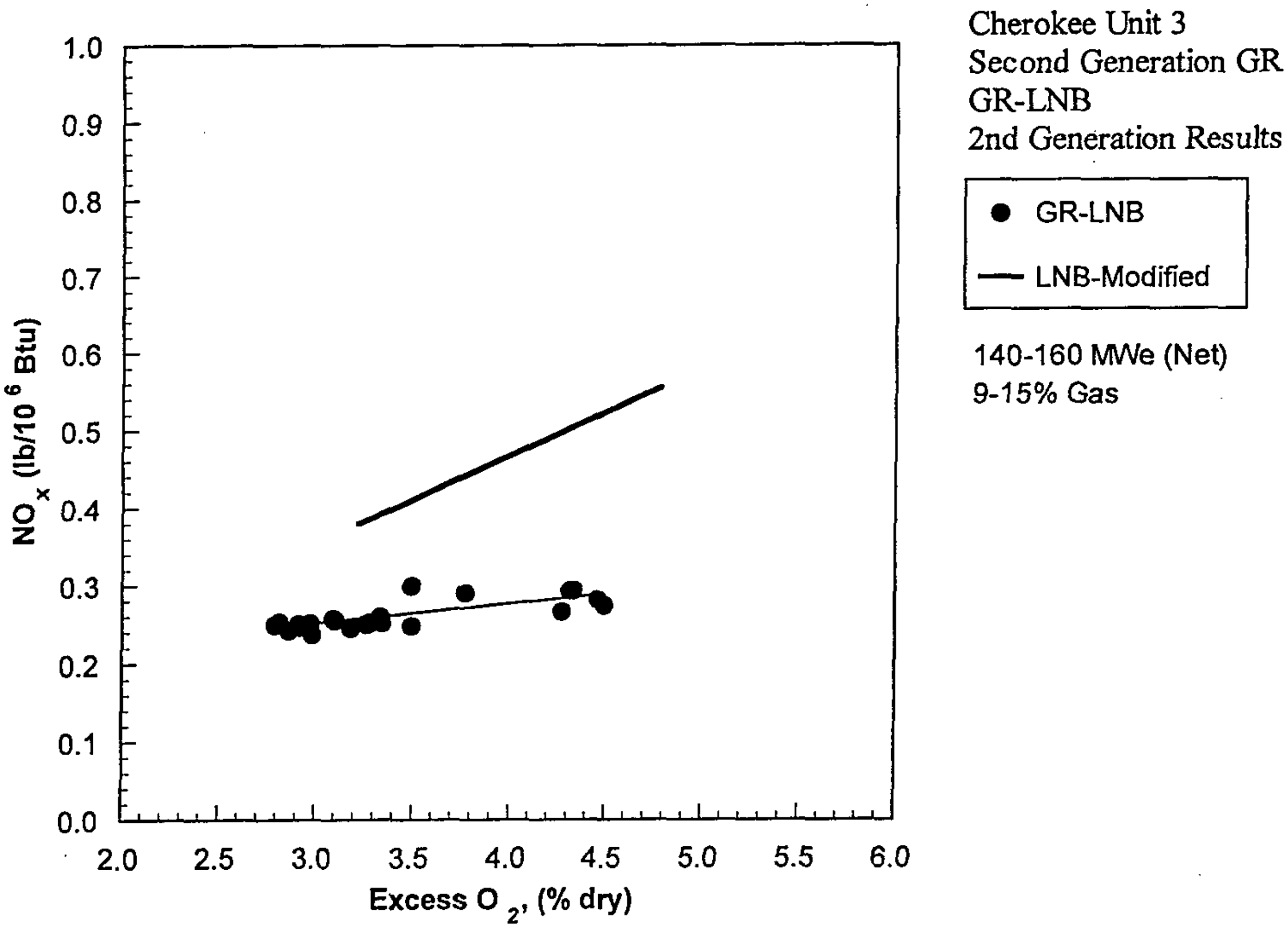


Figure 5-21. *Second Generation* GR-LNB NO_x versus furnace exit flue gas O_2

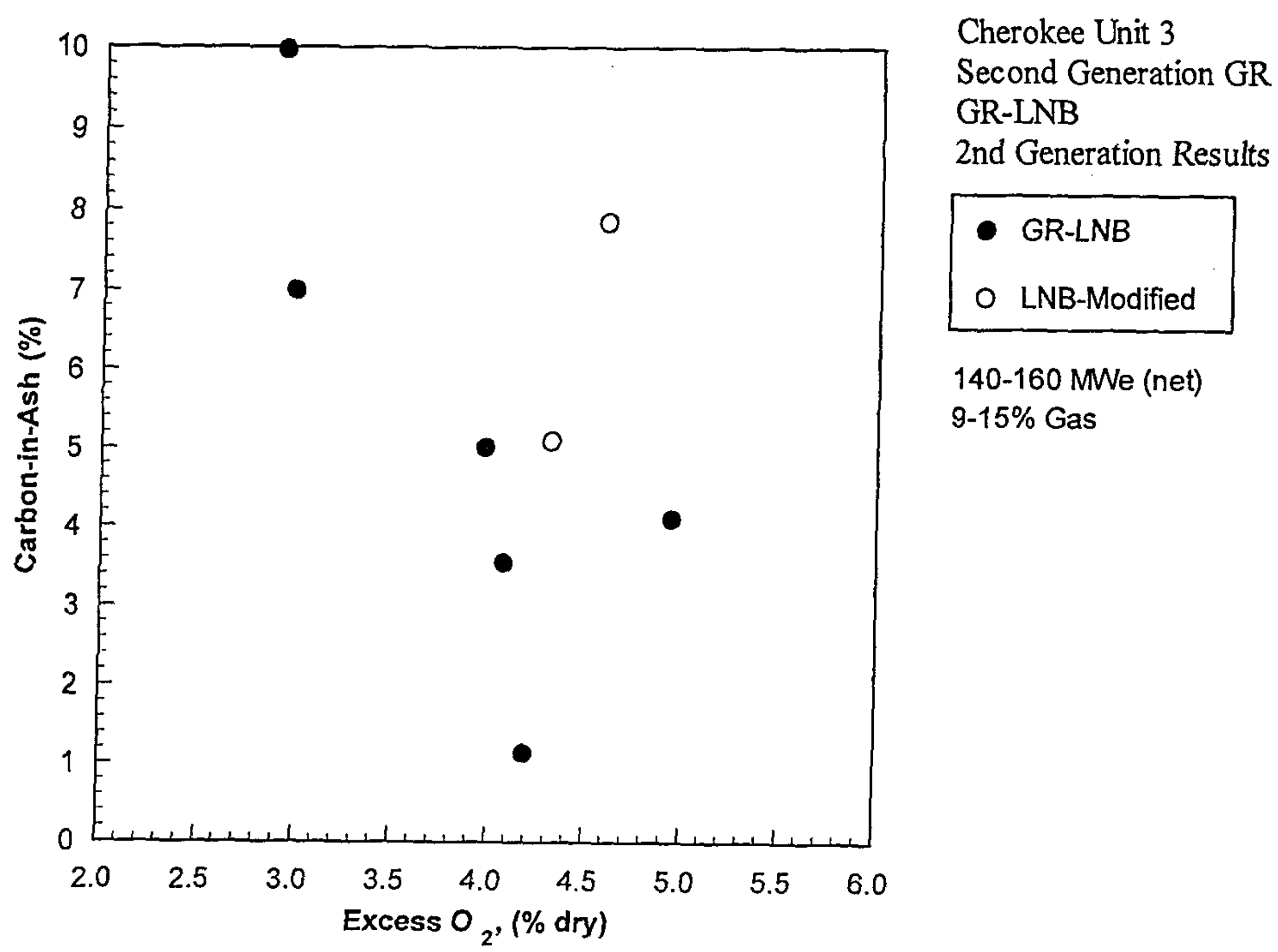


Figure 5-22. Second Generation GR-LNB fly ash carbon versus furnace exit flue gas O_2

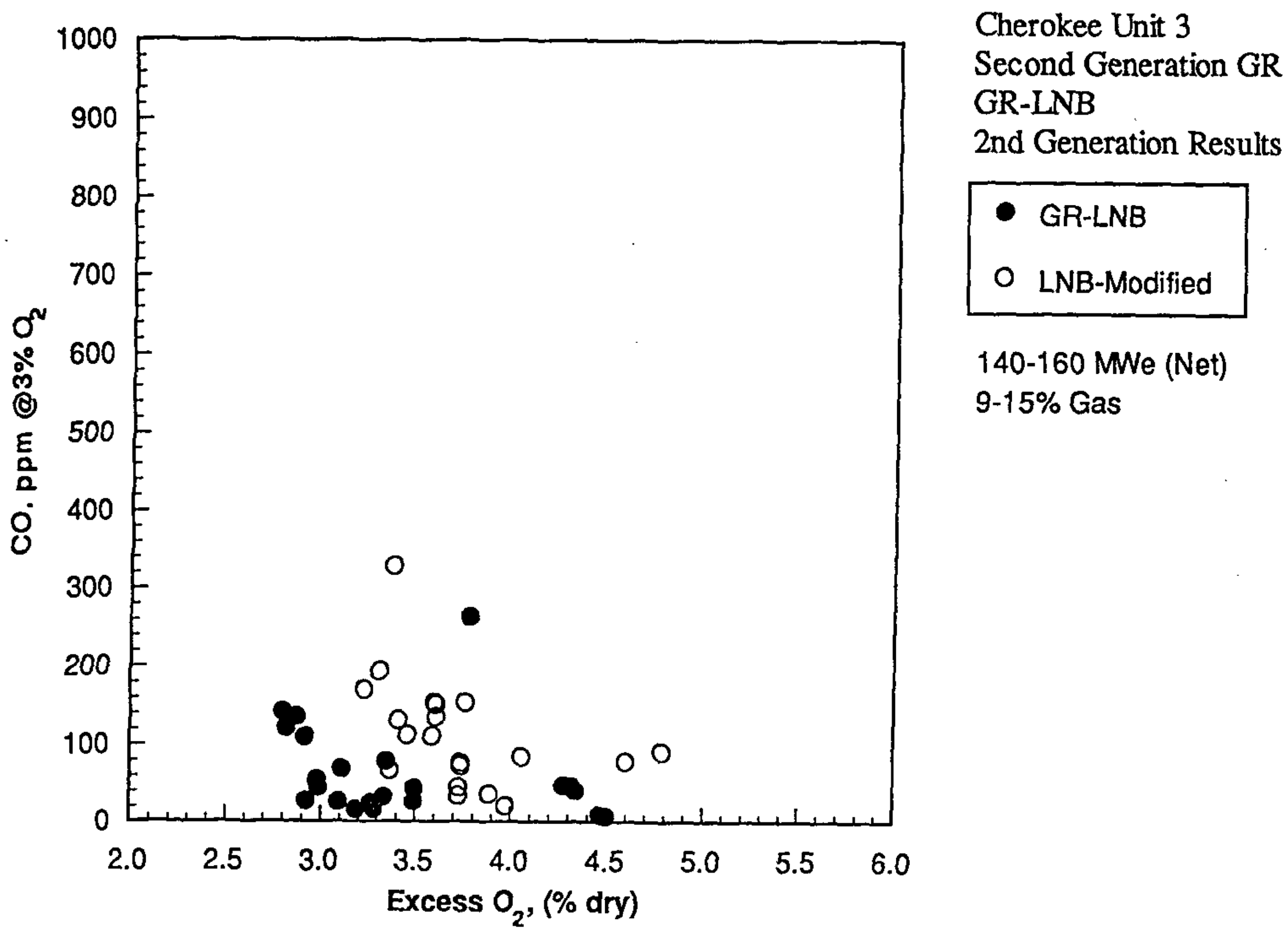


Figure 5-23. Second Generation GR-LNB CO versus furnace exit flue gas O_2

the pre-construction baseline levels when the excess O_2 was above 3.5%. CO levels were somewhat higher than First Generation GR, but approximated the pre-construction levels when excess O_2 was above 3.5%.

An extended series of GR-LNB tests were conducted to verify the system performance. The tests were conducted both at constant loads and with the system under dispatch operation, where unit load was adjusted in order to meet the varying plant electrical output requirements. The load would vary from about 80 to 155 MW_e based on grid demand. The tests ranged in duration from one hour to several days. The results of the long term testing are presented in Figure 5-24. As the figure shows, there was no relative change in NO_x emissions reduction between First and Second Generation GR, even with a reduced gas level.

5.3.3 Assessment of Results

FGR was used initially to provide momentum to the natural gas in order to achieve optimum boiler penetration. However, during the long term testing phase of the project, it was determined that the FGR had minimal effect on NO_x emissions. Therefore, a second series of tests was added to the project to evaluate the modified configuration and gage its impact. This Second Generation GR included:

- Removal of the FGR system.
- Installation of high velocity gas injectors coupled with reduced gas flow.
- Modifications to the OFA ports to provide higher jet momentum, air swirl capability and velocity control. The modifications were designed to improve furnace lateral coverage and turbulence in mixing with unburned fuel. This change provided CO control within acceptable limits at the lower gas levels.

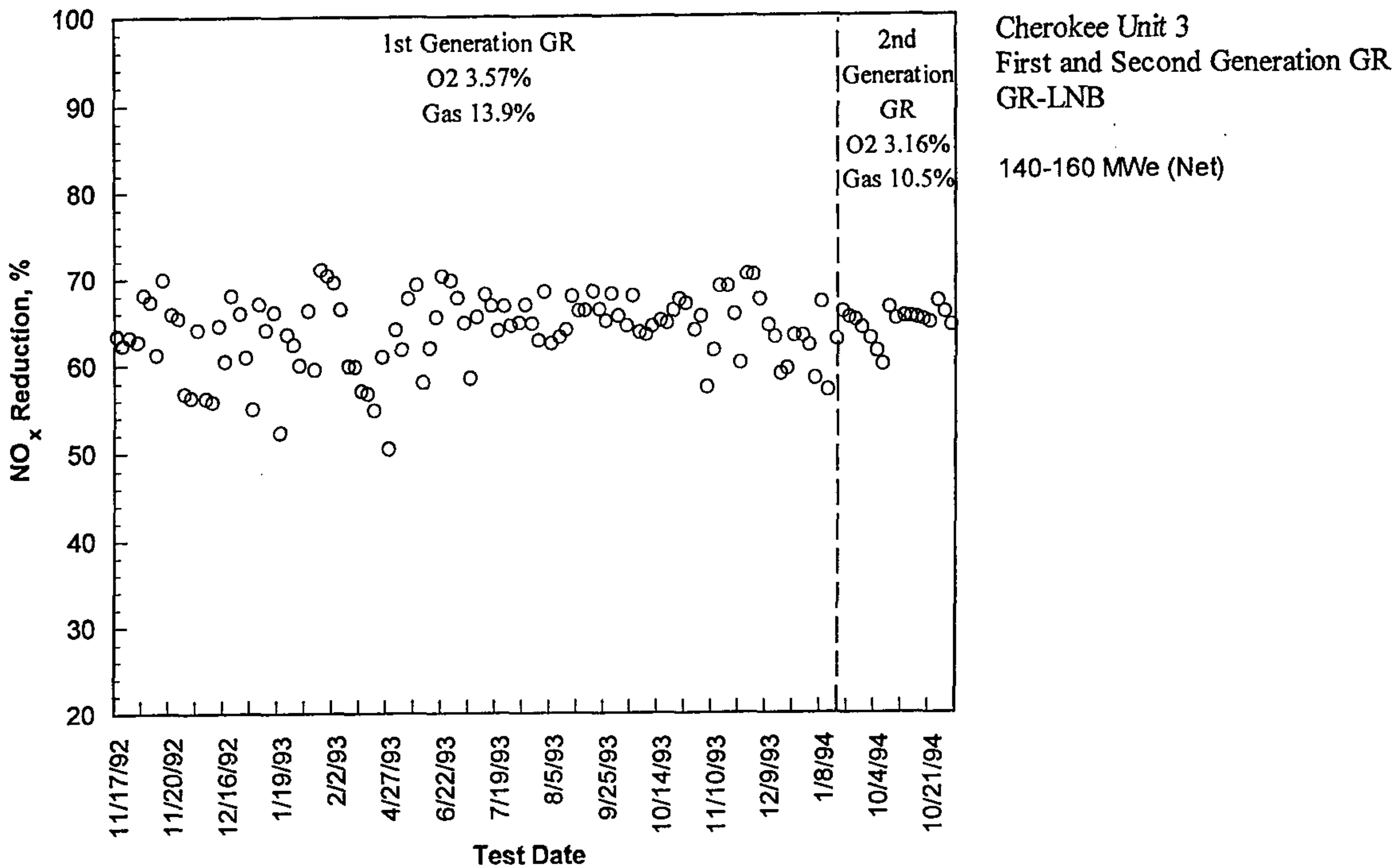


Figure 5-24. Second Generation GR-LNB NO_x reduction versus time

The Second Generation GR was designed to provide performance and economic benefits compared to the First Generation GR. These include:

- Reduced capital cost through elimination of the FGR system
- Reduced operating cost through reduction in the gas heat input
- The same NO_x reduction as First Generation GR with less gas
- Reduced levels of CO at low natural gas flows

FWEC through LNB equipment modifications, achieved a slight reduction in NO_x emissions. No change was indicated in CO emissions (see Figure 5-19). There was only a slight reduction in GR-LNB NO_x emissions from an average of 65% to an average of 64% but with less natural gas due to better performance of the LNBs. At higher gas levels, 68% was achieved. A gas heat input of 12.5% was selected for Second Generation GR testing, which was a reduction of approximately 7% from First Generation GR. The SR_2 setting of 0.90 was maintained, but SR_1 was reduced to compensate for the reduced level of gas heat input. Compared to LNB only, CO emissions were reduced when the GR system was in service.

The results show that modified GR-LNB technology achieved excellent emissions reductions and all goals of the Second Generation GR system were achieved. The following table summarizes the results of the testing:

	First Gen.	Second Gen.
Gas heat input	18%	12.5%
Baseline NO_x	0.73 lb/10^6 Btu	0.73 lb/10^6 Btu
Average NO_x reduction (LNB)	37%	44%
Average NO_x reduction (GR-LNB)	65%	64%

5.4 Gas Gas/Reburning Testing

A limited amount of GR testing was performed with the boiler operating on 100% natural gas (no coal) to determine the reduction in NO_x and assess the impact on CO emissions (see Section 4.1.4). The primary fuel (natural gas) was fired through the LNBs and gas also injected into the reburning zone. No equipment modifications were made to operate in this configuration.

The NO_x emissions results for full load are presented in Figures 5-25 and 5-26. The data show a reduction from a baseline of 0.30 lb/10^6 Btu to 0.17 lb/10^6 Btu (43%) at a reburning gas heat input of 7%. For the most part, CO emissions were below 100 ppm as shown in Figure 5-27. The baseline (100% gas/no reburning) and optimum gas/gas reburning conditions for full load were as follows:

	Baseline	Optimum
SR_1	1.15	1.03
SR_2	1.15	0.94
SR_3	1.16	1.17
Reburn Gas heat input	0%	7%
O_2	3.06%	2.36%
NO_x	0.30 lb/10^6 Btu	0.17 lb/10^6 Btu
NO_x reduction	0%	43%
CO	2 ppm	32 ppm

At mid-load (120 MW_e) the NO_x was reduced from 0.22 lb/10^6 Btu to 0.11 lb/10^6 Btu at 8% reburning gas heat input and CO at 80 ppm. At low load the NO_x was reduced from 0.10 lb/10^6 Btu to 0.06 lb/10^6 Btu at 6% reburning gas heat input and CO at 52 ppm.

The normal test configuration was injection of reburning gas through the 8 rear wall injectors. However, some full-load injector biasing testing was performed. Shifting half of the gas to the front wall showed no change in NO_x emissions, although an increase in CO was observed. When using all 16 injectors (8 front and 8 rear) and 12% gas, NO_x

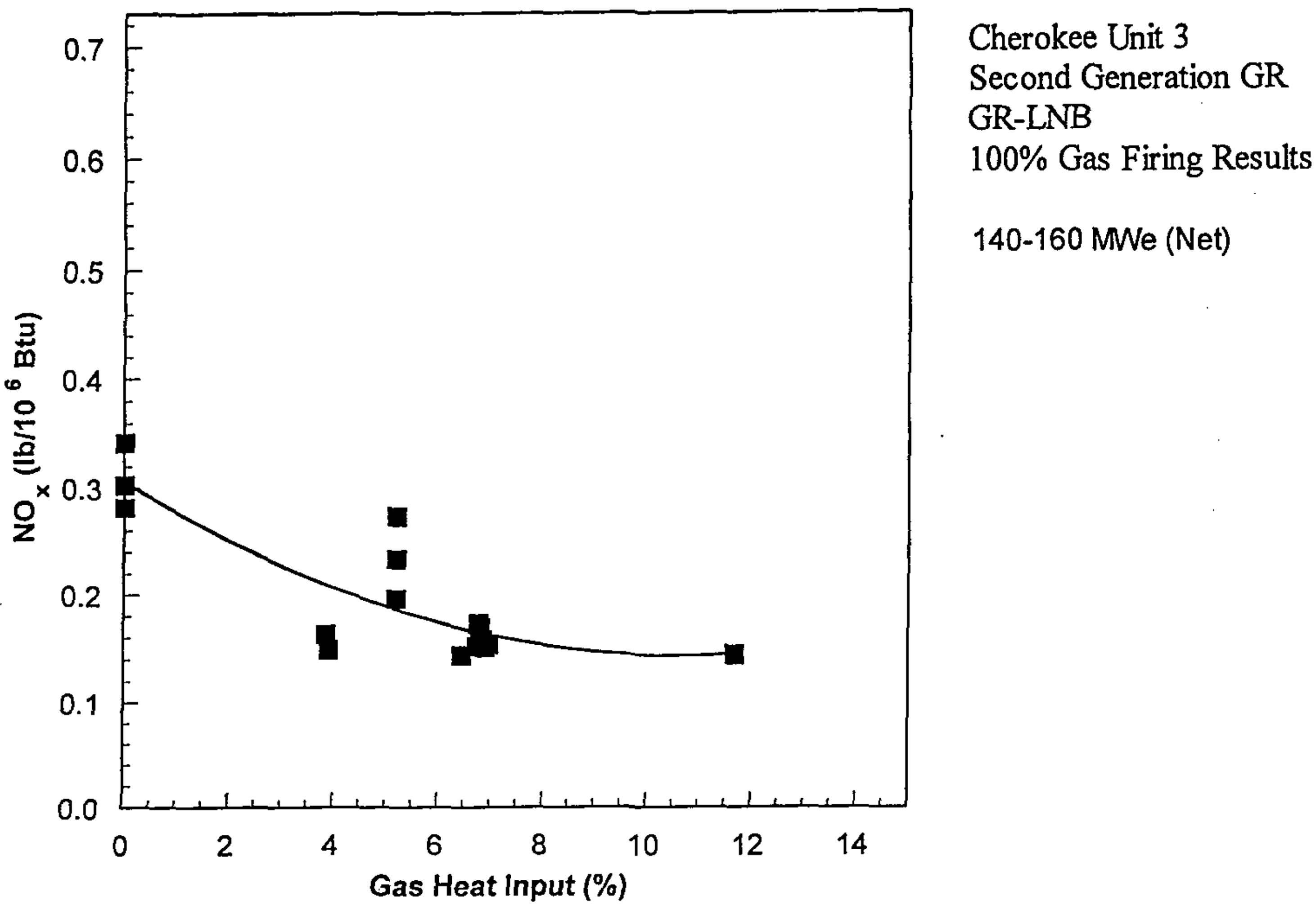


Figure 5-25. GR-LNB 100% gas w/GR NO_x versus gas heat input

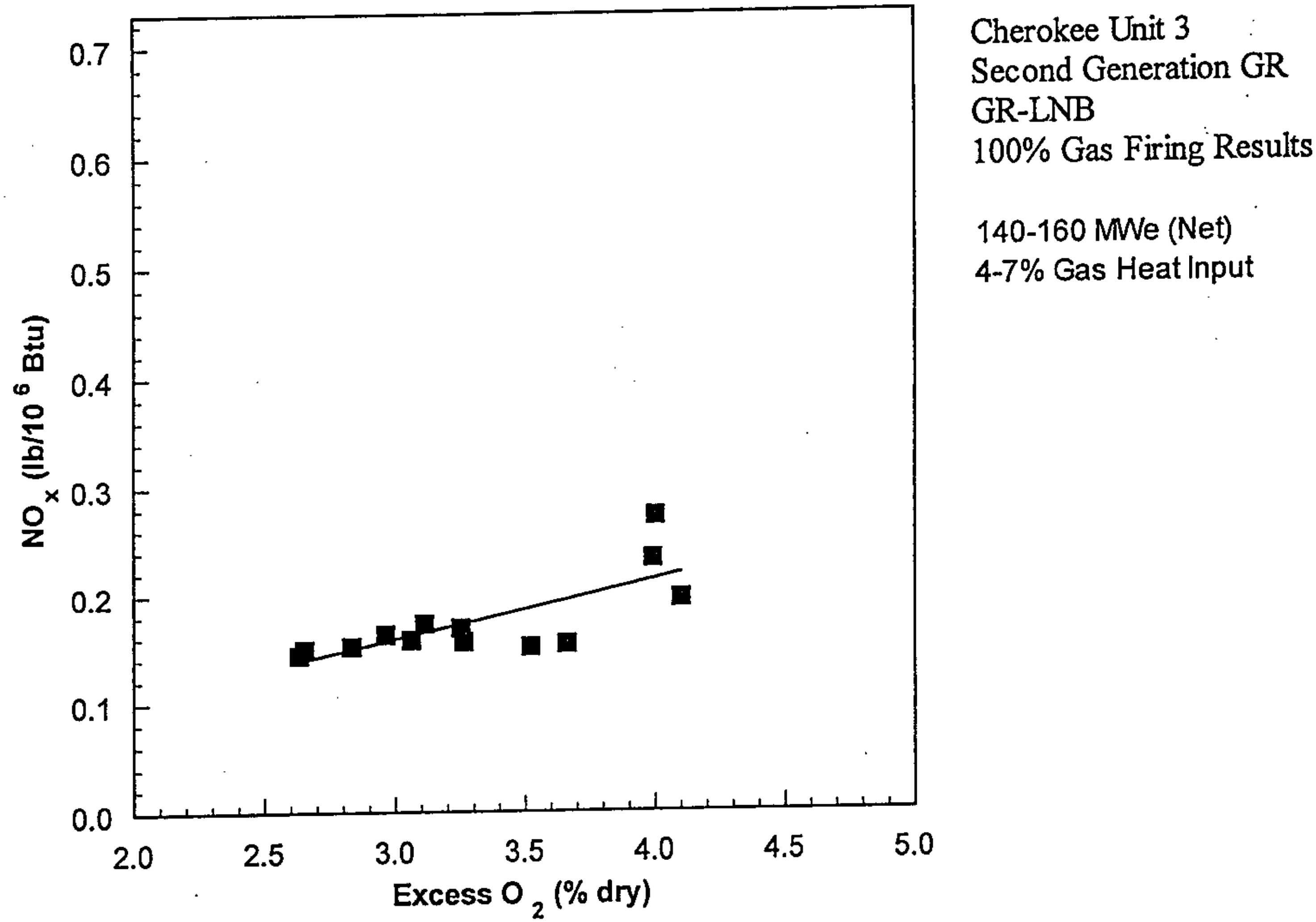


Figure 5-26. GR-LNB 100% gas w/GR NO_x versus O_2

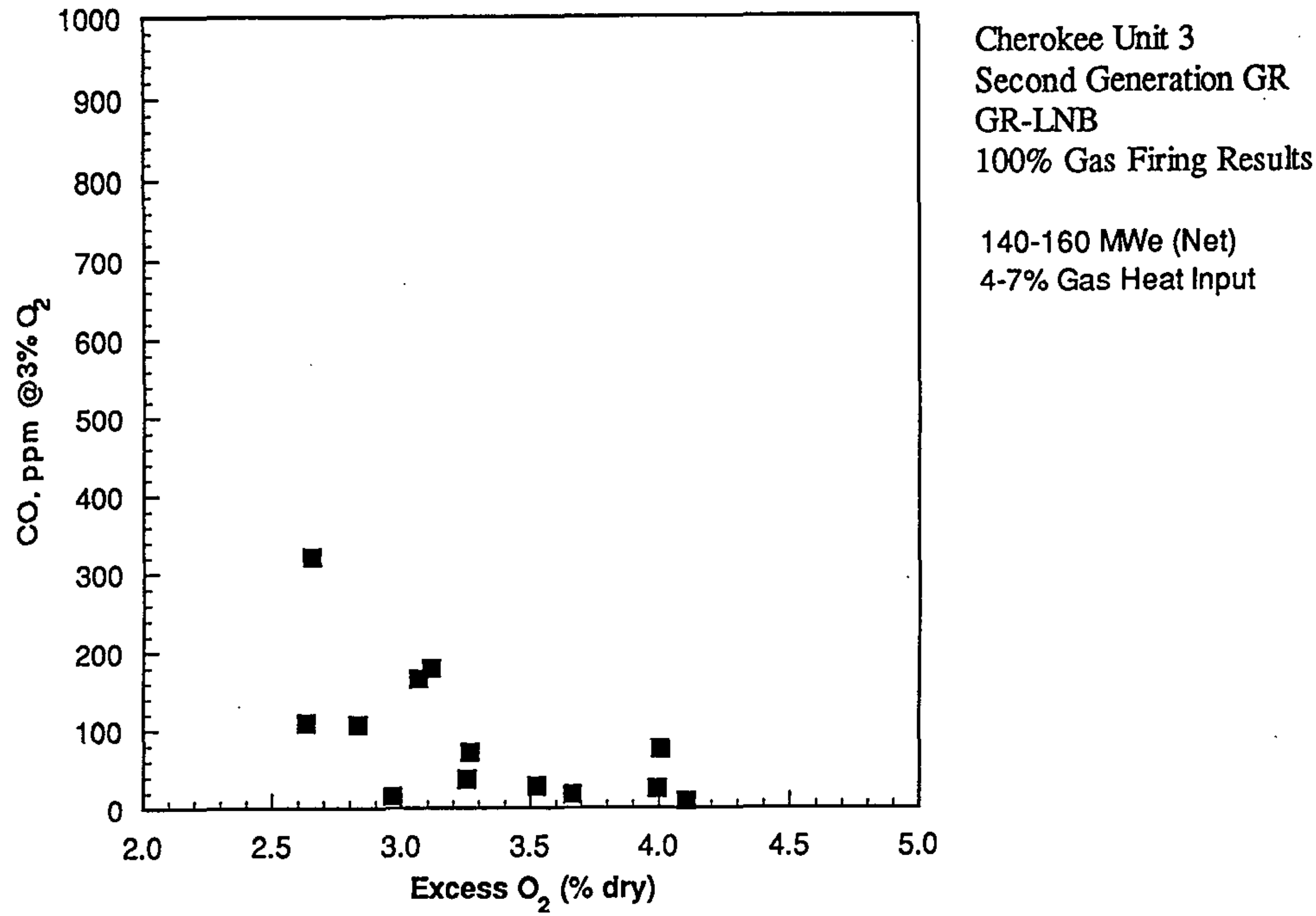


Figure 5-27. GR-LNB 100% gas w/GR CO versus O_2

emissions remained the same as for 7% gas, but the CO emissions increased dramatically. Lower load biasing tests showed similar results. Therefore, the optimum configuration was to use the 8 rear wall injectors only.

The results showed that a reduction in NO_x emissions can be achieved through reburning technology on a 100% gas system, while maintaining levels of CO emissions below 100 ppm.

5.5 Boiler Impacts

5.5.1 Furnace Conditions

GR operation did not exacerbate slagging in the furnace. Long term operation of the GR system did not show any trend toward additional slagging or fouling beyond that which occurred when operating without GR in service. Some slagging was noted around the LNBs, but this was attributed to the abnormal functioning of the burners. Later in the test program, one LNB (D3) nozzle and internals melted evidently due to combustion inside the burner.

In the reburn zone, slag formed around some of the gas injection nozzles on a random basis, but this did not cause a problem with the reburn gas injection system performance. The injection nozzles were designed with a removable inspection cover and clean out port to determine if the gas injection nozzle tip was plugged.

Generally, no more than two gas nozzles per wall would be plugged at a time, and usually only one nozzle per wall would require slag removal. When a nozzle did become plugged, it was a simple matter to "rod" out the nozzle and remove the slag from the nozzle orifice.

In the OFA zone, heavy slag deposits formed around three of the six OFA injectors after about three months of operation. The initiation of the slag formation was attributed to higher flue gas temperatures in this area with the GR in operation. The air injected through the OFA ports would "chill" the slag so that it would solidify at this location. The unrestrained buildup of slag progressed over time due to a lack of sootblowers in this area of the furnace. Slag would build up on the refractory around the ports, and without sootblowers in place for removal, the deposits would continue to grow until a significant "eyebrow" would form and solidify around the port. These deposits were removed during regularly scheduled outages.

In the convection pass of the boiler, the bridging of slag deposits in the secondary superheater section occurred when flames from the LNBs swept up into this area. It was difficult to keep the LNB flames at the correct length, and they were generally too long and would bounce off the rear wall and continue up to the arch region at the exit of the furnace. When the FWEC personnel adjusted the burners for proper operation, this usually did not occur. It should be noted that the phenomenon of flames reaching the upper regions of the furnace occurred independent of GR operation.

The overall conclusion is that GR does not have a significant adverse impact upon boiler operation. The slagging and fouling that occurred did not significantly impact GR operation or performance. However, LNB operation did contribute to slagging in the primary burner zone and in the secondary superheater sections.

5.5.2 Thermal Performance/Efficiency

The impacts of GR-LNB on boiler thermal performance and efficiency were projected in the process design study (see Section 2.4.1). The study predicted that the unit would produce steam at its rated capacity during GR-LNB, but with a slightly lower thermal efficiency. Also, there would be minor changes in the heat absorption profile.

During the parametric and long term testing, data were collected to compare GR-LNB results with baseline and also for comparison with the projections. Tables 5-1 through 5-3 present this data for both First and Second Generation LNB and GR-LNB operation over a range of boiler loads. The data were collected and evaluated to ensure that the unit operated at its rated capacity with proper steam temperatures and to verify that there were no adverse impacts on steam conditions/heat absorption.

Furnace Exit O_2 The average O_2 observed during non-test baseline conditions prior to installation of the GR-LNB system was 3.2%. Following installation of the LNBs, the unit was operated at 2.85% but returned to the 3.2% O_2 level following modifications (in preparation for Second Generation GR testing) in an attempt to lower the CO emissions. GR-LNB operation was operated at 2.6% O_2, sufficiently low to control CO but not too high to jeopardize boiler efficiency.

Steam Side Temperatures As predicted in the process design, increases were observed in both the main and reheat steam temperatures. This was due to the modified heat distribution in the boiler when the GR system is in operation. The increase was lessened with Second Generation GR since the amount of gas heat input was reduced. Steam temperatures were adequately controlled through steam attemperation.

Heat Transfer GR operation can affect the thermal performance by altering the furnace heat release profile and by changing the local stoichiometric ratios and particulate loading resulting in minor changes in lower and upper furnace deposition patterns. Although heat transfer in the furnace was reduced and the heat transfer in the superheater and reheater increased during First Generation GR, the heat transfers improved considerably with the Second Generation GR. The furnace temperature in the reburn zone affects the rate of NO_x reduction. Higher temperatures increase the rate of speed of the chemical reactions that result in NO_x destruction. The temperatures attained in the reburn zone were typically 2300° to 2500° F, which are consistent with the predicted reburn zone temperatures.

TABLE 5-1. THERMAL PERFORMANCE SUMMARY (Full Load - 150 MW_e)

	LNB		GR-LNB	
Thermal Parameters	1st Gen.	2nd Gen.	1st Gen.	2nd Gen.
Process variables				
Exit Plant O2	2.85	3.21	2.63	2.60
Gas heat input (%)			13.72	10.23
OFA (% total air)			19.86	22.30
Steam side temperatures (deg. F)				
Main steam temperature	969	971	992	985
Hot reheat temperature	945	946	984	964
Attemperator outlet temperature (deg. F)	774	782	778	785
Heat transfer (10^6 Btu/hr)				
Furnace	743	747	712	737
Secondary superheater	164	160	173	165
Reheater	163	157	169	153
Primary superheater	231	238	231	239
Air heater	193	192	190	184
Economizer	29	30	29	31
Cleanliness factors				
Furnace	1.028	1.025	1.009	1.026
Secondary superheater	1.038	0.999	1.118	1.045
Reheater	0.901	0.861	0.958	0.849
Primary superheater	1.034	1.053	1.067	1.077
Air heater	1.045	1.032	1.061	1.005
Economizer	1.022	1.047	1.024	1.075
Econ. gas outlet temp. (deg. F)	699	707	713	707
Heat loss (%)				
Dry gas	5.00	4.90	4.80	4.60
Moisture from fuel	1.11	1.11	0.96	0.99
Moisture from combustion	4.26	4.25	5.14	4.90
Combustible in refuse	0.61	0.61	0.53	0.55
Radiation	0.19	0.19	0.21	0.20
Unmeasured	0.83	0.81	0.86	0.83
ASME heat loss efficiency (%)	88.00	88.13	87.51	87.93
Net heat rate (Btu/kWh)	10,208	10,153	10,104	10,103

TABLE 5-2. THERMAL PERFORMANCE SUMMARY (Mid Load - 120 MW_e)

	LNB		GR-LNB	
Thermal Parameters	1st Gen.	2nd Gen.	1st Gen.	2nd Gen.
Process variables				
Exit Plant O2	3.07	3.80	3.30	3.33
Gas heat input (%)			14.25	9.39
OFA (% total air)			21.32	22.87
Steam side temperatures (deg. F)				
Main steam temperature	974	964	989	969
Hot reheat temperature	926	910	958	941
Attemperator outlet temperature (deg. F)	760	777	773	771
Heat transfer (10^6 Btu/hr)				
Furnace	608	585	595	660
Secondary superheater	140	116	139	142
Reheater	131	118	136	132
Primary superheater	166	173	180	192
Air heater	156	152	163	165
Economizer	22	26	22	30
Cleanliness factors				
Furnace	1.046	1.039	1.024	1.052
Secondary superheater	1.083	0.924	1.073	1.025
Reheater	0.907	0.884	0.945	0.844
Primary superheater	0.986	1.071	1.071	1.036
Air heater	1.092	1.098	1.139	1.052
Economizer	1.027	1.252	1.034	1.255
Econ. gas outlet temp. (deg. F)	667	678	689	690
Heat loss (%)				
Dry gas	5.06	4.88	5.04	4.43
Moisture from fuel	1.11	1.10	0.95	0.99
Moisture from combustion	4.26	4.24	5.17	4.82
Combustible in refuse	0.61	0.61	0.52	0.50
Radiation	0.29	0.31	0.29	0.26
Unmeasured	1.12	1.16	1.13	1.03
ASME heat loss efficiency (%)	87.55	87.70	86.90	87.92
Net heat rate (Btu/kWh)	10,303	10,143	10,275	10,617

TABLE 5-3. THERMAL PERFORMANCE SUMMARY (Low Load - 90 MW_e)

	LNB		GR-LNB	
Thermal Parameters	1st Gen.	2nd Gen.	1st Gen.	2nd Gen.
Process variables				
Exit Plant O2	3.87	4.69	4.03	5.00
Gas heat input (%)			15.32	10.95
OFA (% total air)			23.55	25.86
Steam side temperatures (deg. F)				
Main steam temperature	956	998	978	980
Hot reheat temperature	906	974	930	930
Attemperator outlet temperature (deg. F)	752	782	760	772
Heat transfer (10^6 Btu/hr)				
Furnace	486	483	474	497
Secondary superheater	103	104	107	104
Reheater	109	104	111	98
Primary superheater	124	144	129	137
Air heater	126	136	133	134
Economizer	17	24	16	25
Cleanliness factors				
Furnace	4.040	1.036	1.027	1.049
Secondary superheater	0.972	0.991	1.022	0.973
Reheater	0.960	0.917	0.987	0.845
Primary superheater	1.013	1.173	1.070	1.098
Air heater	1.153	1.240	1.229	1.195
Economizer	1.063	1.558	1.060	1.550
Econ. gas outlet temp. (deg. F)	648	67	666	665
Heat loss (%)				
Dry gas	5.28	4.67	5.59	4.73
Moisture from fuel	1.11	1.09	0.94	0.97
Moisture from combustion	4.26	4.21	5.25	4.90
Combustible in refuse	0.61	0.61	0.52	0.54
Radiation	0.37	0.37	0.38	0.37
Unmeasured	1.37	1.37	1.38	1.35
ASME heat loss efficiency (%)	87.00	87.68	85.95	87.12
Net heat rate (Btu/kWh)	10,954	10,871	10,858	11,182

ASME Heat Loss A reduction in thermal efficiency was calculated using ASME Power Test Code 4.1 (heat loss method). A slight reduction in efficiency was observed with GR-LNB as compared to LNB-only due to dry gas heat loss, moisture in fuel heat loss, and heat loss due to moisture from combustion. The decrease in heat absorption and resulting rise in the flue gas temperature increases the dry gas heat loss, especially for GR-LNB operation. Fuel switching, i.e. replacement of coal heat with heat from natural gas, results in a reduction in boiler efficiency due to increased fuel moisture heat loss. Since natural gas has a higher hydrogen-to-carbon ratio than coal, its combustion results in the formation of more moisture and consequently higher moisture from combustion heat loss. Nevertheless, the total reduction in efficiency was less than 1% for all conditions.

5.5.3 Tubewear

During reburning, a reducing of fuel-rich condition is established in the reburning zone. It is well known that fuel-rich conditions can enhance tube wastage due to two mechanisms:

- When fuels containing sulfur are burned under oxygen deficient conditions, some of the sulfur forms reduced sulfur species such as COS and H_2S. These species react with iron in the tubes via Fe and H_2S - FeS. The FeS scales off the tube leading to wastage (corrosion).

- In normal fuel lean operation, the tubes are protected by a thin oxidized layer. Reducing conditions, particularly fluctuating (oxidizing/reducing) conditions, can continuously degrade this protective layer.

Normal rates of tube wastage in coal-fired boilers are normally in the range of 0.001" to 0.003" per year, however, some boilers inherently have massive tube wastage. As part of the field demonstration described above, the boiler tubes were subjected to non-destructive testing to determine if GR operation jeopardized the life of the tubes. Specific areas were targeted for investigation where the mechanisms listed above suggested a potential for significant tube wastage. The prime goal of the testing was to determine if there was a significant increase in tubewall wastage from GR-LNB. A secondary goal was to determine the incremental change in the tube thickness and project this change to the end of the boiler useful life.

Ultrasonic tube thickness measurements were obtained at two time points: in January 16, 1990 prior to GR startup, and in February 21, 1993 following parametric GR testing. Based on the accuracy of the measurement technique (± 0.005"), no significant tube wastage was found. Given these results and the favorable results of two previous EER DOE-CCT projects involving GR, EER and the utility determined that no further testing was warranted.

5.6 Additional Observations

A multiclone mechanical dust collector system had been installed to remove the flyash from the FGR to prevent the ash from plugging the reburn gas injection system. However, one problem with this ash removal system was the recurring need to unplug the multiclone system periodically in order to remove the collected fly ash. The multiclone and associated piping were mounted at a second floor location which made periodic removal of the flyash very difficult. Also, during winter months when the ambient temperature was below 32°F, moisture in the fly ash would freeze and plug the multiclone. This problem was later solved when the gas injection and OFA systems were redesigned and reinstalled during a unit outage in January of 1994. The new gas injection system eliminated FGR as the transport medium for the reburn fuel, thereby eliminating this problem entirely.

Full load temperature measurements were conducted to determine the gas temperature profile in the furnace at points leaving the primary zone, the reburn zone, and the burnout zone. A very limited number of boiler penetration locations were available for temperature measurement in the primary zone. The following average furnace gas temperature profiles were obtained from full load tests:

	Coal Firing (no GR)	19% Gas Heat Input (GR)
Primary zone	2541 F	2389 F
Reburn zone	2381 F	2453 F
Burnout zone	1840 F	1917 F

The temperatures displayed for the various zones are the average of all temperatures measured for a given test. As shown from the above data, the gas temperature profile was shifted upwards in the furnace, with the GR system in operation. With GR in operation, the primary zone temperature dropped about 150 F while the reburn and burnout zones increased in gas temperature by about 70 F and 60 F respectively. This is the expected result with the GR system in operation, since some of the heat input is shifted from the primary zone to the reburn zone. The temperature profile tabulated above was recorded during the test with the greatest NO_x reduction performance for the GR system.

5.7 Coal and Natural Gas Analysis

Initially, during the course of the GR-LNB demonstration program, it was determined through testing that the coal composition was fairly uniform and that the ash levels in the coal were consistently low. The average higher heating value of the coal was 11,268 Btu/lb, ± 600 Btu/lb. After the initial period of baseline and optimization testing, coal was sampled on a less frequent basis. Likewise, the composition of the natural gas used as the reburn fuel did not change over the course of the test program, which is the normal expectation for natural gas. The higher heating value of the natural gas over the duration of testing varied by ± 2%.

Samples were taken from each of the two coal feeders per mill for the four mills and were tested for the following:

- Ultimate analysis
- Proximate analysis
- Heating value
- Ash composition
- Ash fusion temperature

Provided the design coal was being burned, fuel composition had little or no impact upon the performance of the GR, LNB, or the combined GR-LNB operation during this test program. At one point late in the test program, one train load of off-normal coal was burned which caused severe slagging in the boiler, and slag bridging occurred in the boiler which caused the shut down of the unit for cleaning. The coal analyses are shown in Tables 5-4.

Table 5-5 lists the annual average natural gas compositions from two stations that fed the Cherokee Station from 1992 through 1995. The natural gas composition was uniform during testing, and no problems were observed with the GR-LNB system due to the natural gas utilized during the test program.

TABLE 5-4. ANALYSIS OF COAL FOR CHEROKEE UNIT #3

Date	Proximate Composition (%)				Ultimate Composition (%)							Higher	Theoretical	Stoichiometric
Sampled	Moisture	Volatile Matter	Fixed Carbon	Ash	Moisture	Carbon	Hydrogen	Nitrogen	Sulfur	Oxygen	Ash	Heating Value (Btu/lb)	SO2 Emissions (lb/MBtu)	Air Requirement (lb air/lb coal)
10/5/92	10.34	35.15	44.06	10.45	10.34	62.79	4.84	1.54	0.43	9.61	10.45	11,029	0.78	8.51
10/6/92	10.82	35.52	44.11	9.55	10.82	62.52	4.21	1.34	0.45	11.11	9.55	11,000	0.82	8.20
1/20/93	10.51	35.27	45.58	8.64	10.51	64.37	4.30	1.60	0.39	10.19	8.64	11,293	0.69	8.48
7/23/93					10.31	63.01	4.48	1.72	0.44	9.23	10.81	11,089	0.79	8.43
3/23/94					8.55	68.24	4.28	1.51	0.46	9.08	7.86	11,866	0.78	8.97
9/23/94					10.98	62.87	4.34	1.55	0.44	9.15	10.67	10,994	0.80	8.37
1/18/95	10.21	34.81	46.63	8.35	10.21	64.68	4.62	1.43	0.55	10.16	8.35	11,621	0.95	8.63
1/24/95	10.39	34.06	45.89	9.66	10.39	64.47	4.50	1.53	0.44	9.01	9.66	11,186	0.79	8.61
1/27/95	9.63	33.98	45.80	10.59	9.63	65.11	4.56	1.33	0.44	8.34	10.59	11,331	0.78	8.73
Avg.	10.32	34.80	45.35	9.54	10.19	64.23	4.46	1.51	0.45	9.54	9.62	11,268	0.80	8.55
Max.	10.82	35.52	46.63	10.59	10.98	68.24	4.84	1.72	0.55	11.11	10.81	11,866	0.95	8.97
Min.	9.63	33.98	44.06	8.35	8.55	62.52	4.21	1.33	0.39	8.34	7.86	10,994	0.69	8.20
St. Dev.	0.39	0.65	1.04	0.91	0.72	1.78	0.20	0.12	0.04	0.83	1.11	302	0.07	0.22

TABLE 5-5. ANNUAL AVERAGE NATURAL GAS COMPOSITIONS*

Component (Mole %)	1992 East Denver Control	1992 88th & Platte	1993 East Denver Control	1993 88th & Platte	1994 East Denver Control	1994 88th & Platte	1995 East Denver Control	1995 88th & Platte	Overall Average
Carbon Dioxide	1.327	2.287	1.292	2.383	1.757	2.332	1.628	2.048	1.882
Oxygen	1.385	1.680	1.509	1.698	1.300	1.478	1.263	1.238	1.444
Nitrogen	5.761	6.830	6.093	6.640	5.576	6.375	5.097	4.888	5.908
Methane	85.164	80.314	84.167	80.938	84.162	81.127	85.656	85.628	83.395
Ethane	5.373	7.782	5.796	7.114	5.990	7.449	5.252	5.416	6.272
Propane	0.754	0.891	0.839	0.996	0.924	1.002	0.809	0.646	0.858
i-Butane	0.069	0.068	0.083	0.077	0.089	0.079	0.099	0.048	0.077
n-Butane	0.084	0.087	0.105	0.097	0.114	0.107	0.114	0.055	0.095
i-Pentane	0.022	0.019	0.025	0.018	0.030	0.020	0.032	0.012	0.022
n-Pentane	0.017	0.014	0.016	0.012	0.021	0.014	0.018	0.008	0.015
Hexanes Plus	0.044	0.028	0.074	0.025	0.038	0.016	0.033	0.014	0.034
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Compressibility	0.99783	0.99773	0.99780	0.99774	0.99776	0.99770	0.99779	0.99781	0.9978
HHV (Btu/scf)	982	978	964	976	994	989	993	986	983
Specific Gravity	0.6366	0.6646	0.6425	0.6627	0.6450	0.6617	0.6369	0.6365	0.648

* Two lines that feed the Cherokee Station

6.0 ENVIROMENTAL PERFORMANCE

6.0 ENVIRONMENTAL PERFORMANCE

6.1 Impact on the Environment

Environmental measurements were outlined in an Environmental Monitoring Plan (EMP) previously submitted to the DOE. Environmental monitoring was conducted to ensure that environmental standards were met and to provide a data base for environmental impacts of the technology. The measurements were divided into two categories "Compliance" and "Supplemental" measurements. Compliance measurements were recorded by plant personnel to satisfy operating permit requirements of the Colorado Air Pollution Control Division (APCD) and the Colorado Water Quality Control Division (WQCD).

The plant operates under air emissions limits of 1.2 lb $SO_2/10^6$ Btu (516 mg/10^6 J) and an opacity limit of 20 percent averaged over six minute periods. To comply with these limits the plant uses continuous flue gas SO_2 and opacity monitors and conducts fuel analyses to measure maximum theoretical SO_2 emissions. The plant submits Excess Emissions Reports to the APCD on a quarterly basis which state the periods of emissions excursions and the likely reasons. The aqueous discharge to the South Platte River also has limits and daily-to-quarterly monitoring. National Pollutant Discharge Elimination System (NPDES) monitoring sheets are submitted on a monthly basis to the WQCD to demonstrate compliance with aqueous discharge limits.

Supplemental measurements were taken by EER to fully characterize the environmental impacts of the GR-LNB process and to demonstrate environmental acceptability per the cooperative agreement with DOE. Measurements were made in several areas including air emissions from the boiler (NO_x, SO_2, CO, CO_2, and O_2), emissions of nitrous oxide (N_2O), ambient suspended particulate matter with a diameter under 10 microns (PM_{10}), and worker area dust and noise levels. Boiler emissions at the economizer outlet were measured continuously by the CEMS and logged by the BPMS. Gas samples were extracted using a sixteen-point grid of stainless steel tubing, dried, then analyzed by instruments calibrated on a per test basis with zero, mid-span and span gases. Limited measurements of N_2O emissions were made to verify that LNBs and GR-LNB do not increase the discharge of this species. N_2O is believed to be involved in the depletion of stratospheric ozone. Measurements of PM_{10} were made at the border of the facility at both upwind and downwind locations to determine the ambient PM_{10} concentration. Worker area nuisance dust levels were measured in various areas of the boiler house. Noise levels in the boiler house were measured especially near GR equipment to determine the necessity for audiometric protection.

Average gaseous emissions for each GR-LNB testing period are summarized in Table 6-1. Optimization GR-LNB testing was conducted from November 11, 1992 though April 23, 1993. During this period, GR-LNB was evaluated for 107 hours. The average NO_x level was 0.261 lb/10^6 Btu (112 mg/10^6 J), which is a reduction of 64% from the pre-project baseline of 0.73 lb/10^6 Btu (314 mg/10^6 J). Emissions of CO averaged 149 ppm (@ 3% O_2), which is below the typical standard of 200 ppm, and CO_2 accounted for 15.7% of the flue gas volume. Emissions of SO_2 averaged 0.554 lb/10^6 Btu (238 mg/10^6 J), which is far below the 1.2 lb/10^6 Btu (516 mg/10^6 J) limit.

During the long-term demonstration from April 27, 1993 to January 20, 1994, GR-LNB was evaluated for 2,913 hours. The gas heat input was reduced to an average of 12.89%, compared to 17.03% for the Optimization Testing period. The NO_x level averaged 0.260 lb/10^6 Btu (112 mg/10^6 J), again a 64% reduction from the pre-project baseline. Emissions of CO averaged 160 ppm and CO_2 accounted for 16.1% of the flue gas volume. Emissions of SO_2 averaged 0.571 lb/10^6 Btu (246 mg/10^6 J), again were significantly below the standard of 1.2 lb/10^6 Btu (516 mg/10^6 J).

The Second-Generation GR-LNB system was tested for 95 hours, from August 17, 1994 to January 27, 1995. This system used an average gas heat input of 10.22%. The

TABLE 6-1. AVERAGE EMISSIONS FOR CONDITIONS TESTED ON UNIT #3.

Test Condition	Total Duration (hours)	Net Power (MWe)	Reburn Gas Heat (%, totl)	CEMS O2 (%, dry)	COc (ppm)	CO2c (%)	NOxc (ppm)	NOx (lb/MBtu)	SO2c (ppm)	SO2 (lb/MBtu)
Optimization GR	107	141	17.03	3.63	149	15.7	195	0.261	285	0.554
Long-Term GR	2913	133	12.89	4.17	160	16.1	193	0.260	304	0.571
Second-Generation GR	95	134	10.22	3.96	68	16.0	196	0.264	330	0.622
100% Gas Firing	#	124	0.00	3.19	123	10.1	127	0.174	3	0.005
Gas/Gas Reburning	#	123	6.11	3.43	168	10.1	94	0.127	1	0.002

Subscript c denotes correction to 3% O2

#: Total duration of 100% Gas Firing & Gas/Gas Reburning Testing was 53 hours average NO_x level was 0.264 lb/10^6 Btu (114 mg/10^6 J), which is a reduction of 64% from the pre-project baseline. Modifications of the OFA system resulted in an average emissions rate of 68 ppm, which is less than half of the levels measured previously. Emissions of SO_2 were low, at 0.622 lb/10^6 Btu (267 mg/10^6 J).

During a two week period in November, 1994, 100% gas firing and Gas/Gas Reburning were tested over a cumulative period of 53 hours. The unit is capable of firing natural gas at a rate sufficient for full boiler load. Significant changes in emissions were measured since natural gas is free of fuel-bound nitrogen, sulfur, and ash, and because it has a lower carbon to hydrogen ratio. In 100% gas firing, NO_x emissions averaged 0.174 lb/10^6 Btu (75 mg/10^6 J), which is a reduction of 76% from the pre-project coal level. CO emissions averaged 123 ppm, while CO_2 accounted for 10.1% of the flue gas volume. Emissions of SO_2 were negligible. Gas/Gas Reburning was conducted with an average gas heat input of 6.11%. This resulted in an average NO_x emissions rate of 0.127 lb/10^6 Btu (55 mg/10^6 J), corresponding to an 83% reduction from the pre-project coal baseline. CO emissions averaged 168 ppm, CO_2 accounted for 10.1% of the flue gas volume, and there was virtually no SO_2.

Limited measurements of N_2O emissions were made during the Optimization Testing period. The results are presented in Table 6-2. The data indicate that LNB's result in a maximum N_2O level of 5 ppm, while GR-LNB forms N_2O at a level of 3 ppm. These are below the threshold level of 10 ppm under which more extensive measurements were called for. Therefore the GR-LNB process does not increase the emissions of this species which is believed to result in depletion of stratospheric ozone.

The aqueous discharge to the South Platte River is regulated by the Colorado WQCD. Limits of the effluent discharge in the areas of flow rate, maximum temperature, minimum and maximum pH, Total Suspended Solids (TSS), Chromium, Zinc, Chlorine, Copper and Oil & Grease are specified. Some parameters had no limits but required measurement and

TABLE 6-2. MEASUREMENT OF N_2O WITH LNB and GR-LNB OPERATION

Test Date	Test Duration (hours)	Operating Condition	Load (MWe, net)	Gas Heat Input (%, total)	Boiler O2 (%, dry)	Nitrous Oxide (ppm)
4/15/93	2.1	LNB	150	0	3.38	4.37
4/16/93	6.0	LNB	150	0	4.05	5.14
4/19/93	5.7	GR-LNB	150	20	4.19	3.33
4/20/93	3.3	LNB	130	0	3.31	1.04
4/20/93	2.8	LNB	120	0	4.51	1.01

reporting of results. The limits varied with the monitoring period as the operating permit was adjusted. Oil & Grease levels were never determined, since the measurement of this parameter is contingent upon visual observation of Oil & Grease. The measurements as reported on the NPDES monitoring sheets are tabulated in Table 6-3. With the exception of one month in which the maximum temperature exceeded the 86°F limit, all aqueous discharge limits were met.

6.2 Waste Streams and Their Disposal

Limited characterization of fly ash was conducted to determine the extent of fuel burnout (carbon conversion). Fly ash was sampled with a high volume SLM sampler in the area of the air preheater exit. The fly ash was then analyzed for carbon content to evaluate combustion completion. Table 6-4 shows the results of these measurements. Ash carbon content was generally under 10%. GR-LNB did not appear to impact the ash carbon level relative to that produced by LNB's.

The change in the quantity of fly ash generated was not measured. Since natural gas is free of ash, the change in quantity of total ash from the boiler should be equal to the gas heat input. Therefore, it was expected that ash disposal costs would be reduced by approximately 10 to 17%, during the testing periods.

6.3 Potential Environmental Concerns

The major environmental concerns were in the areas of gaseous emissions from the boiler and the makeup of the aqueous discharge. The measurements presented above addressed these concerns, with the finding that the GR-LNB process did not adversely impact gaseous emissions or the aqueous discharge. In addition, other measurements were taken to ensure that the process did not affect the local environment. These include

TABLE 6-3. AQUEOUS EFFLUENT MONITORING DATA

Monitoring	Temp.	pH		TSS		Chromiun		Zinc		Copper		Flow		Chlorine		Oil & Grease
Period	Max	Min	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Visual
	(F)			(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(MGD)	(MGD)	(mg/l)	(mg/l)	Yes=1; No=0
Oct-92	75.5	6.890	8.430	14.400	19.200	0.007	0.007	0.027	0.027	0.044	0.044	2.413	3.320	<0.05	<0.05	0
Nov-92	60.5	6.950	8.180	3.500	6.400	0.031	0.031	0.030	0.030	0.026	0.026	2.301	4.360	<0.05	<0.05	0
Dec-92	54.2	7.290	8.100	6.400	9.600	<0.005	<0.005	0.023	0.023	0.021	0.021	3.094	4.770	<0.05	<0.05	0
Jan-93	58.4	7.070	7.640	12.800	16.400	<0.005	<0.005	0.038	0.038	0.038	0.038	3.008	3.920	<0.05	<0.05	0
Feb-93	59.0	7.060	7.790	5.200	8.800	<0.005	<0.005	0.038	0.038	0.033	0.033	3.064	4.770	<0.05	<0.05	0
Mar-93	69.1	7.220	8.610	8.400	11.600	<0.005	<0.005	0.029	0.029	0.057	0.057	2.745	3.818	<0.05	<0.05	0
Apr-93	69.2	7.350	8.160	12.200	18.200	<0.005	<0.005	0.018	0.018	0.038	0.038	1.981	3.420	<0.05	<0.05	0
May-93	81.4	6.940	7.940	14.050	18.400	<0.005	<0.005	0.029	0.029	0.031	0.031	2.291	4.186	<0.05	<0.05	0
Jun-93	84.1	6.630	8.130	11.750	16.400	<0.005	<0.005	0.026	0.026	0.017	0.017	1.797	2.720	<0.05	<0.05	0
Limit	86.0	6.500	9.000	30.000	100.000	0.110	0.110	0.230	0.460	Report	Report	5.600		0.007	0.015	

Note: 30 day averages, daily maxima

TABLE 6-3. AQUEOUS EFFLUENT MONITORING DATA (con't).

Monitoring	Temperature		pH		TSS		N/Ammonia		N/Nitrate		Phosphorus		Cr/Trivalent		Zinc		Copper		Cr/Hexavlent		Flow		Chlorine		Oil & Grease
Period	Avg	Max	Min	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Visual
	(F)	(F)			(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(MGD)	(MGD)	(mg/l)	(mg/l)	Yes=1, No=0
Jul-93	80.38	85.50	6.78	7.64	17.84	31.60	0.24	0.24	4.20	4.20	0.40	0.40	<0.03	<0.03	0.031	0.039	0.033	0.055	<0.025	<0.025	1.96	3.28	<0.05	<0.05	0
Aug-93	78.51	83.30	6.95	7.79	18.84	27.80	0.07	0.07	10.40	10.40	0.60	0.60	<0.03	<0.03	0.076	0.134	0.042	0.049	<0.025	<0.025	2.12	3.75	<0.05	<0.05	0
Sep-93	69.27	79.70	7.10	7.69	7.00	7.40	0.11	0.11	10.60	10.60	0.30	0.30	<0.03	<0.03	0.035	0.048	0.025	0.034	<0.025	<0.025	1.83	3.75	<0.05	<0.05	0
Oct-93	65.87	74.50	6.74	7.75	13.20	21.20	0.20	0.20	12.30	12.30	0.95	0.95	<0.03	<0.03	0.043	0.060	0.032	0.043	<0.025	<0.025	2.19	3.66	<0.05	<0.05	0
Nov-93	52.20	58.20	6.96	7.75	12.03	14.00	0.19	0.19	10.70	10.70	0.68	0.68	<0.03	<0.03	0.043	0.059	0.029	0.040	<0.025	<0.025	1.90	3.75	<0.05	<0.05	0
Dec-93	52.29	55.80	6.69	7.70	10.38	16.40	0.18	0.18	12.43	12.43	0.68	0.68	<0.03	<0.03	0.045	0.051	0.053	0.079	<0.025	<0.025	2.35	3.92	<0.05	<0.05	0
Jan-94	54.50	56.90	7.19	7.96	20.40	32.40	0.75	0.75	14.10	14.10	1.43	1.43	<0.03	<0.03	0.067	0.098	0.066	0.072	<0.025	<0.025	2.86	4.30	<0.05	<0.05	0
Feb-94	53.65	67.80	7.15	7.66	11.28	15.60	0.39	0.39	16.99	16.99	1.42	1.42	<0.03	<0.03	0.065	0.088	0.061	0.081	<0.025	<0.025	2.42	4.03	<0.05	<0.05	0
Mar-94	61.83	68.00	6.98	7.75	17.70	22.00	0.35	0.35	12.62	12.62	0.85	0.85	<0.03	<0.03	0.042	0.047	0.038	0.043	<0.025	<0.025	2.50	3.76	<0.05	<0.05	0
Apr-94	65.15	74.60	7.09	7.76	19.65	23.60	0.19	0.19	12.37	12.37	1.13	1.13	<0.03	<0.03	0.067	0.105	0.068	0.115	<0.025	<0.025	2.62	3.74	<0.05	<0.05	0
May-94	68.45	75.60	7.10	7.62	20.56	35.60	0.18	0.18	7.88	7.88	0.56	0.56	<0.03	<0.03	0.035	0.045	0.029	0.040	<0.025	<0.025	1.91	2.66	<0.05	<0.05	0
Jun-94	79.85	84.90	6.76	7.54	10.20	19.80	0.10	0.10	2.15	2.15	0.20	0.20	<0.03	<0.03	0.031	0.080	0.022	0.027	<0.025	<0.025	2.43	3.14	<0.05	<0.05	0
Jul-94	76.88	84.60	6.86	8.19	7.05	8.00	0.19	0.19	5.06	5.06	0.27	0.27	<0.03	<0.03	0.036	0.054	0.020	0.031	<0.025	<0.025	2.23	3.96	<0.05	<0.05	0
Aug-94	80.90	86.80	6.86	8.11	6.48	11.60	0.28	0.28	13.35	13.35	0.33	0.33	<0.03	<0.03	0.041	0.068	0.033	0.045	<0.025	<0.025	2.08	3.52	<0.05	<0.05	0
Sep-94	74.28	79.70	6.96	8.00	8.00	13.00	0.21	0.21	12.95	12.95	0.20	0.20	<0.006	0.009	0.066	0.089	0.044	0.051	<0.025	<0.025	1.38	2.33	<0.05	<0.05	0
Oct-94	68.67	73.80	7.05	7.64	7.40	16.00	0.27	0.27	18.14	18.14	0.29	0.29	<0.007	0.014	0.057	0.069	0.035	0.049	<0.025	<0.025	1.65	2.73	<0.05	<0.05	0
Nov-94	58.61	65.30	7.20	7.94	10.00	14.00	0.23	0.23	21.03	21.03	0.23	0.23	<0.0058	0.007	0.027	0.046	0.040	0.047	<0.025	<0.025	1.86	3.22	<0.05	<0.05	0
Dec-94	56.10	64.30	7.22	7.75	13.50	21.00	<0.02	<0.02	13.50	13.50	0.43	0.43	<0.0055	0.007	0.032	0.045	0.043	0.043	<0.025	<0.025	1.89	2.96	<0.05	<0.05	0
Jan-95	54.93	58.80	6.89	7.83	13.40	17.00	0.52	0.52	21.90	21.90	0.53	0.53	<0.005	<0.005	0.036	0.086	0.025	0.053	<0.025	<0.025	1.75	2.59	<0.05	<0.05	0
Limit	Rprt	86.00	6.50	9.00	30.00	84.00	Rprt	Rprt	Rprt	Rprt	Rprt	Rprt	Rprt	0.055	0.350	0.400	0.120	0.240	Rprt	0.018	3.10	5.50		0.02	

Note: 30 day averages, daily maxima

TABLE 6-4. UNIT #3 FLY ASH CARBON DATA

Test Condition	Test Date	Gross Power (MWe)	Net Power (MWe)	CEMS O2 (%, dry)	Gas Heat (%, totl)	Coal Zone Stoich	Reburn Zone Stoich	Exit Zone Stoich	OFA	Carbon In-Ash (%, As Rcvd)
LNB	11/13/92	166	155	4.41	0.00	1.259	1.259	1.259	0%	3.54
LNB	11/13/92	162	151	4.18	0.00	1.182	1.184	1.242	5%	7.47
LNB	11/13/92	162	151	3.75	0.00	1.098	1.100	1.212	9%	11.43
GR-LNB	11/17/92	162	150	3.52	20.86	1.201	0.965	1.194	20%	4.18
GR-LNB	11/17/92	161	150	3.57	21.08	1.162	0.932	1.197	23%	2.71
GR-LNB	11/18/92	162	151	3.67	20.94	1.161	0.933	1.204	24%	2.85
GR-LNB	11/18/92	161	149	3.79	15.96	1.117	0.953	1.213	23%	3.27
GR-LNB	11/19/92	160	149	3.12	5.27	1.074	1.025	1.170	13%	10.24
GR-LNB	11/19/92	163	152	2.64	10.33	1.071	0.969	1.139	15%	7.82
GR-LNB	11/19/92	161	150	2.83	23.41	1.127	0.879	1.150	24%	2.77
GR-LNB	11/20/92	161	150	2.66	18.61	1.091	0.897	1.140	22%	4.34
GR-LNB	11/20/92	161	150	3.60	20.51	1.156	0.933	1.199	24%	4.93
GR-LNB	12/1/92	129	120	4.07	21.03	1.165	0.937	1.231	25%	2.75
GR-LNB	12/1/92	126	116	5.26	8.24	1.129	1.052	1.324	22%	6.77
GR-LNB	12/7/92	130	119	4.12	11.40	1.110	0.999	1.236	20%	3.95
GR-LNB	12/7/92	129	119	4.03	15.70	1.100	0.942	1.229	24%	2.47
GR-LNB	12/7/92	130	119	3.90	20.85	1.119	0.903	1.219	27%	1.62
GR-LNB	12/8/92	100	90	3.87	21.01	1.227	0.990	1.217	20%	3.98
GR-LNB	12/8/92	98	88	5.10	21.24	1.164	0.941	1.308	30%	1.22
GR-LNB	12/8/92	101	91	4.17	11.13	1.128	1.021	1.240	19%	3.84
GR-LNB	12/9/92	99	89	4.68	20.87	1.097	0.891	1.275	32%	1.77
GR-LNB	12/9/92	102	92	4.19	20.99	1.106	0.896	1.239	29%	10.29
GR-LNB	12/14/92	159	150	3.87	5.42	1.085	1.035	1.219	16%	8.75
GR-LNB	12/16/92	161	152	3.75	10.38	1.096	0.994	1.210	19%	6.68
GR-LNB	1/15/93	163	152	3.38	21.76	1.155	0.920	1.184	23%	4.69
GR-LNB	1/21/93	163	152	3.15	22.48	1.137	0.896	1.168	24%	3.51

TABLE 6-4. UNIT #3 FLY ASH CARBON DATA (con't)

Test Condition	Test Date	Gross Power (MWe)	Net Power (MWe)	CEMS O2 (%, dry)	Gas Heat (%, totl)	Coal Zone Stoich	Reburn Zone Stoich	Exit Zone Stoich	OFA	Carbon In-Ash (%, As Rcvd)
GR-LNB	2/2/93	163	152	2.44	19.32	1.067	0.872	1.125	23%	11.47
LNB	3/8/93	126	117	3.92	0.00	1.223	1.225	1.223	0%	11.23
LNB	3/8/93	126	118	3.75	0.00	1.212	1.214	1.212	0%	8.63
LNB	3/9/93	161	151	4.11	0.00	1.238	1.239	1.238	0%	4.87
LNB	3/9/93	157	147	3.58	0.00	1.201	1.202	1.201	0%	6.09
LNB	3/10/93	97	89	5.04	0.00	1.308	1.308	1.308	0%	4.13
LNB	3/10/93	98	90	4.61	0.00	1.274	1.274	1.274	0%	4.81
LNB	3/11/93	159	149	3.75	0.00	1.212	1.212	1.212	0%	5.99
LNB	3/11/93	160	150	3.36	0.00	1.186	1.186	1.186	0%	7.20
LNB	4/23/93	160	149	3.58	0.00	1.201	1.203	1.201	0%	9.81
LNB	4/23/93	157	147	2.93	0.00	1.158	1.160	1.158	0%	8.00
GR-LNB	11/9/93	162	150	3.26	14.57	1.077	0.932	1.178	21%	5.15
GR-LNB	11/10/93	161	148	3.62	11.46	1.086	0.972	1.202	19%	6.69 , 8.69
LNB	11/10/93	158	146	3.36	0.00	1.186	1.186	1.186	0%	4.41
GR-LNB	9/7/94	150	138	4.94	10.17	1.174	1.059	1.296	18%	4.12
GR-LNB	9/7/94	149	138	4.19	10.17	1.106	0.998	1.241	20%	1.16
GR-LNB	9/7/94	150	138	4.07	10.20	1.096	0.989	1.231	20%	3.56
LNB	9/8/94	149	138	4.31	0.00	1.251	1.251	1.251	0%	5.11
GR-LNB	9/8/94	150	139	3.97	16.61	1.210	1.016	1.225	17%	5.03
LNB	1/24/95	157	144	4.59	0.00	1.266	1.266	1.273	1%	7.87
GR-LNB	1/25/95	159	146	2.98	14.25	1.055	0.909	1.160	22%	7.01
GR-LNB	1/26/95	159	146	2.92	13.69	1.042	0.903	1.156	22%	9.98

Note: 9/7/94 Through 1/26/95 Data From Second-Generation GR-LNB System ambient air PM_{10} levels both downwind and upwind of the facility, worker area dust levels, and worker area noise levels.

Worker area dust levels were measured in several levels of the boiler house. The measurements were made using an Gilian Instruments Pump to ensure that the Department of Labor's Occupational Safety and Health Association (OSHA) standard of 15 mg/m^3 was met. Table 6-5 shows the results, with very low dust levels determined. Ambient air sampling was conducted at the periphery of the plant at both upwind and downwind locations using General Metal high volume air samplers.

The results, including the plant contribution to PM_{10}, are shown in Table 6-6. The plant contribution to ambient PM_{10} levels was small, with a maximum of 38 μg/m^3. There was no correlation with either GR-LNB or LNB operation. Worker area noise levels were measured in several levels of the boiler house with a Larson Davis Model 710 Dosimeter. These were used to determine if the OSHA standard of 85 decibels, averaged over 8 hours, was exceeded. The measurements listed in Table 6-7 indicate that this level was exceeded in some areas. Therefore, audiometric protection would be required for workers spending lengthy periods in these areas.

TABLE 6-5. WORKER AREA DUST LEVELS

Test I.D.	Sampling Location	Date	Dust Collected (mg)	Time (min)	Flow Rate, Avg. (l/min)	Concentration milligram/cubic meter
Baseline REP 1	Siemans Fan on	1/26/93	0.00	240	2.223	0.000
Baseline REP 2	Ground Level	1/29/93	0.09	184	2.464	0.198
GR REP 1		1/27/93	0.01	180	2.219	0.025
Baseline REP 1	4th Floor, at	1/26/93	0.00	240	2.367	0.000
Baseline REP 2	Gas Header	1/29/93	0.01	180	2.219	0.025
GR REP 1		1/27/93	0.02	180	2.406	0.046
Baseline REP 1	5th Floor, Back	1/27/93	0.00	240	2.425	0.000
Baseline REP 2	Part of Injection	1/28/93	0.02	180	2.404	0.046
GR REP 1	Area (left of Elev.)	1/27/93	0.11	213	2.397	0.215
Baseline REP 1	5th Floor, Front	1/27/93	0.00	240	2.214	0.000
Baseline REP 2	Part of Injection	1/28/93	0.04	180	2.247	0.099
GR REP 1	Area (Right of Elev.)	1/27/93	0.05	214	2.226	0.105
Baseline REP 1	5.5 Floor, Nozzle	1/28/93	0.00	190	2.248	0.000
Baseline REP 2	Cooling Fans	1/29/93	0.00	180	2.450	0.000
Baseline REP 1	6th Floor, Above	1/28/93	0.00	190	2.430	0.000
Baseline REP 2	FGR Inlet	1/29/93	0.20	180	2.248	0.494
Baseline REP 1	CEM Trailer Inside	1/28/93	0.05	247	2.413	0.084
Baseline REP 1	CEM Trailer Outside	1/28/93	0.96	247	2.256	1.720

Measurements Listed Are in Order of Elevation (Ground Level First)

TABLE 6-6. AMBIENT DUST LEVELS OUTSIDE OF PLANT

Sampling Date		Sampling Time		Filter	Test I.D.	Sampling	TSP<PM10	Plant Contribution
Start	Finish	Start	Finish	Number		Location	micrograms/cubic meter	micrograms/cubic meter
1/25/93	1/25/93	9:00	15:02	2000	GR REP 1	Upwind	110.1	
1/25/93	1/25/93	9:00	15:12	2001		Downwind	148.2	38.1
1/25/93	1/26/93	15:05	8:00	2003	Baseline REP 1	Upwind	100.7	
1/25/93	1/26/93	15:15	7:53	2002		Downwind	118.6	17.9
1/26/93	1/26/93	8:16	14:45	2004	GR REP 2	Upwind	61.8	
1/26/93	1/26/93	8:15	14:55	2005		Downwind	77.2	15.4
1/26/93	1/27/93	14:52	8:25	2006	Baseline REP 2	Upwind	70.7	
1/26/93	1/27/93	15:00	8:15	2007		Downwind	77.2	6.5
1/27/93	1/27/93	9:28	15:28	2009	GR REP 3	Upwind	77.5	
1/27/93	1/27/93	9:23	15:23	2008		Downwind	93.1	15.6
1/27/93	1/28/93	15:40	7:56	2010	Baseline REP 3	Upwind	94.6	
1/27/93	1/28/93	15:30	7:46	2011		Downwind	105.6	11
1/28/93	1/28/93	8:01	14:38	2013	Baseline REP 4	Upwind	35	
1/28/93	1/28/93	8:05	14:45	2012		Downwind	24.7	-10.3
1/28/93	1/29/93	14:41	10:00	2015	Baseline REP 5	Upwind	21.3	
1/28/93	1/29/93	14:51	10:00	2014		Downwind	23.3	2

TABLE 6-7. NOISE LEVELS IN BOILER HOUSE

Test I.D.	Measurement Location	Date	Noise Level (db)
Baseline REP 1	Siemans Fan on Ground Level	1/26/93	92
Baseline REP 2		1/27/93	90.4
Baseline REP 3		1/28/93	89.4
Baseline REP 4		1/29/93	92.4
GR REP 1		1/25/93	91.4
GR REP 2		1/26/93	91
GR REP 3		1/27/93	91.9
Baseline REP 1	4th Floor, at Gas Header	1/26/93	78.4
Baseline REP 2		1/27/93	78.4
Baseline REP 3		1/28/93	79.9
Baseline REP 4		1/29/93	77.9
GR REP 1		1/25/93	90.6
GR REP 2		1/26/93	84.9
GR REP 3		1/27/93	89.4
Baseline REP 1	5th Floor, Scanner Cooling Fan (Maxon)	1/26/93	81.9
Baseline REP 2		1/27/93	83.9
Baseline REP 3		1/28/93	84.4
Baseline REP 4		1/29/93	82.9
GR REP 1		1/25/93	95.4
GR REP 2		1/26/93	93
GR REP 3		1/27/93	94.4
Baseline REP 1	5th Floor, Back Part of Injection Area (Left of Elevator)	1/26/93	75.9
Baseline REP 2		1/27/93	76.4
Baseline REP 3		1/28/93	78.4
Baseline REP 4		1/29/93	75.9
GR REP 1		1/25/93	94.4
GR REP 2		1/26/93	92.9
GR REP 3		1/27/93	92.9

TABLE 6-7. NOISE LEVELS IN BOILER HOUSE (con't)

Test I.D.	Measurement Location	Date	Noise Level (db)
Baseline REP 1	5th Floor, Front Part of Injection Area (Right of Elevator)	1/26/93	79.4
Baseline REP 2		1/27/93	79.9
Baseline REP 3		1/28/93	79.9
Baseline REP 4		1/29/93	79.1
GR REP 1		1/25/93	97.9
GR REP 2		1/26/93	93.9
GR REP 3		1/27/93	95.4
Baseline REP 1	5.5 Floor, Nozzle Cooling Fans	1/26/93	80
Baseline REP 2		1/27/93	80.8
Baseline REP 3		1/28/93	83.4
Baseline REP 4		1/29/93	80.4
GR REP 1		1/25/93	89.9
GR REP 2		1/26/93	89.9
GR REP 3		1/27/93	90.4
Baseline REP 1	6th Floor, Above FGR Inlet	1/26/93	81.9
Baseline REP 2		1/27/93	78.9
Baseline REP 3		1/28/93	81
Baseline REP 4		1/29/93	79.5
GR REP 1		1/25/93	81.5
GR REP 2		1/26/93	80.5
GR REP 3		1/27/93	80.4

Measurements Listed Are in Order of Elevation (Ground Level First)

7.0 ECONOMICS

7.0 ECONOMICS

This section provides the estimated costs of installation, operation and performance for commercial installation of GR-LNB on a 300 MW_e wall-fired boiler. The estimate is based on mature technology; i.e., a so-called "nth" plant which incorporates process improvements resulting from experience gained in earlier installations. For a discussion on the actual costs involved in the 172 MW_e Cherokee demonstration see Section 3.0.

The capital and operating costs for the GR-LNB system for NO_x emissions reduction are based on a retrofit of a 300 MW_e wall-fired power plant. The degree of complexity regarding retrofit costs were factored based on the retrofit cost for the GR-LNB demonstration completed under this DOE contract.

7.1 GR-LNB Economic Parameters

The capital cost estimates presented summarize major equipment cost, approximate bulk material take-offs, and installation labor to arrive at direct construction costs. Construction indirects are added which include: field supervision, construction overhead and fee, and freight. In addition, costs for detailed engineering, project management, procurement, construction management, start-up, and contingency are included to develop the total installed system cost. All engineering and construction costs are representative of a turn-key contract arrangement. EER considers these estimates to be Class II, Preliminary Estimates. The estimates are expected to be representative of the actual cost -10%/+15%. This is based on the information available at this time which includes preliminary process design and conceptual engineering completed, recent major equipment quotes, bulk material takeoff's and average expected labor rates and productivity.

This section provides the basis for the estimating procedures, along with a list of assumptions used for estimating installation man-hours and costs. The cost estimates have been developed using the following sources of information for equipment pricing and for the development of labor costs:

- Richardson's Rapid System 1993 edition of Process Plant Construction Estimating Standards
- Questimate Cost Estimating software by Icarus Corp.
- Means Electrical Cost Data 1991 edition
- Vendor Quotations for Major Equipment
- EER's database of previous equipment purchases

Data from all of these sources were summarized using EER cost estimating software. Once the direct costs were determined, costs for field supervision, contractor overhead and fee, freight, engineering, project management, construction management, start-up, and contingency were added to determine the total installed cost. Table 7-1 shows the cost parameters for developing the capital cost of the installed retro-fit of the GR-LNB system on a 300 MW_e wall-fired unit. These values are commonly encountered in economic calculations and were used in recent studies of CCT processes by the U.S. Department of Energy. No changes were made to the parameters proposed by DOE.

7.2 GR-LNB Capital Cost

The design of the GR-LNB system included three integrated systems: 1) low NO_x burners, 2) natural gas injection and 3) OFA injection. It is further based on the Second Generation GR design wherein FGR is eliminated. Existing conventional burners are removed and replaced with low NO_x burners. A natural gas header was assumed to exist at the station and a tie-in was made to this supply header to provide the natural gas for the GR system. The tie-in pipe supplied gas to a control and metering station and from this station natural gas was distributed to gas injection nozzles located above the low NO_x burners. The

TABLE 7-1. COST FACTORS

Item	Units	Value
Cost of debt	%	8.5
Inflation rate	%	4.0
Construction period	mos.	9
Remaining life of power plant	-	15
Year for cost presented in this report	-	1996
Royalty allowance based on total process capital	%	0.5
Capital charge factor - current dollars	-	0.160
Capital charge factor - constant dollars	-	0.124
O&M cost levelization factor - current dollars	-	1.314
O&M cost levelization factor - constant dollars	-	1.000
Power plant size	MW_e (net)	300
Power plant type	Wall-fired	-
Power plant capacity factor	%	65
Property Taxes and Insurance	%	3
Sales tax rate	%	5.0
Cost of freight	%	2.0
Engineering/home office fees of total process capital	%	10.0

natural gas valve train, common to all of the injection nozzles, included flow metering and control equipment, and safety shut-off valves.

OFA was assumed supplied from the existing hot secondary combustion air windbox. The existing windbox pressure on a tangentially-fired units is normally inadequate, so booster fans were assumed required. The installation of the natural gas injectors and OFA ports requires furnace tubewall modifications. There are no unusual boiler access hindrances that would inhibit normal installation of equipment. No asbestos removal is required during installation. The reburning system is assumed to be installed during a normally scheduled plant outage, negating downtown costs. A list of the major equipment associated with the GR-LNB retro-fit in shown in Table 7-2. The sizes and quantities shown are for a standard 300 MW_e unit.

TABLE 7-2. MAJOR EQUIPMENT LIST

Item No.	Item Name	Number		Unit Capacity	Design Conditions*	Material of Construction
		In Use	Spare			
1	Low NOx Burner	30	0	100 x 10^6 Btu/burner		Steel
2a	Natural Gas Delivery System	1	0	3,840 scfm 60 psi	National Electric Code Class 1, Division 2	Miscellaneous
2b	Natural Gas Cooling Fan	2	0	5,000 scfm		
2c	Natural Gas Injector	16	0	240 scfm/ injector		Steel
3a	Overfire Air System	1	0	200,000 scfm		Miscellaneous
3b	Overfire Air Booster Fan	1	0	200,000 scfm		
3c	Overfire Air Cooling Fan	5	0	20,000 scfm		
3d	Overfire Air Injector	8	0	15,000 scfm/ injector		Steel
4	Control System	1	0	n/a		(Electronic)

* Pressure, temperature, composition, flowrate, surface area, viscosity, special considerations (code, corrosion tolerance, etc.)

Table 7-3 shows the major equipment costs. The total cost for the major equipment items of the GR-LNB system is \$2.35 million (\$2.5 million for total equipment cost). Table 7-4 presents the overall capital cost for the GR-LNB system. This cost includes both equipment and installation costs. The total cost, including a 15% project contingency, is estimated at \$7.80 million or \$26.01/kW_e. The GR and LNB system capital costs can be easily separated from one another for they are independent systems. The capital cost for the GR system only is estimated at \$3.64 million or \$12.14/kW_e, and the LNB system capital cost is estimated at \$4.16 million or \$13.87/kW_e.

TABLE 7-3. MAJOR EQUIPMENT COST

Item No.	Item Name	Cost/Unit F.O.B. Equipment	Cost/Unit Sales Tax (5%)	Cost/Unit Total	No. of Units	Total Cost $1,000s
1	Low NOx Burners	55.7	2.8	58.5	30	1,754.6
2a	Natural Cooling Gas Fans	4.5	0.2	4.7	2	9.5
2b	Natural Gas Injectors & Tubewall Penetrations	5.1	0.3	5.4	8	42.8
3a	Overfire Air Booster Fan	351.8	17.6	369.4	1	369.4
3b	Overfire Air Cooling Fan	11.8	0.6	12.4	2	24.8
3c	Overfire Air Injectors & Tubewall Penetrations	17.4	0.9	18.3	8	146.2
	Total	**446.3**	**22.3**	**468.6**	**1**	**2347.2**

7.3 GR-LNB Operating Cost

EER conducted analyses to evaluate the fixed and variable (operating) costs of a GR system for a 300 MW_e coal wall-fired power plant (net heat rate of 10,000 Btu/kWhr before GR-LNB); contributing cost factors were as follows:

1. Reburning Fuel Cost Differential Since gas costs more than coal on a heating value basis ($\$/10^6$ Btu), there is a cost related to the amount of gas fired. This was calculated based on the delivered costs of gas and coal, the percentage of gas fired (12.5% of the total heat input). A value of $\$1.00/10^6$ Btu was used as the differential between the delivered price of natural gas ($\$2.47/10^6$ Btu) and the delivered price of coal ($\$1.47/10^6$ Btu).

2. Changes in Boiler Efficiency Since the boiler efficiency is lower when using gas as the reburning fuel there needs to be an increase in the amount of fuel fired to make up for the lower efficiency. This increase was based upon the boiler efficiency loss (0.80% w/12.5% gas) for GR and a composite fuel cost of $\$1.67/10^6$ Btu.

TABLE 7-4. GR-LNB CAPITAL COST

Capital Cost

Category	10^6	\$/kWe
Equipment	2.50	8.32
Construction Labor	1.25	4.17
Construction Indirects	0.77	2.57
Other (6%), Freight (2%) & Taxes (5%)	0.32	1.08
Gas Supply [1]	0.00	0.00
Gas Metering & Reduction Station	0.45	1.50
Total Process Capital	5.29	17.64
Engineering (10% of process capital)	0.53	1.76
Project Management (8%) /Owners Costs (5%)	0.69	2.29
Project Contingency @ 15%	0.98	3.25
Total Plant Cost	7.48	24.95
Allowance for Funds During Construction [2]	0.00	0.00
Total Plant Investment (TPI)	**7.48**	**24.95**
Royalty Fees @ 0.5% of Total Process Capital	0.03	0.09
Startup Costs @ 3% TPI	0.22	0.75
Working Capital @ 0.9% TPI	0.07	0.22
Cost of Construction Downtime (28 days) [3]	0.00	0.00
Total Capital Requirement	**7.80**	**26.01**

[1] Gas supply availability at site assumed adequate
[2] No allowance included based on DOE guideline
[3] Assumed downtime to be during scheduled major outage

3. Auxiliary Power Since the GR fuel contributes a significant portion of the boiler fuel, there is a corresponding percentage decreased load on the coal crushers. There is added power required however for the OFA booster fan and the natural gas and OFA cooling air fans. The electricity cost was based on an auxiliary power cost of \$0.02/kWhr.

4. Operating Labor All reburning system operation is performed in the automatic control mode. Therefore, no additional plant operators are required.

5. Maintenance Items/Spare Parts An allowance of 2% of the total plant investment was used for total maintenance, 40% of the 2% was allocated for maintenance items and spare parts. Since the LNBs are replacement units, no additional maintenance cost is included for this equipment.

6. Maintenance Labor An allowance of 2% of the total plant investment was used for total maintenance, 60% of the 2% was allocated for maintenance labor. No additional labor is required to operate the GR-LNB system; however, additional maintenance is required due to the added equipment.

7. Administration and General Overhead An allowance of 60% of plant labor was added to cover administration and general overhead.

8. Local Property Taxes and Insurance An allowance of 3% of total plant investment was used to cover taxes and insurance.

The total annual incremental gross operating cost for the GR-LNB system, excluding fixed charges to payback capital, is estimated at \$2.66 million (see Table 7-5). If an SO_2 allowance credit is taken based on the reduction of fuel sulfur when firing natural gas, the net operating cost is estimated at about \$2.17 million. This SO_2 credit was based on an allowance of \$95/ton (Feb. 1996). Variable operating cost for the GR-LNB is about \$2.33 million and the fixed cost, excluding fixed charges, is about \$0.33 million.

7.4 Summary of Performance and Economics

Based on the developed capital and fixed/variable operating costs, economic projections were made using current dollars which include an inflation rate of 4.0%, and constant dollars which ignore inflation. The factors used in the development of the technology

TABLE 7.5 ANNUAL INCREMENTAL OPERATING COST

Annual Incremental Operating Costs[1]

	Annual Use	Cost/Unit	Cost/Yr
Variable Costs			
Fuel:			
Natural Gas	2,135,250 10^6 Btu	\$1.00 /10^6 Btu [2]	\$2,135,250
Supplemental Fuel	136,656 10^6 Btu	\$1.60 /10^6 Btu [3]	\$217,966
Utilities:			
Electricity [4]	2,181 10^3 kWhr	\$20.00 /10^3 kWhr	\$43,616
Ash Disposal Credit	(8,541) tons	\$9.29 /ton	(\$79,346)
Sub-Total			\$2,317,486
Fixed Costs			
Labor: [5]			
Maintenance (2% of GR TPI x 60%)			\$41,930
Supervision (20% of Maintenance Labor)			\$8,386
Supplies:			
Maintenance (2% of GR TPI x 40%)			\$27,953
Admin. and Gen. Ovhd. (60% of total labor)			\$5,032
Local Taxes and Insurance @ 3% of TPI			\$224,549
Sub-Total			\$307,850
Total Gross Operating Cost			**\$2,625,337**
SO2 Allowance @ \$95/ton [6]			**(\$486,336)**
Total Net Operating Cost			**\$2,139,001**

[1] 65% Capacity factor @ 300 MWe net capacity (10,000 Btu/kWhr heat rate) w/ 12.5% fuel heat input as natural gas
[2] Natural gas assumed delivered at \$2.47/MM Btu; coal cost at \$1.47/MM Btu
[3] Extra fuel added to make up for loss in efficiency (0.80%) at same coal/gas ratio as reburn
[4] OFA booster and cooling fans power requirement (533 kWhr @65% capacity), less pulverizer credit of 10 kWhr/ton coal
[5] Assumed no added operating labor and no incremental maintenance costs for LNBs since they are repalcement parts
[6] February 1996 Allowance Credit Value, reduction based on 4.8 lb SO_2/MM Btu for coal w/coal reduction of 12.5%

TABLE 7-6. GR-LNB ECONOMICS AND PERFORMANCE SUMMARY

Summary of Data

Power Plant Attributes

	Units	Value
Plant capacity, net	MWe	300
Power produced, net	10^9 kWhr/yr	1.71
Capacity factor	%	65
Plant life	yr	15
Coal feed	tons/yr	683,280
Sulfur in Coal	wt%	3.0

Emissions Control Data

	Units	NOx
Removal efficiency	%	64.0
Emissions standard (EPA 40 CFR Part 76 - 12/19/96)	lb/10^6 Btu	0.46
Emissions without controls	lb/10^6 Btu	0.73
Emissions with GR-LNB control	lb/10^6 Btu	0.26
Amount reduced	tons/yr	3,990

Levelized Cost of Power

	Current Dollars		Constant Dollars	
	Factor	**Mills/kWhr**	**Factor**	**Mills/kWhr**
Capital Charge	0.160	0.73	0.124	0.57
Fixed O&M	1.314	0.25	1.000	0.19
Variable Operating Cost	1.314	1.79	1.000	1.36
Total Cost		2.77		2.12
SO_2 Credits	1.314	(0.37)	1.000	(0.28)
Total Cost w/SO_2 Credits		2.40		1.84

Levelized Cost - NOx Removal Basis

	Factor	$/ton removed	Factor	$/ton removed
Capital Charge	0.160	313	0.124	242
Fixed O&M	1.314	108	1.000	82
Variable Operating Cost	1.314	767	1.000	583
Total Cost		***1187***		***908***
SO_2 Credits	1.314	(160)	1.000	(122)
Total Cost w/SO_2 Credits		***1027***		***786***

Basis: 64% NOx reduction assumed based on unit with 0.50 seconds Reburn zone residence time economics are shown in Table 7-1. Table 7-6 shows the performance and cost for a 300 MW_e GR-LNB System that is retro-fitted to a wall-fired boiler. The table reflects the NO_x reduction costs based a 65% capacity factor with 12.5% of the heat input supplied by natural gas at a gas to coal price differential of $1.00/million Btu. The incremental increase in the levelized cost of power, including capital charges is estimated at 2.12 mills/kWhr in constant dollars and 2.77 mills/kWhr in current dollars.

If an SO_2 credit is applied based on fuel sulfur reduction when firing natural gas, the net incremental increase in the levelized cost of power is estimated at 1.84 mills/kWhr in constant dollars and 2.40 mills/kWhr in current dollars. The levelized cost of NO_x removal is estimated at $908/ton and $1187/ton for current and constant dollar projections, respectively. If an SO_2 credit is applied based on fuel sulfur reduction, the net levelized cost of NO_x removal is estimated at $786/ton and $1,027/ton for current and constant dollar projections, respectively.

Based on the levelized cost (in constant dollars) for reducing nitrogen oxides, excluding SO_2 credits, the capital charge component made up around 27% of the total cost of NO_x reduction. The fixed operation and maintenance costs represented only 9%, and the variable cost made up the rest of the cost for removing NO_x. The cost of NO_x removal shows that the variable operating cost is the greatest cost component, making up some 64% of the NO_x reduction.

7.5 Effect of Variables on Economics

The economics developed for the 300 MW_e system were used to determine the economic effects of varying the selected parameters shown below:

- Fuel cost differential between gas and coal
- Wall-fired unit size

- Onstream capacity factor
- Sulfur dioxide allowance credits

The GR-LNB capital costs developed for a range of power plant sizes was based on scaling the power plant cost based on a 0.75 power factor. The effects of the above variables are shown In Figures 7-1 through 7-4. The NO_x reduction costs are based on constant dollars and includes the SO_2 allowance credits.

Figure 7-1 Effect of plant size The size of plant on economics becomes less significant for unit sizes of 300 MW_e and greater. For example, the cost of NO_x emissions for a 300 MW_e unit is $72/ton less than a 150 MW_e plant and when increasing the size to 450 MW_e the cost is reduced only $33/ton.

Figure 7-2 Effect of capacity factor The onstream capacity factor impact is less significant as it increases above 65%. For example, the cost of NOx emissions for a 65% capacity factor is $143/ton less than that for 55%, but when it increases from 65% to 75% the cost is reduced $101/ton.

Figure 7-3 Effect of gas to coal price differential The price of natural gas has a linear effect on the NOx reduction costs. For every $\$0.25/10^6$ Btu change, either an increase or decrease in the gas to coal price differential, there is a corresponding $253/ton cost effect.

Figure 7-4 Effect of SO_2 allowance price The price of SO_2 allowances also has a linear effect on the NOx reduction costs. For every $50/ton change, either an increase or decrease in price, there is a corresponding $64/ton effect.

Of the four parameters that were varied, clearly the price of natural gas is the most dominant parameter regarding the cost of NOx emission reductions.

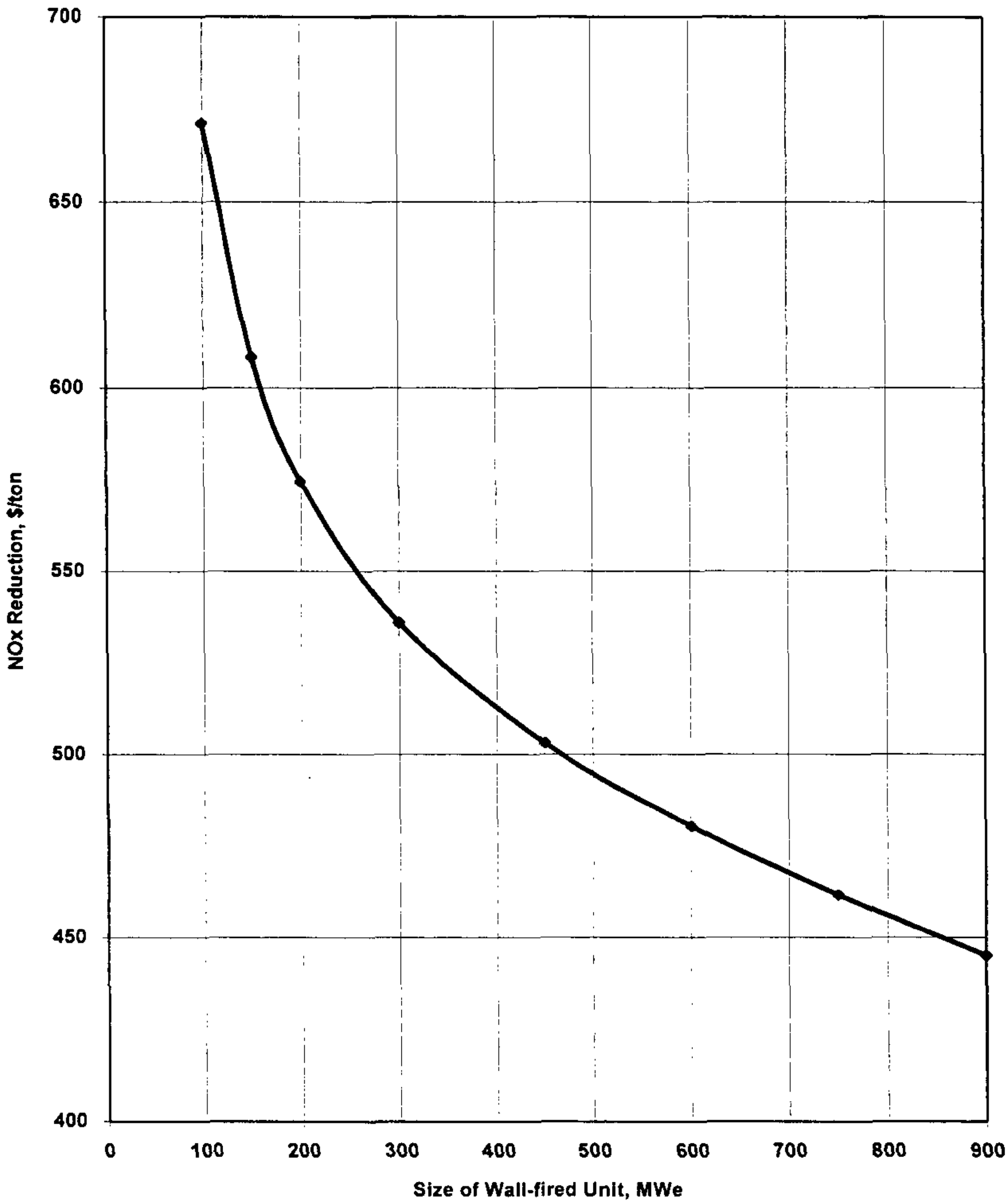


Figure 7-1. The effect of unit size on the cost of NO_x reduction

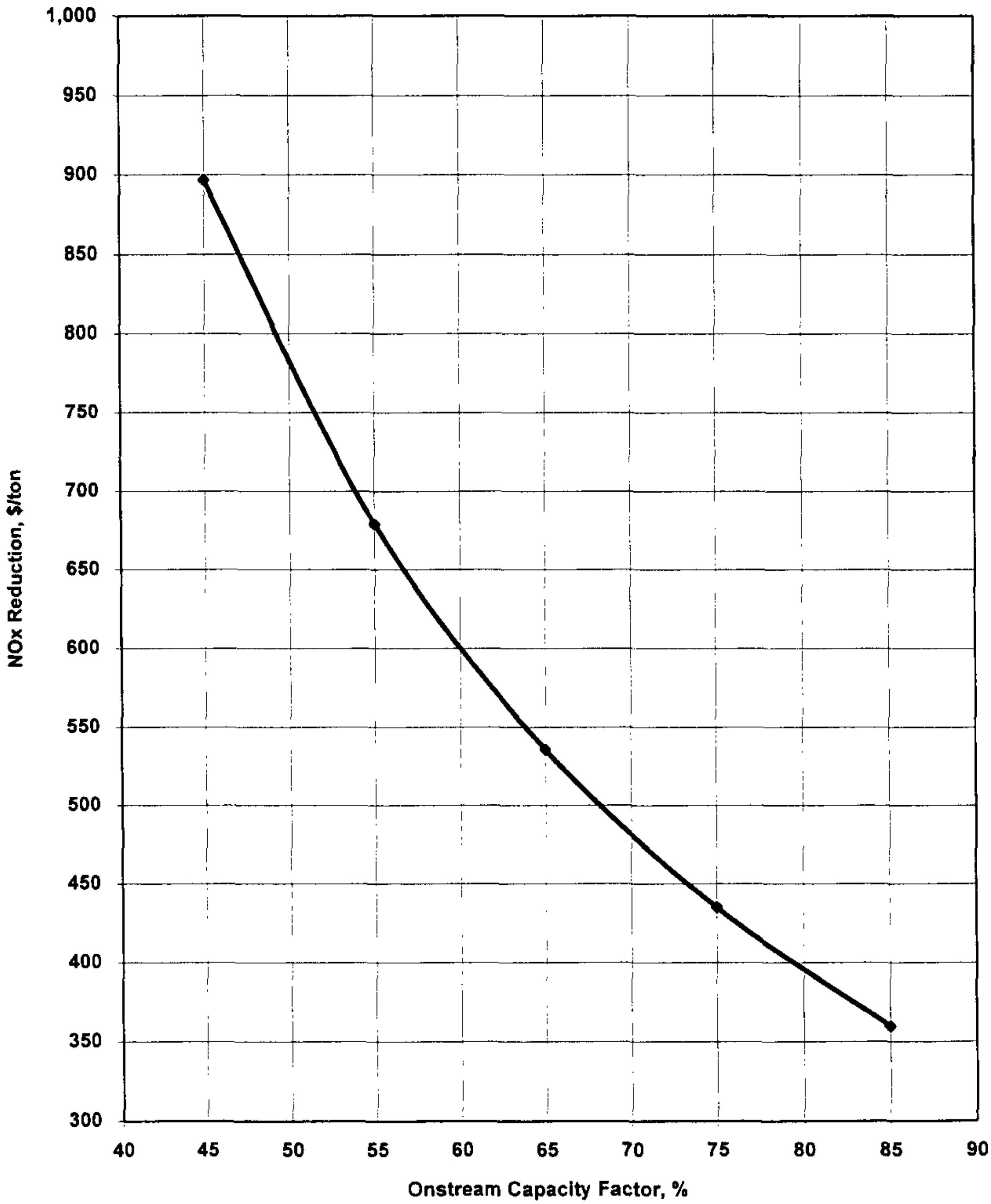


Figure 7-2. The effect of capacity factor on the cost of NO_x reduction

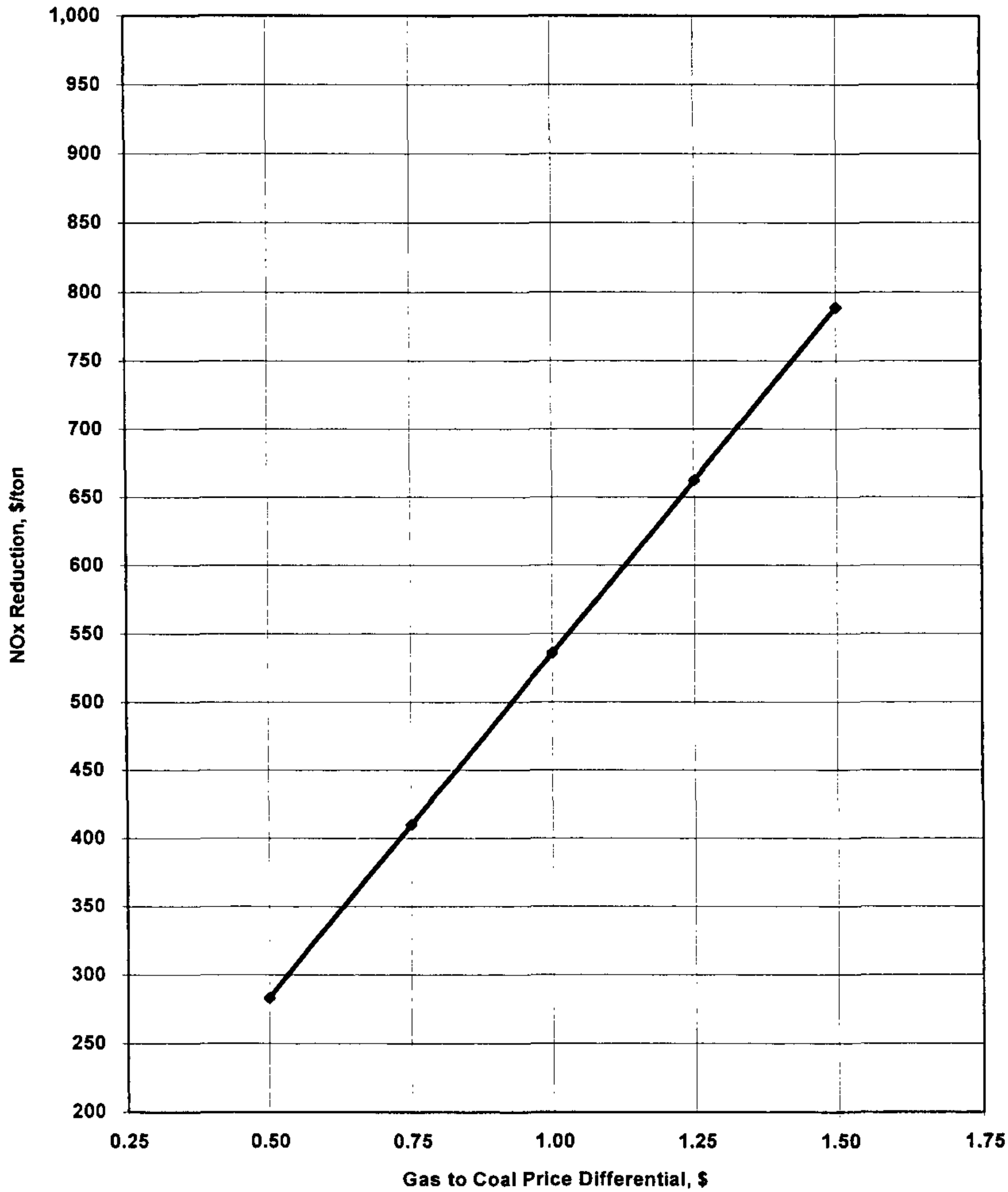


Figure 7-3. The effect of gas to coal price differential on the cost of NO_x reduction

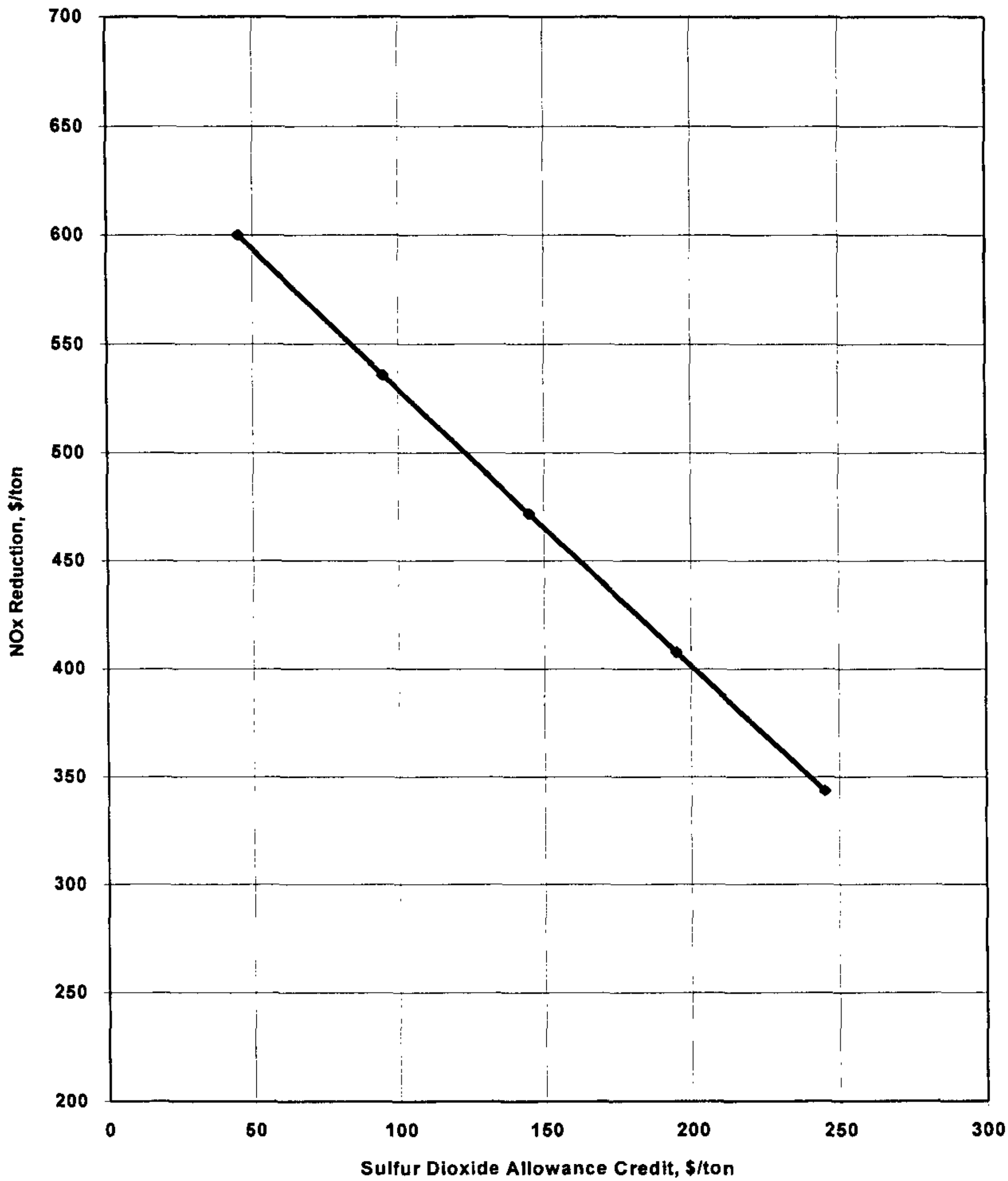


Figure 7-4. The effect of SO_2 allowance price on the cost of NO_x reduction

8.0 COMMERCIALIZATION POTENTIAL AND PLANS

8.0 COMMERCIALIZATION POTENTIAL AND PLANS

In the recent past, the U.S. has experienced a very minimal increase in electric power generating capacity. Further, the new power plants that have been built have been of relatively low capacity. This past trend is predicted for the foreseeable future, so GR technologies, when applied, can be retrofitted to existing power plants.

Title IV of the 1990 Clean Air Act Amendments (CAAA) as specified in §407(b)(2) provides for the reduction of NO_x emissions from coal-fired utility boilers. Under the CAAA, boilers were placed in two groups. For the Phase I Group 1 boilers (dry bottom wall-fired and tangentially-fired boilers), regulations were published in the Federal Register on April 13, 1995.

On December 19, 1996, the U.S. Environmental Protection Agency (EPA) set its regulations for Phase II Group 1 utility boilers and Phase II Group 2 utility boilers. Group 2 comprises the rest of the boiler types used by the utility industry (cyclone-fired, cell burner-fired, wet bottom, dry bottom vertically-fired, stoker-fired, and fluidized bed combustors). This regulations come into effect on January 1, 2000. The NO_x reduction regulations are providing impetus to the electric utility industry to more seriously consider GR in its NO_x control strategy. The new utility boiler regulations for NO_x emission limits are shown in Table 8-1.

8.1 Market Analysis

Under the U.S. EPA regulations for Phase II Group 1 boilers (dry bottom wall-fired and tangentially-fired boilers), there are low cost retrofit technologies available that can be applied to meet the NO_x emission limits. Both of these boiler types can be brought into compliance with burner (low NO_x) retrofits, or burner retrofits with OFA. Therefore, even

TABLE 8-1. U.S. EPA PROPOSED NO_x EMISSION REGULATIONS

(Annual Average Basis)

Utility Boiler Type	PHASE I Current Regulations April 13, 1995	PHASE II Proposed Regulations January 1, 2000
Group 1:	lb $NO_x/10^6$ Btu	lb $NO_x/10^6$ Btu
Wall-Fired (Dry Bottom)	0.50	0.46
Tangentially-Fired	0.45	0.40
Group 2:		
Cell Burner-Fired	-	0.68
Cyclone-Fired	-	0.86
Wet Bottom	-	0.84
Vertically-Fired	-	0.80

Note: No regulations were proposed for stoker-fired units or fluidized bed boilers.

if these regulations are governing, for wall-fired units, rather than using GR-LNB, LNBs with OFA would be sufficient to meet these regulations.

In Group 2, cell burner-fired (36%), wet bottom (13%), and cyclone-fired (41%) boilers make up some 90% of the generating capacity of the group. There are low cost burner replacement options for cell burner-fired boilers and staged combustion appears to be a low cost option for wet bottom boilers to meet the proposed NO_x regulations. Cyclone-fired units present the best market potential for the GR technology based on the CAAA.

The market for the GR technology is difficult to assess at the present time in light of the recent Northeast State filings (states within the Northeast Ozone Transport Region) regarding NO_x emissions from other states. The Northeast States (NY, CT, PA, MA, RI, ME, NH & VT) petitioned other states (AL, AR, DE, GA, IL, IN, IA, KY, LA, MA, MD, MI, MN, MS, MO, NC, NH, NY, PA, OH, RI, SC, TN, VA, WV & WI) to reduce power plant (units $\geq$250 million Btu/hr) NO_x emissions. The petitions varied, but most are asking that the named states reduce their NO_x emissions by 85% or down to a level of 0.15 lb/10^6 Btu, whichever is less stringent. If the targeted states implement regulations to meet these levels it could open a market for GR; however, the NO_x emission level is so low that GR would have to be used in combination with other technologies such as selective catalytic reduction (SCR) or selective non-catalytic reduction (SNCR). It is unlikely that combined GR-LNB technology would be used in this case for the two combined technologies could not meet the requested NO_x emission levels. A third technology such as SCR or SNCR would have to be added.

In addition to the SIP call, there are proposed new National Ambient Air Quality Standards (NAAQS) that would reduce ambient ozone levels by 50%. If these proposed regulations become law there will be more ozone non-attainment areas in the U.S. putting added pressure on the electric utilities to reduce their NO_x emissions (a precursor to ozone production). These three initiatives to reduce NO_x emissions has created a high degree of confusion regarding what standards a certain power plant will have to meet. It has delayed the electric utility industry from making decisions regarding the reduction of NO_x emissions.

8.1.1 Applicability of the Technology

The GR technology is applicable to any type of boiler. A gas injector retrofit requires very little space; this is especially true with the new gas injection system developed by EER. The new system, which was demonstrated under this CCT project, does not require the use of FGR with fuel gas injection. Any type of fuel gas can be used for the GR system, natural gas, propane, landfill gas, etc. With GR, an OFA system is required and in applications to cyclone-fired units, the air pressure in the specific boiler windbox is sufficient for the OFA system, so additional air booster fans would not be required. This may not be the case for other types of boilers, and booster fans could be required.

As stated previously, in light of the existing and proposed new regulations, it is unlikely that there will be a market for combined GR-LNB technology. However, each technology individually will be marketable.

8.1.2 Market Size

The potential size of the market for GR technology is dependent on environmental regulations; the more stringent the NO_x emission limits to a point, the greater the market size will be. The three initiatives which are now operative will set the size of the market. All three of the above discussed initiatives result in different NO_x emission levels. Which one is controlling will set the technologies that will be used in the future based a technology's NO_x reduction potential.

Currently there are thirteen states in the Northeast that are included in the Ozone Transport Region (OTR). They have a cooperative agreement under the Northeastern States Cooperative Air Usage Management (NESCAUM) group to reduce NO_x emissions. The member states are Connecticut, Delaware, District of Columbia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and Virginia.

In these thirteen states there are 463 boilers, that in 1990 emitted some 1 million tons of NO_x to the atmosphere. The average NO_x emissions rate for these boilers was 0.649 lb/10^6 Btu in 1990. In 1999 these boilers will have to meet a five month control average of 0.20 lb/10^6 Btu, and in the year 2003 will have to meet 0.15 lb/10^6 Btu. Under the SIP call another 13 states would be added to this group. If the requested emission levels dictated in the SIP calls prevail, the market for reburning should increase dramatically; how much it increases will be determined by the lowest NO_x emissions allowable by law.

Also, based on the proposed U.S. EPA limits, a new market is specifically opening for the use of reburning technology on cyclone-fired units. The reason for this market is that there are not many cost effective NO_x reduction options available for cyclone-fired boilers. The U.S. EPA regulation for cyclone-fired units (>155 MW_e) is 0.86 lb $NO_x/10^6$ Btu, and there are some 55 cyclone-fired units in the United States to which GR could be applied to put these units into compliance. In addition to cyclone units, power plants in the existing OTR are good marketing targets.

8.1.3 Market Barriers

In the case of the GR technology, a critical capital cost item concerns the availability of natural gas. If natural gas is available at the site to supply a sufficient volume, the capital cost will be much less than that compared to a plant that did not have gas on-site. The capital cost differential between sites is related to the pipeline distance required to bring gas to the power plant.

Another factor that affects the capital cost is the existing combustion air windbox pressure. If there is adequate windbox pressure (4-6 in. W.C. or greater) then a booster OFA fan would not be required. The air pressure required is also dependent on the size of the unit; the larger the size, the higher the air pressure required for optimum furnace penetration with the OFA.

GR is most effective where furnace temperatures are hot (2600+°F) and residence times in the reburning (reducing) zones are long enough to effectively reduce NO_x emissions. The hotter the reburning zone and the longer the residence time, the greater the NO_x reduction will be for the same rate of gas fired as a reburning fuel.

The biggest economic factor concerning the use of the GR technology to reduce NO_x emissions at a specific power plant is the price differential between the reburning fuel (natural gas) and the primary fuel (coal). The smaller the price differential, the more attractive the GR system will become.

Another economic factor is SO_2 allowance credits. Since natural gas, containing no sulfur, replaces coal with sulfur, the higher the SO_2 credits are selling for, the better the economics of a gas reburn system will look.

8.1.4 Economic Comparison with Competing Technologies

Methods for controlling NO_x from coal-fired utility boilers include combustion modifications and post combustion treatment of the flue gas. Combustion modifications involve operating the primary combustion zone under fuel rich conditions (and therefore reduced temperatures), cooling the flame at a higher rate, and dilution of the flame to reduce adiabatic flame temperatures. Gas residence times in the high temperature zone as well as excess air levels are reduced, inhibiting the formation of fuel and thermal NO_x.

The combustion modification techniques that can be applied depends on the type of boiler and method of firing the fuel. Low NO_x burner technology with OFA has been successfully applied to wall and tangentially fired pulverized coal units. Low NO_x burner technology, however, cannot be applied to cyclone units due to the configuration of the cyclone furnaces. The importance of OFA as it relates to staging the combustion process has been determined in testing of low NO_x burner retrofits and demonstrations. This information has promoted the addition of OFA to conventional firing systems as a stand alone alternative to low NO_x burners for utilities requiring moderate reductions.

OFA systems may be "close-coupled" to the existing burner assemblies on tangentially fired units, or separated higher into the furnace on both tangentially and wall fired designs for deeper staging and increased NO_x reductions. Staged combustion with OFA also cannot be applied to cyclone-fired units with high sulfur coal feedstocks. Industry experience indicates that this combustion modification technique for high sulfur feedstocks results in high levels of corrosion in the cyclone barrels.

Post combustion techniques include reburning, selective catalytic reduction (SCR), and selective non-catalytic reduction (SNCR). The reburning process using natural gas as the reburning fuel is described elsewhere in this manual. Coal and coal water slurry (CWS) have also been proposed as reburning fuels. In Table 8-2 below, a relative comparison is made between the cost, design, and operating factors associated with the three reburning fuels.

TABLE 8-2. REBURNING FUEL COMPARISON

	Natural Gas	Coal	CWS
Reburning Fuel Cost	Highest	None	Low
Capital Cost	Lowest	Highest	Low
SO_2 Reduction	Yes	None	Varies
Injector Size	Small	Large	Small
Auxiliary Power	Low	High	Moderate
Residence Time Requirement	Low	Moderate	Moderate

Natural gas is the most expensive reburning fuel, with the differential above coal averaging \$1.00 to \$1.50/10^6 Btu. Coal reburning involves no differential fuel cost since the total heat input to the unit does not change. The cost of CWS is site specific depending on the cost and the availability of the coal fines used to formulate the slurry. CWS may be produced by wet milling the primary coal (~\$4/ton), using the minus 100 mesh froth cell product from coal cleaning plants, or recovering coal fines from coal preparation plant ponds with advanced coal cleaning techniques (delivered cost could be less than primary coal cost or higher depending on ownership of resource, quality of impounded coal and distance from power plant). Other fuels, like fuel oil and Orimulsion®, a Venezuelan bitumen-water emulsion can also be used as effective reburning fuels.

If gas is available at the power plant, GR offers the lowest capital cost investment since there are no fuel preparation or handling equipment requirements. Coal reburning will require the addition of coal handling and milling equipment, milling equipment upgrading, or storage and handling equipment for coal fines produced elsewhere. Reburning with slurry requires CWS feeding equipment, added air compression for CWS atomization, and either onsite CWS storage or CWS formulation equipment for delivered coal fines filter cake.

Since natural gas contains no sulfur, GR offers an additional SO_2 reduction over that provided by SI or other processes since gas replaces coal containing sulfur. For normal GR applications gas would replace coal and SO_2 would be reduced by some 20%.

Auxiliary power requirements for GR are relatively lower since fuel handling and preparation equipment is not necessary as it is with reburning using coal or CWS as the reburn fuels. Demonstrations of GR with FGR have shown that, with most furnace designs and adequate natural gas pressures available, the FGR may not be necessary to promote adequate mixing of the natural gas with the furnace gases. In such a case, the FGR fan can be eliminated, further reducing the auxiliary power requirements.

Consideration of the furnace geometry and available residence time may be critical in the selection of the reburning fuel. Natural gas requires the shortest residence time for the reburning process since the fuel "particle" size is at the molecular level. Coal, having larger particle sizes will require longer residence times.

Selective catalytic and non-catalytic reduction are post combustion treatment methods. In the selective catalytic reduction process, ammonia vapor and preheated air are mixed and injected into the flue gas at the boiler exit. The optimum temperature window for this process is 550 to 750°F. Flue gas at this temperature is generally available upstream of the unit's air heater. A catalytic converter is installed in the duct work at this location. NO_x is reduced by the process to diatomic nitrogen in the converter. SCR systems are better suited for installation downstream of a hot side precipitator since dust buildup and catalyst fouling are reduced. On systems installed upstream of a cold side precipitator, the catalyst mesh size must be increased to reduce dust build-up and catalyst fouling. The larger mesh size dictates a larger converter to provide the necessary surface area.

Ammonia slip (un-reacted NH_3) is a major operating consideration with SCR systems. As the catalyst is expended, ammonia slip increases. Ammonia passing through the converter forms ammonium sulfate in particulate form which may foul equipment downstream such as air heaters, draft fans, or precipitators. Sulfates may also form in the catalyst pores to deactivate the catalyst if the flue gas temperature drops below 500°F. Un-reacted ammonia may also be adsorbed by the fly ash and increase the leachability of metals in the ash, affecting the salability of the fly ash.

In the SNCR process, ammonia or urea based reagents are injected into the upper furnace at locations where flue gas temperatures range from 1600 to 2000°F. With this process the required high activation energy is provided by the temperature of the flue gas, and a converter with catalyst is not necessary.

An independent study completed for the U.S. EPA (Contract No. 68-D2-0168) "Investigation of Performance and Cost of NO_x Controls as Applied to Group 2 Boilers", compared the costs of competing NO_x control technologies. The costs for various NO_x reduction systems applied to boilers were developed as part of this study. The values for GR system are slightly different than those developed by EER due to different cost assumptions. Although actual costs vary, the relative costs for the technologies evaluated should be valid. In Table 8-3, the cost of GR, GR-LNB, Coal Reburning, Selective Non-

Catalytic Reduction (SNCR) and Selective Catalytic Reduction (SCR), based on $/kW$_e$ and $/ton of NO_x removed are shown for 400 MW$_e$ units where the secondary air pressure is high enough not to require a booster fan for GR. As shown in the table, the boiler NO_x control technologies show a cost per ton of NO_x removed that ranges from approximately $490 to $718. Based on this comparison Coal Reburning is the least expensive and GR-LNB and SNCR are the most expensive. GR and SCR are near equal when the price differential between natural gas and the primary coal is $1.00 /10^6 Btu. The NO_x reduction for SCR assumed for this study was low, only 50%.

TABLE 8-3. 400 MW$_e$ UNIT NO_x CONTROL COMPARISON

Technology	NO_x Reduced %	Capital Cost $/kWe	NO_x Removed[5] $/ton
GR[1]	60	15.2	590
GR-LNB[2]	64	24.2	718
Coal Reburning	50	52.7	490
SNCR[3]	35	7.3	690
SCR[4]	50	40.0	575

(1) Natural Gas @ $2.47/10^6 Btu and Coal @ $1.47/10^6 Btu
(2) With 12.5% natural gas and a gas to coal price differential of $1/10^6 Btu, same as GR
(3) 50% Urea solution @ $0.50/gal
(4) Anhydrous Ammonia @ $162/ton & SCR catalyst replacement (3 yr life) @ $350/ft^3
(5) Incremental operating cost, including cost of capital

However, SCR systems have achieved 85%+ reductions with increased catalyst volume. For NO_x reduction beyond what is possible by a particular technology, it is possible to combine some technologies for deeper reduction. For an example, Advanced GR is currently being marketed involving the simultaneous application of GR and SNCR. Overall NO_x reduction is expected to be in the range of 75 to 90 percent. GR has also been demonstrated with low NO_x burners, under this CCT project, achieving overall NO_x reductions of up to 70 percent (64 to 65% average).

8.2 Commercialization Plans

EER is taking the lead in the commercialization of the GR technology. Much of the marketing efforts of the Corporation are targeted to Reburning technology. EER has presented numerous papers on the NO_x reduction results achieved with the GR technology under the CCT demonstrations. It has developed brochures and has presented seminars to prospective utilities which are solely dedicated to the commercialization of Reburning technology.

EER installed and successfully started up a GR system on a glass furnace (Anchor) and a GR system that it installed on a 108 MW_e tangentially-fired unit (New York State Electric & Gas). Several other proposals are outstanding for installation of GR on other electric utility boilers. EER also installed and successfully started up a micronized coal reburning system on a 50 MW_e cyclone-fired unit (Kodak) in the fall of 1996.

In 1998, EER installed a GR system on the Tennessee Valley Authority's Memphis Unit #1, a 330 MW_e cyclone-fired unit. At the time of the writing this report, it was being started up and preliminary testing indicate that the NO_x reduction guarantees will be met. EER, at the time of the issuance of this report, is designing two GR systems for Baltimore Gas and Electric, Crane Units #1 and #2, both 190 MW_e cyclone-fired units.

The impetus provided by the new U.S. EPA regulations for Group 2 utility boilers has been the key to EER's successful commercialization of the technology. Clearly, the commercialization of all of the NO_x reduction technologies is driven by environmental regulations.

9.0 CONCLUSIONS AND RECOMMENDATIONS

9.0 CONCLUSIONS AND RECOMMENDATIONS

The objective of this project was to demonstrate the commercial readiness of the GR-LNB technology for application to pre-NSPS utility boilers. The specific goal was to demonstrate that high levels of NO_x reductions could be achieved over the long term with minor impacts on other areas of unit operation including combustion completion (quantified by unburned carbon-in-ash), furnace slagging or corrosion, convective pass fouling, steam capacity and final steam conditions, and other areas of unit performance. The target was a reduction of 70 percent in NO_x emissions.

Technical Performance Summary

The new LNBs, installed by FWEC reduced NO_x emissions from a pre-construction baseline level of 0.73 lb/10^6 Btu to 0.46 lb/10^6 Btu at 3.5% O_2. This was a reduction of 37%, which was below the targeted reduction of 45%. Also, carbon-in-ash and CO could not be maintained at acceptable levels.

During parametric testing, when GR was introduced the NO_x emissions level dropped to an average of 0.25 lb/10^6 Btu at 3.25% O_2 which was a reduction of 66%. The gas heat input was 18%. Both carbon-in-ash and CO were at acceptable levels. The 70% reduction target could not be achieved without significant levels of gas heat input due to the substandard performance of the LNBs.

Following installation of the Second Generation equipment, the system achieved similar reductions in NO_x emissions, but with only 12.5% gas heat input. Again, both carbon-in-ash and CO were at acceptable levels. The LNBs were modified and achieved a 44% NO_x reduction which helped toward reducing the reburn gas required.

The reburning zone operates under reducing, slightly fuel rich conditions. This suggests the possibility of increased tube wastage due to removal of the protective oxide layer and/or sulfide attack. Accordingly, the field evaluations included a comprehensive program of non-destructive (ultrasonic tube thickness) evaluations. The evaluations showed no evidence of increased tube wastage attributable to GR.

Slag formed around some of the gas injection nozzles on a random basis, but this did not cause a problem with the reburn gas injection system performance. In the OFA zone, heavy slag deposits formed around three of the six OFA injectors after about three months of operation. The initiation of the slag formation was attributed to higher flue gas temperatures in this area. Deposits were removed during regularly scheduled outages.

As predicted, there was a minor change in the heat absorption profile. Increases were observed in both the main and reheat steam temperatures due to the modified heat distribution in the boiler when the GR system was in operation. With the Second Generation GR system since the amount of gas heat input was reduced, the impact on reheat temperatures was less. Nonetheless, steam temperatures were controlled through water spray steam attemperation. There was a reduction in thermal efficiency of less than 1% due to increased moisture from the combustion of the natural gas. The reason for this is that natural gas has a higher H:C ratio than coal which yields more water vapor per million Btus of energy released.

Although not considered a part of this project, the opportunity presented itself to perform testing with natural gas as the primary fuel coupled with gas reburning. The gas/gas reburning testing demonstrated a reduction in NO_x emissions of 43% (0.30 lb/10^6 Btu reduced to 0.17 lb/10^6 Btu) using 7% gas heat input as a reburn fuel.

Economics Summary

The cost and performance data from the Cherokee project were used to estimate the costs of installation, operation and performance for commercial installation of GR-LNB onto a 300 MW_e power plant. The estimate is based on mature technology; i.e., a so-called "nth" plant which incorporates process improvements resulting from experience gained in earlier installations. The results of the economic analysis are as follows:

	GR-LNB
Total installation cost	\$7.48 million
Capital requirement	\$7.80 million
Operation and maintenance cost	\$2.14 million
NO_x removal cost - current dollars	\$1,027/ton
NO_x removal cost - constant dollars	\$786/ton

The analysis is based on a coal-to-gas differential of \$1.00/10^6 Btu, a 64% NO_x removal efficiency at 12.5% gas heat input, Second Generation Gas Reburning technology, and a sulfur dioxide credit of \$95/ton.

Conclusions

The following can be highlighted from the GR-LNB demonstration:

- GR-LNB was installed and operated successfully on a wall-fired unit.
- The project goal of 70% NO_x reduction could be achieved. With First Generation GR, a NO_x reduction of 65% was achieved with 18% gas heat input. A NO_x reduction of 64% was achieved at 12.5% gas heat input using Second Generation GR. On occasion, a 70% reduction was reached. The NO_x reduction performance was diminished somewhat due to the less than projected performance from the LNB's.

- The system was operated consistently and reliably. The GR-LNB system was fully functional in automatic mode. No boiler trips were experienced during the testing phase due to failure of project equipment.
- Carbon-in-ash and CO can be controlled to acceptable levels.
- Existing boiler equipment experienced no mechanical degradation or failure.

Recommendations

GR technology is recommended for any type of utility boiler. A gas injector retrofit requires very little space; this is especially true with the new gas injection system developed by EER which does not require FGR. Any type of fuel gas can be used for the GR system, natural gas, propane, landfill gas, etc. On a purely performance basis, natural gas is the preferred reburning fuel offering the advantages of no ash, no sulfur, no bound nitrogen, and 100% volatiles. With GR, an OFA system will also be required. In certain applications, the air pressure in the boiler windbox will be sufficient for the OFA system, so additional air booster fans will not be required and the GR installed cost will be less.

When considering GR-LNB, certain capital and operating economic cost considerations should be evaluated. A critical capital cost item concerns the availability of natural gas. If natural gas is available at the site to supply a sufficient volume, the capital cost would be much less than that compared to a plant that did not have gas on-site. The capital cost differential between the sites would be related to the pipeline distance required to bring gas to the power plant. The biggest economic operating cost factor is the cost differential between the reburning fuel (natural gas) and the primary fuel (coal). The smaller the cost differential, the more attractive the GR system will become. Regarding the GR-LNB technology, regulatory requirements will dictate whether a GR-LNB system would be considered by an electric utility. At present, LNBs with OFA could meet the 1990 CAAA regulations. However, the GR-LNB could not meet the proposed OTR limits.

BIBLIOGRAPHY OF OTHER PROJECT REPORTS

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APPENDIX A

Instrument and Component List

INSTRUMENT & COMPONENT LIST CHEROKEE CCT UNIT 3

REVISION DATE 08-10-92 by DAP

PSC TAG NUMBER	OLD EER NUMBER	I/O TYPE	SERVICE	P&ID NUMBER	PURCHASE ORDER #	MANUFACTURER SUPPLIER	MODEL NUMBER	INSTALLATION DRAWING	RANGE
			CHEROKEE UNIT#3 INSTRUMENT TAG NUMBER						
	EXAMPLE		FT- FUNCTIONAL INDENTIFIERS						
	FT-31017		3- UNIT NUMBER (#3)						
			10- SYSTEM IDENTIFIER (NATURAL GAS)						
			17- INSTRUMENT LOOP NUMBER						
			82- SYS ID. INST. & SERVICE AIR						
			87- SYS ID. BOILER AIR & FLUE GAS						
			NATURAL GAS SYSTEM INSTRUMENTS & COMPONENTS						
UA-38101		DI	INSTR. AIR DRYER SYSTEM ALARM	P8678E-015/3	47252	PNEU. PROD. CO.	150DHA-SA.4B-1S-F01-D-0		0-150
HV-31004A	BV-304A		NATURAL GAS ISOLATION PLUG VALVE "A" (MANUAL OPERATE)	P8678E-015/3	47707	DEZURIK MCSTAY & ASSOC.	6" PLUG VALVE w/GEAR ACTUATOR, FIG. 118	A8678E-036/2	
HV-31004B	BV-304B		NATURAL GAS ISOLATION PLUG VALVE "B" (MANUAL OPERATE)	P8678E-015/3	47707	DEZURIK MCSTAY & ASSOC.	6" PLUG VALVE w/GEAR ACTUATOR, FIG. 118	A8678E-036/2	
FE-31005			NATURAL GAS FLOW METER PRIMARY ELEMENT	P8678E-015	70230-8706	EQUIMETER(rockwell) J.F. GOOD	MODEL # T-140 12" TURBOMETER	A8678E-036/4	861 ksch @ 75 psi
FI-31005			NATURAL GAS FLOW METER FLOW INDICATOR / TOTALIZER	P8678E-015	70230-8706	EQUIMETER(rockwell) J.F. GOOD	MODEL # 1163113110 ELECTROCORRECTOR	A8678E-036/4	
PI-31005	PI-301		NATURAL GAS SUPPLY PRESSURE INDICATOR	P8678E-015/3	47821	ASHCROFT J.F. GOOD	4-1/2" 1279AS	A8678E-036/2 STD-143/1	0 - 160 PSIG
PCV-31006	PRV-302		NATURAL GAS PRESSURE REDUCING VALVE	P8678E-015/3	47781	FISHER A.E. EHRKE	3" - 125# TYPE 399	A8678E-036/2	10-125 PSIG
PI-31007	PI-303		NATURAL GAS CONTROLLED PRESSURE INDICATOR	P8678E-015/3	47821	ASHCROFT J.F. GOOD	4-1/2" 1279AS	A8678E-036/2 STD-143/1	0 - 30 PSIG
PT-31007	PT-303	AI	NATURAL GAS CONTROLLED PRESSURE TRANSMITTER	P8678E-015/3	47817	ROSEMOUNT INC.	1151GP6S12B1 CALIBRATE 0-25 PSIG	A8678E-036/2 STD-143/4	0 - 100 PSIG
PV-31008	PSV-304		NATURAL GAS RELIEF VENT VALVE	P8678E-015/3	47781	FISHER A.E. EHRKE	6" - 125# TYPE 63EG	A8678E-036/2	10 - 40 PSIG
PSL-31009	PSL-305	DI	NATURAL GAS LOW PRESSURE SWITCH	P8678E-015/3	47821	ASCO J.F. GOOD	SB21D/TD20A11	A8678E-036/2 STD-143/2	1 - 18 PSIG
FV-31010 ZS-31010	SSV-307 ZSC-307	DO DI	NATURAL GAS SAFETY SHUT-OFF VALVE W/CLOSED LIMIT	P8678E-015/3	47797	DEZURIK MCSTAY & ASSOC.	10" BUTTERFLY VALVE	A8678E-036/2	

REVISION DATE 08-10-92 by DAP

PSC TAG NUMBER	OLD EER NUMBER	I/O TYPE	SERVICE	P&ID NUMBER	PURCHASE ORDER #	MANUFACTURER SUPPLIER	MODEL NUMBER	INSTALLATION DRAWING	RANGE
HV-38210	BV-307		MANUAL BALL VALVE FOR FV-31010	P8678E-015/3	47782	WORCESTER CON. A.E. EHRKE	4846 RSE with I/O - 1/4" NPT	A8678E-036/2	
PIC-38210	AF-307 PI-307 PRV-307		AIR PRESSURE FILTER REGULATOR FOR FV-31010	P8678E-015/3	47782	FISHER A.E. EHRKE	TYPE 67AFR-239 w/FILTER & 0 - 100 psi PRESSURE GAUGE with I/O - 1/4" NPT	A8678E-036/2	
PV-31011	SV-310	DO	NATURAL GAS VENT VALVE	P8678E-015/3	47821	ASCO / J.F. GOOD	EF8215C83 (2" 120VAC)	A8678E-036/2	
PSH-31012	PSH-308	DI	NATURAL GAS HIGH PRESSURE SWITCH	P8678E-015/3	47821	ASCO J.F. GOOD	SB21D/TE20A11	A8678E-036/2 STD-143/2	1.5 - 36 PSIG
FV-31013 ZS-31013	SSV-309 ZSC-309	DO DI	NATURAL GAS SAFETY SHUT-OFF VALVE W/CLOSED LIMIT	P8678E-015/3	47797	DEZURIK MCSTAY & ASSOC.	10" BUTTERFLY VALVE	A8678E-036/2	
HV-38213	BV-309		MANUAL BALL VALVE FOR FV-31013	P8678E-015/3	47782	WORCESTER CON. A.E. EHRKE	4846 RSE with I/O - 1/4" NPT	A8678E-036/2	
PIC-38213	AF-309 PI-309 PRV-309		AIR PRESSURE FILTER REGULATOR FOR FV-31013	P8678E-015/3	47782	FISHER A.E. EHRKE	TYPE 67AFR-239 w/FILTER & 0-100 psi PRESSURE GAUGE with I/O - 1/4" NPT	A8678E-036/2	
HV-31014 ZS-31014	MV-322 ZSC-322	DI	FRONT WALL NATURAL GAS CONTROL VALVE W/CLOSED LIMIT MANUAL OPERATION	P8678E-015/3	47797	DEZURIK MCSTAY & ASSOC.	8" PLUG VALVE	A8678E-036/2	
HV-31015 ZS-31015	MV-323 ZSC-323	DI	REAR WALL NATURAL GAS CONTROL VALVE W/CLOSED LIMIT MANUAL OPERATION	P8678E-015/3	47797	DEZURIK MCSTAY & ASSOC.	8" PLUG VALVE	A8678E-036/2	
FCV-31018 ZS-31018	CV-321 ZSC-321	AO DI	NORTH - NATURAL GAS FLOW CONTROL VALVE W/ CLOSED LIMIT	P8678E-015/3	47781	FISHER A.E. EHRKE	6" TYPE 1052-V150 with I/P 3620J POSITIONER (4-20ma)	A8678E-036/2 E8678E-011/2	
HV-38218	BV-321		MANUAL BALL VALVE FOR FC V-31018	P8678E-015/3	47782	WORCESTER CON. A.E. EHRKE	4846 RSE with I/O - 1/4" NPT	A8678E-036/2 E8678E-011/2	
PIC-38218	AF-321 PI-321 PRV-321		AIR PRESSURE FILTER REGULATOR FOR FCV-31018	P8678E-015/3	47782	FISHER A.E. EHRKE	TYPE 67AFR-239 w/FILTER & 0-60 psig PRESSURE GAUGE with I/O - 1/4" NPT	A8678E-036/2 E8678E-011/2	
FCV-31019 ZS-31019	CV-311 ZSC-311	AO DI	SOUTH - NATURAL GAS FLOW CONTROL VALVE W/ CLOSED LIMIT	P8678E-015/3	47781	FISHER A.E. EHRKE	6" TYPE 1052-V150 with I/P 3620J POSITIONER (4-20ma)	A8678E-036/2 E8678E-011/2	
HV-38219	BV-311		MANUAL BALL VALVE FOR FCV-31019	P8678E-015/3	47782	WORCESTER CON. A.E. EHRKE	4846 RSE with I/O - 1/4" NPT	A8678E-036/2 E8678E-011/2	
PIC-38219	AF-311 PI-311 PRV-311		AIR PRESSURE FILTER REGULATOR FOR FCV-31019	P8678E-015/3	47782	FISHER A.E. EHRKE	TYPE 67AFR-239 w/FILTER & 0-60 psig PRESSURE GAUGE with I/O - 1/4" NPT	A8678E-036/2 E8678E-011/2	

REVISION DATE 08-10-92 by DAP

PSC TAG NUMBER	OLD EER NUMBER	I/O TYPE	SERVICE	P&ID NUMBER	PURCHASE ORDER #	MANUFACTURER SUPPLIER	MODEL NUMBER	INSTALLATION DRAWING	RANGE
PI-31020	PI-319		NORTH - NATURAL GAS NOZZLE HEADER PRESSURE GAUGE	P8678E-015/3	47821	DWYER J.F. GOOD	2205	A8678E-036/2 STD-143/1	0 - 5 PSIG
PT-31020	PT-320	AI	NORTH - NATURAL GAS NOZZLE HEADER PRESSURE TRANSMITTER	P8678E-015/3	47817	ROSEMOUNT INC.	1151GP4S12B1 CALIBRATE 0 - 5 PSIG	A8678E-036/2 E8678E-011/2	1 - 150 INWC
PI-31021	PI-312		SOUTH - NATURAL GAS NOZZLE HEADER PRESSURE GAUGE	P8678E-015/3	47821	DWYER J.F. GOOD	2205	A8678E-036/2 STD-143/1	0 - 5 PSIG
PT-31021	PT-312	AI	SOUTH - NATURAL GAS NOZZLE HEADER PRESSURE TRANSMITTER	P8678E-015/3	47817	ROSEMOUNT INC.	1151GP4S12B1 CALIBRATE 0 - 5 PSIG	A8678E-036/2 E8678E-011/2	1 - 150 INWC
PI-31036A	PI-313A		NATURAL GAS NOZZLE PRESSURE GAUGE "36A"	P8678E-015/2	47821	DWYER J.F. GOOD	2205	A8678E-036/1 STD-143/1	0 - 5 PSIG
PI-31036B	PI-313B		NATURAL GAS NOZZLE PRESSURE GAUGE "36B"	P8678E-015/2	47821	DWYER J.F. GOOD	2205	A8678E-036/1 STD-143/1	0 - 5 PSIG
PI-31036C	PI-313C		NATURAL GAS NOZZLE PRESSURE GAUGE "36C"	P8678E-015/2	47821	DWYER J.F. GOOD	2205	A8678E-036/1 STD-143/1	0 - 5 PSIG
PI-31036D	PI-313D		NATURAL GAS NOZZLE PRESSURE GAUGE "36D"	P8678E-015/2	47821	DWYER J.F. GOOD	2205	A8678E-036/1 STD-143/1	0 - 5 PSIG
PI-31036E	PI-313E		NATURAL GAS NOZZLE PRESSURE GAUGE "36E"	P8678E-015/2	47821	DWYER J.F. GOOD	2205	A8678E-036/1 STD-143/1	0 - 5 PSIG
PI-31036F	PI-313F		NATURAL GAS NOZZLE PRESSURE GAUGE "36F"	P8678E-015/2	47821	DWYER J.F. GOOD	2205	A8678E-036/1 STD-143/1	0 - 5 PSIG
PI-31036G	PI-313G		NATURAL GAS NOZZLE PRESSURE GAUGE "36G"	P8678E-015/2	47821	DWYER J.F. GOOD	2205	A8678E-036/1 STD-143/1	0 - 5 PSIG
PI-31036H	PI-313H		NATURAL GAS NOZZLE PRESSURE GAUGE "36H"	P8678E-015/2	47821	DWYER J.F. GOOD	2205	A8678E-036/1 STD-143/1	0 - 5 PSIG
PV-31036A	CV-314A		NATURAL GAS NOZZLE SHUT-OFF VALVE "36A" (MANUAL)	P8678E-015/2	47707	DEZURIK MCSTAY & ASSOC.	3" PLUG VALVE SCREWED ENDS, FIG. 425	A8678E-036/1 D8678E-125/3	
PV-31036B	CV-314B		NATURAL GAS NOZZLE SHUT-OFF VALVE "36B" (MANUAL)	P8678E-015/2	47707	DEZURIK MCSTAY & ASSOC.	3" PLUG VALVE SCREWED ENDS, FIG. 425	A8678E-036/1 D8678E-125/3	
PV-31036C	CV-314C		NATURAL GAS NOZZLE SHUT-OFF VALVE "36C" (MANUAL)	P8678E-015/2	47707	DEZURIK MCSTAY & ASSOC.	3" PLUG VALVE SCREWED ENDS, FIG. 425	A8678E-036/1 D8678E-125/3	
PV-31036D	CV-314D		NATURAL GAS NOZZLE SHUT-OFF VALVE "36D" (MANUAL)	P8678E-015/2	47707	DEZURIK MCSTAY & ASSOC.	3" PLUG VALVE SCREWED ENDS, FIG. 425	A8678E-036/1 D8678E-125/3	
PV-31036E	CV-314E		NATURAL GAS NOZZLE SHUT-OFF VALVE "36E" (MANUAL)	P8678E-015/2	47707	DEZURIK MCSTAY & ASSOC.	3" PLUG VALVE SCREWED ENDS, FIG. 425	A8678E-036/1 D8678E-125/3	

REVISION DATE 08-10-92 by DAP

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PV-31036F	CV-314F		NATURAL GAS NOZZLE SHUT-OFF VALVE "36F" (MANUAL)	P8678E-015/2	47707	DEZURIK MCSTAY & ASSOC.	3" PLUG VALVE SCREWED ENDS, FIG. 425	A8678E-036/1 D8678E-125/3	
PV-31036G	CV-314G		NATURAL GAS NOZZLE SHUT-OFF VALVE "36G" (MANUAL)	P8678E-015/2	47707	DEZURIK MCSTAY & ASSOC.	3" PLUG VALVE SCREWED ENDS, FIG. 425	A8678E-036/1 D8678E-125/3	
PV-31036H	CV-314H		NATURAL GAS NOZZLE SHUT-OFF VALVE "36H" (MANUAL)	P8678E-015/2	47707	DEZURIK MCSTAY & ASSOC.	3" PLUG VALVE SCREWED ENDS, FIG. 425	A8678E-036/1 D8678E-125/3	
PI-31037A	PI-313J		NATURAL GAS NOZZLE PRESSURE GAUGE "37A"	P8678E-015/2	47821	DWYER J.F. GOOD	2205	A8678E-036/1	0 - 5 PSIG
PI-31037B	PI-313K		NATURAL GAS NOZZLE PRESSURE GAUGE "37B"	P8678E-015/2	47821	DWYER J.F. GOOD	2205	A8678E-036/1	0 - 5 PSIG
PI-31037C	PI-313L		NATURAL GAS NOZZLE PRESSURE GAUGE "37C"	P8678E-015/2	47821	DWYER J.F. GOOD	2205	A8678E-036/1	0 - 5 PSIG
PI-31037D	PI-313M		NATURAL GAS NOZZLE PRESSURE GAUGE "37D"	P8678E-015/2	47821	DWYER J.F. GOOD	2205	A8678E-036/1	0 - 5 PSIG
PI-31037E	PI-313N		NATURAL GAS NOZZLE PRESSURE GAUGE"37E"	P8678E-015/2	47821	DWYER J.F. GOOD	2205	A8678E-036/1	0 - 5 PSIG
PI-31037F	PI-313P		NATURAL GAS NOZZLE PRESSURE GAUGE "37F"	P8678E-015/2	47821	DWYER J.F. GOOD	2205	A8678E-036/1	0 - 5 PSIG
PI-31037G	PI-313R		NATURAL GAS NOZZLE PRESSURE GAUGE "37G"	P8678E-015/2	47821	DWYER J.F. GOOD	2205	A8678E-036/1	0 - 5 PSIG
PI-31037H	PI-313S		NATURAL GAS NOZZLE PRESSURE GAUGE "37H"	P8678E-015/2	47821	DWYER J.F. GOOD	2205	A8678E-036/1	0 - 5 PSIG
PV-31037A	CV-314J		NATURAL GAS NOZZLE SHUT-OFF VALVE "37A" (MANUAL)	P8678E-015/2	47707	DEZURIK MCSTAY & ASSOC.	3" PLUG VALVE SCREWED ENDS, FIG. 425	A8678E-036/1 D8678E-125/3	
PV-31037B	CV-314K		NATURAL GAS NOZZLE SHUT-OFF VALVE "37B" (MANUAL)	P8678E-015/2	47707	DEZURIK MCSTAY & ASSOC.	3" PLUG VALVE SCREWED ENDS, FIG. 425	A8678E-036/1 D8678E-125/3	
PV-31037C	CV-314L		NATURAL GAS NOZZLE SHUT-OFF VALVE "37C" (MANUAL)	P8678E-015/2	47707	DEZURIK MCSTAY & ASSOC.	3" PLUG VALVE SCREWED ENDS, FIG. 425	A8678E-036/1 D8678E-125/3	
PV-31037D	CV-314M		NATURAL GAS NOZZLE SHUT-OFF VALVE "37D" (MANUAL)	P8678E-015/2	47707	DEZURIK MCSTAY & ASSOC.	3" PLUG VALVE SCREWED ENDS, FIG. 425	A8678E-036/1 D8678E-125/3	
PV-31037E	CV-314N		NATURAL GAS NOZZLE SHUT-OFF VALVE "37E" (MANUAL)	P8678E-015/2	47707	DEZURIK MCSTAY & ASSOC.	3" PLUG VALVE SCREWED ENDS, FIG. 425	A8678E-036/1 D8678E-125/3	
PV-31037F	CV-314P		NATURAL GAS NOZZLE SHUT-OFF VALVE "37F" (MANUAL)	P8678E-015/2	47707	DEZURIK MCSTAY & ASSOC.	3" PLUG VALVE SCREWED ENDS, FIG. 425	A8678E-036/1 D8678E-125/3	

REVISION DATE 08-10-92 by DAP

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PV-31037G	CV-314R		NATURAL GAS NOZZLE SHUT-OFF VALVE "37G" (MANUAL)	P8678E-015/2	47707	DEZURIK MCSTAY & ASSOC.	3" PLUG VALVE SCREWED ENDS, FIG. 425	A8678E-036/1 D8678E-125/3	
PV-31037H	CV-314S		NATURAL GAS NOZZLE SHUT-OFF VALVE "37H" (MANUAL)	P8678E-015/2	47707	DEZURIK MCSTAY & ASSOC.	3" PLUG VALVE SCREWED ENDS, FIG. 425	A8678E-036/1 D8678E-125/3	
BT-31040A	AE-316A	DI	NORTH FLAME SCANNER "A" ELEVATION 5183' (BURNER 3D2)	P8678E-015/1	47926	COEN COMPANY PROCESS ALTERN.	IR7200A SCANNER IR7000A SIGNAL PROCESSOR	E8678E-011/6	
BT-31040B	AE-316B	DI	SOUTH FLAME SCANNER "B" ELEVATION 5183' (BURNER 3D4)	P8678E-015/1	47926	COEN COMPANY PROCESS ALTERN.	IR7200A SCANNER IR7000A SIGNAL PROCESSOR	E8678E-011/6	
BT-31040C	AE-316C	DI	NORTH FLAME SCANNER "C" ELEVATION 5175' (BURNER 3C1)	P8678E-015/1	47926	COEN COMPANY PROCESS ALTERN.	IR7200A SCANNER IR7000A SIGNAL PROCESSOR	E8678E-011/6	
BT-31040D	AE-316D	DI	SOUTH FLAME SCANNER "D" ELEVATION 5175' (BURNER 3C3)	P8678E-015/1	47926	COEN COMPANY PROCESS ALTERN.	IR7200A SCANNER IR7000A SIGNAL PROCESSOR	E8678E-011/6	
BT-31040E	AE-316E	DI	NORTH FLAME SCANNER "E" ELEVATION 5167' (BURNER 3B2)	P8678E-015/1	47926	COEN COMPANY PROCESS ALTERN.	IR7200A SCANNER IR7000A SIGNAL PROCESSOR	E8678E-011/6	
BT-31040F	AE-316F	DI	SOUTH FLAME SCANNER "F" ELEVATION 5167' (BURNER 3B4)	P8678E-015/1	47926	COEN COMPANY PROCESS ALTERN.	IR7200A SCANNER IR7000A SIGNAL PROCESSOR	E8678E-011/6	
BT-31040G	AE-316G	DI	NORTH FLAME SCANNER "G" ELEVATION 5159' (BURNER 3A1)	P8678E-015/1	47926	COEN COMPANY PROCESS ALTERN.	IR7200A SCANNER IR7000A SIGNAL PROCESSOR	E8678E-011/6	
BT-31040H	AE-316H	DI	SOUTH FLAME SCANNER "H" ELEVATION 5159' (BURNER 3A3)	P8678E-015/1	47926	COEN COMPANY PROCESS ALTERN.	IR7200A SCANNER IR7000A SIGNAL PROCESSOR	E8678E-011/6	
PSL-31040	PSL-318	DI	FLAME SCANNERS COOLING AIR LOW PRESSURE SWITCH	P8678E-015/1	47821	ASCO J.F. GOOD	SB41D-TA41A11	E8678E-011/6	0 - 12" WATER
FE-31050			REAR WALL - NAT. GAS FLOW PRIMARY ELEMENT	P8678E-015	70230-8706	AITKEN J.F. GOOD	CONCENTRIC ORIFICE PLATE 8" LINE	A8678E-036/2	
FT-31050		AI	REAR WALL - GAS FLOW TRANSMITTER	P8678E-015	70224-8706	ROSEMOUNT ROSEMOUNT	MODEL # 1151DP3S12B1	A8678E-036/2	0-30 inwc
FE-31051			FRONT WALL - NAT. GAS FLOW PRIMARY ELEMENT	P8678E-015	70230-8706	AITKEN J.F. GOOD	CONCENTRIC ORIFICE PLATE 8" LINE	A8678E-036/2	
FT-31051		AI	FRONT WALL - GAS FLOW TRANSMITTER	P8678E-015	70224-8706	ROSEMOUNT ROSEMOUNT	MODEL # 1151DP3S12B1	A8678E-036/2	0-30 inwc
			ASH HANDLING SYSTEM INSTRUMENTS & COMPONENTS						
FV-36401 ZS-36401	CD-626 ZSC-626	DI	FGR MULTICLONE HOPPER SLIDE GATE W/CLOSED LIMIT SW.	P8678E-015/2	47819	UNITED CONVEY. WATSON PWR EQ	8"-1804-5/1803-41/1802-64 1814-51/3531-23/1701-324-3F	A8678E-030/1 E8678E-012	

REVISION DATE 08-10-92 by DAP

PSC TAG NUMBER	OLD EER NUMBER	I/O TYPE	SERVICE	P&ID NUMBER	PURCHASE ORDER #	MANUFACTURER SUPPLIER	MODEL NUMBER	INSTALLATION DRAWING	RANGE
HV-38201	BV-626		MANUAL BALL VALVE FOR FV-36401	P8678E-015/2	47782	WORCESTER A.E. EHRKE	4846 RSE with I/O - 1/4" NPT	A8678E-030/1 E8678E-012	
PIC-38201	AF-626 PI-626 PRV-626		AIR PRESSURE FILTER REGULATOR FOR FV-36401	P8678E-015/2	47782	FISHER A.E. EHRKE	TYPE 67AFR w/FILTER & 0 - 60 psig PRESSURE GAUGE I/O- 1/4" NPT	A8678E-030/1 E8678E-012 E8678E-005	
LSH-36401	LSH-615	DI	MULTICLONE HOPPER HIGH LEVEL SWITCH	P8678E-015/2	47927	DYNATROL AUTO. PROD. INC.	CL-10DJT LEVEL DET. W/EC-501A CONTROL UNIT	E8678E-012 E8678E-005	
HV-36402	CD-627		FGR MULTICLONE AIR INTAKE SHUT-OFF VALVE	P8678E-015/2	47819	UNITED CONVEY. WATSON PWR EQ	6"-1904-11/6"-1701-398-178	A8678E-030/1	
AV-36403			FGR MULTICLONE AIR INTAKE CHECK VALVE	P8678E-015/2	47819	UNITED CONVEY. WATSON PWR EQ	6"-1801-24 W/18255-3 CONN. 1701-293-LA	A8678E-030/1	
HV-38202	BV-627		MANUAL BALL VALVE (SPARE / NOT REQUIRED)	SPARE / NOT REQUIRED	47782	WORCESTER A.E. EHRKE	4846 RSE with I/O - 1/4" NPT		
PIC-38202	AF-627 PI-627 PRV-627		AIR PRESSURE FILTER REGULATOR (SPARE / NOT REQUIRED)	SPARE / NOT REQUIRED	47782	FISHER A.E. EHRKE	TYPE 67AFR w/FILTER & 0 - 60 psig PRESSURE GAUGE I/O- 1/4" NPT		
			BOILER AIR AND FLUE GAS SYSTEM INSTRUMENTS & COMPONENTS						
FT-38701		AI	AIR FLOW TRANSMITTER/NORTH	P8678E-015/3		ROSEMOUNT	1151DR2F12B1 0-0.5/6"WC	STD143-6	
FT-38702		AI	AIR FLOW TRANSMITTER/SOUTH	P8678E-015/3		ROSEMOUNT	1151DR2F12B1 0-0.5/6"WC	STD143-6	
FT-38703		AI	GAS RECIRC. FLOW/NORTH	P8678E-015/3		ROSEMOUNT	1151DR2F12B1 0-0.5/6"WC	STD143-6	
FT038704		AI	GAS RECIRC. FLOW/SOUTH	P8678E-015/3		ROSEMOUNT	1151DR2F12B1 0-0.5/6"WC	STD143-6	
FV-38720 ZS-38720A ZS-38720B	CD-608 ZSC-608 ZSO-608	2-DO 2-DI	FGR MULTICLONE INLET ISOLATION DAMPER WITH OPEN & CLOSED LIMIT SWITCHS	P8678E-015/2	42535	MADER DAMPERS HUGHES & ASSOC.	56" X 85" DAMPER DUAL COIL	D8678E-125/4 E8678E-012 E8678E-005	
HV-38220	BV-608		MANUAL BALL VALVE FOR FV-38720	P8678E-015/2	47782	WORCESTER CON. A.E. EHRKE	4846 RSE with I/O - 1/4" NPT	D8678E-125/4 E8678E-012	
PIC-38220	AF-608 PI-608 PRV-608		AIR PRESSURE FILTER REGULATOR FOR FV-38720	P8678E-015/2	47782	FISHER A.E. EHRKE	TYPE 67AFR W/FILTER & 0 - 60 psig PRESSURE GAUGE I/O-1/4" NPT	D8678E-125/4 E8678E-012 E8678E-005	
FCV-38721 ZS-38721	CD-601 ZSC-601	AO DI	FGR INJECTION FAN INLET CONTROL DAMPER FOR FAN-3 W/CLOSED LIMIT SWITCH	P8678E-015/2	42524	BARRON FLO-TECH INC.	30" X 126" DAMPER w/ BECK DRIVE FURNISHED w/ FAN-3	D8678E-125/4 E8678E-012 E8678E-005	

REVISION DATE 08-10-92 by DAP

PSC TAG NUMBER	OLD EER NUMBER	I/O TYPE	SERVICE	P&ID NUMBER	PURCHASE ORDER #	MANUFACTURER SUPPLIER	MODEL NUMBER	INSTALLATION DRAWING	RANGE
IT-38722	IT-616	AI	FGR FAN CURRENT TRANSMITTER FOR M-3	P8678E-015/2	42568	MAGNETEK	PART OF FAN-3 5 KV SWITCHGEAR	D8678E-125/4 E8678E-005	
FS-38722A	FS-613A	DI	FGR FAN INBOARD BEARING OIL FLOW SWITCH	P8678E-015/2	42524	BARRON FLO-TECH, INC.	INCLUDED W/ OCS-1	E8678E-005	
FS-38722B	FS-613B	DI	FGR FAN OUTBOARD BEARING OIL FLOW SWITCH	P8678E-015/2	42524	BARRON FLO-TECH, INC.	INCLUDED W/ OCS-1	E8678E-005	
TE-38722A	TE-613A	AI-TC	FGR FAN INBOARD BEARING TEMP. ELEMENT,TYPE "K" THERMOCOUPLE	P8678E-015/2	42524	BARRON FLO-TECH, INC.	INCLUDED W/ FAN	D8678E-125/4 E8678E-012	
TE-38722B	TE-613B	AI-TC	FGR FAN OUTBOARD BEARING TEMP. ELEMENT,TYPE "K" THERMOCOUPLE	P8678E-015/2	42524	BARRON FLO-TECH, INC.	INCLUDED W/ FAN	D8678E-125/4 E8678E-012	
TE-38722C	TE-613C	AI-TC	FGR FAN MOTOR STATOR TEMP. ELEMENT,TYPE "K" THERMOCOUPLE	P8678E-015/2	42524	BARRON FLO-TECH, INC.	INCLUDED W/ FAN	D8678E-125/4 E8678E-012	
TE-38722D	TE-613D	AI-TC	FGR FAN HOUSING TEMPERATURE ELEMENT,TYPE "K" THERMOCOUPLE	P8678E-015/2	42524	BARRON FLO-TECH, INC.	INCLUDED W/ FAN	D8678E-125/4 E8678E-012	
YT-38722A	VE-614A	AI	FGR FAN INBOARD BEARING VIBRATION SENSOR	P8678E-015/2	42524	BARRON FLO-TECH, INC.	INCLUDED W/ FAN	D8678E-125/4 E8678E-012	
YT-38722B	VE-614B	AI	FGR FAN OUTBOARD BEARING VIBRATION SENSOR	P8678E-015/2	42524	BARRON FLO-TECH, INC.	INCLUDED W/ FAN	D8678E-125/4 E8678E-012	
FV-38723 ZS-38723A ZS-38723B	CD-606 ZSC-606 ZSO-606	2-DO 2-DI	FGR INJECTION FAN DISCHARGE ISOLATION DAMPER WITH OPEN & CLOSED LIMIT SWITCHS	P8678E-015/2	42535	MADER DAMPERS HUGHES & ASSOC.	42" DAMPER INCLUDES FV-38730, FAN-5 AND M-5 DUAL COIL	D8678E-125/3,4 E8678E-012	
HV-38223	BV-606		MANUAL BALL VALVE FOR FV-38723	P8678E-015/2	47782	WORCESTER CON. A.E. EHRKE	4846 RSE with I/O - 1/4" NPT	D8678E-125/3,4 E8678E-012	
PIC-38223	AF-606 PI-606 PRV-606		AIR PRESSURE FILTER REGULATOR FOR FV-38723	P8678E-015/2	47782	FISHER A.E. EHRKE	TYPE 67AFR w/FILTER & 0 - 60 psig PRESSURE GAUGE I/O - 1/4" NPT	D8678E-125/4 E8678E-012	
TI-38724	TI-603		FGR GAS TEMPERATURE INDICATOR	P8678E-015/2	47255	ASHCROFT J.F. GOOD	5" 50EI60E090 w/ WELL	D8678E-125/3 STD-143/3	200-1000 DEG F.
TE-38724	TE-603	AI-TC	FGR DUCT GAS TEMPERATURE ELEMENT,TYPE "K" THERMOCOUPLE	P8678E-015/2	477220	T-TEC A.O. GRUMNEY	1020-K-(23-1/2)-1-S-A-U (T/C) 3/4-260S-(22-1/2)-304 (WELL)	D8678E-125/3	
PI-38724	PI-604		FGR GAS INJECTION PORTS HEADER PRESSURE INDICATOR	P8678E-015/2	47821	DWYER J.F. GOOD	2030	D8678E-125/3 STD-143/1	0 - 30" WATER
PT-38724	PT-623	AI	FGR INJECTION HEADER PRESSURE TRANSMITTER	P8678E-015/2	47817	ROSEMOUNT INC.	1151GP4S12B1 CALIBRATE 0 - 30 INWC	D8678E-125/3 STD-143/4	1 - 150 INWC

REVISION DATE 08-10-92 by DAP

PSC TAG NUMBER	OLD EER NUMBER	I/O TYPE	SERVICE	P&ID NUMBER	PURCHASE ORDER #	MANUFACTURER SUPPLIER	MODEL NUMBER	INSTALLATION DRAWING	RANGE
FK-38225	PR-1A	3-DO	FGR VENTURI PURGE PANEL FOR FE-38726	P8678E-015/2	47905	RBB SYSTEMS, INC.	PURGE PANEL UNIT EER DWG. STD-106	D8678E-125/3,4 E8678E-012	
HV-38225	BV-PR1A		MANUAL BALL VALVE FOR FK-38225	P8678E-015/2	47782	WORCESTER A.E. EHRKE	4846 RSE with I/O - 1/4" NPT	D8678E-125/3,4 E8678E-012	
PIC-38225	AF-PR1A PI -PR1A PRV-PR1A		AIR PRESSURE FILTER REGULATOR FOR FK-38225	P8678E-015/2	47782	FISHER A.E. EHRKE	TYPE 67AFR w/FILTER & 0 - 60 psig PRESSURE GAUGE I/O- 1/4" NPT	D8678E-125/3,4 E8678E-012	
FE-38726	FE-627A		FGR VENTURI FLOW ELEMENT	P8678E-015/2	---------	B&W		D8678E-125/3,4 E8678E-012	
FT-38726	FT-627A	AI	FGR VENTURI FLOW DELTA-P TRANSMITTER (FRONT WALL)	P8678E-015/2	47817	ROSEMOUNT INC.	1151DR2F12B1 CALIB. 0 - 2.4 " WATER	D8678E-125/3,4 E8678E-012	0 - 6 " WATER
FCV-38726 ZS-38726	CD-617B	AO DI	FGR HEADER CONTROL DAMPER W/CLOSED LIMIT SWITCH (EAST)	P8678E-015/2	42535	MADER DAMPERS HUGHES & ASSOC.	30" MODULATING BUTTERFLY DAMPER w/ CLOSED LIMIT	D8678E-125/3,4 E8678E-012	
HV-38226	BV-617B		MANUAL BALL VALVE FOR FCV-38726	P8678E-015/2	47782	WORCESTER CON. A.E. EHRKE	4846 RSE with I/O - 1/4" NPT	D8678E-125/3,4 E8678E-012	
PIC-38226	AF-617B PI-617B PRV-617B		AIR PRESSURE FILTER REGULATOR FOR FCV-38726	P8678E-015/2	47782	FISHER A.E. EHRKE	TYPE 67AFR w/ FILTER & 0 - 60 psig PRESSURE GAUGE I/O-1/4" NPT	D8678E-125/3,4 E8678E-012	
FE-38727	FE-627B		FGR VENTURI FLOW ELEMENT	P8678E-015/2	---------	B&W		D8678E-125/3,4 E8678E-012	
FT-38727	FT-627B	AI	FGR VENTURI FLOW DELTA-P TRANSMITTER (REAR WALL)	P8678E-015/2	47817	ROSEMOUNT INC.	1151DR2F12B1 CALIBRATE 0 - 2.4 " WATER	D8678E-125/3,4 E8678E-012	0 - 6 " WATER
FCV-38727 ZS-38727	CD-617A	AO DI	FGR HEADER CONTROL DAMPER W/CLOSED LIMIT SWITCH (WEST)	P8678E-015/2	42535	MADER DAMPERS HUGHES & ASSOC.	30" MODULATING BUTTERFLY DAMPER w/ CLOSED LIMIT	D8678E-125/3,4 E8678E-012	
HV-38227	BV-617A		MANUAL BALL VALVE FOR FCV-38727	P8678E-015/2	47782	WORCESTER CON. A.E. EHRKE	4846 RSE with I/O - 1/4" NPT	D8678E-125/3,4 E8678E-012	
PIC-38227	AF-617A PI-617A PRV-617A		AIR PRESSURE FILTER REGULATOR FOR FCV-38727	P8678E-015/2	47782	FISHER A.E. EHRKE	TYPE 67AFR w/ FILTER & PRESSURE GAUGE I/O-1/4" NPT	D8678E-125/3,4 E8678E-012	
FK-38228	PR-1A	3-DO	FGR VENTURI PURGE PANEL FOR FE-38727	P8678E-015/2	47905	RBB SYSTEMS, INC.	PURGE PANEL UNIT EER DWG. STD-106	D8678E-125/3,4 E8678E-012	
HV-38228	BV-PR1B		MANUAL BALL VALVE FOR FK-38228	P8678E-015/2	47782	WORCESTER CON. A.E. EHRKE	4846 RSE with I/O - 1/4" NPT	D8678E-125/3,4 E8678E-012	

REVISION DATE 08-10-92 by DAP

PSC TAG NUMBER	OLD EER NUMBER	I/O TYPE	SERVICE	P&ID NUMBER	PURCHASE ORDER #	MANUFACTURER SUPPLIER	MODEL NUMBER	INSTALLATION DRAWING	RANGE
PIC-38228	AF-PR1B PI -PR1B PRV-PR1B		AIR PRESSURE FILTER REGULATOR FOR FK-38228	P8678E-015/2	47782	FISHER A.E. EHRKE	TYPE 67AFR w/FILTER & 0 - 60 psig PRESSURE GAUGE I/O - 1/4" NPT	D8678E-125/3,4 E8678E-012	
FV-38730	CD-610	DO	FGR DISCHARGE DAMPER SEAL AIR FAN SHUT - OFF DAMPER	P8678E-015/2	42535	MADER DAMPERS HUGHES & ASSOC.	INTERGAL PART OF FV-38723	D8678E-125/3,4 E8678E-012	
HV-38230	BV-610		MANUAL BALL VALVE FOR FV-38730	P8678E-015/2	47782	WORCESTER CON. A.E. EHRKE	4846 RSE with I/O - 1/4" NPT	D8678E-125/3,4 E8678E-012	
PIC-38230	AF-610 PI-610 PRV-610		AIR PRESSURE FILTER REGULATOR FOR FV-38730	P8678E-015/2	47782	FISHER A.E. EHRKE	TYPE 67AFR w/ FILTER & 0 - 60 psig PRESSURE GAUGE I/O - 1/4" NPT	D8678E-125/3,4 E8678E-012	
PI-38732	PI-605A		FRONT WALL GAS REBURN HEADER PRESSURE INDICATOR	P8678E-015/2	47821	DWYER J.F. GOOD	2030	A8678E-125/4 E8678E-005	0 - 30" WATER
FV-38732	CV-607A	DO	GR NOZZLE COOLING AIR FAN SHUT- OFF DAMPER "A"	P8678E-015/2	42535	MADER DAMPERS HUGHES & ASSOC.	16" DAMPER	A8678E-125/4 E8678E-005	
HV-38232	BV-607A		MANUAL BALL VALVE FOR FV-38732	P8678E-015/2	47782	WORCESTER CON. A.E. EHRKE	4846 RSE with I/O - 1/4" NPT	A8678E-125/4 E8678E-005	
PIC-38232	AF-607A PI-607A PRV-607A		AIR PRESSURE FILTER REGULATOR FOR FV-38732	P8678E-015/2	47782	FISHER A.E. EHRKE	TYPE 67AFR w/FILTER & 0 - 60 psig PRESSURE GAUGE I/O-1/4" NPT	A8678E-125/4 E8678E-005	
PI-38733	PI-605B		REAR WALL GAS REBURN HEADER PRESSURE INDICATOR	P8678E-015/2	47821	DWYER J.F. GOOD	2030	A8678E-125/4 E8678E-005	0 - 30" WATER
FV-38733	CV-607B	DO	GR NOZZLE COOLING AIR FAN SHUT-OFF DAMPER "B"	P8678E-015/2	42535	MADER DAMPERS HUGHES & ASSOC.	16" DAMPER	A8678E-125/4 E8678E-005	
HV-38233	BV-607B		MANUAL BALL VALVE FOR FV-38733	P8678E-015/2	47782	WORCESTER CON. A.E. EHRKE	4846 RSE with I/O - 1/4" NPT	A8678E-125/4 E8678E-005	
PIC-38233	AF-607B PI-607B PRV-607B		AIR PRESSURE FILTER REGULATOR FOR FV-38733	P8678E-015/2	47782	FISHER A.E. EHRKE	TYPE 67AFR w/FILTER & 0 - 60 psig PRESSURE GAUGE I/O - 1/4" NPT	A8678E-125/4 E8678E-005	
PV-38736A	CV-609A		MANUAL FGR INJECTION FLOW BALANCING DAMPER "36A"	P8678E-015/2	42536	OLSON TECH. HUGHES & ASSOC.	10" DAMPER FIG.# 25 AW-22 HM-L	E8678E-005	
PV-38736B	CV-609B		MANUAL FGR INJECTION FLOW BALANCING DAMPER "36B"	P8678E-015/2	42536	OLSON TECH. HUGHES & ASSOC.	10" DAMPER FIG.# 25 AW-22 HM-L	E8678E-005	
PV-38736C	CV-609C		MANUAL FGR INJECTION FLOW BALANCING DAMPER "36C"	P8678E-015/2	42536	OLSON TECH. HUGHES & ASSOC.	10" DAMPER FIG.# 25 AW-22 HM-L	E8678E-005	

REVISION DATE 08-10-92 by DAP

PSC TAG NUMBER	OLD EER NUMBER	I/O TYPE	SERVICE	P&ID NUMBER	PURCHASE ORDER #	MANUFACTURER SUPPLIER	MODEL NUMBER	INSTALLATION DRAWING	RANGE
PV-38736D	CV-609D		MANUAL FGR INJECTION FLOW BALANCING DAMPER "36D"	P8678E-015/2	42536	OLSON TECH. HUGHES & ASSOC.	10" DAMPER FIG.# 25 AW-22 HM-L	E8678E-005	
PV-38736E	CV-609E		MANUAL FGR INJECTION FLOW BALANCING DAMPER "36E"	P8678E-015/2	42536	OLSON TECH. HUGHES & ASSOC.	10" DAMPER FIG.# 25 AW-22 HM-L	E8678E-005	
PV-38736F	CV-609F		MANUAL FGR INJECTION FLOW BALANCING DAMPER "36F"	P8678E-015/2	42536	OLSON TECH. HUGHES & ASSOC.	10" DAMPER FIG.# 25 AW-22 HM-L	E8678E-005	
PV-38736G	CV-609G		MANUAL FGR INJECTION FLOW BALANCING DAMPER "36G"	P8678E-015/2	42536	OLSON TECH. HUGHES & ASSOC.	10" DAMPER FIG.# 25 AW-22 HM-L	E8678E-005	
PV-38736H	CV-609H		MANUAL FGR INJECTION FLOW BALANCING DAMPER "36H"	P8678E-015/2	42536	OLSON TECH. HUGHES & ASSOC.	10" DAMPER FIG.# 25 AW-22 HM-L	E8678E-005	
PV-38737A	CV-609J		MANUAL FGR INJECTION FLOW BALANCING DAMPER "37A"	P8678E-015/2	42536	OLSON TECH. HUGHES & ASSOC.	10" DAMPER FIG.# 25 AW-22 HM-L	E8678E-005	
PV-38737B	CV-609K		MANUAL FGR INJECTION FLOW BALANCING DAMPER "37B"	P8678E-015/2	42536	OLSON TECH. HUGHES & ASSOC.	10" DAMPER FIG.# 25 AW-22 HM-L	E8678E-005	
PV-38737C	CV-609L		MANUAL FGR INJECTION FLOW BALANCING DAMPER "37C"	P8678E-015/2	42536	OLSON TECH. HUGHES & ASSOC.	10" DAMPER FIG.# 25 AW-22 HM-L	E8678E-005	
PV-38737D	CV-609M		MANUAL FGR INJECTION FLOW BALANCING DAMPER "37D"	P8678E-015/2	42536	OLSON TECH. HUGHES & ASSOC.	10" DAMPER FIG.# 25 AW-22 HM-L	E8678E-005	
PV-38737E	CV-609N		MANUAL FGR INJECTION FLOW BALANCING DAMPER "37E"	P8678E-015/2	42536	OLSON TECH. HUGHES & ASSOC.	10" DAMPER FIG.# 25 AW-22 HM-L	E8678E-005	
PV-38737F	CV-609P		MANUAL FGR INJECTION FLOW BALANCING DAMPER "37F"	P8678E-015/2	42536	OLSON TECH. HUGHES & ASSOC.	10" DAMPER FIG.# 25 AW-22 HM-L	E8678E-005	
PV-38737G	CV-609R		MANUAL FGR INJECTION FLOW BALANCING DAMPER "37G"	P8678E-015/2	42536	OLSON TECH. HUGHES & ASSOC.	10" DAMPER FIG.# 25 AW-22 HM-L	E8678E-005	
PV-38737H	CV-609S		MANUAL FGR INJECTION FLOW BALANCING DAMPER "37H"	P8678E-015/2	42536	OLSON TECH. HUGHES & ASSOC.	10" DAMPER FIG.# 25 AW-22 HM-L	E8678E-005	
FV-38742 ZS-38742A ZS-38742B	CD-404B ZSC-404B ZSO-404B	2-DO 2-DI	OVER-FIRE AIR INTAKE ISOLATION DAMPER (SOUTH) W/ OPEN & CLOSED LIMIT SWITCHS	P8678E-015/1	42535	MADER DAMPERS HUGHES & ASSOC.	42" X 84" DAMPER W/ FISHER ACTUATOR #1061 DUAL COIL	A8678E-045/1,3 E8678E-005 E8678E-011/2	
HV-38242	BV-404B		MANUAL BALL VALVE FOR FOR FV-38742	P8678E-015/1	47782	WORCESTER CON. A.E. EHRKE	4846 RSE with I/O - 1/4" NPT	A8678E-045/1,3 E8678E-011/2	
PIC-38242	AF-404B PI-404B PRV-404B		AIR PRESSURE FILTER REGULATOR FOR FV-38742	P8678E-015/1	47782	FISHER A.E. EHRKE	TYPE 67AFR W/FILTER & 0 - 60 psig PRESSURE GAUGE I/O - 1/4" NPT	A8678E-045/1,3 E8678E-005 E8678E-011/2	

INSTRUMENT & COMPONENT LIST CHEROKEE CCT UNIT 3

REVISION DATE 08-10-92 by DAP

PSC TAG NUMBER	OLD EER NUMBER	I/O TYPE	SERVICE	P&ID NUMBER	PURCHASE ORDER #	MANUFACTURER SUPPLIER	MODEL NUMBER	INSTALLATION DRAWING	RANGE
FV-38743 ZS-38743A ZS-38743B	CD-404A ZSC-404A ZSO-404A	2-DO 2-DI	OVER-FIRE AIR INTAKE ISOLATION DAMPER (NORTH) W/ OPEN & CLOSED LIMIT SWITCHS	P8678E-015/1	42535	MADER DAMPERS HUGHES & ASSOC.	42" X 84" DAMPER W/ FISHER ACTUATOR #1061 DUAL COIL	A8678E-045/1 E8678E-005 E8678E-011/2	
HV-38243	BV-404A		MANUAL BALL VALVE FOR FV-38743	P8678E-015/1	47782	WORCESTER CON. A.E. EHRKE	4846 RSE with I/O - 1/4" NPT	A8678E-045/1 E8678E-011/2	
PIC-38243	AF-404A PI-404A PRV-404A		AIR PRESSURE FILTER REGULATOR FOR FV-38743	P8678E-015/1	47782	FISHER A.E. EHRKE	TYPE 67AFR w/FILTER & 0 - 60 psig PRESSURE GAUGE I/O - 1/4" NPT	A8678E-045/1 E8678E-005 E8678E-011/2	
FCV-38745 ZS-38745A	CD-403 ZSC-403	AO DI	OVER-FIRE AIR BOOSTER FAN CONTROL DAMPER W/CLOSED LIMIT SWITCH	P8678E-015/1	42524	BARRON FLO-TECH INC.	60" X 105" ZERO LEAKAGE DAMPER w/ BECK DRIVE & CLOSED LIMIT SWITCH	A8678E-045/2,3 E8678E-005	
IT-38747	IT-408	AI	OVERFIRE AIR FAN CURRENT TRANSMITTER FOR M-1	P8678E-015/1	42568	MAGNETEK	PART OF FAN-1 5 KV SWITCHGEAR	A8678E-045/1 E8678E-005	
FS-38747A	FS-622A	DI	OFA FAN INBOARD BEARING OIL FLOW SWITCH	P8678E-015/1	42524	BARRON FLO-TECH, INC.	INCLUDED W/ OCS-1	A8678E-045/1 E8678E-005	
FS-38747B	FS-622B	DI	OFA FAN OUTBOARD BEARING OIL FLOW SWITCH	P8678E-015/1	42524	BARRON FLO-TECH, INC.	INCLUDED W/ OCS-1	A8678E-045/1 E8678E-005	
TE-38747A	TE-622A	AI-TC	OFA FAN INBOARD BEARING TEMP. ELEMENT,TYPE "K" THERMOCOUPLE	P8678E-015/1	42524	BARRON FLO-TECH, INC.	INCLUDED W/ FAN	A8678E-045/1 E8678E-005	
TE-38747B	TE-622B	AI-TC	OFA FAN OUTBOARD BEARING TEMP ELEMENT,TYPE "K" THERMOCOUPLE	P8678E-015/1	42524	BARRON FLO-TECH, INC.	INCLUDED W/ FAN	A8678E-045/1 E8678E-005	
TE-38747C	TE-622C	AI-TC	OFA FAN MOTOR STATOR TEMP. ELEMENT,TYPE "K" THERMOCOUPLE	P8678E-015/1	42524	BARRON FLO-TECH, INC.	INCLUDED W/ FAN	A8678E-045/1 E8678E-005	
TE-38747D	TE-622D	AI-TC	OFA FAN HOUSING TEMPERATURE ELEMENT,TYPE "K" THERMOCOUPLE	P8678E-015/1	42524	BARRON FLO-TECH, INC.	INCLUDED W/ FAN	A8678E-045/1 E8678E-005	
YT-38747A	VE-622A	AI	OFA FAN INBOARD BEARING VIBRATION SENSOR	P8678E-015/1	42524	BARRON FLO-TECH, INC.	INCLUDED W/ FAN	A8678E-045/1 E8678E-005	
YT-38747B	VE-622B	AI	OFA FAN OUTBOARD BEARING VIBRATION SENSOR	P8678E-015/1	42524	BARRON FLO-TECH, INC.	INCLUDED W/ FAN	A8678E-045/1 E8678E-005	
FV-38749 ZS-38749A ZS-38749B	CD-405 ZSC-405 ZSO-405	2-DO 2-DI	OVER-FIRE AIR DISCHARGE ISOLATION DAMPER W/OPEN & CLOSED LIMIT SWITCHES	P8678E-015/1	42535	MADER DAMPERS HUGHES & ASSOC.	54" X 120" DAMPER DUAL COIL	A8678E-045/1 E8678E-005 E8678E-011/5	
HV-38249	BV-405		MANUAL BALL VALVE FOR FV-38749	P8678E-015/1	47782	WORCESTER CON. A.E. EHRKE	4846 RSE with I/O - 1/4" NPT	A8678E-045/1 E8678E-011/5	

INSTRUMENT & COMPONENT LIST CHEROKEE CCT UNIT 3

REVISION DATE 08-10-92 by DAP

PSC TAG NUMBER	OLD EER NUMBER	I/O TYPE	SERVICE	P&ID NUMBER	PURCHASE ORDER #	MANUFACTURER SUPPLIER	MODEL NUMBER	INSTALLATION DRAWING	RANGE
PIC-38249	AF-405 PI-405 PRV-405		AIR PRESSURE FILTER REGULATOR FOR FV38749	P8678E-015/1	47782	FISHER A.E. EHRKE	TYPE 67AFR w/FILTER & 0 - 60 psig PRESSURE GUAGE I/O - 1/4" NPT	A8678E-045/1 E8678E-005 E8678E-011/5	
FE-38750	FE-401B		SOUTH OVER-FIRE AIR FLOW GRID PITOT TUBE	P8678E-015/1	47818	AIR MONITOR H.R. BOWERS CO.	MODEL CA 12" - 3'6" x 7'0"	A8678E-045/1 E8678E-011/2	
FT-38750	FT-401B	AI	SOUTH OVER-FIRE AIR FLOW TRANSMITTER	P8678E-015/1	47817	ROSEMOUNT INC.	1151DR2F12B1 CALIB. 0 - 0.77" WATER	A8678E-045/1 E8678E-011/2	0 - 6" WATER
FE-38751	FE-401A		NORTH OVER-FIRE AIR FLOW GRID PITOT TUBE	P8678E-015/1	47818	AIR MONITOR H.R. BOWERS CO.	MODEL CA 12" - 3'6" x 7'0"	A8678E-045/1 E8678E-011/2	
FT-38751	FT-401A	AI	NORTH OVER-FIRE AIR FLOW TRANSMITTER	P8678E-015/1	47817	ROSEMOUNT INC.	1151DR2F12B1 CALIB. 0 - 0.77" WATER	A8678E-045/1 E8678E-011/2	0 - 6" WATER
TE-38752	TT-402	AI-TC	OVER-FIRE AIR TEMPERATURE ELEMENT, TYPE "K" THERMOCOUPLE	P8678E-015/1	47220	T-TEC A.O. GRUMNEY	1020-K-(23-1/2)-1-S-A-U (T/C) 3/4-260S-(22-1/2)-304 (WELL)	A8678E-045/1	
PI-38752	PI-407		OVER-FIRE AIR HEADER PRESSURE INDICATOR	P8678E-015/1	47821	DWYER J.F. GOOD	2030	A8678E-045/1 STD-143/1	0 - 30" WATER
PT-38752	PT-407	AI	OVER-FIRE AIR HEADER PRESSURE TRANSMITTER	P8678E-015/1	47817	ROSEMOUNT INC.	1151GP4S12B1 CALIBRATE 0 - 30 INWC	A8678E-045/1 E8678E-011/5	1 - 150 INWC
FV-38754A	CV-409A		OVER-FIRE AIR MANUAL INJECTION BALANCING DAMPER "A"	P8678E-015/1	42535	MADER DAMPERS HUGHES & ASSOC.	16" X 21" BUTTERFLY DAMPER	A8678E-045/1 E8678E-005	
FV-38754B	CV-409B		OVER-FIRE AIR MANUAL INJECTION BALANCING DAMPER "B"	P8678E-015/1	42535	MADER HUGHES & ASSOC.	16" X 21" BUTTERFLY DAMPER	A8678E-045/1 E8678E-005	
FV-38754C	CV-409C		OVER-FIRE AIR MANUAL INJECTION BALANCING DAMPER "C"	P8678E-015/1	42535	MADER HUGHES & ASSOC.	16" X 21" BUTTERFLY DAMPER	A8678E-045/1 E8678E-005	
FV-38754D	CV-409D		OVER-FIRE AIR MANUAL INJECTION BALANCING DAMPER "D"	P8678E-015/1	42535	MADER HUGHES & ASSOC.	16" X 21" BUTTERFLY DAMPER	A8678E-045/1 E8678E-005	
FV-38754E	CV-409E		OVER-FIRE AIR MANUAL INJECTION BALANCING DAMPER "E"	P8678E-015/1	42535	MADER HUGHES & ASSOC.	16" X 21" BUTTERFLY DAMPER	A8678E-045/1 E8678E-005	
FV-38754F	CV-409F		OVER-FIRE AIR MANUAL INJECTION BALANCING DAMPER "F"	P8678E-015/1	42535	MADER HUGHES & ASSOC.	16" X 21" BUTTERFLY DAMPER	A8678E-045/1 E8678E-005	
FV-38760	CD-410	DO	OFA INLET CONTROL DAMPER SEAL AIR FAN SHUT-OFF DAMPER	P8678E-015/1	42524	BARRON FLO-TECH, INC.	W/OFA FAN-1 SEAL AIR FAN-6	A8678E-045/2 E8678E-005	
HV-38260	BV-410		MANUAL BALL VALVE FOR FV-38760	P8678E-015/1	47782	WORCESTER CON. A.E. EHRKE	4846RSE with I/O - 1/4" NPT	A8678E-045/2 E8678E-005	

REVISION DATE 08-10-92 by DAP

PSC TAG NUMBER	OLD EER NUMBER	I/O TYPE	SERVICE	P&ID NUMBER	PURCHASE ORDER #	MANUFACTURER SUPPLIER	MODEL NUMBER	INSTALLATION DRAWING	RANGE
PIC-38260	AF-410 PI-410 PRV-410		AIR PRESSURE FILTER REGULATOR FOR FV-38760	P8678E-015/1	47782	FISHER A.E. EHRKE	TYPE 67AFR w/FILTER & 0 - 60 psig PRESSURE GAUGE I/O - 1/4" NPT	A8678E-045/2 E8678E-005	
HV-38761	CD-461		OVER-FIRE AIR NOZZLE COOLING FAN MANUAL ISOLATION DAMPER - NORTH	P8678E-015/1	42535	MADER DAMPERS HUGHES & ASSOC.	16" DAMPER	A8678E-045/1 E8678E-005	
FV-38762	CD-406B	DO	OVER-FIRE AIR NOZZLE COOLING FAN SHUT-OFF DAMPER (EAST)	P8678E-015/1	42535	MADER DAMPERS HUGHES & ASSOC.	18" DAMPER	A8678E-045/1 E8678E-005	
HV-38262	BV-406B		MANUAL BALL VALVE FOR FV-38762	P8678E-015/1	47782	WORCESTER CON. A.E. EHRKE	4846 RSE with I/O - 1/4" NPT	A8678E-045/1 E8678E-005	
PIC-38262	AF-406B PI-406B PRV-406B		AIR PRESSURE FILTER REGULATOR FOR FV-38762	P8678E-015/1	47782	FISHER A.E. EHRKE	TYPE 67AFR w/FILTER & 0 - 60 psig PRESSURE GAUGE I/O - 1/4" NPT	A8678E-045/2 E8678E-005 E8678E-011/5	
FV-38763	CD-406A	DO	OVER-FIRE AIR NOZZLE COOLING FAN SHUT-OFF DAMPER (WEST)	P8678E-015/1	42535	MADER DAMPERS HUGHES & ASSOC.	18" DAMPER	A8678E-045/1 E8678E-005	
HV-38263	BV-406A		MANUAL BALL VALVE FOR FV-38763	P8678E-015/1	47782	WORCESTER CON. A.E. EHRKE	4846 RSE with I/O - 1/4" NPT	A8678E-045/1 E8678E-005	
PIC-38263	AF-406A PI-406A PRV-406A		AIR PRESSURE FILTER REGULATOR FOR FV-38763	P8678E-015/1	47782	FISHER A.E. EHRKE	TYPE 67AFR w/FILTER & 0 - 60 psig PRESSURE GAUGE I/O - 1/4" NPT	A8678E-045/2 E8678E-005 E8678E-011/5	
HV-38764	CD-628		GR NOZZLE COOLING FAN MANUAL ISOLATION DAMPER (REAR WALL)	P8678E-015/2	42536	OLSON TECH. HUGHES & ASSOC.	12" DAMPER FIG. # 25 AW-22 HM-L	D8678E-125/3 E8678E-005	
HV-38765	CD-629		GR NOZZLE COOLING FAN MANUAL ISOLATION DAMPER (FRONT WALL)	P8678E-015/2	42536	OLSON TECH. HUGHES & ASSOC.	12" DAMPER FIG. # 25 AW-22 HM-L	D8678E-125/3 E8678E-005	
HV-38766	CD-629		OFA NOZZLE COOLING FAN MANUAL ISOLATION DAMPER (CENTER)	P8678E-015/1	70039	OLSON TECH. HUGHES & ASSOC.	16" DAMPER	SK-010792	
HV-38767	CD-629		OFA NOZZLE COOLING FAN MANUAL ISOLATION DAMPER (SOUTH)	P8678E-015/1	70039	OLSON TECH. HUGHES & ASSOC.	12" DAMPER	SK-010792	
HS-38770	SIEMERSD	DI	EMERGENCY GR SHUT DOWN				PUSH-PULL HAND SWITCH		
TE-38780		AI-TC	OIL COOLING SYS. RESERVOIR TEMP ELEMENT,TYPE "K" THERMOCOUPLE	P8678E-015/1	42524	BARRON FLO-TECH, INC.	INCLUDED W/ OCS-1	A8678E-045/1 E8678E-005	0-300 DEGF
LSL-38780		DI	OIL COOLING SYSTEM RESERVOIR LOW OIL LEVEL SWITCH	P8678E-015/1	42524	BARRON FLO-TECH, INC.	INCLUDED W/ OCS-1	A8678E-045/1 E8678E-005	
CR-38780A		DI	OIL COOLING SYSTEM #1 PUMP FAIL SWITCH (TR-1)	P8678E-015/1	42524	BARRON FLO-TECH, INC.	INCLUDED W/ OCS-1	A8678E-045/1 E8678E-005	

REVISION DATE 08-10-92 by DAP

PSC TAG NUMBER	OLD EER NUMBER	I/O TYPE	SERVICE	P&ID NUMBER	PURCHASE ORDER #	MANUFACTURER SUPPLIER	MODEL NUMBER	INSTALLATION DRAWING	RANGE
CR-38780B		DI	OIL COOLING SYSTEM #2 PUMP FAIL SWITCH (TR-2)	P8678E-015/1	42524	BARRON FLO-TECH, INC.	INCLUDED W/ OCS-1	A8678E-045/1 E8678E-005	
UM-39320A		AI	BOILER MASTER SIGNAL TRANSDUCER (P/I)	P8678E-055	47820	BELLOFRAM PROC. VALVE & EQ.	TYPE 5000 P/I P/N 241-964-201-000	P8678E-055	3-27psig 4-20 ma.
UM-39320B		AO	REBURN GAS FLOW SIGNAL TRANSDUCER (I/P)	P8678E-055	47820	BELLOFRAM PROC. VALVE & EQ.	TYPE 1000 I/P P/N 221-961-074-000	P8678E-055	4-20 ma. 3-27psig

EXISTING SYSTEM INPUTS FOR BPMS TO BE DEFINED LATER

DATE	REVISION LISTING
6/04/1991	added psc tag numbers
8/19/1991	update p.o. #, descrip, model, manuf./suplr.
8/30/1991	update p.o. #, descrip, model, manuf./suplr.
	added fgr gas temp TE-603 & TT-603
9/02/1991	update descrip, model, manuf./suplr.
	remove existing system inputs list
9/27/1991	added av-36403, deleted tt-38724,tt-38752
	changed all temps. to type "k" t/c
12/06/1991	update p.o.#, correct um-39320a & um-39320b
	added oil cooling system ??-38780's, suplr.
12/09/1991	added fs-38722a/b & fs-38747a/b switches
12/19/1991	added burner #'s to scanners, misc. changes
01/29/1992	reformat, added ua-38101, add installation dwg
02/25/1992	added bpms xmtrs, ft-38701/4, rwh
04/01/1992	added hs-38770
04/08/1992	added hv-38766, hv-38767
08/10/1992	added fe-31005, fi-31005, fe-31050,51 ,ft-31050,51
	deleted fe-31016,17, ft-31016,17

APPENDIX B

First Generation Gas Reburning Test Data

Cherokee Unit 3, Average Test Data
Pre Modification

Test No.	Date	Dur.	CEMS O2 % Dry	Plant O2 % Wet	COc ppm	CO2c %	NOxc ppm	NOx lb/mbtu	SO2c ppm	SO2 lb/mbtu	Reb Gas scfm	West OFA scfm	East OFA scfm	FGR scfm	Steam lbs/hr	Mill A	Mill B 0=On	Mill C	Mill D
Base Cond. (OFA off)	11/11/92	8:42	4.00	3.19	125	16.72	253	.345	320	.610	0	0	0	776	805808	0	0	0	0
GR	11/11/92	1:01	3.38	2.90	256	15.55	208	.278	276	.515	5569	31902	32282	10075	1239194	0	0	0	0
Base Cond. (OFA off)	11/11/92	4:25	4.00	3.13	9	16.70	397	.543	337	.645	0	0	0	1740	1243929	0	0	0	0
Base Cond. OFA off	11/12/92	0:45	3.24	2.76	36	16.9	352	.480	330	.629	0	0	0	2782	1257174	0	0	0	0
BPMS GR 4	11/12/92	1:05	3.85	3.09	29	15.5	227	.303	269	.503	5269	33996	33892	10212	1230455	0	0	0	0
Base Cond. OFA off	11/12/92	1:15	3.95	3.23	8	16.6	383	.523	331	.631	0	0	0	2060	1243684	0	0	0	0
BPMS Base Cond. 5	11/13/92	2:55	4.41	3.59	6	16.6	420	.573	329	.628	0	0	0	796	1254148	0	0	0	0
BPMS Base Cond. 6	11/13/92	1:00	4.18	3.56	85	16.6	327	.446	334	.638	0	7233	8547	2250	1268525	0	0	0	0
BPMS Base Cond. 7	11/13/92	1:00	3.75	3.51	513	16.7	274	.373	333	.636	0	15101	15019	2707	1278852	0	0	0	0
Base Cond.-1d	11/16/92	1:00	4.28	3.27	5	16.7	410	.559	339	.646	0	0	0	2531	1165455	0	0	0	0
GR-10c	11/16/92	1:00	3.46	3.56	154	16.7	317	.432	354	.676	0	6212	5770	2871	1231148	0	0	0	0
GR-10d	11/16/92	1:00	3.69	3.31	274	16.7	326	.444	364	.695	0	9737	9975	2943	1233115	0	0	0	0
Base Cond. OFA off	11/17/92	1:15	4.16	3.49	9	16.7	422	.576	341	.650	0	0	0	7809	1245526	0	0	0	0
GR-11c	11/17/92	1:00	3.52	3.14	86	15.5	206	.274	280	.521	5502	30489	30297	10595	1199836	0	0	0	0
GR-11d	11/17/92	1:00	3.57	2.79	13	15.5	200	.266	278	.517	5521	35105	34771	10732	1190179	0	0	0	0
Base Cond. OFA off	11/17/92	0:20	4.93	3.79	5	16.5	443	.604	345	.657	0	0	0	3102	1170476	0	0	0	0
Base Cond. OFA off	11/18/92	0:28	3.28	2.66	29	16.7	360	.491	338	.645	0	0	0	2267	1219655	0	0	0	0
GR-11e	11/18/92	1:04	3.67	2.89	14	15.4	201	.268	281	.523	5517	35902	35882	10794	1203538	0	0	0	0
GR-12b	11/18/92	1:05	3.79	2.97	31	15.7	203	.272	306	.573	4168	34344	34271	10957	1199394	0	0	0	0
Base Cond. OFA off	11/18/92	0:35	4.05	3.44	79	16.7	377	.514	353	.674	0	0	0	3020	1190000	0	0	0	0
GR-12 (5% Gas)	11/19/92	1:00	3.12	3.06	986	16.3	208	.282	338	.641	1385	18886	20014	10324	1237049	0	0	0	0
GR-12a (10% Gas)	11/19/92	1:00	2.64	2.41	955	16.0	176	.238	326	.614	2740	22246	23343	10348	1222295	0	0	0	0
GR-12c (23% Gas)	11/19/92	1:00	2.83	2.24	92	15.2	175	.232	275	.511	6063	35104	35381	15051	1172295	0	0	0	0
Base Cond. OFA off	11/19/92	0:20	3.98	3.33	14	16.4	373	.509	340	.649	0	0	0	7364	1172857	0	0	0	0
GR-13A; 18% Gas	11/20/92	0:58	2.66	2.19	530	15.7	164	.219	285	.532	4850	30837	31822	4063	1191695	0	0	0	0
GR-13D; 18% Gas	11/20/92	1:00	3.25	2.33	43	15.7	186	.248	291	.544	4822	33657	34629	11943	1175082	0	0	0	0
GR-14B; 20% Gas	11/20/92	1:00	3.60	2.46	32	15.5	189	.251	281	.525	5305	33962	34994	10075	1170984	0	0	0	0
Base Cond. OFA off	11/30/92	1:50	3.74	3.13	234	16.7	363	.495	343	.654	0	0	0	2008	1214054	0	0	0	0
GR-BFr	11/30/92	0:26	4.39	3.56	162	15.9	236	.318	315	.593	2783	35407	34997	12754	1207407	0	0	0	0
GR-BFf	11/30/92	0:27	4.58	3.51	41	15.9	234	.315	314	.593	2736	34383	34410	11483	1195357	0	0	0	0
GR-21C	12/1/92	1:06	4.07	2.97	34	15.4	168	.224	271	.504	4377	30188	31048	10570	924946	0	0	0	0
GR-22	12/1/92	0:50	5.26	4.19	11	16.0	208	.281	310	.585	1697	28007	29199	10663	939580	0	0	0	0
Bias Firing	12/1/92	0:10	4.11	2.80	45	15.4	168	.224	279	.519	4539	28229	29327	12196	919221	0	0	0	0
Base Cond. OFA on	12/1/92	0:50	3.63	3.80	272	16.70	212	.288	324	.617	0	9215	13085	6438	952541	0	0	0	0
Base Cond. OFA off	12/1/92	0:40	4.06	3.47	90	16.76	298	.407	341	.650	0	0	0	1606	1008774	0	0	0	0
Base Cond. OFA off	12/2/92	3:55	3.91	3.57	17	16.6	348	.475	373	.711	0	0	0	0	1184549	0	0	0	0
Base Cond. OFA off	12/4/92	0:55	4.26	3.18	69	16.8	257	.350	464	.884	0	0	0	0	964976	0	0	0	0
OFA Test	12/4/92	2:10	4.57	4.24	167	16.7	208	.283	455	.867	0	11958	15882	0	901188	0	0	0	0
Base Cond. OFA off	12/7/92	2:10	4.48	3.37	152	16.8	297	.405	353	.673	0	0	0	0	979707	0	0	0	0
GR-22A	12/7/92	1:05	4.12	3.78	671	16.0	175	.236	320	.602	2440	25023	26622	12026	960300	0	0	0	0

Cherokee Unit 3, Average Test Data
Pre Modification

Test No.	Date	Dur.	CEMS O2 % Dry	Plant O2 % Wet	COc ppm	CO2c %	NOxc ppm	NOx lb/mbtu	SO2c ppm	SO2 lb/mbtu	Reb Gas scfm	West OFA scfm	East OFA scfm	FGR scfm	Steam lbs/hr	Mill A	Mill B (0=On)	Mill C	Mill D
GR-22B	12/7/92	1:00	4.03	3.50	23	15.8	173	.231	302	.566	3332	29743	31158	10291	948854	0	0	0	0
GR-22C	12/7/92	1:00	3.90	3.17	8	15.5	163	.217	281	.524	4429	32849	34158	11935	948973	0	0	0	0
Base Cond. OFA off	12/8/92	0:27	3.58	2.51	826	16.6	236	.321	345	.657	0	0	0	3757	741704	0	0	0	0
GR-31C	12/8/92	1:00	3.87	3.18	202	15.4	158	.210	281	.523	3575	18244	21244	12085	744738	0	0	0	0
GR-31F	12/8/92	1:23	5.10	4.07	8	15.1	183	.242	275	.512	3600	30965	32115	12243	746411	0	0	0	0
GR-32A	12/8/92	1:00	4.17	3.67	240	15.9	168	.227	304	.573	1892	17900	20712	12444	750449	0	0	0	0
Base Cond. OFA off	12/9/92	0:41	3.08	2.54	256	16.8	223	.304	339	.646	0	0	0	4971	763638	0	0	0	0
GR-32C	12/9/92	1:00	4.68	3.74	17	15.3	171	.226	262	.489	3494	32821	32536	12564	730910	0	0	0	0
GR-32C; 3Mills	12/9/92	0:56	4.19	3.64	13	15.3	146	.194	265	.494	3590	29831	29860	12776	753483	0	0	0	1
Base Cond. OFA off	12/9/92	0:15	4.94	4.22	15	16.4	303	.412	342	.652	0	0	0	2255	800406	0	0	0	0
Base Cond. OFA off	12/14/92	2:00	4.40	3.59	69	16.5	335	.456	346	.659	0	0	0	0	1073140	0	0	0	0
GR-12Z	12/14/92	1:02	3.87	3.24	326	16.0	237	.322	309	.586	1428	23928	25198	10074	1195714	0	0	0	0
GR 2.7% Gas	12/14/92	0:17	4.12	3.44	54	16.2	235	.319	314	.597	696	30334	31860	10062	1193333	0	0	0	0
Base Cond. OFA off	12/15/92	1:37	3.74	3.08	327	16.7	323	.439	339	.646	0	0	0	0	1171486	0	0	0	0
GR 20% Gas	12/15/92	0:36	3.54	2.89	53	15.5	194	.258	263	.490	5002	34687	34800	10892	1181622	0	0	0	0
Base Cond. OFA off	12/16/92	0:48	3.97	3.64	9	16.6	371	.506	317	.604	0	0	0	0	1190000	0	0	0	0
GR-12A1	12/16/92	2:19	3.75	3.18	74	16.0	214	.288	288	.542	2725	27872	29125	10690	1216071	0	0	0	0
Test C1	1/15/93	1:00	4.02	3.16	31	16.29	242	.328	292	.553	1996	22497	24181	13462	1220000	0	0	0	0
Test C2	1/15/93	1:00	3.89	2.96	17	16.02	212	.285	282	.531	3256	29561	30316	13509	1219508	0	0	0	0
Test C3	1/15/93	0:58	3.67	2.44	13	15.74	185	.248	275	.514	4545	35040	35272	13849	1219153	0	0	0	0
Test C4	1/15/93	0:50	3.38	2.12	77	15.49	175	.233	262	.488	5786	35093	35485	13941	1220000	0	0	0	0
Test B1	1/15/93	0:59	4.16	3.63	43	16.77	271	.370	338	.644	0	24531	25480	2681	1239167	0	0	0	0
Test B3	1/15/93	1:01	3.66	3.43	138	16.86	260	.355	342	.652	0	23602	24718	2461	1238871	0	0	0	0
Base Cond. OFA off	1/18/93	0:45	3.48	2.81	9	16.89	381	.520	332	.632	0	0	0	0	1262609	0	0	0	0
Test B5	1/18/93	1:01	3.60	3.28	102	16.87	270	.368	342	.652	0	20653	23758	0	1270323	0	0	0	0
Base Cond. OFA cooling	1/19/93	0:39	4.00	3.79	7	16.85	385	.523	332	.634	0	0	7531	2946	1272000	0	0	0	0
GR-12R	1/19/93	1:00	4.56	3.84	20	16.44	256	.348	310	.589	1352	31531	33639	12599	1254754	0	0	0	0
GR-13E	1/19/93	1:00	3.42	2.39	33	15.75	185	.247	269	.503	4865	33584	35609	10066	1205738	0	0	0	0
GR-13C	1/20/93	1:10	3.50	2.42	28	15.77	199	.266	277	.518	4844	35894	36507	9901	1231000	0	0	0	0
GR-12D	1/20/93	1:05	3.81	2.61	12	15.86	204	.274	283	.532	4070	35814	36201	11463	1230484	0	0	0	0
GR-12E	1/20/93	0:59	3.52	2.69	57	16.21	216	.292	312	.589	2633	28992	29776	12031	1233833	0	0	0	0
Base Cond. OFA off	1/20/93	0:15	2.92	2.34	96	16.95	332	.451	338	.643	0	0	0	2659	1243750	0	0	0	0
150 MWn Max NOx Red	1/21/93	1:05	3.15	2.00	54	15.57	185	.246	269	.500	6076	36261	36094	10201	1224091	0	0	0	0
Base Cond. OFA cooling	1/21/93	1:30	3.42	3.14	20	16.98	340	.463	339	.646	0	0	4339	5341	1221429	0	0	0	0
120 MWn Max NOx Red	1/21/93	1:00	3.47	2.49	13	15.49	160	.213	255	.473	5272	29726	29847	10044	971677	0	0	0	0
GR Environ. #1	1/25/93	5:10	4.42	3.21	8	15.63	218	.291	278	.520	4396	33399	34070	11142	1152283	0	0	0	0
Base Cond. OFA cooling	1/26/93	0:55	4.28	3.64	44	16.79	302	.412	321	.611	0	486	9414	3670	1140357	0	0	0	0
GR Environ. Test #2	1/26/93	5:22	3.95	3.11	22	15.79	197	.263	283	.530	4108	34163	34076	12804	1132215	0	0	0	0
Environ. #3	1/27/93	5:55	4.03	3.18	31	15.69	220	.295	276	.517	4242	34388	34265	12240	1220225	0	0	0	0
Environ. #4 (No GR)	1/27/93	6:00	3.50	3.11	60	16.59	357	.487	325	.621	0	0	0	2182	1157591	0	0	0	0

Cherokee Unit 3, Average Test Data
Pre Modification

Test No.	Date	Dur.	CEMS O2 % Dry	Plant O2 % Wet	COc ppm	CO2c %	NOxc ppm	NOx lb/mbtu	SO2c ppm	SO2 lb/mbtu	Reb Gas scfm	West OFA scfm	East OFA scfm	FGR scfm	Steam lbs/hr	Mill A	Mill B 0=On	Mill C	Mill D
Environ. #5 (No GR)	1/28/93	6:04	3.67	3.17	8	17.04	389	.530	320	.610	0	0	0	610	1248877	0	0	0	0
Base Cond.	2/2/93	0:17	3.31	3.00	13	16.89	348	.475			0	0	0	1087	1221514	0	0	0	0
LNB 120MW #1	3/8/93	2:00	3.92	3.36	277	16.54	263	.359	367	.699	0	0	0	2097	962185	0	0	0	0
LNB 120MW #2	3/8/93	2:00	3.75	2.89	342	16.50	249	.339	368	.703	0	0	0	2985	954153	0	0	0	0
LNB 150MW #1	3/9/93	2:00	4.11	3.56	10	16.54	395	.539	347	.661	0	0	0	1726	1238182	0	0	0	0
LNB 150MW #2	3/9/93	2:00	3.58	2.88	35	16.59	346	.472	347	.662	0	0	0	2244	1227898	0	0	0	0
LNB 90MW #1	3/10/93	2:00	5.04	4.40	32	16.44	346	.471	320	.610	0	0	0	304	747371	0	0	0	0
LNB 90MW #2	3/10/93	1:58	4.61	4.29	69	16.44	329	.448	316	.603	0	0	0	209	748097	0	0	0	0
LNB 150MW #3	3/11/93	2:00	3.75	3.38	17	16.59	363	.495	308	.587	0	0	0	0	1190331	0	0	0	0
LNB 150MW #4	3/11/93	2:00	3.36	3.13	62	16.62	333	.454	304	.580	0	0	0	0	1211074	0	0	0	0
3M1	3/22/93	1:02	2.53	1.89	158	15.64	150	.200	280	.523	5156	32799	32127	10248	1218254	0	0	0	1
3M2	3/22/93	1:03	2.27	1.68	144	15.58	150	.200	272	.507	5174	29745	29125	10278	1210156	0	0	0	1
3M3	3/22/93	0:59	2.87	2.38	16	15.53	181	.241	271	.504	5183	29132	28952	10258	1206667	0	0	0	1
3 Mill 7	4/13/93	1:00	3.44	3.10	104	16.64	230	.314	348	.664	0	0	0	1276	963564	0	0	0	1
3 Mill 6	4/13/93	1:00	3.02	2.70	281	16.77	211	.287	356	.680	0	0	0	1496	972327	0	0	0	1
Level 6 1/2	4/15/93	2:05	3.70	2.28	182	16.82	307	.419	335	.639	0	0	0	130	1190873	0	0	0	0
Level 4	4/15/93	1:10	3.75	2.32	151	16.79	308	.421	335	.639	0	0	0	67	1190704	0	0	0	0
Level 3	4/15/93	0:53	3.73	2.19	230	16.82	307	.419	331	.631	0	0	0	393	1191296	0	0	0	0
Level 5 1/2	4/15/93	1:58	3.31	2.31	237	16.77	292	.398	329	.628	0	0	0	1173	1195042	0	0	0	0
Base Cond	4/15/93	5:25	3.50	2.28	238	16.78	299	.408	331	.632	0	0	0	644	1192178	0	0	0	0
Level 5 1/2	4/16/93	1:47	4.03	3.20	79	16.74	375	.512	332	.635	0	0	0	775	1204194	0	0	0	0
Level 6 1/2	4/16/93	1:19	3.88	3.11	8	16.76	362	.494	341	.649	0	0	0	2339	1212250	0	0	0	0
Level 3	4/16/93	0:44	3.99	3.16	8	16.70	367	.501	347	.662	0	0	0	2497	1210222	0	0	0	0
Level 4	4/16/93	1:00	3.98	3.14	8	16.70	366	.499	347	.662	0	0	0	2533	1211967	0	0	0	0
North out, South in	4/16/93	0:20	4.71	3.23	321	16.66	405	.552	330	.633	0	0	0	790	1201429	0	0	0	0
South out, North in	4/16/93	0:20	3.81	3.21	9	16.79	358	.488	339	.646	0	0	0	787	1202381	0	0	0	0
Base Cond	4/16/93	6:25	3.98	3.14	41	16.73	367	.500	341	.651	0	0	0	1989	1210081	0	0	0	0
Level 4	4/19/93	0:56	3.69	2.81	59	15.75	220	.293	386	.720	4996	31169	31190	12318	1191228	0	0	0	0
Level 3	4/19/93	0:52	3.68	2.80	58	15.75	219	.292	385	.720	4996	31175	31209	12323	1190566	0	0	0	0
Level 5 1/2	4/19/93	2:29	4.18	3.23	9	15.74	236	.315	371	.693	5021	33682	33472	12180	1180600	0	0	0	0
Level 6 1/2	4/19/93	1:10	4.27	3.25	9	15.84	246	.329	383	.716	5040	34184	33691	12391	1180000	0	0	0	0
Base Cond. OFA on	4/19/93	1:00	4.97	4.26	16	16.56	325	.444	456	.870	0	23654	23943	12375	1193770	0	0	0	0
GR	4/19/93	5:42	4.10	3.16	12	15.76	235	.313	376	.702	5020	33651	33434	12254	1180644	0	0	0	0
Level 6 1/2	4/20/93	1:47	3.30	2.84	68	16.72	259	.353	406	.773	0	0	0	233	1079815	0	0	0	1
Base Cond 130MW	4/20/93	3:35	3.24	2.81	113	16.71	252	.343	413	.788	0	0	0	484	1079537	0	0	0	0
Base Cond 120MW	4/20/93	2:55	4.48	3.25	68	16.52	292	.398	427	.814	0	0	0	1260	962761	0	0	0	0
Base Cond. OFA off	4/21/93	7:40	3.98	2.99	380	16.38	271	.370	477	.910	0	0	0	1689	936625	0	0	0	0
Base Cond. OFA off	4/23/93	0:30	3.58	2.68	17	16.89	348	.476	355	.677	0	0	0	2645	1200645	0	0	0	0
4M12 (OFA off)	4/23/93	1:00	2.93	1.92	6	15.96	299	.409	296	.565	0	0	0	2856	1216721	0	0	0	0
4M13a (78,000 scfm OFA	4/23/93	0:20	3.68	3.25	50	15.70	193	.263	291	.556	0	39940	38135	2871	1259524	0	0	0	0

Cherokee Unit 3, Average Test Data

Pre Modification

Test No.	Date	Dur.	CEMS O2 % Dry	Plant O2 % Wet	COc ppm	CO2c %	NOxc ppm	NOx lb/mbtu	SO2c ppm	SO2 lb/mbtu	Reb Gas scfm	West OFA scfm	East OFA scfm	FGR scfm	Steam lbs/hr	Mill A	Mill B 0=On	Mill C	Mill D
4M13b (70,000 scfm OFA	4/23/93	0:50	3.79	3.07	33	15.73	214	.293	286	.545	0	35404	34049	2766	1267308	0	0	0	0
Base Cond. OFA On	4/27/93	0:30	4.81	3.62	11	16.59	386	.526	340	.647	0	8540	9861	5545	1221613	0	0	0	0
GR on 150MW, 11% Gas	4/27/93	0:53	3.99	3.00	25	16.09	268	.361	299	.564	2987	18389	18339	10001	1208519	0	0	0	0
GR on 150MW, 17% Gas	4/27/93	2:48	3.64	2.81	40	15.76	213	.285	280	.523	4459	36218	35490	10001	1208037	0	0	0	0
Base Cond. OFA on	4/28/93	0:44	4.90	3.87	10	16.64	355	.484	335	.639	0	7132	9195	4686	1137333	0	0	0	0
GR on Auto	4/28/93	6:35	3.74	2.86	6	15.80	191	.256	284	.533	3933	33171	32485	9995	1097551	0	0	0	0
GR on Auto	5/3/93	7:00	4.19	3.65	7	15.50	222	.297	287	.537	4270	35646	34442	9996	1138217	0	0	0	0
Base Cond. OFA on	5/6/93	2:45	4.85	3.32	31	16.48	344	.470	353	.673	0	6985	8367	4146	1163494	0	0	0	0
GR on Auto	5/6/93	1:15	3.91	2.91	20	15.70	204	.274	292	.547	3774	32268	31261	10005	1143947	0	0	0	0
Base Cond. OFA off	5/6/93	0:21	4.43	2.12	772	16.39	292	.398	342	.653	0	0	0	3601	970203	0	0	0	0
GR on Auto 150MW	5/7/93	4:26	3.74	2.94	11	15.57	196	.262	315	.589	4553	36388	35798	10000	1206418	0	0	0	0
GR on Auto 160MW	5/7/93	1:59	3.49	2.70	8	15.58	208	.278	323	.605	4836	37227	36368	9989	1295750	0	0	0	0
GR on Auto 140MW	5/7/93	4:50	4.06	3.19	7	15.41	208	.278	338	.632	4248	35014	34787	10004	1122062	0	0	0	0
Base Cond. OFA off	5/7/93	0:35	4.48	3.20	8	16.20	398	.542	361	.690	0	0	0	1400	1179167	0	0	0	0
GR on Auto	5/11/93	6:08	4.86	3.64	7	15.52	209	.280	298	.558	4071	34084	33708	10003	1089265	0	0	0	0
GR 13	5/25/93	15:04	3.98	3.25	7	15.70	208	.279	297	.557	4233	34644	35080	10004	1164920	0	0	0	0
GR 14	5/25/93	1:25	5.04	4.06	5	15.40	224	.300	296	.554	2961	29291	29684	9972	823513	0	0	0	0
GR 15	5/26/93	1:29	5.06	4.10	5	15.38	207	.276	296	.553	3118	29027	30011	9992	862219	0	0	0	0
LNB-OFA	5/26/93	0:42	6.41	5.47	25	15.99	283	.390	346	.659	0	18890	20768	8231	741474	0	0	0	0
LNB	5/26/93	9:44	3.61	2.62	161	16.58	304	.415	357	.680	0	0	0	2053	1128501	0	0	0	0
LNB	5/27/93	0:10	4.07	2.78	329	16.62	264	.359	361	.688	0	0	0	5694	917407	0	0	0	0
LNB-OFA	5/27/93	0:45	4.60	3.65	38	16.58	321	.438	366	.699	0	18427	15737	8930	1199783	0	0	0	0
GR-LNB 16	5/27/93	13:40	4.19	3.43	7	15.68	222	.298	302	.565	3964	33655	32673	9997	1140676	0	0	0	0
GR-LNB 17	5/28/93	2:57	5.47	4.41	6	15.45	221	.297	300	.563	2883	28577	28796	9789	865399	0	0	0	0
LNB	5/28/93	1:23	6.01	5.10	10	16.22	301	.410	346	.660	0	0	0	3066	699170	0	0	0	0
GR-LNB 20b	6/3/93	8:51	3.29	2.40	18	16.22	176	.236	301	.564	4103	34468	33864	9991	1126804	0	0	0	0
LNB	6/3/93	1:05	5.50	4.25	30	17.05	341	.467	357	.680	0	0	0	2084	761725	0	0	0	0
LNB (low load)	6/4/93	6:52	5.91	4.56	18	16.80	365	.497	357	.682	0	0	0	1828	723239	0	0	0	0
LNB (high load)	6/4/93	5:25	4.22	3.06	15	17.39	343	.468	369	.704	0	0	0	1331	1199289	0	0	0	0
LNB-OFA	6/4/93	2:31	4.16	3.44	96	16.59	280	.382	361	.688	0	17155	15601	5952	1269880	0	0	0	0
GR-LNB	6/4/93	7:42	3.07	2.29	37	15.72	176	.235	301	.564	4228	35531	34075	10001	1164427	0	0	0	0
LNB	6/8/93	1:35	4.32	3.13	34	16.42	331	.452	349	.666	0	0	0	2428	1128646	0	0	0	0
LNB-OFA	6/8/93	1:40	4.79	3.54	135	16.63	310	.422	371	.707	0	9617	7060	4718	1139901	0	0	0	0
GR-LNB 22a	6/8/93	6:21	4.54	3.46	16	15.79	198	.265	310	.580	3922	33702	32454	10001	1054627	0	0	0	0
GR-LNB 22b	6/8/93	5:30	3.05	2.55	87	16.07	167	.224	306	.573	4340	36153	34706	9998	1160091	0	0	0	0
GR-LNB 23a	6/9/93	1:16	3.70	2.93	49	16.19	157	.211	307	.576	3130	29755	29425	10008	890215	0	0	0	0
LNB-OFA	6/9/93	0:30	5.56	4.50	59	16.83	184	.251	358	.683	0	17162	18085	5358	688972	0	0	0	0
LNB	6/9/93	16:03	4.71	3.41	107	17.10	295	.402	362	.690	0	0	0	2719	950036	0	0	0	0
GR-LNB 23b	6/9/93	4:28	4.84	4.03	6	16.07	232	.311	308	.576	4052	34395	33067	10000	1090496	0	0	0	0
LNB	6/10/93	8:47	4.41	3.20	518	17.15	239	.326	363	.693	0	0	0	2474	920397	0	0	0	0

Cherokee Unit 3, Average Test Data
Pre Modification

Test No.	Date	Dur.	CEMS O2 % Dry	Plant O2 % Wet	COc ppm	CO2c %	NOxc ppm	NOx lb/mbtu	SO2c ppm	SO2 lb/mbtu	Reb Gas scfm	West OFA scfm	East OFA scfm	FGR scfm	Steam lbs/hr	Mill A	Mill B 0=On	Mill C	Mill D
LNB-OFA	6/10/93	1:16	5.03	3.68	35	17.16	291	.396	366	.698	0	14739	12660	5820	1218442	0	0	0	0
GR-LNB 24	6/10/93	2:57	4.54	3.55	11	15.69	229	.306	309	.577	4417	36757	34841	10001	1165749	0	0	0	0
LNB	6/10/93	0:37	4.08	3.07	10	16.63	370	.504	380	.724	0	0	0	3177	1230000	0	0	0	0
GR-LNB 25a	6/11/93	5:28	3.91	3.11	18	15.59	192	.258	337	.632	3635	32240	30812	9997	1044157	0	0	0	0
GR-LNB 25b	6/11/93	9:06	3.79	2.98	15	15.56	207	.278	342	.641	4101	35111	33049	10003	1166323	0	0	0	0
GR-LNB 26a	6/12/93	11:22	3.42	2.68	44	15.69	179	.240	335	.628	3718	33199	31983	9995	1068493	0	0	0	0
GR-LNB 26b	6/12/93	2:13	5.19	4.32	31	15.69	256	.344	349	.659	1437	20377	21102	7909	717418	0	0	0	0
LNB-OFA	6/12/93	7:11	3.61	2.26	764	16.49	269	.367	396	.756	0	13517	10477	6584	1117982	0	0	0	0
LNB-OFA	6/13/93	9:43	5.87	4.07	136	16.44	396	.540	385	.734	0	3874	7030	5970	665303	0	0	0	0
GR-LNB 28	6/14/93	4:06	3.26	2.69	28	16.02	188	.252	327	.611	4365	36577	34514	10000	1192146	0	0	0	0
LNB	6/14/93	1:59	3.95	2.48	364	16.87	268	.365	385	.735	0	0	0	3153	1066859	0	0	0	0
LNB	6/18/93	0:38	3.41	2.92	27	16.85	310	.422	361	.689	0	0	0	4902	1067799	0	0	0	0
GR-LNB 29	6/18/93	14:24	3.76	3.16	8	15.77	197	.263	322	.601	4340	34953	34502	9998	1127750	0	0	0	0
GR-LNB 30a	6/19/93	0:30	5.24	4.03	4	15.44	244	.324	320	.598	3384	29882	30161	10001	815086	0	0	0	0
LNB	6/19/93	9:15	5.08	4.06	247	16.56	410	.559	387	.737	0	0	0	2536	690957	0	0	0	0
GR-LNB 30b	6/19/93	11:53	3.01	2.34	59	15.85	162	.217	325	.608	4587	36895	35211	10002	1137486	0	0	0	0
GR-LNB 30c	6/19/93	1:33	4.56	3.33	6	15.67	203	.270	318	.595	2921	29301	28696	9837	775014	0	0	0	0
GR-LNB 23	6/23/93	7:35	2.99	1.91	35	15.75	165	.221	317	.593	4697	37616	35636	9998	1187149	0	0	0	0
GR-LNB 32b	6/23/93	1:09	3.65	2.39	18	15.84	173	.231	292	.546	3872	33770	32415	10011	1012043	0	0	0	0
LNB-OFA cooling	6/24/93	6:25	4.65	3.80	164	16.87	337	.459	381	.726	0	3779	7686	4923	687386	0	0	0	0
GR-LNB 33a	6/24/93	6:00	3.61	2.96	6	15.82	188	.251	346	.649	3638	32322	31113	10006	968909	0	0	0	0
GR-LNB 33	6/24/93	11:22	2.98	2.39	12	15.78	176	.235	335	.626	4612	36864	35541	10002	1165609	0	0	0	0
GR-LNB 34a	6/25/93	1:52	5.57	4.30	3	15.68	330	.443	348	.653	2150	24838	25094	9048	674211	0	0	0	0
LNB-OFA	6/25/93	4:03	5.74	4.57	42	16.57	358	.487	391	.746	0	11767	14803	6053	685403	0	0	0	0
GR-LNB 34	6/25/93	8:00	3.23	2.67	17	15.94	178	.238	353	.661	4192	34905	34235	9997	1119480	0	0	0	0
LNB (some OFA)	6/28/93	1:03	3.44	2.52	73	16.87	321	.437	366	.697	0	558	0	327	1214844	0	0	0	0
LNB (some OFA)	6/29/93	12:15	3.41	2.66	429	16.81	285	.389	385	.733	0	7879	0	1872	1036440	0	0	0	0
LNB	6/30/93	11:51	3.86	3.14	428	16.99	278	.378	386	.736	0	0	0	1295	945475	0	0	0	0
GR-LNB 35	6/30/93	1:48	3.71	2.74	46	15.71	191	.256	325	.608	4311	36183	34437	9992	1202018	0	0	0	0
GR-LNB 35a	6/30/93	6:05	4.48	3.31	5	15.59	226	.303	318	.596	4250	36009	34027	9998	1187541	0	0	0	0
GR-LNB 35b	6/30/93	1:53	5.18	3.82	4	15.49	231	.309	304	.570	3802	33177	31397	10017	1053950	0	0	0	0
GR-0LNB 36a	7/1/93	8:22	6.32	4.99	19	15.42	276	.371	320	.602	2070	24474	24227	8739	734912	0	0	0	0
GR-LNB 36	7/1/93	15:37	3.62	2.55	80	15.68	176	.236	324	.607	3933	34216	32307	9999	1138706	0	0	0	0
GR 37a	7/2/93	14:55	4.39	2.88	444	15.56	179	.240	323	.607	3058	29847	28438	9714	926914	0	0	0	0
GR 37	7/2/93	7:05	3.71	2.66	45	15.68	188	.251	331	.619	4255	36003	33902	10002	1210316	0	0	0	0
GR-LNB 38	7/3/93	7:46	3.63	2.59	90	15.54	173	.232	325	.608	4032	34453	32853	10001	1177277	0	0	0	0
GR-LNB 38a	7/3/93	8:43	3.47	2.62	43	15.29	159	.238	304	.570	3953	33798	32878	9996	1143061	0	0	0	0
GR-LNB 39a	7/4/93	17:27	4.23	3.35	21	15.14	155	.249	328	.617	2523	26426	26360	9236	872129	0	0	0	0
GR-LNB 39	7/4/93	6:33	3.16	2.33	11	15.29	152	.242	323	.607	3887	32822	32136	9998	1173866	0	0	0	0
GR-LNB 40a	7/5/93	11:52	4.84	3.94	7	15.07	165	.279	332	.626	1926	23418	23603	8514	768092	0	0	0	0

Cherokee Unit 3, Average Test Data
Pre Modification

Test No.	Date	Dur.	CEMS O2 % Dry	Plant O2 % Wet	COc ppm	CO2c %	NOxc ppm	NOx lb/mbtu	SO2c ppm	SO2 lb/mbtu	Reb Gas scfm	West OFA scfm	East OFA scfm	FGR scfm	Steam lbs/hr	Mill A	Mill B	Mill C	Mill D
																	0=On		
GR-LNB 40	7/5/93	12:08	3.48	2.63	6	15.11	142	.238	329	.617	3628	31924	30822	9996	1118801	0	0	0	0
GR-LNB 52a	7/17/93	8:31	5.27	3.62	0	15.38	198	.266	311	.583	2936	28931	30044	9587	815654	0	0	0	0
GR-LNB 52	7/17/93	5:45	3.99	2.89	0	15.82	188	.251	320	.599	4181	33584	34666	10003	1146028	0	0	0	0
LNB	7/19/93	1:53	3.64	2.79		16.57	211	.287	378	.721	0	0	0	166	918704	0	0	0	0
LNB-OFA	7/19/93	0:22	3.76	3.27		16.45	205	.281	384	.732	0	10140	9012	564	970186	0	0	0	0
GR-LNB 53a	7/19/93	3:29	3.79	3.23		15.66	176	.236	316	.592	3396	29845	31116	9886	955417	0	0	0	0
GR-LNB 53	7/19/93	7:06	3.72	2.85		15.66	196	.263	312	.585	4301	34294	35259	9997	1189204	0	0	0	0
LNB	7/21/93	8:34	4.63	4.17	0	16.27	351	.478	348	.664	0	0	0	0	658291	0	0	0	0
GR-LNB 54	7/21/93	4:52	3.69	3.00	0	15.82	194	.260	308	.576	4192	33366	34909	10004	1144957	0	0	0	0
LNB	7/23/93	2:35	4.41	3.73	53	16.66	299	.407	358	.682	0	0	0	13	763630	0	0	0	0
GR-LNB 55	7/23/93	4:53	4.37	3.24	7	15.58	210	.281	336	.630	4136	33640	34384	9994	1151463	0	0	0	0
GR-LNB 55a	7/23/93	1:08	4.64	3.58	10	15.53	193	.259	338	.633	3649	31303	32213	10012	1027666	0	0	0	0
LNB	7/23/93	3:55	4.47	3.61	583	16.38	232	.317	377	.719	0.00	1668	0	0	650024	0	0	0	0
LNB	7/24/93	1:52	5.44	3.47	454	15.97	231	.316	309	.588	0	0	0	0	675137	0	0	0	0
LNB-OFA	7/24/93	0:36	6.78	4.74	121	15.85	253	.345	354	.675	0	14115	13297	446	746830	0	0	0	0
GR-LNB 56	7/24/93	7:45	4.20	3.12	12	15.57	190	.254	321	.600	4118	33628	34167	10008	1142849	0	0	0	0
GR-LNB 56a	7/24/93	2:09	5.65	4.17	7	15.39	269	.360	312	.585	2664	27341	27876	8334	767608	0	0	0	0
GR-LNB 57a	7/25/93	1:10	6.85	5.06	5	15.02	364	.489	303	.569	2193	24105	25090	7051	625994	0	0	0	0
LNB-OFA	7/25/93	5:52	6.41	5.37	11	16.24	267	.364	363	.693	0	26373	27358	8162	715693	0	0	0	0
GR-LNB 57b	7/25/93	10:19	5.03	3.64	9	15.62	210	.281	319	.598	3579	31520	32176	9704	994774	0	0	0	0
GR-LNB 57	7/25/93	6:14	3.73	2.70	11	15.81	181	.242	319	.597	4239	35128	34744	10003	1198755	0	0	0	0
GR-LNB 58a	7/26/93	10:15	6.08	4.14	8	15.29	237	.317	312	.584	3067	29204	30414	9444	873265	0	0	0	0
GR-LNB 58	7/26/93	8:34	3.89	2.54	6	15.74	193	.259	304	.570	4169	34676	34556	10000	1206515	0	0	0	0
GR-LNB 58b	7/26/93	5:09	4.83	3.09	6	15.65	201	.269	288	.539	3592	31628	31619	9983	1062357	0	0	0	0
GR-LNB 59a	7/27/93	10:48	5.72	4.01	5	15.55	245	.327	294	.552	2992	29052	29511	8908	879577	0	0	0	0
LNB-OFA	7/27/93	3:21	3.25	2.39	482	17.07	301	.410	382	.729	0	5383	196	1459	1271436	0	0	0	0
GR-LNB 59	7/27/93	9:16	3.98	3.00	10	15.84	190	.255	314	.589	3766	32201	31721	10010	1089309	0	0	0	0
GR-LNB 60a	7/28/93	11:06	4.33	3.32	7	15.88	191	.256	317	.595	3414	29808	30879	9957	994650	0	0	0	0
GR-LNB 60b	7/28/93	2:02	3.57	2.50	13	15.82	195	.261	309	.579	4467	36181	35864	10007	1268293	0	0	0	0
LNB-OFA	7/28/93	2:21	3.29	2.24	386	16.72	332	.452	377	.720	0	8128	41	3904	1284085	0	0	0	0
GR-LNB 60	7/28/93	8:10	3.19	2.50	37	15.82	191	.256	305	.571	4342	35842	35083	10002	1270102	0	0	0	0
GR-LNB 61a	7/29/93	15:55	3.58	2.82	26	15.80	192	.257	314	.588	4069	33739	33869	9994	1180275	0	0	0	0
GR-LNB 61	7/29/93	8:04	3.28	2.38	81	15.75	180	.241	315	.590	4198	35071	34330	9997	1182536	0	0	0	0
GR-LNB 62	7/30/93	10:04	3.47	2.54	168	15.80	169	.227	316	.592	3928	32711	33077	9999	1132029	0	0	0	0
LNB-OFA	7/30/93	4:32	4.07	3.01	342	16.75	319	.435	381	.727	0	11829	5626	3879	1236007	0	0	0	0
GR-LNB 62a	7/30/93	9:00	4.19	3.05	43	15.84	203	.271	308	.577	4132	33977	34618	9997	1190684	0	0	0	0
GR-LNB 63a	7/31/93	17:10	3.53	2.54	38	15.93	178	.238	319	.598	4078	33569	34189	10005	1179568	0	0	0	0
GR-LNB 63b	7/31/93	6:49	3.25	2.23	67	15.93	172	.230	320	.601	3898	32584	32554	10000	1195410	0	0	0	0
GR-LNB 64a	8/1/93	1:25	3.81	2.62	30	15.83	169	.226	315	.591	3541	30740	31067	9989	1052532	0	0	0	0
GR-LNB 64b	8/1/93	10:21	5.20	4.02	6	15.70	229	.308	306	.574	2771	27501	29408	9017	823827	0	0	0	0

Cherokee Unit 3, Average Test Data
Pre Modification

Test No.	Date	Dur.	CEMS O2 % Dry	Plant O2 % Wet	COc ppm	CO2c %	NOxc ppm	NOx lb/mbtu	SO2c ppm	SO2 lb/mbtu	Reb Gas scfm	West OFA scfm	East OFA scfm	FGR scfm	Steam lbs/hr	Mill A	Mill B 0=On	Mill C	Mill D
GR-LNB 64c	8/1/93	12:14	3.64	2.61	24	15.88	180	.241	302	.566	3938	32749	34103	10001	1156441	0	0	0	0
GR-LNB 65a	8/2/93	8:55	5.73	4.17	5	15.32	234	.314	287	.538	2601	26353	28721	8422	790952	0	0	0	0
LNB-OFA	8/2/93	1:23	3.98	2.25	425	16.84	289	.395	362	.691	0	1680	4992	2352	1234365	0	0	0	0
GR-LNB 65b	8/2/93	6:02	3.47	2.26	14	15.73	167	.224	295	.552	4058	32292	34857	10002	1173016	0	0	0	0
GR-LNB 65c	8/2/93	7:14	3.66	2.49	9	15.01	173	.232			3977	32303	34498	9965	1126852	0	0	0	0
GR-LNB 66a	8/3/93	8:29	6.17	4.48	4	15.11	255	.342			2520	26065	29515	8775	721769	0	0	0	0
GR-LNB 66b	8/3/93	9:34	4.39	3.10	4	15.87	193	.258			3984	30990	34863	9994	1119411	0	0	0	0
GR-LNB 66c	8/3/93	5:55	3.68	2.50	6	15.92	181	.243			4107	31654	35389	9998	1172640	0	0	0	0
GR-LNB 67	8/4/93	24:00	4.23	2.75	8	15.80	188	.252			3628	29591	33640	9964	1078102	0	0	0	0
GR-LNB 68a	8/5/93	7:39	4.76	3.38	7	15.73	178	.239			2975	27352	31903	9999	907097	0	0	0	0
GR-LNB 68b	8/5/93	15:50	4.05	2.45	8	15.82	204	.274			3997	29936	34829	9999	1193868	0	0	0	0
GR-LNB 69	8/6/93	9:48	3.74	2.86	7	15.75	189	.253			3575	27908	33577	9982	1084174	0	0	0	0
LNB	8/6/93	7:58	3.55	2.27	321	16.54	317	.432			0	0	0	0	1211591	0	0	0	0
LNB-OFA	8/6/93	5:04	3.70	2.29	199	16.49	331	.451			0	3977	0	0	1250695	0	0	0	0
LNB	8/7/93	3:04	3.12	1.68	805	16.54	288	.392			0	2	0	63	1186157	0	0	0	0
GR-LNB 70	8/7/93	3:53	3.61	2.41	875	15.98	184	.249			1815	16491	20425	7457	1086542	0	0	0	0
LNB-OFA	8/7/93	8:05	3.86	2.37	362	16.38	305	.415			0	2653	1581	14	1213040	0	0	0	0
LNB	8/7/93	6:28	3.71	2.38	217	16.46	323	.440			0	0	0	0	1234851	0	0	0	0
LNB	8/9/93	8:04	4.16	2.85	248	16.71	288	.393			0	0	0	0	1139708	0	0	0	0
GR-LNB 71 (10% Gas)	8/9/93	13:45	3.91	2.81	15	16.20	199	.268			2762	27917	29863	9999	1226985	0	0	0	0
GR-LNB 72a (10%)	8/10/93	7:48	3.96	2.70	48	16.23	195	.263			2446	25681	29001	9992	1185288	0	0	0	0
LNB	8/10/93	7:27	4.31	2.60	27	16.74	330	.450			0	1	0	0	1216526	0	0	0	0
GR-LNB 72b (10%)	8/10/93	7:25	4.29	3.07	14	16.22	204	.275			2455	25926	29000	10002	1167690	0	0	0	0
GR-LNB 73	8/11/93	3:22	4.65	3.64	9	16.00	217	.294			2380	24891	28634	9995	1120389	0	0	0	0
LNB-OFA	8/11/93	9:49	3.90	2.35	172	16.74	282	.384			0	5042	0	0	1271288	0	0	0	0
LNB	8/11/93	2:45	4.37	2.96	11	16.68	304	.414			0	0	0	0	1205723	0	0	0	0
LNB	8/12/93	7:36	4.45	3.34	105	16.69	248	.338			0	0	0	0	893989	0	0	0	0
GR-LNB 74	8/12/93	14:33	4.07	2.80	9	16.22	194	.262			2552	26538	30326	9997	1203784	0	0	0	0
GR-LNB 75	8/13/93	18:16	4.26	2.83	11	15.99	205	.276			2584	26141	30856	9996	1182245	0	0	0	0
GR-LNB 76a	8/14/93	4:54	4.85	3.18	46	15.83	188	.254			1899	20598	25294	9999	925040	0	0	0	0
LNB	8/14/93	1:46	7.18	4.91	106	15.74	326	.445			0	0	0	0	679285	0	0	0	0
GR-LNB 76b	8/14/93	11:05	4.75	3.01	10	15.91	199	.268			2513	25381	30722	9996	1158368	0	0	0	0
GR-LNB 77	8/15/93	1:10	5.35	3.36	24	15.79	199	.271			1798	19760	25005	9696	887753	0	0	0	0
LNB	8/15/93	14:44	4.80	3.03	575	16.38	271	.370			0	1258	786	129	913531	0	0	0	0
LNB	8/15/93	6:58	3.73	1.84	223	16.63	290	.396			0	1987	0	0	1239884	0	0	0	0
LNB (low load)	8/16/93	7:38	4.90	3.07	786	16.38	236	.322			0	0	0	0	812318	0	0	0	0
LNB (150 MWe)	8/16/93	3:21	4.28	2.85	34	16.70	348	.474			0	0	0	31	1263073	0	0	0	0
LNB-OFA cooling	8/16/93	11:40	3.88	2.14	70	16.57	340	.464			0	6499	0	172	1291641	0	0	0	0
LNB	8/17/93	9:07	4.14	2.46	384	16.58	279	.381			0	0	0	0	949955	0	0	0	0
100% Gas (plant test)	8/17/93	0:34	2.85	1.89	971	10.16	76	.104			0	0	0	0	566196	0	0	0	0

Cherokee Unit 3, Average Test Data

Pre Modification

Test No.	Date	Dur.	CEMS O2 % Dry	Plant O2 % Wet	COc ppm	CO2c %	NOxc ppm	NOx lb/mbtu	SO2c ppm	SO2 lb/mbtu	Reb Gas scfm	West OFA scfm	East OFA scfm	FGR scfm	Steam lbs/hr	Mill A	Mill B	Mill C	Mill D
																0=On			
LNB (OFA cooling)	8/17/93	8:59	3.60	2.27	314	16.70	313	.427			0	6435	0	0	0	0	0	0	0
LNB	8/17/93	3:05	3.43	2.08	269	16.80	296	.403			0	0	0	0	0	0	0	0	0
LNB (low load)	8/18/93	9:42	3.87	2.47	775	16.62	234	.320			0	0	0	0	0	0	0	0	0
LNB 150 MWe	8/18/93	14:16	4.04	2.53	25	16.77	336	.459			0	2	0	0	0	0	0	0	0
GR-LNB 78	8/24/93	3:25	3.47	2.41	141	16.05	174	.234			2712	26959	31890	10010	1129806	0	0	0	0
LNB OFA cooling	8/24/93	10:38	4.12	2.35	227	16.68	320	.436			0	8003	0	5	1156672	0	0	0	0
LNB OFA cooling	8/25/93	2:06	4.00	2.75	528	16.56	250	.341			0	4689	0	0	881699	0	0	0	0
LNB	8/25/93	8:38	4.16	2.65	738	16.73	248	.338			0	0	0	0	848417	0	0	0	0
LNB	8/25/93	13:08	4.54	2.99	14	17.11	351	.479			0	0	0	0	1151539	0	0	0	0
LNB	8/26/93	21:16	5.44	3.65	222	18.16	301	.411			0	0	0	10	879914	0	0	0	0
LNB	8/26/93	2:42	4.39	3.03	26	16.95	339	.462			0	0	0	0	1209141	0	0	0	0
LNB	8/27/93	8:26	5.27	3.98	38	17.94	345	.469			0	0	0	0	817252	0	0	0	0
LNB	8/27/93	6:17	4.36	2.90	18	16.92	322	.440			0	0	0	0	1193794	0	0	0	0
GR-LNB 79	9/8/93	11:15	3.94	2.89	52	16.50	183	.246			3348	25986	31999	9996	1191746	0	0	0	0
GR-LNB 79a	9/8/93	1:49	4.82	3.54	72	17.42	176	.236			2994	24836	31141	9992	969489	0	0	0	0
GR-LNB 80a	9/9/93	6:55	5.17	3.97	69	17.83	198	.266			2757	24239	30756	9466	867451	0	0	0	0
LNB-OFA	9/9/93	1:46	6.52	4.50	93	19.50	300	.409			0	692	10904	9370	699534	0	0	0	0
GR-LNB 80	9/9/93	14:15	4.17	3.16	202	16.75	169	.227			3350	26718	31944	9977	1085308	0	0	0	0
LNB-OFA	9/10/93	4:50	7.18	4.45	137	20.45	403	.549			0	769	6815	3080	651164	0	0	0	0
GR-LNB 81	9/10/93	1:46	4.99	3.68	15	17.61	180	.240			2960	26769	31123	9760	852630	0	0	0	0
LNB	9/10/93	13:30	4.62	2.72	145	17.20	327	.445			0	6	0	0	1170095	0	0	0	0
LNB	9/11/93	19:30	4.45	3.03	548	17.01	290	.396			0	1072	0	0	1081220	0	0	0	0
GR-LNB 82	9/11/93	4:10	4.88	2.96	25	17.48	201	.270			3642	28192	32487	9998	1191334	0	0	0	0
GR-LNB 83a	9/12/93	11:51	5.39	3.46	15	18.07	190	.256			3132	26150	31407	9960	1013296	0	0	0	0
GR-LNB 83	9/12/93	12:09	4.04	2.22	52	16.59	183	.246			3519	27123	32187	10002	1251152	0	0	0	0
GR-LNB 84a	9/13/93	5:35	5.67	3.68	13	18.42	190	.255			2802	24327	30811	9626	916612	0	0	0	0
GR-LNB 84	9/13/93	18:03	4.63	3.28	54	17.21	195	.262			2706	21575	31415	10001	1155926	0	0	0	0
GR-LNB 85a	9/14/93	4:15	4.57	3.39	135	17.14	173	.233			2702	22127	30843	9997	1019116	0	0	0	0
LNB	9/14/93	11:05	4.69	3.62	255	17.28	306	.416			0	0	0	0	959581	0	0	0	0
LNB-OFA	9/14/93	1:06	4.59	3.64	337	17.15	297	.405			0	1957	9647	75	1226119	0	0	0	0
GR-LNB 85	9/14/93	6:55	3.19	2.69	28	15.80	171	.230			3115	24319	32107	10002	1163822	0	0	0	0
GR-LNB 86a	9/15/93	0:50	3.92	3.23	15	16.48	167	.224			2925	23514	31543	10008	1046613	0	0	0	0
LNB	9/15/93	3:07	4.72	3.16	329	17.32	278	.379			0	0	0	35	810045	0	0	0	0
GR-LNB 86b	9/15/93	4:26	4.14	3.38	18	16.73	178	.239			2808	23148	31322	9940	971915	0	0	0	0
GR-LNB 86	9/15/93	11:20	3.33	2.72	12	15.93	182	.245			3153	24447	32230	10003	1150475	0	0	0	0
GR-LNB 87a	9/16/93	5:46	4.32	3.58	7	16.92	194	.260			2740	22996	31181	9379	963288	0	0	0	0
GR-LNB 87	9/16/93	15:24	4.87	3.14	15	17.48	191	.256			2889	22666	32109	10002	1087587	0	0	0	0
GR-LNB 88a	9/17/93	5:31	4.80	3.21	13	17.40	174	.233			2920	23877	31699	9859	999394	0	0	0	0
GR-LNB 88	9/17/93	18:28	3.83	2.73	23	16.40	179	.241			3046	23613	32303	9997	1157526	0	0	0	0
GR-LNB 89	9/18/93	24:00	3.61	2.86	63	16.19	173	.232			2820	22544	31568	10003	1122638	0	0	0	0

Cherokee Unit 3, Average Test Data
Pre Modification

Test No.	Date	Dur.	CEMS O2 % Dry	Plant O2 % Wet	COc ppm	CO2c %	NOxc ppm	NOx lb/mbtu	SO2c ppm	SO2 lb/mbtu	Reb Gas scfm	West OFA scfm	East OFA scfm	FGR scfm	Steam lbs/hr	Mill A	Mill B 0=On	Mill C	Mill D
GR-LNB 90a	9/19/93	10:06	4.07	3.08	23	16.64	173	.233			2639	21476	30777	10000	1020960	0	0	0	0
GR-LNB 90	9/19/93	13:54	3.48	2.81	22	16.07	182	.245			2759	21902	31645	10008	1179188	0	0	0	0
GR-LNB 91	9/20/93	24:00	3.19	2.52	192	15.80	165	.222			3063	24230	31646	10000	1124284	0	0	0	0
GR-LNB 92a	9/21/93	3:00	4.01	3.03	256	16.61	166	.223			2904	25267	30735	9860	931802	0	0	0	0
GR-LNB 92	9/21/93	17:56	3.74	2.63	135	16.31	168	.225	199	.374	3255	25975	31436	9999	1139502	0	0	0	0
GR-LNB 3 Mill a	9/22/93	7:59	4.93	3.50	35	17.53	154	.206	284	.533	2933	25081	30671	10008	900782	0	0	0	1
GR-LNB 3 Mill b	9/22/93	8:25	4.53	2.87	18	15.91	160	.215	287	.540	2944	24580	30769	9976	972294	0	0	0	1
GR-LNB 3 Mill c	9/23/93	24:00	4.52	3.13	16	15.73	165	.221	329	.618	2980	24403	31080	10001	982953	0	0	0	1
GR-LNB 3 Mill d	9/24/93	1:58	5.63	3.96	8	15.40	165	.221	306	.574	2598	23971	30157	8874	791465	0	0	0	1
LNB-OFA 3 Mill	9/24/93	3:33	7.73	5.83	32	15.65	226	.308	351	.669	0	18759	24561	7142	636951	0	0	0	1
GR-LNB 3 Mill e	9/24/93	6:10	4.97	3.72	12	15.76	174	.234	311	.584	2863	23530	31072	9997	988715	0	0	0	1
GR-LNB 93	9/24/93	12:09	4.63	3.38	10	16.08	192	.258	320	.601	2926	23587	31459	10002	1115514	0	0	0	0
GR-LNB 94a	9/25/93	2:12	4.70	3.44	9	16.01	169	.228	314	.590	2783	23317	30654	9990	972449	0	0	0	0
LNB-OFA	9/25/93	2:24	6.51	5.05	9	16.36	218	.298	355	.677	0	23399	30302	7976	807992	0	0	0	0
GR-LNB 94	9/25/93	19:05	4.01	2.86	12	16.16	190	.255	326	.614	2966	23405	31870	9997	1191631	0	0	0	0
GR-LNB 95a	9/26/93	4:15	4.74	3.49	9	16.17	171	.229	304	.571	2919	24257	31129	9991	952879	0	0	0	0
LNB-OFA	9/26/93	2:55	7.19	5.70	13	16.55	251	.341	350	.667	0	23968	30323	6819	785818	0	0	0	0
GR-LNB 95	9/26/93	16:33	4.48	3.36	7	16.01	191	.256	319	.601	3042	24139	31945	9996	1112300	0	0	0	0
GR-LNB 96a	9/27/93	2:53	5.10	3.81	7	15.70	187	.251	312	.586	2944	23763	31827	10003	1008787	0	0	0	0
LNB	9/27/93	19:45	4.62	3.28	45	16.79	373	.508	375	.715	0	1531	0	10	1200767	0	0	0	0
GR-LNB 96b	9/27/93	0:57	4.36	3.12	26	15.95	163	.218	316	.593	3147	27716	32450	9966	986342	0	0	0	0
GR-LNB 97a	9/28/93	9:13	4.81	3.58	8	15.99	187	.250	313	.589	3055	24969	31696	9967	1037986	0	0	0	0
LNB	9/28/93	4:27	2.25	1.20	868	17.18	245	.334	375	.716	0	0	0	9997	1220446	0	0	0	0
GR-LNB 97	9/28/93	5:58	3.49	2.42	30	16.32	172	.232	333	.629	2702	25173	32083	10000	1184986	0	0	0	0
GR-LNB 97b	9/28/93	2:48	4.57	3.14	8	16.20	184	.248	326	.615	2133	21533	27849	9945	974067	0	0	0	0
GR-LNB 98a	9/29/93	5:22	5.23	3.81	6	16.03	204	.275	322	.607	1898	19930	26018	9624	884053	0	0	0	0
GR-LNB 98	9/29/93	18:37	3.89	2.74	14	16.15	186	.251	325	.611	3027	25188	31946	10003	1189487	0	0	0	0
GR-LNB 99a	9/30/93	5:32	5.49	4.01	6	15.51	204	.273	305	.573	2808	25547	30337	9499	890779	0	0	0	0
GR-LNB 99	9/30/93	13:24	4.15	2.92	9	16.06	193	.259	321	.603	3351	26070	32041	10000	1181229	0	0	0	0
GR-LNB 99b	9/30/93	2:27	5.07	3.42	7	15.85	183	.246	311	.583	3265	27085	31292	9979	995361	0	0	0	0
LNB-OFA	9/30/93	2:27	6.35	5.05	305	16.39	370	.505	352	.672	0	1636	6437	897	669649	0	0	0	0
GR-LNB 100a	10/1/93	11:00	6.13	4.46	7	15.76	223	.299	287	.538	2628	26189	30307	9347	816223	0	0	0	0
GR-LNB 100	10/1/93	9:12	4.68	3.20	7	16.07	174	.234	278	.522	3009	25908	30576	9999	983329	0	0	0	0
GR-LNB 101	10/2/93	24:00	5.29	3.60	6	16.29	184	.247	289	.542	2909	25906	30694	9990	963831	0	0	0	0
GR-LNB 102	10/3/93	24:00	5.56	3.85	6	16.14	195	.262	287	.540	2737	26269	29985	9750	911766	0	0	0	0
GR-LNB 103	10/4/93	24:00	4.95	3.45	7	15.96	181	.243	291	.545	3122	27549	31218	9993	977555	0	0	0	0
GR-LNB 104	10/5/93	24:00	5.11	3.55	6	15.79	189	.254	305	.571	3436	27513	31632	9990	998394	0	0	0	0
GR-LNB 105	10/6/93	10:15	4.69	3.35	10	15.96	188	.252	307	.577	3383	26196	32154	10000	1137382	0	0	0	0
GR-LNB 106	10/8/93	8:45	3.63	2.58	18	16.60	174	.234	309	.582	3173	25180	31649	10002	1186027	0	0	0	0
GR-LNB 107	10/9/93	24:00	4.59	3.13	12	16.52	197	.264	308	.581	3085	24385	31839	10005	1182794	0	0	0	0

Cherokee Unit 3, Average Test Data
Pre Modification

Test No.	Date	Dur.	CEMS O2 % Dry	Plant O2 % Wet	COc ppm	CO2c %	NOxc ppm	NOx lb/mbtu	SO2c ppm	SO2 lb/mbtu	Reb Gas scfm	West OFA scfm	East OFA scfm	FGR scfm	Steam lbs/hr	Mill A	Mill B (0=On)	Mill C	Mill D
GR-LNB 108	10/10/93	11:00	4.65	3.15	32	16.35	198	.266	311	.585	3096	24362	31937	9997	1184866	0	0	0	0
GR-LNB 109a	10/13/93	4:07	4.24	2.42	18	16.47	193	.259	310	.582	3647	31684	30645	10000	1195887	0	0	0	0
GR-LNB 109b	10/13/93	2:02	4.93	3.08	12	16.31	188	.252	311	.584	2968	29485	29602	10002	986307	0	0	0	0
GR-LNB 110a	10/14/93	6:02	4.86	2.99	20	16.36	190	.255	312	.586	3217	29854	30095	10009	1040627	0	0	0	0
GR-LNB 110	10/14/93	14:56	4.19	2.39	18	16.36	190	.255	307	.575	4022	33654	33411	9997	1173059	0	0	0	0
GR-LNB 110b	10/14/93	3:00	5.35	3.27	8	15.96	201	.269	294	.550	3805	32522	32481	9980	951225	0	0	0	0
GR-LNB 111	10/15/93	12:49	4.45	2.51	63	16.39	174	.233	311	.582	3691	31735	32152	9998	1066641	0	0	0	0
GR-LNB 3 Mill a	10/15/93	2:58	3.46	1.83	30	16.56	178	.239	315	.591	3765	31716	31998	10000	1151508	0	0	1	0
GR-LNB 3 Mill b	10/15/93	7:05	4.45	2.71	16	16.54	191	.257	316	.593	3261	29959	30343	10000	1065767	0	0	1	0
GR-LNB 3 Mill c	10/16/93	12:05	5.90	4.11	5	16.16	212	.285	315	.591	2735	28856	29543	9896	856244	0	0	1	0
GR-LNB 3 Mill d	10/16/93	10:28	4.04	2.45	16	16.58	198	.265	317	.595	4054	34099	33851	10004	1240715	0	0	1	0
GR-LNB 3 Mill e	10/16/93	1:25	4.32	2.34	31	16.55	158	.213	312	.586	3513	30086	30936	10008	1093256	0	0	1	0
GR-LNB 3 Mill f	10/17/93	23:46	4.40	2.30	164	16.34	161	.215	310	.581	3438	30122	30651	9994	1035016	0	0	1	0
LNB-OFA 3 Mill	10/18/93	11:10	5.47	3.18	169	17.07	184	.251	364	.693	0	22983	24415	7645	838204	0	0	1	0
GR-LNB 3 Mill g	10/19/93	15:35	4.87	3.17	20	15.69	172	.231	284	.533	3251	29408	30579	9998	1008201	0	0	1	0
GR-LNB 3 Mill h	10/20/93	7:35	5.02	3.10	14	15.79	171	.229	238	.445	3265	29130	30593	10000	1003963	0	0	1	0
GR-LNB 112	10/20/93	4:09	5.41	3.69	22	16.10	196	.263	270	.507	3037	28893	30578	9998	951590	0	0	0	0
LNB-OFA	10/20/93	0:56	5.91	4.16	61	16.46	273	.371	335	.640	0	26411	27589	8222	1075664	0	0	0	0
GR-LNB 113	10/20/93	10:42	4.55	3.04	16	15.72	192	.257	296	.555	3846	31426	33526	9992	1180964	0	0	0	0
GR-LNB 113	10/21/93	24:00	4.25	3.10	93	15.72	184	.246	303	.568	4089	33130	35144	10002	1168787	0	0	0	0
GR-LNB 114	10/22/93	24:00	4.16	3.11	96	15.67	176	.235	312	.584	4029	33036	34593	10000	1138196	0	0	0	0
GR-LNB 115	10/23/93	24:00	4.29	3.08	74	15.63	177	.237	311	.583	4094	33662	34816	10001	1186652	0	0	0	0
GR-LNB 116	10/24/93	14:00	4.32	3.09	91	15.62	174	.233	313	.587	3884	32233	33537	9999	1164111	0	0	0	0
GR-LNB 116a	10/24/93	10:00	4.17	2.91	103	15.46			310	.579	4050	33729	34365	10002	1187424	0	0	0	0
GR-LNB 117a	10/25/93	4:55	5.13	3.48	19	15.34			312	.586	3012	28619	30001	9822	946111	0	0	0	0
GR-LNB 117	10/25/93	19:04	4.10	2.89	68	15.79			307	.576	3836	32010	32868	9999	1163105	0	0	0	0
GR-LNB 118	10/26/93	24:00	3.89	2.81	47	16.03			312	.585	3786	31721	32722	10002	1157913	0	0	0	0
GR-LNB 119	10/27/93	14:25	3.58	2.44	267	15.87			306	.574	3822	31745	32808	10002	1194679	0	0	0	0
GR-LNB 119a	10/27/93	9:34	3.00	2.44		15.56			311	.583	3710	31517	31771	10006	1167386	0	0	0	0
GR-LNB 120a	10/28/93	7:21	3.55	2.74		15.39			311	.583	3396	30547	30776	10001	1105049	0	0	0	0
GR-LNB 120	10/28/93	16:38	3.31	2.55	257	16.11			305	.572	3700	31258	31701	10000	1169499	0	0	0	0
GR-LNB 121	10/29/93	24:00	4.07	2.62	211	16.40			300	.563	3725	30717	32584	9999	1162158	0	0	0	0
GR-LNB 122	10/30/93	24:00	3.88	2.49	95	16.36			317	.595	3853	31919	33273	10005	1201700	0	0	0	0
GR-LNB 123	10/31/93	24:00	3.93	2.50	55	16.13			331	.621	3801	31826	32642	10000	1177015	0	0	0	0
GR-LNB 124	11/1/93	6:18	3.92	2.71		16.36			328	.616	2909	29009	29846	10006	1151387	0	0	0	0
LNB-OFA	11/1/93	1:08	4.88	3.67		17.25			371	.709	0	19684	22513	8362	939449	0	0	0	0
GR-LNB 125a	11/2/93	8:15	2.96	2.26		16.90			324	.611	2806	28763	30384	9997	1177218	0	0	0	0
LNB	11/2/93	0:29	2.97	2.24		16.80			318	.599	2766	28844	29778	9909	1168762	0	0	0	0
GR-LNB 125	11/2/93	10:09	2.96	2.23		16.79			317	.597	2802	28984	29924	10007	1168297	0	0	0	0
GR-LNB 126a	11/4/93	1:40	2.57	2.22		16.43					2523	26835	28941	10014	1135867	0	0	0	0

Cherokee Unit 3, Average Test Data
Pre Modification

Test No.	Date	Dur.	CEMS O2 % Dry	Plant O2 % Wet	COc ppm	CO2c %	NOxc ppm	NOx lb/mbtu	SO2c ppm	SO2 lb/mbtu	Reb Gas scfm	West OFA scfm	East OFA scfm	FGR scfm	Steam lbs/hr	Mill A	Mill B	Mill C	Mill D
																	0=On		
GR-LNB 126	11/4/93	13:29	3.36	2.45		16.78	179	.241			2522	27084	29025	10002	1158195	0	0	0	0
GR-LNB 127a	11/5/93	7:20	6.00	2.99		17.45	192	.259			2300	24624	27869	10002	1081003	0	0	0	0
GR-LNB 127	11/5/93	5:54	3.94	2.93		15.06	178	.240			2623	27270	30504	9999	1215775	0	0	0	0
GR-LNB 128	11/8/93	4:55	3.76	2.93	244	16.44	195	.263			3752	30677	32862	9998	1178015	0	0	0	0
GR-LNB 129	11/9/93	8:30	3.26	2.50	216	15.80	186	.251			3781	31136	32644	9990	1215592	0	0	0	0
GR-LNB 129a	11/9/93	5:29	3.86	3.30	123	15.87	230	.311			3269	28567	30900	10004	1280032	0	0	0	0
GR-LNB 130	11/10/93	15:43	3.62	2.89	405	16.09	207	.280			2960	28559	30907	10002	1213151	0	0	0	0
LNB	11/10/93	7:50	3.36	2.86	855	16.82	329	.444			0	0	0	0	1232191	0	0	0	0
LNB	11/11/93	2:00	4.37	3.55	265	16.63	365	.493			0	0	0	0	1150603	0	0	0	0
LNB 3 Mill a	11/11/93	3:34	4.09	2.36	976	16.68	248	.335			0	0	0	0	889428	1	0	0	0
LNB 3 Mill b	11/11/93	9:20	4.87	2.83	297	16.52	290	.392	305	.582	0	0	0	0	896590	1	0	0	0
LNB 3 Mill c	11/12/93	12:30	4.57	2.82	184	16.14	310	.418	284	.542	0	0	0	0	974764	1	0	0	0
LNB 3 Mill d	11/12/93	11:29	2.61	2.01	486	17.20	296	.399	288	.549	0	0	0	0	1224797	1	0	0	0
LNB 3 Mill e	11/13/93	14:30	3.70	2.92	83	17.18	358	.484	282	.538	0	0	0	0	1192612	1	0	0	0
LNB 3 Mill f	11/13/93	9:29	2.62	2.13	341	17.33			298	.568	0	0	0	0	1227895	1	0	0	0
LNB 3 Mill	11/14/93	24:00	3.07	2.67	190	17.57			282	.539	0	0	0	0	1172791	1	0	0	0
LNB	11/15/93	1:39	2.65	2.59	159	17.79			277	.528	0	0	0	0	1189100	0	0	0	0
GR-LNB 131	11/15/93	13:00	3.16	3.06	17	15.93	191	.257	243	.457	3614	29963	32813	10004	1169471	0	0	0	0
GR-LNB 132	11/16/93	7:42	3.02	3.09	15	15.95	177	.239	255	.479	3385	28551	31680	10005	1128226	0	0	0	0
GR-LNB 132a	11/16/93	16:17	5.58	3.18	14	15.64	181	.245	225	.423	3186	28414	30801	9974	1045179	0	0	0	0
GR-LNB 133	11/17/93	0:40	5.65	3.28	8	15.72	167	.225	239	.450	2986	28195	31101	9977	1003996	0	0	0	0
LNB	11/17/93	8:40	5.35	2.70	304	16.64	249	.336	280	.534	0	0	0	0	983988	0	0	0	0
LNB	12/3/93	5:15	4.00	3.02	342	17.01			315	.602	0	0	0	0	1201392	0	0	0	0
LNB	12/6/93	2:33	4.29	3.36	932	15.87			296	.564	0	0	0	0	870724	0	0	0	0
LNB	12/6/93	3:00	3.97	3.03	36	15.80			304	.579	0	0	0	0	1269337	0	0	0	0
LNB	12/6/93	1:55	4.30	3.36	10	15.71	381	.520	295	.562	0	0	0	0	1271638	0	0	0	0
LNB	12/7/93	6:45	4.10	3.04	190	17.18	352	.480	309	.590	0	0	0	0	1294655	0	0	0	0
LNB	12/8/93	4:03	4.65	3.59	47	17.01	403	.550	322	.614	0	0	0	2	1264918	0	0	0	0
GR-LNB 134	12/8/93	3:40	3.03	2.22	287	16.22	169	.226	293	.549	4200	33105	33616	10002	1261376	0	0	0	0
GR-LNB 134a	12/8/93	0:46	3.30	2.85	239	16.86	214	.290	329	.624	1400	19258	20738	10001	1268511	0	0	0	0
GR-LNB 134b	12/8/93	2:44	2.32	2.18	806	17.07	184	.249	331	.628	1402	19366	20690	9982	1258909	0	0	0	0
GR-LNB 134c	12/8/93	3:31	1.76	1.72	934	17.07	167	.226	329	.623	1402	19146	20966	10015	1257547	0	0	0	0
GR-LNB 135	12/9/93	12:00	2.26	2.06	828	16.96	168	.228	317	.601	1277	18190	20991	9999	1154113	0	0	0	0
GR-LNB 135a	12/9/93	2:59	3.08	2.39	377	17.05	199	.269	301	.571	1373	19049	20954	10002	1210333	0	0	0	0
GR-LNB 135b	12/9/93	7:10	4.71	3.81	27	16.94	249	.338	263	.498	1193	17976	20945	9891	1143046	0	0	0	0
GR-LNB 136	12/10/93	11:35	4.39	3.58	87	16.97	233	.316	272	.516	1202	17739	21020	10000	1182535	0	0	0	0
GR-LNB 137	12/11/93	16:15	3.83	3.06	124	16.44	205	.278	294	.557	1120	16157	21833	10001	1117980	0	0	0	0
GR-LNB 137a	12/11/93	7:44	3.64	3.04		16.10	221	.300	308	.584	1328	16685	23322	9997	1271054	0	0	0	0
GR-LNB 138	12/12/93	24:00	3.47	2.93		15.87	218	.295	285	.540	1352	16215	23771	10003	1277488	0	0	0	0
GR-LNB 139	12/13/93	7:48	3.17	2.66		16.33	197	.268	249	.473	1342	15208	24858	9995	1275586	0	0	0	0

Cherokee Unit 3, Average Test Data
Pre Modification

Test No.	Date	Dur.	CEMS O2 % Dry	Plant O2 % Wet	COc ppm	CO2c %	NOxc ppm	NOx lb/mbtu	SO2c ppm	SO2 lb/mbtu	Reb Gas scfm	West OFA scfm	East OFA scfm	FGR scfm	Steam lbs/hr	Mill A	Mill B	Mill C	Mill D
																	0=On		
GR-LNB 139a	12/13/93	4:18	3.65	2.68	183	16.65	197	.268	240	.454	1350	14257	25801	10000	1261888	0	0	0	0
LNB	12/13/93	5:18	4.30	2.90	60	16.96	353	.481	308	.588	0	0	0	24	1220439	0	0	0	0
LNB-OFA	12/14/93	1:55	4.98	3.31	17	16.68	223	.304	321	.612	0	21463	29880	10030	1278835	0	0	0	0
GR-LNB 140	12/14/93	1:18	3.68	2.52	868	16.59	203	.276	310	.588	1383	20291	19521	9535	1269747	0	0	0	0
LNB	12/14/93	8:30	3.45	2.18	172	16.95	293	.399	316	.602	0	0	0	3	1256579	0	0	0	0
LNB	12/15/93	9:28	4.15	3.02	18	16.71	337	.459	302	.576	0	0	0	0	1247133	0	0	0	0
LNB-OFA	12/15/93	5:29	4.45	3.70	132	16.50	284	.388	302	.575	0	12277	14828	1056	1265273	0	0	0	0
GR-LNB 141	12/15/93	5:15	3.70	2.73	461	16.24	195	.265	285	.540	1272	18316	20573	9951	1113543	0	0	0	0
LNB	12/15/93	2:50	5.84	4.53	21	15.83	347	.472	268	.512	0	0	0	0	745605	0	0	0	0
LNB	12/16/93	15:05	4.40	2.68	442	16.69	345	.470	291	.556	0	0	0	0	1175991	0	0	0	0
GR-LNB 142	12/16/93	6:14	4.30	2.75	685	16.68	224	.303	274	.520	1424	19258	20992	10010	1261200	0	0	0	0
GR-LNB 142a	12/16/93	1:15	4.83	3.10	848	16.53	172	.233	261	.494	1083	17145	20277	9990	849694	0	0	0	0
GR-LNB 143	12/17/93	2:10	5.25	3.72	848	16.42	172	.233	262	.496	1066	16822	20435	10001	823936	0	0	0	0
LNB-OFA	12/17/93	0:40	8.68	6.73	13	15.74	492	.669	247	.472	0	15944	19979	7066	464254	0	0	0	0
LNB	12/17/93	6:10	4.08	2.78	367	17.00	317	.433	303	.578	0	0	0	0	1214380	0	0	0	0
LNB	12/20/93	2:25	4.97	3.51	199	16.70	354	.482	308	.588	0	0	0	0	1062739	0	0	0	0
100% Gas Firing	12/20/93	0:34	6.39	4.20	19	10.20	125	.170	49	.093	0	0	0	0	693795	0	0	0	0
LNB	12/22/93	2:35	5.22	3.65	497	16.58	308	.420	256	.488	0	0	0	2148	984811	0	0	0	0
LNB	1/5/94	2:24	3.53	2.73	146	16.92	344	.470	306	.583	0	0	0	0	1192621	0	0	0	0
LNB-OFA	1/5/94	2:26	4.05	3.68	729	16.79	303	.413	294	.559	0	5894	5319	7587	1200884	0	0	0	0
LNB-OFA	1/5/94	9:15	4.21	3.42	888	16.87	248	.339	320	.610	0	57	5725	3966	1042703	0	0	0	0
LNB-OFA	1/6/94	8:47	4.68	3.51	1016	16.77	215	.293	316	.603	0	0	5143	2872	797140	0	0	0	0
LNB	1/6/94	15:12	3.59	2.22	490	17.05	296	.404	314	.599	0	0	0	0	1178087	0	0	0	0
LNB	1/7/94	6:55	4.00	2.81	587	17.14	242	.330	319	.608	0	0	0	0	958594	0	0	0	0
LNB-OFA	1/7/94	1:09	4.35	3.59	850	16.94	194	.264	310	.593	0	12141	18034	0	989174	0	0	0	0
GR-LNB 144	1/7/94	15:40	3.79	2.79	849	16.35	197	.267	286	.542	1368	18898	21049	9994	1126768	0	0	0	0
GR-LNB 145a	1/8/94	8:20	3.69	2.44	917	16.39	162	.220	281	.534	1226	18058	20744	10000	993975	0	0	0	0
GR-LNB 145	1/8/94	15:39	3.06	1.77	1001	16.36	177	.239	283	.537	1396	19041	21022	10002	1174058	0	0	0	0
GR-LNB 146a	1/9/94	2:10	2.70	1.40	983	16.15	157	.213	282	.534	1399	18374	21546	9995	1137267	0	0	0	0
GR-LNB 146b	1/9/94	8:39	3.75	2.26	956	16.13	157	.213	276	.523	1114	17179	20841	9963	901363	0	0	0	0
GR-LNB 146	1/9/94	9:02	3.89	2.76	880	16.13	196	.266	269	.510	1357	18815	21051	9988	1087677	0	0	0	0
LNB	1/9/94	3:35	4.09	2.96	817	16.52	219	.299	285	.544	0	0	38	47	940925	0	0	0	0
LNB	1/10/94	3:50	4.51	2.52	740	17.09	238	.324	298	.569	0	0	20	28	1040174	0	0	0	0
GR-LNB 147	1/10/94	2:40	4.32	2.36	822	16.88	221	.300	289	.548	1404	19352	20681	9991	1248369	0	0	0	0
GR-LNB 147a	1/10/94	4:04	5.19	3.14	364	16.66	194	.262	278	.526	1462	19597	21281	9971	974260	0	0	0	0
GR-LNB 147b	1/10/94	4:54	5.39	3.52	209	16.65	201	.272	268	.507	1448	18816	21905	9999	980778	0	0	0	0
GR-LNB 148a	1/11/94	6:32	5.93	4.04	48	16.47	208	.281	268	.507	1350	17867	22029	9972	860045	0	0	0	0
GR-LNB 148	1/11/94	14:38	4.13	3.12	541	16.39	232	.313	273	.516	1775	20985	22888	9996	1238948	0	0	0	0
GR-LNB 148b	1/11/94	2:48	4.39	3.21	393	16.42	188	.254	275	.521	1358	18743	21145	9966	1015828	0	0	0	0
GR-LNB 149a	1/12/94	6:14	4.41	3.31	437	16.51	210	.285	266	.503	1433	18680	21677	10008	1062151	0	0	0	0

Cherokee Unit 3, Average Test Data
Pre Modification

Test No.	Date	Dur.	CEMS O2 % Dry	Plant O2 % Wet	COc ppm	CO2c %	NOxc ppm	NOx lb/mbtu	SO2c ppm	SO2 lb/mbtu	Reb Gas scfm	West OFA scfm	East OFA scfm	FGR scfm	Steam lbs/hr	Mill A	Mill B 0=On	Mill C	Mill D
GR-LNB 149	1/12/94	13:30	4.18	3.09	553	16.40	220	.298	266	.503	1550	19639	21999	10011	1142102	0	0	0	0
GR-LNB A Mill off	1/12/94	1:09	4.05	3.05	717	16.36	206	.279	267	.505	1444	18905	21690	10002	1029804	0	0	0	0
GR-LNB D Mill off	1/12/94	1:39	3.15	2.36	791	16.24	161	.218	266	.503	2060	22512	24896	7923	1071712	0	0	0	1
GR-LNB D Mill off line	1/13/94	4:23	3.70	2.48	844	16.18	138	.186	266	.503	1401	18359	21403	8862	841565	0	0	0	1
GR-LNB 150	1/13/94	7:15	3.55	2.53	1023	16.40	200	.271	281	.532	1786	21134	22719	9994	1217306	0	0	0	0
GR-LNB D Mill off line	1/13/94	1:13	3.23	2.12	970	16.22	153	.207	281	.531	1940	22816	24213	9045	1067973	0	0	0	1
GR-LNB 150a	1/13/94	6:00	4.15	3.02	619	16.37	189	.256	274	.519	1567	20166	21808	10004	1074955	0	0	0	0
GR-LNB 151a	1/14/94	7:25	4.91	3.56	200	16.21	180	.243	272	.514	1241	18501	20545	9571	852590	0	0	0	0
GR-LNB, ABC	1/14/94	7:50	3.70	2.03	1023	16.51	163	.220	283	.536	1405	19212	20780	10006	1033877	0	0	0	1
GR-LNB 151	1/14/94	7:54	3.75	2.78	612	16.58	190	.257	281	.532	1413	19093	21170	9995	1042914	0	0	0	0
GR-LNB 156	1/19/94	24:00	4.15	3.45	643	16.52	175	.237	312	.591	1342	18138	21655	9831	925175	0	0	0	0
GR-LNB 157a	1/20/94	6:38	4.04	3.31	486	16.86	163	.220	314	.594	1281	16416	22981	9762	884252	0	0	0	0
GR-LNB 157	1/20/94	3:50	3.55	2.50	674	16.55	187	.253	321	.607	1865	19514	25301	10010	1142670	0	0	0	0

Cherokee Unit 3, Average Test D
Pre Modification

Test No.	Date	Dur.	Coal Flow lbs/hr	Gas Heat % totl	Coal Stoich	Reburn Stoich	Exit Stoich	Gross Power MWe	Net Power MWe	Total Air scfm	Steam lbs/hr	Main Steam Temp	RH At flow lbs/hr	SH At flow lbs/hr	Air Htr H A mbtu/hr	Econ H A mbtu/hr	Furn H A mbtu/hr
Base Cond. (OFA off)	11/11/92	8:42	95421	0.0	1.229	1.230	1.229	110	100	192210	805808	987	950	2102	137	18	515
GR	11/11/92	1:01	113190	20.6	1.176	0.948	1.185	168	157	230148	1239194	994	2675	18217	200	29	713
Base Cond. (OFA off)	11/11/92	4:25	140720	0.0	1.229	1.231	1.229	164	153	248175	1243929	968	1038	4539	203	29	744
Base Cond. OFA off	11/12/92	0:45	139961	0.00	1.18	1.18	1.18	162	151	243139	1257174	947	1030	1285	191	30	758
BPMS GR 4	11/12/92	1:05	114695	19.50	1.18	0.97	1.22	167	156	232694	1230455	1001	3117	18272	207	29	710
Base Cond. OFA off	11/12/92	1:15	140390	0.00	1.23	1.23	1.23	163	152	248446	1243684	967	1038	3535	204	30	742
BPMS Base Cond. 5	11/13/92	2:55	142362	0.00	1.259	1.259	1.259	166	155	254849	1254148	979	1045	3565	211	30	742
BPMS Base Cond. 6	11/13/92	1:00	141044	0.00	1.182	1.184	1.242	162	151	242242	1268525	945	1049	1275	199	31	763
BPMS Base Cond. 7	11/13/92	1:00	141483	0.00	1.098	1.100	1.212	162	151	236964	1278852	937	1074	1287	193	31	770
Base Cond.-1d	11/16/92	1:00	131564	0.00	1.249	1.251	1.249	153	143	237391	1165455	973	1023	1494	190	28	695
GR-10c	11/16/92	1:00	137268	0.00	1.146	1.147	1.192	157	147	236962	1231148	938	1079	1345	182	30	750
GR-10d	11/16/92	1:00	137421	0.00	1.131	1.133	1.207	157	146	235031	1233115	939	1079	1387	184	30	750
Base Cond. OFA off	11/17/92	1:15	140413	0.00	1.240	1.246	1.240	162	151	251397	1245526	966	1058	1513	202	30	747
GR-11c	11/17/92	1:00	110086	20.86	1.201	0.965	1.194	162	150	224777	1199836	993	1064	9438	192	29	709
GR-11d	11/17/92	1:00	108995	21.08	1.162	0.932	1.197	161	150	222068	1190179	994	1077	10305	192	28	702
Base Cond. OFA off	11/17/92	0:20	134059	0.00	1.299	1.301	1.299	156	145	247246	1170476	974	1079	6496	202	28	700
Base Cond. OFA off	11/18/92	0:28	136025	0.00	1.180	1.181	1.180	159	148	244558	1219655	962	1059	1348	188	29	734
GR-11e	11/18/92	1:04	109854	20.94	1.161	0.933	1.204	162	151	226522	1203538	996	1040	15022	197	29	702
GR-12b	11/18/92	1:05	115754	15.96	1.117	0.953	1.213	161	149	225788	1199394	987	1045	11622	196	29	705
Base Cond. OFA off	11/18/92	0:35	135727	0.00	1.233	1.235	1.233	157	147	245788	1190000	973	1054	5829	197	29	714
GR-12 (5% Gas)	11/19/92	1:00	131242	5.27	1.074	1.025	1.170	160	149	228005	1237049	953	1050	1259	186	30	747
GR-12a (10% Gas)	11/19/92	1:00	125387	10.33	1.071	0.969	1.139	163	152	224106	1222295	990	1053	2987	184	29	729
GR-12c (23% Gas)	11/19/92	1:00	104612	23.41	1.127	0.879	1.150	161	150	218445	1172295	1003	2197	26121	184	27	674
Base Cond. OFA off	11/19/92	0:20	135016	0.00	1.228	1.233	1.228	158	147	244664	1172857	984	1081	4779	193	28	705
GR-13A; 18% Gas	11/20/92	0:58	111898	18.61	1.091	0.897	1.140	161	150	217317	1191695	997	948	11693	187	28	702
GR-13D; 18% Gas	11/20/92	1:00	110655	18.69	1.106	0.913	1.176	161	150	219718	1175082	1002	949	17611	194	28	683
GR-14B; 20% Gas	11/20/92	1:00	108464	20.51	1.156	0.933	1.199	161	150	220152	1170984	1006	1078	18921	198	28	680
Base Cond. OFA off	11/30/92	1:50	138225	0.00	1.211	1.212	1.211	161	150	243850	1214054	981	968	1430	193	29	729
GR-BFr	11/30/92	0:26	124321	10.56	1.094	0.992	1.256	161	150	226601	1207407	988	1036	2659	202	29	723
GR-BFl	11/30/92	0:27	123102	10.49	1.112	1.009	1.270	159	148	226345	1195357	980	1039	1433	200	29	722
GR-21C	12/1/92	1:06	86699	21.03	1.165	0.937	1.231	129	120	191800	924946	1001	1031	11535	154	21	564
GR-22	12/1/92	0:50	99718	8.24	1.129	1.052	1.324	126	116	201618	939580	955	991	1486	162	22	592
Bias Firing	12/1/92	0:10	85602	21.85	1.203	0.959	1.234	127	118	193233	919221	999	979	8263	153	21	573
Base Cond. OFA on	12/1/92	0:50	108167	0.00	1.131	1.137	1.241	125	116	202208	952541	937	1038	1556	150	22	605
Base Cond. OFA off	12/1/92	0:40	116558	0.00	1.217	1.218	1.217	137	127	221698	1008774	985	1004	1475	165	23	624
Base Cond. OFA off	12/2/92	3:55	134387	0.00	1.223	1.223	1.223	157	146	244387	1184549	974	972	1509	194	29	715
Base Cond. OFA off	12/4/92	0:55	113673	0.00	1.248	1.248	1.248	130	120	218621	964976	987	937	3501	167	22	603
OFA Test	12/4/92	2:10	105538	0.00	1.129	1.129	1.271	122	111	205575	901188	988	948	3539	156	21	566
Base Cond. OFA off	12/7/92	2:10	114409	0.00	1.264	1.264	1.264	132	122	223175	979707	997	1089	9564	171	22	599
GR-22A	12/7/92	1:05	100069	11.40	1.110	0.999	1.236	130	119	203782	960300	997	1100	14016	164	22	581

Cherokee Unit 3, Average Test D
Pre Modification

Test No.	Date	Dur.	Coal Flow lbs/hr	Gas Heat % totl	Coal Stoich	Reburn Stoich	Exit Stoich	Gross Power MWe	Net Power MWe	Total Air scfm	Steam lbs/hr	Main Steam Temp	RH At flow lbs/hr	SH At flow lbs/hr	Air Htr H A mbtu/hr	Econ H A mbtu/hr	Furn H A mbtu/hr
GR-22B	12/7/92	1:00	94323	15.70	1.100	0.942	1.229	129	119	200290	948854	1000	1097	19490	162	21	568
GR-22C	12/7/92	1:00	88644	20.85	1.119	0.903	1.219	130	119	194496	948973	999	1097	21111	162	21	565
Base Cond. OFA off	12/8/92	0:27	87540	0.00	1.200	1.204	1.200	99	89	184147	741704	989	1098	7096	122	16	471
GR-31C	12/8/92	1:00	70866	21.01	1.227	0.990	1.217	100	90	170678	744738	1001	1095	15093	128	16	461
GR-31F	12/8/92	1:23	70399	21.24	1.164	0.941	1.308	98	88	173095	746411	998	1094	15852	138	16	456
GR-32A	12/8/92	1:00	79710	11.13	1.128	1.021	1.240	101	91	173693	750449	998	1084	7135	130	16	475
Base Cond. OFA off	12/9/92	0:41	90429	0.00	1.167	1.171	1.167	101	91	187241	763638	992	1144	3412	120	17	491
GR-32C	12/9/92	1:00	69844	20.87	1.097	0.891	1.275	99	89	166006	730910	998	1149	12399	130	16	456
GR-32C; 3Mills	12/9/92	0:56	71250	20.99	1.106	0.896	1.239	102	92	176241	753483	997	1141	17862	127	16	463
Base Cond. OFA off	12/9/92	0:15	95016	0.00	1.299	1.302	1.299	108	98	205862	800406	999	1147	11640	143	17	497
Base Cond. OFA off	12/14/92	2:00	127673	0.00	1.258	1.258	1.258	145	137	234352	1073140	981	1092	1422	187	26	666
GR-12Z	12/14/92	1:02	131479	5.42	1.085	1.035	1.219	159	150	229446	1195714	979	1122	1375	199	29	727
GR 2.7% Gas	12/14/92	0:17	134689	2.65	1.020	1.001	1.237	159	150	227458	1193333	980	1143	1351	202	29	723
Base Cond. OFA off	12/15/92	1:37	129836	0.00	1.211	1.211	1.211	155	146	237785	1171486	964	1163	1407	184	28	717
GR 20% Gas	12/15/92	0:36	108043	19.62	1.128	0.921	1.195	161	152	223123	1181622	996	1166	8993	186	28	708
Base Cond. OFA off	12/16/92	0:48	135250	0.00	1.227	1.227	1.227	157	149	243911	1190000	960	1166	1380	195	29	727
GR-12A1	12/16/92	2:19	124136	10.38	1.096	0.994	1.210	161	152	227194	1216071	975	1165	1389	197	30	734
Test C1	1/15/93	1:00	129234	7.53	1.134	1.062	1.233	161	150	231773	1220000	990	1519	2415	200	29	722
Test C2	1/15/93	1:00	122975	12.25	1.121	0.997	1.219	162	151	228682	1219508	997	1537	10620	199	29	710
Test C3	1/15/93	0:58	116628	17.05	1.118	0.943	1.204	162	151	221631	1219153	999	1553	17440	197	29	703
Test C4	1/15/93	0:50	109761	21.76	1.155	0.920	1.184	163	152	219438	1220000	997	1544	23365	194	28	696
Test B1	1/15/93	0:59	139887	0.00	1.050	1.052	1.241	160	149	235867	1239167	972	1542	1950	199	30	738
Test B3	1/15/93	1:01	139538	0.00	1.020	1.022	1.206	160	149	234121	1238871	973	1545	2067	193	30	738
Base Cond. OFA off	1/18/93	0:45	142799	0.00	1.194	1.194	1.194	166	156	249671	1262609	992	1520	2318	204	30	745
Test B5	1/18/93	1:01	141516	0.00	1.033	1.033	1.202	164	152	236019	1270323	971	1515	1763	198	31	753
Base Cond. OFA cooling	1/19/93	0:39	142187	0.00	1.199	1.201	1.227	165	154	251230	1272000	974	1516	4040	211	31	749
GR-12R	1/19/93	1:00	132746	5.10	1.071	1.029	1.272	161	149	235829	1254754	963	1518	2614	213	30	743
GR-13E	1/19/93	1:00	112787	18.54	1.114	0.921	1.187	160	149	218946	1205738	997	1519	13008	199	29	703
GR-13C	1/20/93	1:10	115745	18.08	1.108	0.921	1.192	163	152	234599	1231000	997	1544	14459	200	29	713
GR-12D	1/20/93	1:05	120063	15.17	1.102	0.948	1.216	163	151	226863	1230484	994	1546	11826	204	29	717
GR-12E	1/20/93	0:59	127283	9.84	1.073	0.978	1.195	162	150	229434	1233833	991	1554	7575	198	30	725
Base Cond. OFA off	1/20/93	0:15	140760	0.00	1.156	1.158	1.156	161	150	240941	1243750	976	1584	2988	192	30	741
150 MWn Max NOx Red	1/21/93	1:05	109132	22.48	1.137	0.896	1.168	163	152	220284	1224091	997	1946	27916	193	28	694
Base Cond. OFA cooling	1/21/93	1:30	139004	0.00	1.173	1.176	1.190	158	147	240390	1221429	981	1592	2544	191	29	730
120 MWn Max NOx Red	1/21/93	1:00	85199	24.62	1.188	0.913	1.190	132	122	190749	971677	999	1542	12743	154	22	583
GR Environ. #1	1/25/93	5:10	109308	17.50	1.180	0.990	1.257	155	144	223404	1152283	997	1548	13797	195	27	673
Base Cond. OFA cooling	1/26/93	0:55	128790	0.00	1.208	1.211	1.250	149	139	232800	1140357	978	1537	2292	186	27	685
GR Environ. Test #2	1/26/93	5:22	108980	16.61	1.121	0.951	1.223	152	141	216046	1132215	997	1536	13875	184	26	664
Environ. #3	1/27/93	5:55	116374	16.15	1.14	0.97	1.23	162	151	229275	1220225	995	1599	13395	201	29	706
Environ. #4 (No GR)	1/27/93	6:00	131023	0.00	1.20	1.20	1.20	151	141	239155	1157591	967	1619	3643	183	27	698

Cherokee Unit 3, Average Test D
Pre Modification

Test No.	Date	Dur.	Coal Flow lbs/hr	Gas Heat % totl	Coal Stoich	Reburn Stoich	Exit Stoich	Gross Power MWe	Net Power MWe	Total Air scfm	Steam lbs/hr	Main Steam Temp	RH At flow lbs/hr	SH At flow lbs/hr	Air Htr H A mbtu/hr	Econ H A mbtu/hr	Furn H A mbtu/hr
Environ. #5 (No GR)	1/28/93	6:04	139606	0.00	1.206	1.206	1.206	163	152	249938	1248877	981	1600	1984	199	30	740
Base Cond.	2/2/93	0:17	138217	0.00	1.183	1.183	1.183	157	147	242538	1221514	978	1856	1868	188	29	734
LNB 120MW #1	3/8/93	2:00	112721	0.00	1.223	1.225	1.223	126	117	213576	962185	932	0	3393	151	23	633
LNB 120MW #2	3/8/93	2:00	113254	0.00	1.212	1.214	1.212	126	118	211837	954153	950	0	3416	152	23	628
LNB 150MW #1	3/9/93	2:00	144518	0.00	1.238	1.239	1.238	161	151	251015	1238182	967	0	3357	208	31	764
LNB 150MW #2	3/9/93	2:00	142136	0.00	1.201	1.202	1.201	157	147	243876	1227898	947	0	3331	195	30	768
LNB 90MW #1	3/10/93	2:00	88914	0.00	1.308	1.308	1.308	97	89	194021	747371	921	0	2758	129	17	513
LNB 90MW #2	3/10/93	1:58	89253	0.00	1.274	1.274	1.274	98	90	190408	748097	928	0	2654	127	17	512
LNB 150MW #3	3/11/93	2:00	140628	0.00	1.212	1.212	1.212	159	149	244440	1190331	980	0	3192	203	29	741
LNB 150MW #4	3/11/93	2:00	141453	0.00	1.186	1.186	1.186	160	150	242136	1211074	970	0	3190	199	30	754
3M1	3/22/93	1:02	107276	20.22	1.08	0.88	1.13	157	147	213141	1218254	942	0	3443	168	30	750
3M2	3/22/93	1:03	106881	20.34	1.09	0.88	1.12	157	147	214502	1210156	952	0	3467	165	29	744
3M3	3/22/93	0:59	107574	20.26	1.14	0.93	1.15	158	148	221879	1206667	962	0	3484	172	29	740
3 Mill 7	4/13/93	1:00	107272	0.00	1.192	1.193	1.192	125	116	217012	963564	923	0	3395	138	23	624
3 Mill 6	4/13/93	1:00	108328	0.00	1.163	1.164	1.163	127	117	216033	972327	932	0	3436	136	23	628
Level 6 1/2	4/15/93	2:05	132176	0.00	1.209	1.209	1.209	157	147	236762	1190873	966	0	3453	185	29	729
Level 4	4/15/93	1:10	132081	0.00	1.212	1.212	1.212	157	147	236963	1190704	965	0	3449	186	29	729
Level 3	4/15/93	0:53	132366	0.00	1.210	1.210	1.210	158	147	236303	1191296	967	0	3461	186	29	729
Level 5 1/2	4/15/93	1:58	132167	0.00	1.182	1.183	1.182	157	146	235825	1195042	957	0	3395	180	29	733
Base Cond	4/15/93	5:25	132182	0.00	1.195	1.195	1.195	157	147	236260	1192178	963	0	3437	183	29	731
Level 5 1/2	4/16/93	1:47	135162	0.00	1.232	1.232	1.232	161	151	247500	1204194	984	0	3650	196	29	731
Level 6 1/2	4/16/93	1:19	135361	0.00	1.220	1.222	1.220	161	150	247523	1212250	974	0	3599	193	29	736
Level 3	4/16/93	0:44	135550	0.00	1.230	1.231	1.230	161	150	248308	1210222	974	0	3680	194	29	737
Level 4	4/16/93	1:00	135705	0.00	1.229	1.231	1.229	161	150	248259	1211967	974	0	3670	194	29	737
North out, South in	4/16/93	0:20	135478	0.00	1.281	1.282	1.281	161	151	247553	1201429	985	0	3664	205	29	731
South out, North in	4/16/93	0:20	134606	0.00	1.216	1.217	1.216	161	150	247562	1202381	982	0	3633	192	29	729
Base Cond	4/16/93	6:25	135460	0.00	1.228	1.230	1.228	161	150	247714	1210081	976	0	3635	194	29	735
Level 4	4/19/93	0:56	108837	19.50	1.178	0.964	1.205	162	151	225868	1191228	997	0	11697	189	29	706
Level 3	4/19/93	0:52	108733	19.51	1.177	0.963	1.204	162	151	225729	1190566	997	0	11653	189	29	706
Level 5 1/2	4/19/93	2:29	107787	19.73	1.196	0.977	1.239	161	150	229197	1180600	997	0	16114	195	28	694
Level 6 1/2	4/19/93	1:10	108196	19.72	1.204	0.984	1.247	162	151	230268	1180000	997	0	16411	198	28	695
Base Cond. OFA on	4/19/93	1:00	132138	0.00	1.109	1.120	1.302	156	145	236365	1193770	951	0	3721	197	29	728
GR	4/19/93	5:42	107835	19.71	1.191	0.973	1.234	161	150	228332	1180644	997	0	15645	194	28	695
Level 6 1/2	4/20/93	1:47	118536	0.00	1.183	1.183	1.183	140	130	224896	1079815	927	0	3288	158	26	680
Base Cond 130MW	4/20/93	3:35	118485	0.00	1.178	1.178	1.178	140	130	224650	1079537	928	0	3294	156	26	680
Base Cond 120MW	4/20/93	2:55	110982	0.00	1.265	1.266	1.265	132	123	218887	962761	991	0	5572	160	22	603
Base Cond. OFA off	4/21/93	7:40	107591	0.00	1.229	1.230	1.229	128	118	211507	936625	980	0	4237	149	22	594
Base Cond. OFA off	4/23/93	0:30	134843	0.00	1.201	1.203	1.201	160	149	243990	1200645	981	0	3565	185	29	729
4M12 (OFA off)	4/23/93	1:00	133541	0.00	1.158	1.160	1.158	157	147	240464	1216721	945	0	3541	172	29	745
4M13a (78,000 scfm OFA	4/23/93	0:20	135843	0.00	0.900	0.902	1.206	157	146	230443	1259524	909	0	3511	179	31	777

Cherokee Unit 3, Average Test D
Pre Modification

Test No.	Date	Dur.	Coal Flow lbs/hr	Gas Heat % totl	Coal Stoich	Reburn Stoich	Exit Stoich	Gross Power MWe	Net Power MWe	Total Air scfm	Steam lbs/hr	Main Steam Temp	RH At flow lbs/hr	SH At flow lbs/hr	Air Htr H A mbtu/hr	Econ H A mbtu/hr	Furn H A mbtu/hr
4M13b (70,000 scfm OFA	4/23/93	0:50	135673	0.00	0.944	0.945	1.215	157	146	233023	1267308	904	0	3545	178	31	780
Base Cond. OFA On	4/27/93	0:30	137393	0.00	1.217	1.222	1.289	162	150	249563	1221613	991	0	5772	205	30	733
GR on 150MW, 11% Gas	4/27/93	0:53	121810	11.43	1.218	1.091	1.227	161	150	235246	1208519	995	0	5238	193	29	729
GR on 150MW, 17% Gas	4/27/93	2:48	113324	17.18	1.104	0.927	1.202	162	151	226405	1208037	997	0	7450	188	29	722
Base Cond. OFA on	4/28/93	0:44	128025	0.00	1.228	1.233	1.297	149	138	238462	1137333	966	0	3617	189	27	703
GR on Auto	4/28/93	6:35	105563	16.42	1.106	0.938	1.209	149	138	216279	1097551	996	0	7627	174	26	670
GR on Auto	5/3/93	7:00	109090	17.13	1.144	0.962	1.240	153	142	228883	1138217	996	0	7358	185	27	693
Base Cond. OFA on	5/6/93	2:45	128448	0.00	1.229	1.233	1.293	149	139	237273	1163494	937	0	2943	183	28	720
GR on Auto	5/6/93	1:15	109881	15.34	1.125	0.965	1.221	153	142	218626	1143947	981	0	3561	178	27	697
Base Cond. OFA off	5/6/93	0:21	111951	0.00	1.261	1.264	1.261	132	122	217774	970203	989	0	3435	155	23	615
GR on Auto 150MW	5/7/93	4:26	112649	17.57	1.113	0.931	1.208	159	148	223455	1206418	974	0	3979	186	29	735
GR on Auto 160MW	5/7/93	1:59	121216	17.39	1.110	0.929	1.192	171	159	231918	1295750	986	0	3295	199	32	778
GR on Auto 140MW	5/7/93	4:50	106629	17.36	1.129	0.947	1.232	151	140	217963	1122062	990	0	4270	180	27	690
Base Cond. OFA off	5/7/93	0:35	133176	0.00	1.264	1.265	1.264	156	146	243468	1179167	974	0	3174	193	28	724
GR on Auto	5/11/93	6:08	104108	17.10	1.198	1.010	1.291	150	139	218598	1089265	996	0	9325	185	26	660
GR 13	5/25/93	15:04	110684	16.79	1.126	0.951	1.226	158	147	225159	1164920	996	0	8647	187	28	699
GR 14	5/25/93	1:25	81198	16.15	1.158	0.990	1.306	113	103	185230	823513	971	0	4070	140	19	530
GR 15	5/26/93	1:29	84832	16.24	1.176	1.004	1.306	119	109	192062	862219	982	0	4397	147	20	549
LNB-OFA	5/26/93	0:42	85765	0.00	1.184	1.199	1.432	99	90	186468	741474	931	0	3984	133	16	485
LNB	5/26/93	9:44	125678	0.00	1.204	1.206	1.204	146	137	229683	1128501	952	0	3937	168	27	695
LNB	5/27/93	0:10	103797	0.00	1.236	1.241	1.236	124	114	212013	917407	972	0	4177	141	21	573
LNB-OFA	5/27/93	0:45	135091	0.00	1.140	1.147	1.274	158	147	241483	1199783	980	0	4461	195	29	726
GR-LNB 16	5/27/93	13:40	110253	15.93	1.147	0.978	1.241	154	144	227015	1140676	995	0	7485	184	27	688
GR-LNB 17	5/28/93	2:57	86180	14.87	1.209	1.049	1.341	118	108	197193	865399	973	0	4505	149	20	551
LNB	5/28/93	1:23	81863	0.00	1.393	1.399	1.393	93	84	192218	699170	942	0	4155	123	15	460
GR-LNB 20b	6/3/93	8:51	107116	16.83	1.069	0.901	1.181	153	142	210403	1126804	993	0	10859	173	27	679
LNB	6/3/93	1:05	88649	0.00	1.347	1.350	1.347	103	95	196080	761725	959	0	4230	132	17	492
LNB (low load)	6/4/93	6:52	84677	0.00	1.385	1.388	1.385	97	89	190380	723239	951	0	4567	128	16	471
LNB (high load)	6/4/93	5:25	133437	0.00	1.246	1.247	1.246	157	146	241367	1199289	955	0	4418	191	29	731
LNB-OFA	6/4/93	2:31	137915	0.00	1.115	1.119	1.242	159	149	238263	1269880	924	0	4132	189	31	775
GR-LNB	6/4/93	7:42	110334	16.81	1.053	0.888	1.165	157	147	213422	1164427	995	0	9843	176	28	700
LNB	6/8/93	1:35	127379	0.00	1.253	1.255	1.253	149	139	236646	1128646	955	0	3709	179	27	701
LNB-OFA	6/8/93	1:40	127822	0.00	1.218	1.223	1.288	149	138	235405	1139901	949	0	3713	183	27	708
GR-LNB 22a	6/8/93	6:21	101957	16.86	1.171	0.989	1.269	145	134	212158	1054627	992	0	7486	176	25	649
GR-LNB 22b	6/8/93	5:30	110084	17.23	1.053	0.884	1.164	158	147	215138	1160091	997	0	11450	175	28	699
GR-LNB 23a	6/9/93	1:16	87779	15.82	1.063	0.909	1.207	125	115	187305	890215	997	0	10693	138	20	559
LNB-OFA	6/9/93	0:30	81446	0.00	1.122	1.131	1.355	94	85	171211	688972	956	0	4469	118	15	458
LNB	6/9/93	16:03	108345	0.00	1.284	1.287	1.284	126	116	214188	950036	952	0	5018	153	22	601
GR-LNB 23b	6/9/93	4:28	105101	16.90	1.199	1.013	1.289	149	138	223166	1090496	992	0	6716	183	26	669
LNB	6/10/93	8:47	105994	0.00	1.260	1.262	1.260	125	115	211843	920397	977	0	5348	148	21	582

Cherokee Unit 3, Average Test D
Pre Modification

Test No.	Date	Dur.	Coal Flow lbs/hr	Gas Heat % totl	Coal Stoich	Reburn Stoich	Exit Stoich	Gross Power MWe	Net Power MWe	Total Air scfm	Steam lbs/hr	Main Steam Temp	RH At flow lbs/hr	SH At flow lbs/hr	Air Htr H A mbtu/hr	Econ H A mbtu/hr	Furn H A mbtu/hr
LNB-OFA	6/10/93	1:16	135703	0.00	1.200	1.205	1.307	159	148	240132	1218442	953	0	4156	201	30	742
GR-LNB 24	6/10/93	2:57	110517	17.42	1.178	0.988	1.266	158	148	228295	1165749	996	0	10355	195	28	698
LNB	6/10/93	0:37	136793	0.00	1.235	1.237	1.235	159	149	245179	1230000	943	0	4320	187	30	751
GR-LNB 25a	6/11/93	5:28	101493	15.87	1.114	0.952	1.222	144	134	209043	1046837	994	0	12835	166	24	634
GR-LNB 25b	6/11/93	9:06	112279	16.16	1.117	0.950	1.212	159	148	222755	1166549	996	0	12950	184	28	696
GR-LNB 26a	6/12/93	11:22	103242	15.88	1.068	0.911	1.188	147	136	205936	1068493	995	0	16439	167	25	640
GR-LNB 26b	6/12/93	2:13	77735	8.74	1.156	1.071	1.318	99	89	173515	717418	978	0	5247	123	16	468
LNB-OFA	6/12/93	7:11	125768	0.00	1.106	1.111	1.207	147	137	221490	1117982	961	0	4900	166	27	689
LNB-OFA	6/13/93	9:43	76903	0.00	1.305	1.316	1.381	87	79	171221	665303	920	0	5061	114	14	440
GR-LNB 28	6/14/93	4:06	113195	16.90	1.077	0.907	1.177	160	149	221655	1192146	994	0	7366	180	29	717
LNB	6/14/93	1:59	120039	0.00	1.227	1.230	1.227	138	129	221993	1066859	941	0	5113	161	25	670
LNB	6/18/93	0:38	121009	0.00	1.188	1.192	1.188	145	136	232919	1067799	1000	0	16158	165	25	637
GR-LNB 29	6/18/93	14:24	105693	17.81	1.109	0.926	1.211	153	142	218273	1127750	997	108	20667	178	26	663
GR-LNB 30a	6/19/93	0:30	78474	18.54	1.197	0.995	1.319	114	104	186016	815086	1001	0	14343	143	18	506
LNB	6/19/93	9:15	81061	0.00	1.318	1.322	1.319	94	85	181229	690957	977	0	8147	117	15	441
GR-LNB 30b	6/19/93	11:53	105584	18.64	1.054	0.870	1.161	155	144	212397	1137486	997	1157	32235	173	26	658
GR-LNB 30c	6/19/93	1:33	77325	16.62	1.109	0.943	1.269	108	98	174718	775014	995	40	10996	131	17	490
GR-LNB 23	6/23/93	7:35	110131	18.35	1.060	0.877	1.160	159	149	216811	1187149	997	0	15566	175	28	703
GR-LNB 32b	6/23/93	1:09	96516	17.45	1.081	0.907	1.203	139	129	197925	1012043	993	0	12113	157	24	618
LNB-OFA cooling	6/24/93	6:25	80146	0.00	1.202	1.208	1.278	93	85	172577	687386	968	0	5900	113	15	446
GR-LNB 33a	6/24/93	6:00	92834	17.10	1.075	0.905	1.202	134	124	196457	968909	997	23	15011	151	22	585
GR-LNB 33	6/24/93	11:22	108227	18.35	1.054	0.873	1.160	158	148	215139	1165609	996	29	17183	173	27	688
GR-LNB 34a	6/25/93	1:52	68421	14.11	1.173	1.030	1.349	92	83	166204	674211	981	0	6936	119	15	432
LNB-OFA	6/25/93	4:03	78347	0.00	1.185	1.196	1.369	89	79	173363	685403	926	0	5899	115	15	448
GR-LNB 34	6/25/93	8:00	104912	17.42	1.060	0.888	1.175	151	141	209807	1119480	994	0	13915	171	26	665
LNB (some OFA)	6/28/93	1:03	137238	0.00	1.189	1.189	1.191	160	148	240977	1214844	978	0	5405	182	29	736
LNB (some OFA)	6/29/93	12:15	117110	0.00	1.154	1.155	1.189	136	124	218918	1036440	961	0	6328	152	24	640
LNB	6/30/93	11:51	108672	0.00	1.220	1.221	1.220	127	116	210612	945475	985	0	8344	148	22	584
GR-LNB 35	6/30/93	1:48	114578	16.56	1.112	0.941	1.207	161	149	225995	1202018	997	0	14300	185	29	712
GR-LNB 35a	6/30/93	6:05	113256	16.52	1.175	0.996	1.262	160	147	233001	1187541	997	0	15340	192	28	699
GR-LNB 35b	6/30/93	1:53	101543	16.47	1.229	1.044	1.317	143	131	223189	1053950	996	10	13473	179	25	632
GR-0LNB 36a	7/1/93	8:22	75163	12.30	1.266	1.132	1.418	99	88	183412	734912	966	0	7199	131	16	468
GR-LNB 36	7/1/93	15:37	109011	15.97	1.099	0.937	1.202	153	141	214425	1138706	994	17	18764	174	27	671
GR 37a	7/2/93	14:55	91390	14.78	1.131	0.980	1.259	126	115	192716	926914	988	15	19794	147	21	564
GR 37	7/2/93	7:05	115392	16.28	1.116	0.947	1.208	161	149	224382	1210316	997	62	20901	188	29	709
GR-LNB 38	7/3/93	7:46	112169	15.94	1.106	0.943	1.202	159	147	219199	1177277	987	78	33089	182	27	679
GR-LNB 38a	7/3/93	8:43	110737	15.84	1.265	1.081	1.341	155	143	214154	1143061	997	25	23503	199	27	672
GR-LNB 39a	7/4/93	17:27	89454	12.57	1.387	1.235	1.495	119	108	186634	872129	986	3	13189	170	20	541
GR-LNB 39	7/4/93	6:33	114795	15.16	1.338	1.153	1.399	159	147	219205	1173866	997	0	20363	215	28	692
GR-LNB 40a	7/5/93	11:52	81700	10.62	1.517	1.381	1.634	105	95	177264	768092	983	0	10126	164	17	488

Cherokee Unit 3, Average Test D
Pre Modification

Test No.	Date	Dur.	Coal Flow lbs/hr	Gas Heat % totl	Coal Stoich	Reburn Stoich	Exit Stoich	Gross Power MWe	Net Power MWe	Total Air scfm	Steam lbs/hr	Main Steam Temp	RH At flow lbs/hr	SH At flow lbs/hr	Air Htr H A mbtu/hr	Econ H A mbtu/hr	Furn H A mbtu/hr
GR-LNB 40	7/5/93	12:08	110736	14.71	1.444	1.252	1.497	152	140	213890	1118801	993	83	18898	219	26	666
GR-LNB 52a	7/17/93	8:31	79101	16.36	1.174	1.002	1.328	108	97	179699	815654	961	0	8745	135	18	516
GR-LNB 52	7/17/93	5:45	107944	16.95	1.129	0.952	1.226	154	141	219497	1146028	997	99	24861	181	26	670
LNB	7/19/93	1:53	106496	0.00	1.204	1.204	1.204	124	114	213817	918704	996	0	7616	138	21	582
LNB-OFA	7/19/93	0:22	110577	0.00	1.122	1.123	1.214	128	117	216790	970186	983	0	6550	141	22	613
GR-LNB 53a	7/19/93	3:29	93598	16.05	1.088	0.927	1.213	130	119	198618	955417	995	0	17783	147	22	587
GR-LNB 53	7/19/93	7:06	113352	16.68	1.117	0.943	1.208	159	146	223835	1189204	997	250	19969	181	28	706
LNB	7/21/93	8:34	76228	0.00	1.278	1.278	1.278	86	75	175788	658291	940	0	6567	104	14	428
GR-LNB 54	7/21/93	4:52	108745	16.89	1.111	0.937	1.207	152	140	219369	1144957	997	3	17092	170	27	677
LNB	7/23/93	2:35	91398	0.00	1.260	1.260	1.260	96	85	181205	763630	898	0	7180	124	19	505
GR-LNB 55	7/23/93	4:53	110471	16.48	1.167	0.989	1.254	155	143	224082	1151463	997	27	16973	186	27	684
GR-LNB 55a	7/23/93	1:08	100763	16.06	1.177	1.004	1.277	139	127	208479	1027666	989	0	9683	171	24	636
LNB	7/23/93	3:55	75018	0.00	1.254	1.254	1.266	82	72	173970	650024	911	0	6680	98	14	437
LNB	7/24/93	1:52	78094	0.00	1.344	1.344	1.344	87	77	182387	675137	928	0	7533	107	14	446
LNB-OFA	7/24/93	0:36	88171	0.00	1.301	1.301	1.464	99	89	186576	746830	951	0	6168	137	17	491
GR-LNB 56	7/24/93	7:45	109225	16.60	1.151	0.974	1.242	154	141	220171	1142849	996	0	18945	185	27	676
GR-LNB 56a	7/24/93	2:09	76098	15.60	1.206	1.037	1.357	102	91	173585	767608	946	0	7085	131	17	497
GR-LNB 57a	7/25/93	1:10	62811	15.55	1.318	1.136	1.473	82	72	161845	625994	941	0	6634	115	13	415
LNB-OFA	7/25/93	5:52	81925	0.00	1.080	1.095	1.429	92	82	175681	715693	909	0	6281	124	16	470
GR-LNB 57b	7/25/93	10:19	95992	16.35	1.194	1.017	1.307	134	122	203531	994774	986	40	13611	166	23	603
GR-LNB 57	7/25/93	6:14	114215	16.37	1.115	0.945	1.209	160	148	222568	1198755	996	0	14591	186	28	709
GR-LNB 58a	7/26/93	10:15	85467	15.90	1.274	1.093	1.399	118	107	193771	873265	988	6	11136	156	20	539
GR-LNB 58	7/26/93	8:34	114931	16.06	1.127	0.959	1.219	160	147	224715	1206515	996	23	18228	189	28	709
GR-LNB 58b	7/26/93	5:09	103155	15.49	1.190	1.021	1.290	143	131	210698	1062357	990	91	13659	176	25	642
GR-LNB 59a	7/27/93	10:48	86014	15.43	1.235	1.064	1.368	118	106	192711	879577	978	23	10341	154	20	542
LNB-OFA	7/27/93	3:21	141613	0.00	1.158	1.159	1.179	164	151	242944	1271436	970	0	5939	189	31	769
GR-LNB 59	7/27/93	9:16	106270	15.74	1.129	0.965	1.226	146	134	213115	1089309	995	2	11296	174	26	664
GR-LNB 60a	7/28/93	11:06	97255	15.61	1.140	0.977	1.252	136	124	203508	994650	996	0	16462	164	23	604
GR-LNB 60b	7/28/93	2:02	120122	16.42	1.108	0.938	1.197	169	156	228036	1268293	996	2784	26570	197	30	731
LNB-OFA	7/28/93	2:21	143731	0.00	1.151	1.153	1.181	166	153	247702	1284085	977	11	6047	190	31	771
GR-LNB 60	7/28/93	8:10	120987	15.92	1.079	0.919	1.173	168	155	227971	1270102	996	74	18139	192	30	742
GR-LNB 61a	7/29/93	15:55	113186	15.93	1.102	0.939	1.199	158	145	221114	1180275	997	405	20169	184	28	695
GR-LNB 61	7/29/93	8:04	112810	16.41	1.080	0.915	1.179	159	146	218047	1182536	997	1161	26560	180	28	689
GR-LNB 62	7/30/93	10:04	108598	16.02	1.089	0.927	1.191	153	140	211712	1132029	997	580	24781	174	26	666
LNB-OFA	7/30/93	4:32	138517	0.00	1.169	1.172	1.235	159	146	242314	1236007	972	0	6207	189	30	749
GR-LNB 62a	7/30/93	9:00	114381	16.00	1.152	0.981	1.241	158	145	225616	1190684	997	76	15248	191	28	705
GR-LNB 63a	7/31/93	17:10	112988	16.00	1.098	0.935	1.195	157	144	216384	1179568	996	229	17322	181	28	699
GR-LNB 63b	7/31/93	6:49	115516	15.11	1.084	0.932	1.177	160	147	216882	1195410	996	18	21189	182	28	702
GR-LNB 64a	8/1/93	1:25	102747	15.38	1.109	0.952	1.214	143	131	204553	1052532	996	116	21342	168	24	629
GR-LNB 64b	8/1/93	10:21	81407	15.22	1.170	1.010	1.320	110	99	183972	823827	974	0	9809	139	18	519

Cherokee Unit 3, Average Test D
Pre Modification

Test No.	Date	Dur.	Coal Flow lbs/hr	Gas Heat % totl	Coal Stoich	Reburn Stoich	Exit Stoich	Gross Power MWe	Net Power MWe	Total Air scfm	Steam lbs/hr	Main Steam Temp	RH At flow lbs/hr	SH At flow lbs/hr	Air Htr H A mbtu/hr	Econ H A mbtu/hr	Furn H A mbtu/hr
GR-LNB 64c	8/1/93	12:14	111057	15.75	1.100	0.939	1.203	155	142	217308	1156441	996	11	21748	184	27	678
GR-LNB 65a	8/2/93	8:55	78544	14.83	1.216	1.055	1.364	105	93	179557	790952	965	0	8166	138	18	503
LNB-OFA	8/2/93	1:23	138466	0.00	1.203	1.205	1.229	160	148	237609	1234365	986	0	6720	195	30	744
GR-LNB 65b	8/2/93	6:02	112140	16.02	1.091	0.929	1.191	156	143	213646	1173016	997	51	13594	182	28	700
GR-LNB 65c	8/2/93	7:14	107432	16.30	1.098	0.932	1.205	150	138	211496	1126852	993	115	18594	177	26	669
GR-LNB 66a	8/3/93	8:29	71855	15.61	1.238	1.067	1.402	97	86	173390	721769	975	0	7203	132	16	465
GR-LNB 66b	8/3/93	9:34	106999	16.40	1.163	0.987	1.256	151	138	216394	1119411	997	83	18890	184	26	665
GR-LNB 66c	8/3/93	5:55	111634	16.25	1.110	0.942	1.205	157	145	217833	1172640	997	209	19994	186	27	690
GR-LNB 67	8/4/93	24:00	104594	15.46	1.138	0.977	1.245	145	133	208422	1078102	993	19	16089	176	25	646
GR-LNB 68a	8/5/93	7:39	90167	14.82	1.145	0.992	1.283	124	112	191039	907097	992	0	10075	153	21	565
GR-LNB 68b	8/5/93	15:50	114545	15.55	1.147	0.982	1.230	160	147	220991	1193868	997	248	22391	193	28	697
GR-LNB 69	8/6/93	9:48	105202	15.18	1.105	0.950	1.211	146	134	208024	1084174	995	145	16609	174	25	649
LNB	8/6/93	7:58	135507	0.00	1.199	1.199	1.199	156	144	235303	1211591	967	0	6387	182	29	737
LNB-OFA	8/6/93	5:04	139200	0.00	1.193	1.193	1.208	160	147	240153	1250695	965	0	5946	187	30	758
LNB	8/7/93	3:04	133043	0.00	1.170	1.170	1.170	154	142	230595	1186157	975	0	6181	176	28	722
GR-LNB 70	8/7/93	3:53	115672	7.62	1.127	1.050	1.203	147	135	207263	1086542	996	2815	15760	176	25	652
LNB-OFA	8/7/93	8:05	136082	0.00	1.203	1.203	1.220	157	145	235797	1213040	978	4	7841	185	29	732
LNB	8/7/93	6:28	137961	0.00	1.209	1.209	1.209	159	146	239395	1234851	971	0	7092	186	30	746
LNB	8/9/93	8:04	127397	0.00	1.241	1.241	1.241	146	134	229959	1139708	955	0	6246	175	27	701
GR-LNB 71 (10% Gas)	8/9/93	13:45	124813	10.44	1.116	1.010	1.221	160	147	224046	1226985	995	40	10619	192	29	731
GR-LNB 72a (10%)	8/10/93	7:48	121811	9.58	1.113	1.017	1.225	157	144	219910	1185288	996	152	20808	187	27	703
LNB	8/10/93	7:27	138553	0.00	1.252	1.252	1.252	156	144	243708	1216526	949	0	6127	191	30	759
GR-LNB 72b (10%)	8/10/93	7:25	119944	9.73	1.135	1.036	1.249	153	140	220653	1167690	993	0	8292	185	28	704
GR-LNB 73	8/11/93	3:22	114651	9.87	1.164	1.062	1.278	148	135	220455	1120389	991	11	9183	180	26	675
LNB-OFA	8/11/93	9:49	141129	0.00	1.205	1.205	1.224	161	149	245466	1271288	965	0	6040	192	31	765
LNB	8/11/93	2:45	134064	0.00	1.255	1.255	1.255	153	141	241401	1205723	956	0	6297	187	29	733
LNB	8/12/93	7:36	102169	0.00	1.263	1.263	1.263	116	104	203969	893989	951	0	6646	140	20	569
GR-LNB 74	8/12/93	14:33	122857	9.87	1.116	1.017	1.233	158	145	222362	1203784	996	16	13802	191	29	712
GR-LNB 75	8/13/93	18:16	120404	10.12	1.132	1.030	1.247	155	143	220957	1182245	992	38	15043	189	28	699
GR-LNB 76a	8/14/93	4:54	97749	9.27	1.171	1.077	1.292	126	114	192824	925040	998	0	18081	155	21	563
LNB	8/14/93	1:46	80714	0.00	1.508	1.508	1.508	89	80	187627	679285	959	0	6501	129	15	443
GR-LNB 76b	8/14/93	11:05	118872	10.02	1.171	1.066	1.283	153	141	219864	1158368	994	73	13927	191	27	690
GR-LNB 77	8/15/93	1:10	94016	9.10	1.214	1.120	1.339	120	108	187601	887753	989	0	12358	154	20	551
LNB	8/15/93	14:44	104787	0.00	1.287	1.287	1.299	120	109	203571	913531	964	0	7850	147	21	572
LNB	8/15/93	6:58	139032	0.00	1.204	1.204	1.211	160	148	237720	1239884	982	0	6317	189	30	747
LNB (low load)	8/16/93	7:38	94604	0.00	1.302	1.302	1.302	109	98	193269	812318	982	0	9256	139	18	511
LNB (150 MWe)	8/16/93	3:21	140409	0.00	1.250	1.250	1.250	162	150	246741	1263073	976	0	6768	202	30	755
LNB-OFA cooling	8/16/93	11:40	142241	0.00	1.197	1.197	1.221	162	150	244498	1291641	946	0	5830	192	31	781
LNB	8/17/93	9:07	124002	0.00	1.240	1.240	1.240	142	130	224890	949955	953	0	6374	171	26	679
100% Gas (plant test)	8/17/93	0:34	73951	0.00	1.156	1.156	1.156	80	71	170693	566196	880	0	6423	88	14	439

Cherokee Unit 3, Average Test D
Pre Modification

Test No.	Date	Dur.	Coal Flow lbs/hr	Gas Heat % totl	Coal Stoich	Reburn Stoich	Exit Stoich	Gross Power MWe	Net Power MWe	Total Air scfm	Steam lbs/hr	Main Steam Temp	RH At flow lbs/hr	SH At flow lbs/hr	Air Htr H A mbtu/hr	Econ H A mbtu/hr	Furn H A mbtu/hr
LNB (OFA cooling)	8/17/93	8:59	148384	0.00	1.180	1.180	1.202	161	148	242598	0	951	0	6048	200	31	771
LNB	8/17/93	3:05	145491	0.00	1.191	1.191	1.191	158	146	238257	0	957	0	6373	194	30	756
LNB (low load)	8/18/93	9:42	111224	0.00	1.223	1.223	1.223	122	110	204399	0	962	0	8394	152	21	581
LNB 150 MWe	8/18/93	14:16	148284	0.00	1.233	1.233	1.233	160	147	244593	0	938	0	5958	204	31	774
GR-LNB 78	8/24/93	3:25	117053	10.89	1.066	0.961	1.191	159	147	216487	1129806	997	42	26186	172	24	699
LNB OFA cooling	8/24/93	10:38	134604	0.00	1.208	1.208	1.239	160	148	242758	1156672	989	237	7947	181	25	743
LNB OFA cooling	8/25/93	2:06	105315	0.00	1.206	1.206	1.229	126	116	214667	881699	998	0	9695	135	18	586
LNB	8/25/93	8:38	100894	0.00	1.241	1.241	1.241	120	110	209651	848417	990	0	11845	133	18	562
LNB	8/25/93	13:08	132513	0.00	1.268	1.268	1.268	157	146	247077	1151539	975	0	5801	186	25	740
LNB	8/26/93	21:16	100277	0.00	1.344	1.344	1.344	114	103	205520	879914	934	0	7243	146	20	559
LNB	8/26/93	2:42	135579	0.00	1.258	1.258	1.258	157	145	244242	1209141	969	0	6768	191	29	730
LNB	8/27/93	8:26	93838	0.00	1.329	1.329	1.329	107	97	197534	817252	936	0	7077	135	18	524
LNB	8/27/93	6:17	132554	0.00	1.256	1.256	1.256	154	142	238653	1193794	949	0	6686	186	29	728
GR-LNB 79	9/8/93	11:15	117756	13.04	1.138	1.002	1.223	158	146	219460	1191746	991	0	5420	188	29	718
GR-LNB 79a	9/8/93	1:49	96950	14.13	1.180	1.030	1.288	130	119	194649	969489	982	0	3646	161	23	609
GR-LNB 80a	9/9/93	6:55	86601	14.55	1.186	1.031	1.317	118	106	184430	867451	988	0	6488	147	20	543
LNB-OFA	9/9/93	1:46	81879	0.00	1.364	1.382	1.441	92	81	176686	699534	947	0	3407	127	16	461
GR-LNB 80	9/9/93	14:15	106284	14.33	1.144	0.994	1.241	146	134	207267	1085308	994	0	10513	174	26	653
LNB-OFA	9/10/93	4:50	75788	0.00	1.457	1.464	1.511	85	75	169294	651164	938	0	3426	122	14	427
GR-LNB 81	9/10/93	1:46	84099	15.66	1.162	0.999	1.301	117	106	180373	852630	996	0	8314	148	19	531
LNB	9/10/93	13:30	130674	0.00	1.276	1.276	1.276	151	140	237494	1170095	959	0	4397	186	28	713
LNB	9/11/93	19:30	121777	0.00	1.259	1.259	1.263	141	129	224267	1081220	963	0	4194	171	26	666
GR-LNB 82	9/11/93	4:10	116087	14.21	1.223	1.064	1.293	157	144	220738	1191334	978	0	3901	197	29	722
GR-LNB 83a	9/12/93	11:51	100367	14.18	1.239	1.081	1.335	137	125	204346	1013296	984	0	5650	174	24	625
GR-LNB 83	9/12/93	12:09	123161	13.10	1.156	1.016	1.230	166	153	222367	1251152	995	4	8779	198	30	742
GR-LNB 84a	9/13/93	5:35	91790	13.90	1.244	1.089	1.359	125	113	192148	916612	991	0	6494	163	21	571
GR-LNB 84	9/13/93	18:03	116688	10.91	1.179	1.063	1.274	157	144	219520	1155926	994	0	8995	195	28	692
GR-LNB 85a	9/14/93	4:15	102703	12.26	1.160	1.032	1.270	140	128	199390	1019116	996	0	11985	171	24	619
LNB	9/14/93	11:05	109330	0.00	1.281	1.281	1.281	128	117	216210	959581	966	0	4382	157	22	602
LNB-OFA	9/14/93	1:06	136479	0.00	1.226	1.226	1.272	160	148	240505	1226119	969	0	3277	195	30	743
GR-LNB 85	9/14/93	6:55	115131	12.49	1.072	0.949	1.174	158	145	215025	1163822	996	0	13699	176	28	691
GR-LNB 86a	9/15/93	0:50	104429	12.89	1.114	0.983	1.223	143	131	202384	1046613	995	0	12049	168	25	636
LNB	9/15/93	3:07	92960	0.00	1.284	1.284	1.284	110	99	199104	810045	974	0	13233	130	18	508
GR-LNB 86b	9/15/93	4:26	96768	13.57	1.118	0.980	1.240	134	122	195843	971915	997	0	14525	159	22	588
GR-LNB 86	9/15/93	11:20	113876	12.76	1.084	0.957	1.183	156	144	216897	1150475	996	0	14998	176	27	682
GR-LNB 87a	9/16/93	5:46	95779	13.35	1.126	0.990	1.253	131	119	195838	963288	977	0	14051	155	22	587
GR-LNB 87	9/16/93	15:24	109303	12.33	1.198	1.065	1.293	148	136	211933	1087587	996	0	14439	185	26	649
GR-LNB 88a	9/17/93	5:31	99764	13.45	1.178	1.036	1.289	137	125	199621	999394	996	0	15091	169	23	603
GR-LNB 88	9/17/93	18:28	115080	12.26	1.119	0.994	1.216	157	144	216191	1157526	996	0	17557	185	27	682
GR-LNB 89	9/18/93	24:00	112388	11.72	1.095	0.978	1.201	153	140	211284	1122638	996	0	16604	176	26	666

Cherokee Unit 3, Average Test D

Pre Modification

Test No.	Date	Dur.	Coal Flow lbs/hr	Gas Heat % totl	Coal Stoich	Reburn Stoich	Exit Stoich	Gross Power MWe	Net Power MWe	Total Air scfm	Steam lbs/hr	Main Steam Temp	RH At flow lbs/hr	SH At flow lbs/hr	Air Htr H A mbtu/hr	Econ H A mbtu/hr	Furn H A mbtu/hr
GR-LNB 90a	9/19/93	10:06	102865	11.99	1.120	0.999	1.234	141	129	199891	1020960	997	0	19034	166	23	610
GR-LNB 90	9/19/93	13:54	118596	10.93	1.092	0.983	1.193	160	147	219053	1179188	996	3	20274	183	28	689
GR-LNB 91	9/20/93	24:00	110995	12.72	1.069	0.944	1.174	154	141	210599	1124284	996	46	26227	172	26	654
GR-LNB 92a	9/21/93	3:00	92301	14.45	1.097	0.953	1.230	127	116	187661	931802	993	0	12842	150	21	569
GR-LNB 92	9/21/93	17:56	112357	13.27	1.116	0.980	1.210	153	141	211239	1139502	992	2	12408	178	27	681
GR-LNB 3 Mill a	9/22/93	7:59	89138	14.84	1.177	1.019	1.297	123	112	188060	900782	994	0	8495	151	21	560
GR-LNB 3 Mill b	9/22/93	8:25	95611	14.03	1.152	1.006	1.266	131	120	195196	972294	983	0	7698	155	23	603
GR-LNB 3 Mill c	9/23/93	24:00	96702	14.02	1.154	1.008	1.265	132	122	199335	982953	985	0	6644	158	23	608
GR-LNB 3 Mill d	9/24/93	1:58	78987	14.88	1.212	1.051	1.358	107	97	176006	791465	986	0	5183	138	18	505
LNB-OFA 3 Mill	9/24/93	3:33	70772	0.00	1.241	1.260	1.573	75	66	162304	636951	842	0	3496	114	14	432
GR-LNB 3 Mill e	9/24/93	6:10	97473	13.47	1.192	1.048	1.300	131	120	202006	988715	966	0	3463	161	23	621
GR-LNB 93	9/24/93	12:09	111231	12.24	1.180	1.049	1.275	148	136	213502	1115514	980	0	4723	183	27	680
GR-LNB 94a	9/25/93	2:12	98036	13.13	1.166	1.028	1.279	132	121	192762	972449	990	0	5022	165	23	605
LNB-OFA	9/25/93	2:24	93154	0.00	1.130	1.144	1.442	108	97	182642	807992	962	0	3748	150	18	516
GR-LNB 94	9/25/93	19:05	119198	11.64	1.136	1.016	1.229	160	147	217890	1191631	994	34	10765	192	29	707
GR-LNB 95a	9/26/93	4:15	95006	14.03	1.168	1.021	1.283	131	119	191570	952879	998	4	9133	162	22	586
LNB-OFA	9/26/93	2:55	88733	0.00	1.179	1.192	1.509	99	89	178143	785818	892	0	3315	144	18	518
GR-LNB 95	9/26/93	16:33	110855	12.73	1.167	1.032	1.264	150	138	210955	1112300	993	0	8549	183	26	670
GR-LNB 96a	9/27/93	2:53	99821	13.53	1.207	1.060	1.311	136	124	201088	1008787	981	0	7246	172	24	621
LNB	9/27/93	19:45	133431	0.00	1.270	1.270	1.276	154	142	243127	1200767	949	0	3468	191	29	733
GR-LNB 96b	9/27/93	0:57	97262	14.56	1.126	0.977	1.255	133	121	189650	986342	983	0	6438	161	23	613
GR-LNB 97a	9/28/93	9:13	103105	13.59	1.186	1.040	1.288	141	129	204855	1037986	993	0	9458	176	24	630
LNB	9/28/93	4:27	135363	0.00	1.117	1.121	1.117	159	147	230272	1220446	977	0	3575	172	30	740
GR-LNB 97	9/28/93	5:58	119429	10.66	1.075	0.971	1.194	159	147	213319	1184986	997	0	17711	185	28	695
GR-LNB 97b	9/28/93	2:48	101042	9.99	1.146	1.045	1.272	133	122	194464	974067	995	0	13239	162	22	593
GR-LNB 98a	9/29/93	5:22	92861	9.67	1.194	1.095	1.324	122	111	188531	884053	998	0	10722	155	20	545
GR-LNB 98	9/29/93	18:37	118547	11.91	1.122	1.000	1.221	158	146	217802	1189487	991	51	10254	188	29	708
GR-LNB 99a	9/30/93	5:32	88275	14.42	1.219	1.061	1.345	119	108	187077	890779	969	0	4263	153	21	563
GR-LNB 99	9/30/93	13:24	116759	13.15	1.154	1.015	1.238	157	146	218364	1181229	992	0	5489	189	28	711
GR-LNB 99b	9/30/93	2:27	97960	14.97	1.212	1.047	1.308	134	123	197604	995361	978	0	6963	169	23	616
LNB-OFA	9/30/93	2:27	76313	0.00	1.371	1.373	1.429	83	73	168982	669649	873	0	3750	113	15	451
GR-LNB 100a	10/1/93	11:00	81763	14.60	1.255	1.092	1.400	111	100	181919	816223	983	0	5612	151	18	516
GR-LNB 100	10/1/93	9:12	98068	13.94	1.170	1.022	1.278	135	124	196599	983329	998	0	12991	165	23	598
GR-LNB 101	10/2/93	24:00	96512	13.73	1.215	1.065	1.327	132	121	196058	963831	994	0	9652	170	22	591
GR-LNB 102	10/3/93	24:00	92146	13.54	1.227	1.079	1.351	125	115	192393	911766	998	0	10313	163	21	561
GR-LNB 103	10/4/93	24:00	96999	14.51	1.189	1.033	1.300	134	123	198625	977555	994	0	12590	168	23	596
GR-LNB 104	10/5/93	24:00	97825	15.65	1.222	1.048	1.311	136	125	202754	998394	995	0	10261	173	23	610
GR-LNB 105	10/6/93	10:15	112323	13.71	1.195	1.046	1.278	154	142	216460	1137382	994	0	9357	192	27	682
GR-LNB 106	10/8/93	8:45	117155	12.51	1.106	0.979	1.202	159	146	215108	1186027	990	0	6285	187	29	714
GR-LNB 107	10/9/93	24:00	117345	12.23	1.182	1.051	1.272	159	147	218954	1182794	992	17	7886	200	28	708

Cherokee Unit 3, Average Test D
Pre Modification

Test No.	Date	Dur.	Coal Flow lbs/hr	Gas Heat % totl	Coal Stoich	Reburn Stoich	Exit Stoich	Gross Power MWe	Net Power MWe	Total Air scfm	Steam lbs/hr	Main Steam Temp	RH At flow lbs/hr	SH At flow lbs/hr	Air Htr H A mbtu/hr	Econ H A mbtu/hr	Furn H A mbtu/hr
GR-LNB 108	10/10/93	11:00	118041	12.19	1.187	1.056	1.275	160	147	219289	1184866	995	64	10205	201	28	705
GR-LNB 109a	10/13/93	4:07	115981	14.23	1.155	1.004	1.244	158	146	217498	1195887	980	0	7811	190	29	720
GR-LNB 109b	10/13/93	2:02	98246	13.75	1.171	1.027	1.298	133	121	195799	986307	979	0	4616	166	23	616
GR-LNB 110a	10/14/93	6:02	102633	14.17	1.183	1.031	1.292	143	131	205061	1040627	997	5	14721	178	24	625
GR-LNB 110	10/14/93	14:56	111767	15.94	1.145	0.977	1.241	159	147	216301	1173059	996	100	20327	191	28	687
GR-LNB 110b	10/14/93	3:00	90211	18.19	1.226	1.023	1.332	129	117	193348	951225	984	10	8301	166	22	589
GR-LNB 111	10/15/93	12:49	102263	16.00	1.154	0.985	1.260	146	134	205285	1066641	996	74	19628	178	25	633
GR-LNB 3 Mill a	10/15/93	2:58	110532	15.23	1.087	0.934	1.190	154	142	213940	1151508	996	0	6596	173	28	696
GR-LNB 3 Mill b	10/15/93	7:05	104279	14.15	1.149	1.001	1.260	143	131	209026	1065767	983	0	5721	172	25	656
GR-LNB 3 Mill c	10/16/93	12:05	85759	14.41	1.236	1.078	1.380	117	105	191574	856244	988	0	6575	157	19	539
GR-LNB 3 Mill d	10/16/93	10:28	118518	15.28	1.136	0.976	1.230	165	152	224874	1240715	988	49	9051	199	30	738
GR-LNB 3 Mill e	10/16/93	1:25	106901	14.78	1.150	0.995	1.249	147	135	204794	1093256	986	0	3918	179	26	673
GR-LNB 3 Mill f	10/17/93	23:46	99865	15.36	1.146	0.985	1.256	140	130	203394	1035016	991	0	10384	166	24	631
LNB-OFA 3 Mill	10/18/93	11:10	96210	0.00	1.075	1.086	1.346	114	103	187027	838204	978	0	8181	142	19	529
GR-LNB 3 Mill g	10/19/93	15:35	97978	14.92	1.180	1.020	1.292	134	122	204933	1008201	970	0	3705	162	24	631
GR-LNB 3 Mill h	10/20/93	7:35	98242	14.92	1.194	1.033	1.304	135	123	204782	1003963	987	0	4075	168	24	625
GR-LNB 112	10/20/93	4:09	94572	14.47	1.211	1.054	1.335	130	118	199263	951590	996	0	8780	170	22	586
LNB-OFA	10/20/93	0:56	121545	0.00	1.140	1.150	1.381	144	132	224156	1075664	989	0	8756	194	25	646
GR-LNB 113	10/20/93	10:42	113856	15.13	1.176	1.013	1.267	158	145	220076	1180964	991	9	10722	198	28	704
GR-LNB 113	10/21/93	24:00	111346	16.22	1.147	0.976	1.246	157	145	220403	1168787	995	84	14942	190	28	692
GR-LNB 114	10/22/93	24:00	108366	16.38	1.137	0.965	1.239	154	141	216629	1138196	994	119	15353	183	27	677
GR-LNB 115	10/23/93	24:00	112995	16.04	1.152	0.981	1.248	159	147	221084	1186652	994	80	12726	191	28	705
GR-LNB 116	10/24/93	14:00	111670	15.48	1.154	0.990	1.250	157	144	218947	1164111	994	32	13513	190	28	692
GR-LNB 116a	10/24/93	10:00	113536	15.83	1.142	0.975	1.239	159	147	220654	1187424	994	0	12601	190	28	705
GR-LNB 117a	10/25/93	4:55	93260	14.43	1.189	1.035	1.317	127	116	195229	946111	983	0	9111	160	22	585
GR-LNB 117	10/25/93	19:04	111542	15.35	1.136	0.976	1.234	157	145	218580	1163105	996	16	18161	188	27	685
GR-LNB 118	10/26/93	24:00	111142	15.22	1.117	0.960	1.220	156	144	215759	1157913	994	11	13753	185	27	690
GR-LNB 119	10/27/93	14:25	114505	14.97	1.098	0.946	1.200	161	149	218216	1194679	995	214	16685	188	28	704
GR-LNB 119a	10/27/93	9:34	113018	14.76	1.054	0.910	1.161	157	145	213987	1167386	994	8	14049	175	28	696
GR-LNB 120a	10/28/93	7:21	108008	14.18	1.082	0.941	1.198	149	136	208779	1105049	990	7	10614	171	26	668
GR-LNB 120	10/28/93	16:38	112702	14.76	1.076	0.929	1.181	158	146	217868	1169499	995	22	17451	181	28	691
GR-LNB 121	10/29/93	24:00	111329	15.01	1.134	0.977	1.233	157	145	217065	1162158	995	91	21872	193	27	683
GR-LNB 122	10/30/93	24:00	114860	15.02	1.120	0.965	1.220	162	149	221186	1201700	994	181	19621	196	28	705
GR-LNB 123	10/31/93	24:00	113177	15.04	1.124	0.968	1.223	159	147	219332	1177015	995	8	17788	189	28	695
GR-LNB 124	11/1/93	6:18	115166	11.75	1.102	0.985	1.222	155	143	215363	1151387	994	40	13427	186	27	688
LNB-OFA	11/1/93	1:08	106797	0.00	1.082	1.091	1.298	125	114	200469	939449	982	0	6439	158	21	585
GR-LNB 125a	11/2/93	8:15	116997	11.23	1.026	0.920	1.158	159	147	214569	1177218	995	33	24736	179	28	687
LNB	11/2/93	0:29	116783	11.10	1.029	0.924	1.160	158	145	214638	1168762	995	87	22462	175	27	686
GR-LNB 125	11/2/93	10:09	116526	11.25	1.029	0.923	1.159	158	145	214404	1168297	995	89	22754	175	27	686
GR-LNB 126a	11/4/93	1:40	114620	10.38	1.001	0.906	1.136	154	141	209490	1135867	996	102	18389	170	27	674

Cherokee Unit 3, Average Test D
Pre Modification

Test No.	Date	Dur.	Coal Flow lbs/hr	Gas Heat % totl	Coal Stoich	Reburn Stoich	Exit Stoich	Gross Power MWe	Net Power MWe	Total Air scfm	Steam lbs/hr	Main Steam Temp	RH At flow lbs/hr	SH At flow lbs/hr	Air Htr H A mbtu/hr	Econ H A mbtu/hr	Furn H A mbtu/hr
GR-LNB 126	11/4/93	13:29	117149	10.20	1.057	0.960	1.186	156	143	213649	1158195	994	45	13128	181	27	692
GR-LNB 127a	11/5/93	7:20	111238	9.79	1.282	1.174	1.393	145	133	208091	1081003	986	0	8391	201	26	660
GR-LNB 127	11/5/93	5:54	122263	10.16	1.103	1.002	1.225	160	147	221892	1215775	980	0	4859	194	29	736
GR-LNB 128	11/8/93	4:55	113732	14.82	1.112	0.960	1.211	159	147	219770	1178015	996	21	13339	187	28	700
GR-LNB 129	11/9/93	8:30	116930	14.57	1.077	0.932	1.178	162	150	222588	1215592	993	3	13544	186	29	718
GR-LNB 129a	11/9/93	5:29	125401	12.09	1.123	0.998	1.217	167	154	234137	1280032	974	0	4125	199	31	767
GR-LNB 130	11/10/93	15:43	120549	11.46	1.086	0.972	1.202	161	148	225277	1213151	987	0	9191	188	29	725
LNB	11/10/93	7:50	136104	0.00	1.186	1.186	1.186	158	146	243412	1232191	960	0	3799	181	30	752
LNB	11/11/93	2:00	128349	0.00	1.257	1.257	1.257	150	138	240911	1150603	962	0	4121	181	28	709
LNB 3 Mill a	11/11/93	3:34	101986	0.00	1.236	1.236	1.236	118	108	208283	889428	982	0	4844	137	20	566
LNB 3 Mill b	11/11/93	9:20	102041	0.00	1.295	1.295	1.295	117	106	211771	896590	960	0	3495	143	21	576
LNB 3 Mill c	11/12/93	12:30	109663	0.00	1.272	1.272	1.272	127	116	221314	974764	960	0	3587	155	23	617
LNB 3 Mill d	11/12/93	11:29	134370	0.00	1.140	1.140	1.140	157	145	239384	1224797	955	0	3560	174	30	749
LNB 3 Mill e	11/13/93	14:30	131971	0.00	1.210	1.210	1.210	154	142	241735	1192612	960	0	3879	182	29	730
LNB 3 Mill f	11/13/93	9:29	134978	0.00	1.139	1.139	1.139	158	146	238693	1227895	959	0	3478	174	30	751
LNB 3 Mill	11/14/93	24:00	129746	0.00	1.169	1.169	1.169	152	140	237224	1172791	964	0	3732	174	28	720
LNB	11/15/93	1:39	131242	0.00	1.141	1.141	1.141	154	143	238277	1189100	967	0	3386	175	29	727
GR-LNB 131	11/15/93	13:00	112669	14.44	1.060	0.918	1.172	157	144	224019	1169471	992	8	11858	180	28	697
GR-LNB 132	11/16/93	7:42	109648	14.00	1.047	0.911	1.163	152	140	217597	1128226	993	0	11845	174	27	678
GR-LNB 132a	11/16/93	16:17	102674	14.01	1.248	1.091	1.351	140	128	205351	1045179	977	0	11422	184	24	638
GR-LNB 133	11/17/93	0:40	100222	13.66	1.239	1.087	1.354	135	123	203232	1003996	991	0	8011	180	23	621
LNB	11/17/93	8:40	110887	0.00	1.339	1.339	1.339	127	116	212617	984433	945	0	3448	169	23	626
LNB	12/3/93	5:15	133061	0.00	1.231	1.231	1.231	154	142	240232	1201392	964	0	3691	190	29	733
LNB	12/6/93	2:33	99047	0.00	1.251	1.251	1.251	112	101	201062	870724	952	0	4646	142	20	559
LNB	12/6/93	3:00	138996	0.00	1.228	1.228	1.228	161	148	247314	1269337	948	0	3230	197	31	773
LNB	12/6/93	1:55	139695	0.00	1.251	1.251	1.251	162	149	251332	1271638	947	0	3302	201	31	775
LNB	12/7/93	6:45	141062	0.00	1.236	1.236	1.236	162	149	249915	1294655	933	0	3419	199	32	788
LNB	12/8/93	4:03	140531	0.00	1.277	1.277	1.277	163	150	255401	1264918	966	0	3421	208	31	765
GR-LNB 134	12/8/93	3:40	119433	15.65	1.076	0.918	1.164	164	151	221915	1261376	985	1	5166	189	31	759
GR-LNB 134a	12/8/93	0:46	133141	5.25	1.086	1.037	1.182	162	149	230147	1268511	961	0	3577	190	31	771
GR-LNB 134b	12/8/93	2:44	133004	5.27	1.022	0.974	1.121	164	151	225616	1258909	983	11	4878	180	31	759
GR-LNB 134c	12/8/93	3:31	132393	5.29	0.987	0.939	1.089	167	154	223579	1257547	994	26	16467	179	30	739
GR-LNB 135	12/9/93	12:00	122705	5.20	1.006	0.960	1.118	154	142	214665	1154113	993	35	17121	169	27	685
GR-LNB 135a	12/9/93	2:59	128403	5.34	1.066	1.016	1.167	162	149	225977	1210333	993	48	15507	188	29	714
GR-LNB 135b	12/9/93	7:10	120972	4.93	1.171	1.124	1.282	147	134	224404	1143046	948	0	5054	187	28	702
GR-LNB 136	12/10/93	11:35	125344	4.81	1.155	1.109	1.259	153	140	227625	1182535	961	0	4135	190	29	722
GR-LNB 137	12/11/93	16:15	119739	4.70	1.105	1.062	1.218	147	134	216505	1117980	976	0	8189	178	27	682
GR-LNB 137a	12/11/93	7:44	134330	4.96	1.104	1.058	1.203	165	152	233215	1271054	973	0	3724	197	31	765
GR-LNB 138	12/12/93	24:00	134660	5.03	1.095	1.048	1.193	166	152	232940	1277488	972	0	3878	197	31	767
GR-LNB 139	12/13/93	7:48	135122	4.98	1.073	1.027	1.173	168	155	228791	1275586	991	3	6147	196	31	759

Cherokee Unit 3, Average Test D
Pre Modification

Test No.	Date	Dur.	Coal Flow lbs/hr	Gas Heat % totl	Coal Stoich	Reburn Stoich	Exit Stoich	Gross Power MWe	Net Power MWe	Total Air scfm	Steam lbs/hr	Main Steam Temp	RH At flow lbs/hr	SH At flow lbs/hr	Air Htr H A mbtu/hr	Econ H A mbtu/hr	Furn H A mbtu/hr
GR-LNB 139a	12/13/93	4:18	134009	5.05	1.106	1.058	1.205	167	153	227653	1261888	993	0	6437	200	31	752
LNB	12/13/93	5:18	133870	0.00	1.253	1.253	1.253	157	144	243245	1220439	949	0	14433	193	29	731
LNB-OFA	12/14/93	1:55	141974	0.00	1.109	1.117	1.303	166	152	230943	1278835	974	0	3325	216	31	768
GR-LNB 140	12/14/93	1:18	135497	5.12	1.114	1.065	1.208	168	154	230530	1269747	992	0	5085	198	31	761
LNB	12/14/93	8:30	139333	0.00	1.192	1.192	1.192	162	149	239735	1256579	967	0	3354	192	31	763
LNB	12/15/93	9:28	137698	0.00	1.241	1.241	1.241	160	148	244378	1247133	958	0	3190	199	30	759
LNB-OFA	12/15/93	5:29	139287	0.00	1.158	1.159	1.262	162	149	240166	1265273	955	0	3214	204	31	768
GR-LNB 141	12/15/93	5:15	119469	5.34	1.096	1.047	1.211	147	133	213125	1113543	983	29	6617	178	26	683
LNB	12/15/93	2:50	86246	0.00	1.388	1.388	1.388	98	87	199225	745605	994	0	9958	133	16	474
LNB	12/16/93	15:05	132676	0.00	1.260	1.260	1.260	156	143	242540	1175991	977	0	3635	194	27	733
GR-LNB 142	12/16/93	6:14	135161	5.27	1.157	1.105	1.251	168	154	236507	1261200	992	948	4896	210	30	772
GR-LNB 142a	12/16/93	1:15	94213	5.74	1.150	1.098	1.290	115	104	179796	849694	980	0	4768	150	19	554
GR-LNB 143	12/17/93	2:10	91390	5.80	1.181	1.128	1.323	112	101	182796	823936	994	0	6119	149	18	530
LNB-OFA	12/17/93	0:40	55318	0.00	1.337	1.364	1.688	57	47	121691	464254	877	0	3039	105	10	326
LNB	12/17/93	6:10	136809	0.00	1.236	1.236	1.236	163	150	243507	1214380	984	0	4441	197	28	752
LNB	12/20/93	2:25	121446	0.00	1.317	1.317	1.317	144	132	233768	1062739	988	0	6793	187	25	662
100% Gas Firing	12/20/93	0:34	80058	0.00	1.435	1.435	1.435	92	83	208245	693795	975	0	5164	126	15	448
LNB	12/22/93	2:35	113294	0.00	1.322	1.325	1.322	133	122	226092	984811	984	0	5659	176	22	621
LNB	1/5/94	2:24	135271	0.00	1.196	1.196	1.196	159	147	243031	1192621	984	0	3685	184	28	742
LNB-OFA	1/5/94	2:26	135407	0.00	1.189	1.194	1.233	159	146	240631	1200884	971	0	3688	191	28	748
LNB-OFA	1/5/94	9:15	119495	0.00	1.218	1.222	1.244	140	128	218178	1042703	977	0	4077	171	24	661
LNB-OFA	1/6/94	8:47	93312	0.00	1.255	1.259	1.284	107	96	184621	797140	976	0	9765	138	18	514
LNB	1/6/94	15:12	133673	0.00	1.201	1.201	1.201	159	147	237896	1178087	987	0	4910	190	28	730
LNB	1/7/94	6:55	110162	0.00	1.231	1.231	1.231	129	118	209883	958594	983	0	5586	159	22	610
LNB-OFA	1/7/94	1:09	113386	0.00	1.119	1.119	1.260	134	122	204185	989174	982	0	10220	169	22	621
GR-LNB 144	1/7/94	15:40	121635	5.61	1.107	1.054	1.214	154	142	220257	1126768	994	102	12035	184	26	690
GR-LNB 145a	1/8/94	8:20	107935	5.64	1.084	1.033	1.208	137	125	199257	993975	996	0	19271	163	22	607
GR-LNB 145	1/8/94	15:39	125471	5.56	1.060	1.009	1.166	161	148	220472	1174058	995	490	25884	186	27	697
GR-LNB 146a	1/9/94	2:10	120661	5.77	1.032	0.980	1.143	157	145	213181	1137267	995	0	36933	174	25	666
GR-LNB 146b	1/9/94	8:39	98416	5.63	1.071	1.022	1.211	126	114	189715	901363	998	17	30082	153	19	541
GR-LNB 146	1/9/94	9:02	117435	5.76	1.109	1.055	1.221	150	138	216733	1087677	995	107	18453	181	25	659
LNB	1/9/94	3:35	108271	0.00	1.238	1.238	1.238	125	114	201739	940925	966	0	3700	155	22	608
LNB	1/10/94	3:50	119039	0.00	1.269	1.269	1.269	142	130	216822	1040174	996	88	14220	179	24	637
GR-LNB 147	1/10/94	2:40	134381	5.22	1.159	1.108	1.252	168	155	233086	1248369	992	597	9077	212	29	759
GR-LNB 147a	1/10/94	4:04	105585	6.84	1.201	1.133	1.319	132	120	200523	974260	987	0	7282	173	22	615
GR-LNB 147b	1/10/94	4:54	106168	6.74	1.220	1.152	1.335	133	121	204128	980778	983	0	8432	177	22	619
GR-LNB 148a	1/11/94	6:32	93894	7.06	1.254	1.183	1.383	118	106	194218	860045	997	0	10158	164	19	542
GR-LNB 148	1/11/94	14:38	130318	6.70	1.143	1.077	1.238	164	151	234355	1238948	973	0	4073	202	29	765
GR-LNB 148b	1/11/94	2:48	108570	6.22	1.139	1.080	1.257	133	121	203986	1015828	949	0	3754	165	23	653
GR-LNB 149a	1/12/94	6:14	114624	6.20	1.150	1.090	1.259	145	132	216406	1062151	990	4	7050	181	24	663

Cherokee Unit 3, Average Test D

Pre Modification

Test No.	Date	Dur.	Coal Flow lbs/hr	Gas Heat % totl	Coal Stoich	Reburn Stoich	Exit Stoich	Gross Power MWe	Net Power MWe	Total Air scfm	Steam lbs/hr	Main Steam Temp	RH At flow lbs/hr	SH At flow lbs/hr	Air Htr H A mbtu/hr	Econ H A mbtu/hr	Furn H A mbtu/hr
GR-LNB 149	1/12/94	13:30	122024	6.29	1.137	1.076	1.241	154	141	224520	1142102	986	14	7113	189	27	706
GR-LNB A Mill off	1/12/94	1:09	110619	6.45	1.118	1.056	1.233	142	130	214568	1029804	998	321	22215	172	23	623
GR-LNB D Mill off	1/12/94	1:39	111431	8.88	1.054	0.969	1.173	148	136	211571	1071712	999	0	24362	169	24	643
GR-LNB D Mill off line	1/13/94	4:23	90176	7.45	1.065	0.997	1.209	116	106	181847	841565	995	0	24408	135	18	516
GR-LNB 150	1/13/94	7:15	128758	6.80	1.100	1.035	1.198	165	153	229501	1217306	994	1276	23810	197	28	724
GR-LNB D Mill off line	1/13/94	1:13	111747	8.41	1.055	0.975	1.176	149	137	212931	1067973	998	138	36523	168	24	629
GR-LNB 150a	1/13/94	6:00	115289	6.70	1.129	1.064	1.240	146	133	213233	1074955	984	231	12399	180	25	665
GR-LNB 151a	1/14/94	7:25	93341	6.57	1.161	1.099	1.298	115	103	186662	852590	976	15	9084	148	19	548
GR-LNB, ABC	1/14/94	7:50	110912	6.26	1.093	1.035	1.208	143	132	212467	1033877	998	0	27821	164	23	620
GR-LNB 151	1/14/94	7:54	112463	6.25	1.097	1.039	1.212	143	131	210589	1042914	994	40	18587	170	24	637
GR-LNB 156	1/19/94	24:00	100531	6.59	1.113	1.051	1.241	126	114	195405	925175	988	1	10075	153	21	584
GR-LNB 157a	1/20/94	6:38	95851	6.59	1.094	1.034	1.233	122	111	188348	884252	998	0	18640	150	19	547
GR-LNB 157	1/20/94	3:50	119466	7.65	1.089	1.015	1.196	157	145	217610	1142670	996	129	29647	189	26	675

Cherokee Unit 3, Average Test E
Pre Modification

Test No.	Date	Dur.	RH HA mbtu/hr	PSH HA mbtu/hr	SSH HA mbtu/hr	Total HA mbtu/hr	Total Heat In mbtu/hr	GrossHV BoilEff %	LowHV BoilEff %	HtLoss BoilEff %	Furn Clean Fact	PSH Clean Fact	SSH Clean Fact	RH Clean Fact	ECON Clean Fact	AirHtr Clean Fact	Ht In Burners mbtu/hr	Ht In GR mbtu/hr
Base Cond. (OFA off)	11/11/92	8:42	126	140	116	915	1051	87.06	90.55	85.09	1.04	1.05	1.05	1.04	1.05	1.16	1051	0
GR	11/11/92	1:01	209	242	178	1371	1570	87.31	91.95	85.76	0.99	1.09	1.13	1.16	1.03	1.09	1247	324
Base Cond. (OFA off)	11/11/92	4:25	189	239	160	1362	1550	87.87	91.39	87.13	1.02	1.05	1.00	1.03	1.01	1.08	1550	0
Base Cond. OFA off	11/12/92	0:45	186	222	165	1362	1542	88.35	91.89	88.58	1.02	0.97	1.02	1.00	1.03	1.01	1542	0
BPMS GR 4	11/12/92	1:05	205	252	171	1368	1569	87.17	91.74	87.32	0.99	1.14	1.09	1.14	1.03	1.13	1263	306
Base Cond. OFA off	11/12/92	1:15	188	241	156	1358	1546	87.83	91.35	88.02	1.02	1.07	0.98	1.02	1.03	1.09	1546	0
BPMS Base Cond. 5	11/13/92	2:55	195	245	164	1377	1568	87.79	91.31	87.98	1.01	1.07	1.02	1.06	1.03	1.12	1568	0
BPMS Base Cond. 6	11/13/92	1:00	185	230	159	1367	1554	87.98	91.51	88.17	1.02	0.99	0.97	0.98	1.02	1.04	1554	0
BPMS Base Cond. 7	11/13/92	1:00	183	227	160	1372	1558	88.05	91.58	88.25	1.02	0.97	0.97	0.97	1.02	1.00	1558	0
Base Cond.-1d	11/16/92	1:00	178	214	156	1270	1449	87.66	91.17	87.85	1.02	1.03	1.03	1.04	1.04	1.10	1449	0
GR-10c	11/16/92	1:00	178	216	157	1331	1512	88.02	91.55	88.22	1.03	0.95	0.98	0.97	1.03	0.97	1512	0
GR-10d	11/16/92	1:00	177	217	157	1331	1514	87.94	91.46	88.15	1.03	0.96	0.98	0.96	1.02	0.99	1514	0
Base Cond. OFA off	11/17/92	1:15	188	236	162	1362	1547	88.09	91.62	88.27	1.02	1.03	1.01	1.02	1.03	1.08	1547	0
GR-11c	11/17/92	1:00	194	237	166	1334	1532	87.09	91.74	87.26	1.01	1.10	1.07	1.10	1.03	1.07	1213	320
GR-11d	11/17/92	1:00	193	236	164	1323	1521	86.94	91.59	87.11	1.01	1.10	1.07	1.10	1.03	1.08	1201	321
Base Cond. OFA off	11/17/92	0:20	184	228	150	1289	1477	87.31	90.81	87.46	1.01	1.08	0.99	1.06	1.03	1.15	1477	0
Base Cond. OFA off	11/18/92	0:28	179	228	155	1325	1498	88.43	91.98	88.61	1.02	1.03	0.99	1.00	1.03	1.03	1498	0
GR-11e	11/18/92	1:04	193	245	163	1332	1530	87.03	91.68	87.17	1.00	1.14	1.06	1.10	1.03	1.10	1210	320
GR-12b	11/18/92	1:05	189	240	159	1322	1517	87.13	91.51	87.30	1.00	1.11	1.03	1.08	1.03	1.10	1275	242
Base Cond. OFA off	11/18/92	0:35	183	233	152	1310	1495	87.64	91.15	87.83	1.02	1.08	0.98	1.04	1.03	1.10	1495	0
GR-12 (5% Gas)	11/19/92	1:00	183	217	168	1344	1526	88.10	91.92	88.28	1.02	0.96	1.05	1.00	1.03	1.00	1446	80
GR-12a (10% Gas)	11/19/92	1:00	189	234	171	1353	1540	87.88	91.97	88.04	1.02	1.06	1.09	1.05	1.03	1.01	1381	159
GR-12c (23% Gas)	11/19/92	1:00	200	218	189	1309	1504	87.01	91.80	87.14	0.99	1.05	1.26	1.17	1.02	1.07	1152	352
Base Cond. OFA off	11/19/92	0:20	187	227	159	1306	1487	87.83	91.35	87.96	1.02	1.07	1.04	1.08	1.03	1.10	1487	0
GR-13A; 18% Gas	11/20/92	0:58	191	233	170	1326	1514	87.54	92.08	87.72	1.01	1.09	1.11	1.09	1.03	1.05	1232	282
GR-13D; 18% Gas	11/20/92	1:00	195	236	167	1309	1499	87.30	91.84	87.48	1.00	1.13	1.11	1.13	1.03	1.12	1219	280
GR-14B; 20% Gas	11/20/92	1:00	197	237	168	1309	1503	87.11	91.74	87.27	0.99	1.14	1.12	1.15	1.03	1.15	1195	308
Base Cond. OFA off	11/30/92	1:50	184	233	162	1338	1522	87.86	91.38	88.06	1.02	1.06	1.03	1.03	1.03	1.06	1522	0
GR-BFr	11/30/92	0:26	186	242	156	1336	1531	87.26	91.34	87.41	1.01	1.11	1.00	1.04	1.03	1.12	1369	162
GR-BFl	11/30/92	0:27	182	229	160	1323	1515	87.33	91.41	87.47	1.02	1.06	1.03	1.03	1.03	1.11	1356	159
GR-21C	12/1/92	1:06	154	173	136	1048	1209	86.71	91.34	86.84	1.02	1.10	1.10	1.13	1.04	1.14	955	254
GR-22	12/1/92	0:50	143	170	116	1043	1197	87.11	91.06	87.24	1.04	1.04	0.91	1.02	1.04	1.16	1098	99
Bias Firing	12/1/92	0:10	147	177	130	1048	1207	86.89	91.58	87.05	1.03	1.12	1.05	1.06	1.04	1.12	943	264
Base Cond. OFA on	12/1/92	0:50	139	151	129	1047	1191	87.86	91.38	88.19	1.05	0.91	1.01	0.97	1.03	1.06	1191	0
Base Cond. OFA off	12/1/92	0:40	155	188	137	1127	1284	87.79	91.31	87.93	1.04	1.07	1.03	1.04	1.04	1.10	1284	0
Base Cond. OFA off	12/2/92	3:55	180	233	147	1304	1480	88.09	91.62	88.24	1.02	1.09	0.96	1.03	1.03	1.09	1480	0
Base Cond. OFA off	12/4/92	0:55	160	178	135	1099	1252	87.80	91.32	88.01	1.04	1.06	1.05	1.11	1.03	1.16	1252	0
OFA Test	12/4/92	2:10	143	170	121	1021	1162	87.80	91.32	87.99	1.04	1.11	0.99	1.06	1.04	1.17	1162	0
Base Cond. OFA off	12/7/92	2:10	159	175	150	1105	1260	87.67	91.18	87.88	1.02	1.03	1.16	1.09	1.03	1.19	1260	0
GR-22A	12/7/92	1:05	161	179	141	1085	1244	87.20	91.32	87.38	1.01	1.09	1.11	1.14	1.03	1.16	1102	142

Cherokee Unit 3, Average Test D
Pre Modification

Test No.	Date	Dur.	RH H A mbtu/hr	PSH H A mbtu/hr	SSH H A mbtu/hr	Total H A mbtu/hr	Total Heat In mbtu/hr	GrossHV BoilEff %	LowHV BoilEff %	HtLoss BoilEff %	Furn Clean Fact	PSH Clean Fact	SSH Clean Fact	RH Clean Fact	ECON Clean Fact	AirHtr Clean Fact	Ht In Burners mbtu/hr	Ht In GR mbtu/hr
GR-22B	12/7/92	1:00	162	178	143	1072	1232	87.00	91.36	87.17	1.01	1.10	1.14	1.16	1.03	1.17	1039	194
GR-22C	12/7/92	1:00	163	176	144	1070	1234	86.73	91.36	86.89	1.00	1.10	1.15	1.17	1.03	1.17	976	257
Base Cond. OFA off	12/8/92	0:27	117	121	116	841	964	87.26	90.75	87.44	1.03	1.02	1.13	1.05	1.06	1.14	964	0
GR-31C	12/8/92	1:00	128	129	119	853	988	86.28	90.89	86.44	1.01	1.09	1.15	1.15	1.06	1.19	781	208
GR-31F	12/8/92	1:23	129	134	111	846	985	85.98	90.59	86.04	1.00	1.14	1.08	1.16	1.06	1.29	775	209
GR-32A	12/8/92	1:00	123	134	110	857	988	86.80	90.89	86.94	1.03	1.11	1.06	1.09	1.06	1.20	878	110
Base Cond. OFA off	12/9/92	0:41	118	130	115	871	996	87.42	90.93	87.66	1.04	1.05	1.08	1.02	1.05	1.08	996	0
GR-32C	12/9/92	1:00	124	135	105	835	972	85.86	90.44	85.97	1.01	1.16	1.04	1.13	1.06	1.23	769	203
GR-32C; 3Mills	12/9/92	0:56	128	135	115	858	993	86.36	90.98	86.49	1.01	1.13	1.10	1.14	1.05	1.18	785	209
Base Cond. OFA off	12/9/92	0:15	131	148	117	910	1047	86.93	90.41	87.06	1.02	1.13	1.07	1.10	1.04	1.23	1047	0
Base Cond. OFA off	12/14/92	2:00	197	198	151	1238	1406	88.01	91.54	88.16	1.03	1.03	1.07	1.23	1.03	1.16	1406	0
GR-12Z	12/14/92	1:02	201	230	161	1348	1531	88.04	91.87	88.14	1.02	1.05	1.04	1.13	1.03	1.10	1448	83
GR 2.7% Gas	12/14/92	0:17	200	233	158	1343	1524	88.14	91.82	88.23	1.02	1.07	1.02	1.13	1.03	1.12	1484	40
Base Cond. OFA off	12/15/92	1:37	142	209	163	1260	1430	88.08	91.61	88.29	1.03	0.98	1.06	0.81	1.03	1.04	1430	0
GR 20% Gas	12/15/92	0:36	158	229	173	1296	1481	87.51	92.11	87.65	1.01	1.07	1.13	0.90	1.03	1.04	1190	291
Base Cond. OFA off	12/16/92	0:48	184	216	160	1315	1490	88.30	91.84	88.46	1.03	0.99	1.03	1.03	1.03	1.08	1490	0
GR-12A1	12/16/92	2:19	184	232	163	1342	1526	87.99	92.10	88.13	1.02	1.05	1.03	1.02	1.03	1.07	1367	158
Test C1	1/15/93	1:00	198	230	172	1352	1539	87.80	91.74	87.99	1.01	1.05	1.10	1.11	1.03	1.10	1423	116
Test C2	1/15/93	1:00	202	233	176	1350	1544	87.46	91.64	87.64	1.00	1.07	1.14	1.14	1.03	1.10	1355	189
Test C3	1/15/93	0:58	205	233	181	1351	1549	87.21	91.65	87.39	1.00	1.08	1.17	1.16	1.03	1.10	1285	264
Test C4	1/15/93	0:50	207	233	181	1346	1545	87.09	91.79	87.27	0.99	1.08	1.17	1.17	1.02	1.08	1209	336
Test B1	1/15/93	0:59	191	229	167	1355	1541	87.94	91.47	88.16	1.02	1.02	1.05	1.05	1.03	1.08	1541	0
Test B3	1/15/93	1:01	190	229	168	1354	1537	88.11	91.65	88.35	1.02	1.02	1.06	1.05	1.03	1.04	1537	0
Base Cond. OFA off	1/18/93	0:45	196	237	183	1390	1573	88.39	91.94	88.62	1.01	1.04	1.13	1.06	1.03	1.08	1573	0
Test B5	1/18/93	1:01	188	232	175	1378	1559	88.39	91.93	88.61	1.02	1.00	1.08	1.01	1.03	1.05	1559	0
Base Cond. OFA cooling	1/19/93	0:39	193	244	166	1383	1566	88.32	91.86	88.54	1.01	1.06	1.03	1.04	1.03	1.11	1566	0
GR-12R	1/19/93	1:00	188	235	159	1356	1541	87.99	91.80	88.18	1.02	1.04	0.99	1.02	1.03	1.14	1462	79
GR-13E	1/19/93	1:00	198	232	174	1335	1525	87.52	92.06	87.71	1.00	1.08	1.13	1.13	1.03	1.12	1242	283
GR-13C	1/20/93	1:10	199	241	174	1357	1556	87.19	91.69	87.39	1.00	1.10	1.11	1.11	1.03	1.10	1275	281
GR-12D	1/20/93	1:05	200	250	163	1359	1559	87.16	91.49	87.35	1.00	1.13	1.04	1.11	1.03	1.12	1322	236
GR-12E	1/20/93	0:59	196	248	162	1361	1555	87.51	91.57	87.72	1.01	1.12	1.03	1.09	1.03	1.08	1402	153
Base Cond. OFA off	1/20/93	0:15	193	239	162	1365	1549	88.07	91.60	88.33	1.02	1.06	1.02	1.05	1.03	1.03	1549	0
150 MWn Max NOx Red	1/21/93	1:05	208	229	189	1348	1551	86.94	91.67	87.16	0.98	1.06	1.22	1.18	1.02	1.08	1202	349
Base Cond. OFA cooling	1/21/93	1:30	192	233	163	1348	1531	88.02	91.55	88.29	1.02	1.06	1.04	1.07	1.03	1.05	1531	0
120 MWn Max NOx Red	1/21/93	1:00	151	176	144	1076	1245	86.45	91.27	86.68	1.02	1.07	1.13	1.07	1.03	1.09	938	306
GR Environ. #1	1/25/93	5:10	184	223	164	1271	1459	87.09	91.55	87.25	1.00	1.10	1.11	1.10	1.03	1.15	1204	255
Base Cond. OFA cooling	1/26/93	0:55	170	208	157	1246	1419	87.85	91.37	88.07	1.02	1.03	1.06	1.02	1.03	1.10	1419	0
GR Environ. Test #2	1/26/93	5:22	183	215	165	1252	1439	87.00	91.40	87.19	1.00	1.08	1.13	1.11	1.03	1.10	1200	239
Environ. #3	1/27/93	5:55	184	250	160	1329	1529	86.92	91.29	87.08	1.00	1.15	1.03	1.04	1.03	1.12	1282	247
Environ. #4 (No GR)	1/27/93	6:00	175	222	144	1267	1443	87.76	91.27	87.93	1.02	1.07	0.96	1.03	1.03	1.06	1443	0

Cherokee Unit 3, Average Test D

Pre Modification

Test No.	Date	Dur.	RH HA mbtu/hr	PSH HA mbtu/hr	SSH HA mbtu/hr	Total HA mbtu/hr	Total Heat In mbtu/hr	GrossHV BoilEff %	LowHV BoilEff %	HtLoss BoilEff %	Furn Clean Fact	PSH Clean Fact	SSH Clean Fact	RH Clean Fact	ECON Clean Fact	AirHtr Clean Fact	Ht In Burners mbtu/hr	Ht In GR mbtu/hr
Environ. #5 (No GR)	1/28/93	6:04	177	244	161	1352	1538	87.93	91.45	88.21	1.02	1.08	1.01	0.97	1.03	1.07	1538	0
Base Cond.	2/2/93	0:17	181	223	172	1340	1522	88.02	91.55	88.26	1.02	1.01	1.10	1.01	1.03	1.03	1522	0
LNB 120MW #1	3/8/93	2:00	139	150	140	1085	1241	87.44	90.95	87.61	1.06	0.86	1.06	0.93	1.02	1.02	1241	0
LNB 120MW #2	3/8/93	2:00	138	160	139	1088	1247	87.25	90.75	87.42	1.05	0.92	1.05	0.94	1.02	1.03	1247	0
LNB 150MW #1	3/9/93	2:00	194	248	156	1393	1592	87.54	91.05	87.70	1.03	1.07	0.96	1.04	1.02	1.09	1592	0
LNB 150MW #2	3/9/93	2:00	187	230	157	1373	1565	87.69	91.21	87.87	1.03	0.99	0.97	1.00	1.02	1.03	1565	0
LNB 90MW #1	3/10/93	2:00	108	112	104	854	979	87.18	90.68	87.31	1.07	0.87	0.96	0.92	1.04	1.13	979	0
LNB 90MW #2	3/10/93	1:58	109	116	104	857	983	87.16	90.65	87.29	1.07	0.90	0.96	0.93	1.04	1.12	983	0
LNB 150MW #3	3/11/93	2:00	194	239	160	1364	1549	88.03	91.56	88.19	1.03	1.07	1.01	1.07	1.02	1.10	1549	0
LNB 150MW #4	3/11/93	2:00	190	235	163	1373	1558	88.13	91.66	88.30	1.03	1.03	1.02	1.03	1.02	1.06	1558	0
3M1	3/22/93	1:02	147	209	164	1299	1481	87.67	92.31	87.85	1.03	0.93	1.03	0.80	1.02	0.91	1182	300
3M2	3/22/93	1:03	146	211	165	1296	1478	87.71	92.36	87.88	1.03	0.95	1.05	0.81	1.02	0.90	1177	301
3M3	3/22/93	0:59	149	224	159	1301	1486	87.54	92.18	87.70	1.03	1.01	1.01	0.83	1.02	0.94	1185	301
3 Mill 7	4/13/93	1:00	116	144	135	1042	1182	88.15	91.68	88.31	1.06	0.84	1.03	0.79	1.02	0.95	1182	0
3 Mill 6	4/13/93	1:00	116	147	140	1054	1193	88.36	91.90	88.55	1.05	0.85	1.06	0.79	1.02	0.92	1193	0
Level 6 1/2	4/15/93	2:05	141	212	169	1281	1456	87.96	91.49	88.19	1.03	0.97	1.09	0.79	1.02	1.03	1456	0
Level 4	4/15/93	1:10	141	212	169	1280	1455	87.96	91.49	88.19	1.03	0.97	1.09	0.79	1.02	1.03	1455	0
Level 3	4/15/93	0:53	142	213	170	1282	1458	87.93	91.46	88.17	1.03	0.97	1.09	0.80	1.02	1.03	1458	0
Level 5 1/2	4/15/93	1:58	142	212	164	1281	1456	87.97	91.49	88.18	1.03	0.97	1.05	0.79	1.02	0.99	1456	0
Base Cond	4/15/93	5:25	142	212	167	1281	1456	87.97	91.50	88.20	1.03	0.97	1.07	0.80	1.02	1.01	1456	0
Level 5 1/2	4/16/93	1:47	147	238	161	1306	1489	87.70	91.21	87.92	1.02	1.08	1.03	0.82	1.03	1.08	1489	0
Level 6 1/2	4/16/93	1:19	148	236	158	1307	1491	87.68	91.19	87.90	1.02	1.06	1.00	0.82	1.03	1.05	1491	0
Level 3	4/16/93	0:44	148	238	156	1308	1493	87.60	91.11	87.81	1.02	1.07	0.99	0.82	1.03	1.06	1493	0
Level 4	4/16/93	1:00	149	238	156	1309	1495	87.60	91.11	87.81	1.02	1.07	0.99	0.82	1.03	1.06	1495	0
North out, South in	4/16/93	0:20	147	239	160	1305	1492	87.48	90.99	87.69	1.02	1.08	1.02	0.82	1.03	1.12	1492	0
South out, North in	4/16/93	0:20	147	237	159	1301	1483	87.74	91.26	87.97	1.02	1.08	1.01	0.82	1.03	1.06	1483	0
Base Cond	4/16/93	6:25	148	237	158	1308	1492	87.65	91.17	87.87	1.02	1.07	1.00	0.82	1.03	1.06	1492	0
Level 4	4/19/93	0:56	157	236	168	1296	1489	87.06	91.63	87.28	1.00	1.09	1.09	0.89	1.03	1.06	1199	290
Level 3	4/19/93	0:52	157	236	168	1295	1488	87.06	91.63	87.28	1.00	1.09	1.09	0.89	1.03	1.06	1198	290
Level 5 1/2	4/19/93	2:29	160	238	163	1284	1479	86.81	91.38	87.04	1.00	1.12	1.07	0.92	1.03	1.11	1187	292
Level 6 1/2	4/19/93	1:10	161	241	162	1288	1485	86.76	91.32	87.02	1.00	1.13	1.06	0.92	1.03	1.12	1192	293
Base Cond. OFA on	4/19/93	1:00	149	224	146	1277	1455	87.71	91.23	87.88	1.02	1.02	0.94	0.83	1.03	1.09	1455	0
GR	4/19/93	5:42	160	238	164	1285	1479	86.83	91.40	87.07	1.00	1.12	1.07	0.92	1.03	1.10	1188	292
Level 6 1/2	4/20/93	1:47	130	171	146	1154	1306	88.35	91.89	88.53	1.04	0.88	1.02	0.80	1.02	0.96	1306	0
Base Cond 130MW	4/20/93	3:35	129	171	147	1153	1305	88.35	91.89	88.53	1.04	0.87	1.02	0.79	1.02	0.96	1305	0
Base Cond 120MW	4/20/93	2:55	126	171	144	1067	1222	87.32	90.82	87.48	1.04	1.02	1.12	0.88	1.03	1.11	1222	0
Base Cond. OFA off	4/21/93	7:40	120	159	140	1035	1185	87.31	90.81	87.43	1.04	0.98	1.11	0.85	1.03	1.07	1185	0
Base Cond. OFA off	4/23/93	0:30	150	231	161	1301	1485	87.58	91.09	87.84	1.02	1.06	1.03	0.84	1.03	1.02	1485	0
4M12 (OFA off)	4/23/93	1:00	148	214	160	1295	1471	88.07	91.60	88.07	1.03	0.96	1.01	0.81	1.02	0.93	1471	0
4M13a (78,000 scfm OFA	4/23/93	0:20	147	213	150	1318	1496	88.07	91.60	87.98	1.03	0.91	0.91	0.78	1.02	0.93	1496	0

Cherokee Unit 3, Average Test D
Pre Modification

Test No.	Date	Dur.	RH H A mbtu/hr	PSH H A mbtu/hr	SSH H A mbtu/hr	Total H A mbtu/hr	Total Heat In mbtu/hr	GrossHV BoilEff %	LowHV BoilEff %	HtLoss BoilEff %	Furn Clean Fact	PSH Clean Fact	SSH Clean Fact	RH Clean Fact	ECON Clean Fact	AirHtr Clean Fact	Ht In Burners mbtu/hr	Ht In GR mbtu/hr
4M13b (70,000 scfm OFA	4/23/93	0:50	145	211	149	1317	1494	88.10	91.63	88.02	1.03	0.90	0.91	0.76	1.02	0.92	1494	0
Base Cond. OFA On	4/27/93	0:30	153	239	169	1324	1513	87.48	90.99	87.67	1.02	1.07	1.07	0.85	1.03	1.12	1513	0
GR on 150MW, 11% Gas	4/27/93	0:53	158	236	170	1323	1515	87.31	91.44	87.51	1.02	1.07	1.09	0.88	1.03	1.06	1342	173
GR on 150MW, 17% Gas	4/27/93	2:48	156	240	165	1312	1507	87.04	91.48	87.23	1.02	1.10	1.06	0.88	1.03	1.04	1248	259
Base Cond. OFA on	4/28/93	0:44	141	209	154	1233	1410	87.44	90.94	87.63	1.03	1.01	1.03	0.83	1.03	1.10	1410	0
GR on Auto	4/28/93	6:35	145	213	155	1209	1391	86.91	91.30	87.10	1.02	1.08	1.07	0.89	1.03	1.05	1163	228
GR on Auto	5/3/93	7:00	152	230	157	1259	1450	86.80	91.22	86.92	1.02	1.11	1.05	0.89	1.03	1.07	1202	248
Base Cond. OFA on	5/6/93	2:45	142	204	145	1240	1415	87.61	91.13	87.76	1.04	0.96	0.95	0.82	1.02	1.04	1415	0
GR on Auto	5/6/93	1:15	145	224	149	1243	1430	86.93	91.26	87.08	1.02	1.09	1.00	0.85	1.03	1.04	1210	219
Base Cond. OFA off	5/6/93	0:21	122	169	147	1077	1233	87.34	90.84	87.47	1.04	0.99	1.13	0.84	1.03	1.06	1233	0
GR on Auto 150MW	5/7/93	4:26	154	230	162	1311	1505	87.06	91.53	87.21	1.03	1.04	1.03	0.86	1.02	1.02	1241	264
GR on Auto 160MW	5/7/93	1:59	164	260	173	1407	1616	87.08	91.53	87.23	1.02	1.08	1.04	0.85	1.03	1.01	1335	281
GR on Auto 140MW	5/7/93	4:50	147	218	155	1236	1421	86.96	91.41	87.06	1.03	1.08	1.05	0.88	1.03	1.06	1174	247
Base Cond. OFA off	5/7/93	0:35	150	225	156	1284	1467	87.52	91.03	87.58	1.03	1.05	1.02	0.85	1.02	1.08	1467	0
GR on Auto	5/11/93	6:08	145	216	150	1197	1383	86.52	90.93	86.65	1.02	1.11	1.05	0.90	1.03	1.14	1147	237
GR 13	5/25/93	15:04	155	232	160	1273	1465	86.91	91.32	87.08	1.02	1.10	1.05	0.90	1.03	1.07	1219	246
GR 14	5/25/93	1:25	113	149	109	920	1066	86.24	90.59	86.32	1.04	1.07	0.96	0.90	1.05	1.15	894	172
GR 15	5/26/93	1:29	118	157	119	963	1115	86.30	90.65	86.37	1.04	1.07	1.01	0.91	1.04	1.15	934	181
LNB-OFA	5/26/93	0:42	103	118	95	817	945	86.51	89.97	86.50	1.05	0.97	0.91	0.91	1.06	1.22	945	0
LNB	5/26/93	9:44	141	192	157	1213	1384	87.56	91.07	87.73	1.03	0.94	1.06	0.84	1.03	1.00	1384	0
LNB	5/27/93	0:10	121	155	127	996	1143	87.14	90.63	87.33	1.05	1.00	1.04	0.89	1.04	1.06	1143	0
LNB-OFA	5/27/93	0:45	151	232	160	1298	1488	87.25	90.74	87.43	1.02	1.06	1.03	0.85	1.03	1.08	1488	0
GR-LNB 16	5/27/93	13:40	155	228	155	1252	1445	86.69	91.04	86.85	1.02	1.11	1.04	0.92	1.03	1.08	1214	230
GR-LNB 17	5/28/93	2:57	118	158	116	963	1116	86.25	90.52	86.32	1.04	1.06	0.97	0.90	1.05	1.16	949	167
LNB	5/28/93	1:23	97	110	94	777	902	86.19	89.65	86.26	1.04	0.98	0.94	0.91	1.07	1.20	902	0
GR-LNB 20b	6/3/93	8:51	151	210	166	1234	1419	86.94	91.35	87.25	1.02	1.04	1.13	0.90	1.03	1.03	1180	239
LNB	6/3/93	1:05	104	125	106	844	976	86.36	89.82	86.70	1.04	0.99	1.00	0.90	1.06	1.19	976	0
LNB (low load)	6/4/93	6:52	100	114	103	804	933	86.13	89.58	86.38	1.04	0.97	1.00	0.91	1.07	1.22	933	0
LNB (high load)	6/4/93	5:25	152	218	158	1287	1470	87.54	91.05	87.94	1.03	1.00	1.01	0.85	1.02	1.05	1470	0
LNB-OFA	6/4/93	2:31	153	210	166	1335	1519	87.89	91.41	88.06	1.03	0.89	1.01	0.81	1.02	0.98	1519	0
GR-LNB	6/4/93	7:42	154	220	171	1272	1461	87.07	91.49	87.25	1.02	1.05	1.13	0.89	1.03	1.01	1215	246
LNB	6/8/93	1:35	144	207	146	1225	1403	87.28	90.78	87.41	1.03	1.01	0.98	0.85	1.02	1.04	1403	0
LNB-OFA	6/8/93	1:40	143	208	144	1231	1408	87.40	90.91	87.60	1.04	1.00	0.96	0.84	1.02	1.05	1408	0
GR-LNB 22a	6/8/93	6:21	142	208	144	1168	1351	86.45	90.84	86.65	1.02	1.10	1.03	0.90	1.03	1.11	1123	228
GR-LNB 22b	6/8/93	5:30	156	221	172	1275	1465	87.05	91.49	87.33	1.02	1.06	1.14	0.91	1.02	1.01	1213	252
GR-LNB 23a	6/9/93	1:16	123	151	145	999	1148	86.94	91.30	87.22	1.03	0.99	1.20	0.92	1.03	1.05	967	182
LNB-OFA	6/9/93	0:30	95	107	104	780	897	86.94	90.43	87.18	1.04	0.95	1.04	0.89	1.07	1.15	897	0
LNB	6/9/93	16:03	123	163	130	1039	1193	86.94	90.43	87.28	1.04	0.97	1.01	0.86	1.04	1.08	1193	0
GR-LNB 23b	6/9/93	4:28	147	216	147	1205	1393	86.51	90.90	86.80	1.02	1.10	1.02	0.91	1.03	1.11	1158	235
LNB	6/10/93	8:47	119	156	138	1018	1168	87.14	90.64	87.49	1.04	0.97	1.11	0.86	1.04	1.08	1168	0

Cherokee Unit 3, Average Test D
Pre Modification

Test No.	Date	Dur.	RH H A mbtu/hr	PSH H A mbtu/hr	SSH H A mbtu/hr	Total H A mbtu/hr	Total Heat In mbtu/hr	GrossHV BoilEff %	LowHV BoilEff %	HtLoss BoilEff %	Furn Clean Fact	PSH Clean Fact	SSH Clean Fact	RH Clean Fact	ECON Clean Fact	AirHtr Clean Fact	Ht In Burners mbtu/hr	Ht In GR mbtu/hr
LNB-OFA	6/10/93	1:16	152	229	152	1305	1495	87.28	90.77	87.63	1.03	1.02	0.96	0.83	1.02	1.09	1495	0
GR-LNB 24	6/10/93	2:57	155	240	153	1274	1474	86.44	90.87	86.63	1.01	1.14	1.01	0.90	1.03	1.11	1217	257
LNB	6/10/93	0:37	157	214	163	1316	1507	87.32	90.82	87.52	1.03	0.95	1.02	0.85	1.02	1.00	1507	0
GR-LNB 25a	6/11/93	5:28	144	198	153	1153	1332	86.53	90.87	86.66	1.02	1.07	1.10	0.93	1.03	1.07	1123	209
GR-LNB 25b	6/11/93	9:06	159	225	170	1278	1475	86.63	90.98	86.75	1.01	1.07	1.12	0.92	1.02	1.05	1238	237
GR-LNB 26a	6/12/93	11:22	147	202	158	1172	1353	86.58	90.92	86.74	1.01	1.07	1.12	0.93	1.03	1.06	1137	216
GR-LNB 26b	6/12/93	2:13	100	124	102	810	939	86.19	90.12	86.24	1.04	1.06	1.00	0.91	1.07	1.17	856	83
LNB-OFA	6/12/93	7:11	141	191	163	1211	1385	87.35	90.85	87.52	1.03	0.94	1.10	0.85	1.03	0.99	1385	0
LNB-OFA	6/13/93	9:43	89	96	91	730	847	86.19	89.65	86.34	1.04	0.90	0.93	0.88	1.08	1.18	847	0
GR-LNB 28	6/14/93	4:06	157	231	169	1302	1500	86.80	91.21	87.07	1.02	1.07	1.09	0.89	1.03	1.01	1247	254
LNB	6/14/93	1:59	133	173	151	1153	1322	87.17	90.66	87.44	1.04	0.89	1.06	0.83	1.02	1.00	1322	0
LNB	6/18/93	0:38	148	200	160	1170	1333	87.75	91.27	87.99	1.01	1.07	1.15	0.95	1.02	1.05	1333	0
GR-LNB 29	6/18/93	14:24	158	213	170	1231	1416	86.90	91.36	87.10	1.00	1.07	1.16	0.96	1.02	1.07	1164	252
GR-LNB 30a	6/19/93	0:30	118	151	121	914	1061	86.14	90.61	86.27	1.02	1.12	1.08	0.96	1.05	1.20	864	197
LNB	6/19/93	9:15	98	114	103	771	893	86.20	89.65	86.39	1.02	1.06	1.03	0.94	1.09	1.20	893	0
GR-LNB 30b	6/19/93	11:53	163	206	187	1240	1429	86.73	91.23	86.98	0.99	1.03	1.27	0.98	1.01	1.03	1163	266
GR-LNB 30c	6/19/93	1:33	114	141	117	879	1022	86.01	90.36	86.18	1.02	1.10	1.07	0.96	1.06	1.15	852	170
GR-LNB 23	6/23/93	7:35	159	222	179	1291	1486	86.91	91.41	87.12	1.01	1.04	1.17	0.91	1.02	0.99	1213	273
GR-LNB 32b	6/23/93	1:09	139	187	149	1117	1288	86.71	91.15	86.93	1.02	1.05	1.11	0.92	1.03	1.05	1063	225
LNB-OFA cooling	6/24/93	6:25	94	110	101	766	883	86.74	90.22	87.01	1.03	1.01	1.02	0.91	1.07	1.13	883	0
GR-LNB 33a	6/24/93	6:00	137	176	147	1068	1234	86.55	90.95	86.76	1.01	1.06	1.14	0.96	1.03	1.06	1023	211
GR-LNB 33	6/24/93	11:22	159	216	178	1269	1460	86.95	91.45	87.17	1.01	1.04	1.18	0.93	1.02	1.00	1192	268
GR-LNB 34a	6/25/93	1:52	96	118	93	754	880	85.77	89.97	85.90	1.02	1.12	0.96	0.94	1.08	1.22	754	125
LNB-OFA	6/25/93	4:03	91	99	94	747	863	86.59	90.06	86.76	1.04	0.91	0.95	0.87	1.07	1.16	863	0
GR-LNB 34	6/25/93	8:00	148	210	165	1215	1399	86.84	91.28	87.09	1.01	1.06	1.14	0.90	1.03	1.03	1156	243
LNB (some OFA)	6/28/93	1:03	157	222	175	1320	1512	87.34	90.84	87.61	1.02	1.00	1.11	0.87	1.03	0.99	1512	0
LNB (some OFA)	6/29/93	12:15	135	176	148	1123	1290	87.02	90.50	87.28	1.03	0.95	1.08	0.87	1.04	0.99	1290	0
LNB	6/30/93	11:51	127	167	141	1041	1197	86.84	90.32	87.16	1.03	1.02	1.11	0.91	1.04	1.06	1197	0
GR-LNB 35	6/30/93	1:48	164	234	174	1312	1512	86.78	91.17	86.96	1.01	1.08	1.12	0.92	1.02	1.03	1262	250
GR-LNB 35a	6/30/93	6:05	164	235	166	1293	1494	86.50	90.88	86.65	1.00	1.10	1.09	0.94	1.03	1.09	1248	247
GR-LNB 35b	6/30/93	1:53	147	208	144	1155	1339	86.25	90.61	86.36	1.01	1.12	1.04	0.95	1.03	1.15	1118	221
GR-0LNB 36a	7/1/93	8:22	104	126	101	814	948	85.79	89.90	85.80	1.03	1.06	0.97	0.94	1.07	1.23	828	121
GR-LNB 36	7/1/93	15:37	157	209	175	1239	1429	86.64	90.99	86.80	1.01	1.03	1.19	0.94	1.02	1.04	1201	229
GR 37a	7/2/93	14:55	130	155	154	1023	1184	86.33	90.60	86.45	1.01	0.98	1.22	0.94	1.03	1.09	1007	178
GR 37	7/2/93	7:05	165	229	184	1316	1518	86.66	91.03	86.83	1.00	1.05	1.18	0.93	1.02	1.04	1271	247
GR-LNB 38	7/3/93	7:46	166	210	189	1272	1470	86.56	90.91	86.68	0.99	1.00	1.25	0.97	1.01	1.05	1235	234
GR-LNB 38a	7/3/93	8:43	160	211	179	1248	1449	86.07	90.39	86.10	1.00	1.04	1.21	0.95	1.02	1.18	1220	230
GR-LNB 39a	7/4/93	17:27	122	152	133	968	1132	85.47	89.58	85.37	1.02	1.02	1.12	0.93	1.04	1.33	985	147
GR-LNB 39	7/4/93	6:33	162	221	179	1282	1490	86.00	90.27	86.02	1.00	1.05	1.18	0.94	1.02	1.23	1264	226
GR-LNB 40a	7/5/93	11:52	108	130	116	859	1012	84.89	88.86	84.71	1.03	1.04	1.08	0.93	1.06	1.47	900	112

Cherokee Unit 3, Average Test D

Pre Modification

Test No.	Date	Dur.	RH HA mbtu/hr	PSH HA mbtu/hr	SSH HA mbtu/hr	Total HA mbtu/hr	Total Heat In mbtu/hr	GrossHV BoilEff %	LowHV BoilEff %	HtLoss BoilEff %	Furn Clean Fact	PSH Clean Fact	SSH Clean Fact	RH Clean Fact	ECON Clean Fact	AirHtr Clean Fact	Ht In Burners mbtu/hr	Ht In GR mbtu/hr
GR-LNB 40	7/5/93	12:08	154	208	169	1223	1430	85.47	89.69	85.40	1.01	1.04	1.16	0.93	1.02	1.32	1220	211
GR-LNB 52a	7/17/93	8:31	111	137	115	897	1042	86.04	90.38	86.11	1.04	1.00	1.02	0.90	1.05	1.14	871	171
GR-LNB 52	7/17/93	5:45	158	212	176	1242	1432	86.74	91.15	86.96	1.00	1.05	1.19	0.95	1.02	1.08	1189	243
LNB	7/19/93	1:53	119	161	143	1027	1173	87.55	91.06	87.71	1.04	1.02	1.15	0.86	1.03	1.01	1173	0
LNB-OFA	7/19/93	0:22	119	157	157	1070	1218	87.81	91.33	87.94	1.05	0.92	1.21	0.82	1.02	0.98	1218	0
GR-LNB 53a	7/19/93	3:29	135	173	150	1067	1228	86.80	91.17	86.95	1.02	1.04	1.17	0.95	1.03	1.04	1031	197
GR-LNB 53	7/19/93	7:06	163	230	176	1304	1498	86.99	91.40	87.15	1.01	1.07	1.15	0.93	1.02	1.02	1249	250
LNB	7/21/93	8:34	90	97	93	723	840	86.03	89.48	86.12	1.03	0.96	0.98	0.90	1.08	1.10	840	0
GR-LNB 54	7/21/93	4:52	154	227	159	1244	1441	86.31	90.70	86.53	1.01	1.12	1.08	0.92	1.02	1.00	1198	243
LNB	7/23/93	2:35	132	147	69	873	1007	86.69	90.16	86.90	1.01	1.09	0.62	1.07	1.07	1.04	1007	0
GR-LNB 55	7/23/93	4:53	159	226	165	1261	1457	86.57	90.95	86.71	1.01	1.10	1.11	0.94	1.02	1.09	1217	240
GR-LNB 55a	7/23/93	1:08	138	198	146	1142	1322	86.33	90.67	86.44	1.02	1.07	1.06	0.89	1.03	1.11	1110	213
LNB	7/23/93	3:55	86	75	103	715	826	86.58	90.05	86.71	1.05	0.73	1.09	0.86	1.07	1.03	826	0
LNB	7/24/93	1:52	91	89	104	744	860	86.53	89.99	86.53	1.05	0.81	1.07	0.88	1.07	1.08	860	0
LNB-OFA	7/24/93	0:36	101	123	104	834	971	85.92	89.37	85.87	1.04	0.99	0.98	0.88	1.05	1.24	971	0
GR-LNB 56	7/24/93	7:45	156	226	163	1248	1442	86.52	90.90	86.65	1.01	1.11	1.10	0.93	1.02	1.09	1203	239
GR-LNB 56a	7/24/93	2:09	105	125	108	853	993	85.81	90.10	85.87	1.03	0.97	0.99	0.90	1.06	1.15	838	155
GR-LNB 57a	7/25/93	1:10	87	96	86	698	819	85.20	89.46	85.12	1.03	0.99	0.94	0.91	1.09	1.26	692	127
LNB-OFA	7/25/93	5:52	97	107	90	780	902	86.39	89.86	86.47	1.05	0.91	0.89	0.88	1.06	1.18	902	0
GR-LNB 57b	7/25/93	10:19	138	185	143	1091	1265	86.16	90.50	86.31	1.02	1.07	1.08	0.94	1.03	1.14	1057	208
GR-LNB 57	7/25/93	6:14	163	231	174	1305	1504	86.72	91.10	86.93	1.01	1.07	1.13	0.93	1.02	1.04	1258	246
GR-LNB 58a	7/26/93	10:15	120	162	120	961	1119	85.73	90.03	85.76	1.03	1.11	1.01	0.93	1.05	1.24	941	178
GR-LNB 58	7/26/93	8:34	163	232	174	1307	1508	86.70	91.06	86.88	1.01	1.08	1.13	0.93	1.02	1.06	1266	242
GR-LNB 58b	7/26/93	5:09	144	203	148	1161	1345	86.32	90.63	86.47	1.02	1.09	1.06	0.92	1.03	1.13	1136	209
GR-LNB 59a	7/27/93	10:48	120	164	117	964	1121	85.85	90.13	85.96	1.03	1.11	0.97	0.92	1.05	1.21	947	174
LNB-OFA	7/27/93	3:21	157	238	172	1367	1560	87.61	91.12	87.94	1.03	1.02	1.05	0.84	1.02	0.98	1560	0
GR-LNB 59	7/27/93	9:16	148	211	154	1202	1389	86.50	90.83	86.71	1.02	1.09	1.07	0.91	1.03	1.07	1171	219
GR-LNB 60a	7/28/93	11:06	138	190	142	1097	1270	86.37	90.69	86.59	1.02	1.10	1.08	0.94	1.03	1.12	1071	198
GR-LNB 60b	7/28/93	2:02	177	237	198	1372	1583	86.66	91.04	86.88	0.99	1.04	1.23	0.96	1.01	1.04	1323	260
LNB-OFA	7/28/93	2:21	163	240	180	1386	1583	87.57	91.08	87.80	1.02	1.02	1.09	0.86	1.02	0.98	1583	0
GR-LNB 60	7/28/93	8:10	170	245	187	1375	1585	86.78	91.13	86.98	1.00	1.06	1.15	0.91	1.02	1.01	1333	252
GR-LNB 61a	7/29/93	15:55	162	229	171	1285	1483	86.65	91.00	86.85	1.01	1.09	1.12	0.94	1.02	1.05	1247	236
GR-LNB 61	7/29/93	8:04	166	220	184	1287	1486	86.57	90.94	86.76	1.00	1.04	1.21	0.96	1.02	1.03	1243	244
GR-LNB 62	7/30/93	10:04	157	205	179	1234	1424	86.62	90.97	86.82	1.00	1.03	1.22	0.95	1.02	1.04	1196	228
LNB-OFA	7/30/93	4:32	156	230	167	1332	1526	87.31	90.81	87.56	1.03	1.02	1.05	0.85	1.02	1.02	1526	0
GR-LNB 62a	7/30/93	9:00	162	234	168	1297	1500	86.50	90.84	86.72	1.01	1.09	1.10	0.92	1.02	1.08	1260	240
GR-LNB 63a	7/31/93	17:10	159	220	178	1284	1481	86.65	91.01	86.89	1.01	1.04	1.17	0.92	1.02	1.03	1244	237
GR-LNB 63b	7/31/93	6:49	163	224	182	1298	1499	86.63	90.93	86.86	1.00	1.05	1.18	0.93	1.02	1.02	1272	226
GR-LNB 64a	8/1/93	1:25	147	199	156	1155	1338	86.36	90.66	86.56	1.01	1.08	1.13	0.95	1.02	1.08	1132	206
GR-LNB 64b	8/1/93	10:21	112	147	113	909	1058	85.93	90.20	86.09	1.03	1.07	0.99	0.90	1.05	1.16	897	161

Cherokee Unit 3, Average Test D
Pre Modification

Test No.	Date	Dur.	RH H A mbtu/hr	PSH H A mbtu/hr	SSH H A mbtu/hr	Total H A mbtu/hr	Total Heat In mbtu/hr	GrossHV BoilEff %	LowHV BoilEff %	HtLoss BoilEff %	Furn Clean Fact	PSH Clean Fact	SSH Clean Fact	RH Clean Fact	ECON Clean Fact	AirHtr Clean Fact	Ht In Burners mbtu/hr	Ht In GR mbtu/hr
GR-LNB 64c	8/1/93	12:14	159	226	166	1257	1452	86.54	90.87	86.76	1.00	1.10	1.11	0.94	1.02	1.07	1223	229
GR-LNB 65a	8/2/93	8:55	106	136	109	872	1016	85.74	89.98	85.76	1.04	1.04	0.98	0.89	1.05	1.19	865	151
LNB-OFA	8/2/93	1:23	154	230	176	1333	1525	87.43	90.94	87.70	1.03	1.02	1.11	0.85	1.02	1.05	1525	0
GR-LNB 65b	8/2/93	6:02	154	224	171	1276	1471	86.77	91.13	86.95	1.02	1.06	1.13	0.89	1.02	1.04	1235	236
GR-LNB 65c	8/2/93	7:14	152	210	169	1226	1414	86.65	91.02	86.61	1.01	1.05	1.15	0.91	1.02	1.06	1183	231
GR-LNB 66a	8/3/93	8:29	99	125	99	803	938	85.65	89.93	85.62	1.04	1.08	0.97	0.90	1.07	1.26	791	146
GR-LNB 66b	8/3/93	9:34	153	214	163	1221	1410	86.56	90.93	86.78	1.01	1.08	1.13	0.93	1.02	1.12	1179	231
GR-LNB 66c	8/3/93	5:55	159	229	168	1273	1468	86.73	91.10	86.96	1.01	1.09	1.11	0.93	1.02	1.07	1230	239
GR-LNB 67	8/4/93	24:00	147	207	154	1179	1363	86.52	90.84	86.71	1.01	1.09	1.09	0.93	1.03	1.11	1152	211
GR-LNB 68a	8/5/93	7:39	124	167	129	1007	1166	86.32	90.59	86.47	1.03	1.08	1.06	0.92	1.04	1.14	993	173
GR-LNB 68b	8/5/93	15:50	163	229	177	1294	1494	86.65	90.98	86.85	1.00	1.08	1.15	0.94	1.02	1.09	1262	232
GR-LNB 69	8/6/93	9:48	148	207	156	1185	1366	86.72	91.03	86.88	1.02	1.08	1.10	0.93	1.02	1.09	1159	208
LNB	8/6/93	7:58	152	217	168	1304	1492	87.36	90.86	87.54	1.03	0.99	1.07	0.85	1.02	1.00	1492	0
LNB-OFA	8/6/93	5:04	155	219	178	1340	1533	87.39	90.89	87.55	1.03	0.96	1.11	0.84	1.02	0.99	1533	0
LNB	8/7/93	3:04	153	222	159	1284	1465	87.60	91.11	87.79	1.03	1.04	1.03	0.87	1.02	0.99	1465	0
GR-LNB 70	8/7/93	3:53	156	218	148	1199	1380	86.85	90.75	87.00	1.01	1.13	1.04	0.97	1.03	1.10	1274	106
LNB-OFA	8/7/93	8:05	153	216	177	1308	1499	87.25	90.75	87.39	1.03	0.99	1.13	0.86	1.02	1.02	1499	0
LNB	8/7/93	6:28	155	222	175	1327	1520	87.33	90.83	87.49	1.03	0.99	1.10	0.85	1.02	1.00	1520	0
LNB	8/9/93	8:04	142	197	157	1224	1403	87.20	90.69	87.43	1.04	0.95	1.05	0.84	1.02	1.02	1403	0
GR-LNB 71 (10% Gas)	8/9/93	13:45	160	239	173	1333	1535	86.81	90.86	87.05	1.02	1.08	1.10	0.89	1.02	1.04	1375	160
GR-LNB 72a (10%)	8/10/93	7:48	159	222	178	1289	1484	86.87	90.88	87.10	1.02	1.05	1.17	0.92	1.01	1.07	1342	142
LNB	8/10/93	7:27	154	220	168	1331	1526	87.21	90.70	87.44	1.03	0.96	1.04	0.83	1.02	1.02	1526	0
GR-LNB 72b (10%)	8/10/93	7:25	153	220	168	1273	1464	86.94	90.96	87.16	1.02	1.05	1.11	0.89	1.03	1.06	1321	143
GR-LNB 73	8/11/93	3:22	150	214	154	1219	1401	86.99	91.02	87.14	1.02	1.08	1.06	0.91	1.03	1.09	1263	138
LNB-OFA	8/11/93	9:49	158	232	173	1358	1554	87.36	90.86	87.60	1.02	1.00	1.06	0.84	1.02	1.01	1554	0
LNB	8/11/93	2:45	151	219	156	1287	1477	87.18	90.67	87.40	1.03	1.00	1.00	0.84	1.02	1.03	1477	0
LNB	8/12/93	7:36	116	141	131	976	1125	86.69	90.16	86.91	1.05	0.91	1.07	0.86	1.03	1.06	1125	0
GR-LNB 74	8/12/93	14:33	160	232	173	1307	1501	87.02	91.05	87.25	1.01	1.07	1.12	0.91	1.02	1.07	1353	148
GR-LNB 75	8/13/93	18:16	158	226	170	1282	1476	86.80	90.83	86.96	1.01	1.06	1.12	0.91	1.02	1.08	1326	150
GR-LNB 76a	8/14/93	4:54	132	166	144	1025	1187	86.29	90.26	86.39	1.02	1.06	1.16	0.96	1.03	1.15	1077	110
LNB	8/14/93	1:46	96	107	98	759	889	85.42	88.84	85.31	1.04	1.00	1.01	0.93	1.07	1.31	889	0
GR-LNB 76b	8/14/93	11:05	155	223	165	1260	1455	86.60	90.62	86.74	1.01	1.08	1.10	0.91	1.02	1.11	1309	146
GR-LNB 77	8/15/93	1:10	120	158	132	982	1140	86.10	90.04	86.17	1.03	1.05	1.09	0.91	1.04	1.19	1036	104
LNB	8/15/93	14:44	120	147	141	1001	1154	86.54	90.00	86.67	1.04	0.92	1.13	0.88	1.04	1.11	1154	0
LNB	8/15/93	6:58	154	223	184	1337	1531	87.32	90.82	87.52	1.02	0.99	1.15	0.84	1.02	1.01	1531	0
LNB (low load)	8/16/93	7:38	110	141	118	898	1042	86.11	89.56	86.27	1.03	1.05	1.06	0.91	1.05	1.18	1042	0
LNB (150 MWe)	8/16/93	3:21	155	238	171	1349	1547	87.26	90.75	87.48	1.02	1.04	1.05	0.84	1.02	1.07	1547	0
LNB-OFA cooling	8/16/93	11:40	158	221	177	1369	1567	87.35	90.86	87.54	1.03	0.93	1.07	0.83	1.02	0.98	1567	0
LNB	8/17/93	9:07	137	198	150	1190	1366	87.10	90.59	87.30	1.04	1.01	1.04	0.84	1.02	1.04	1366	0
100% Gas (plant test)	8/17/93	0:34	86	79	94	711	815	87.29	90.79	84.82	1.05	0.76	0.99	0.86	1.06	0.92	815	0

Cherokee Unit 3, Average Test D

Pre Modification

Test No.	Date	Dur.	RH H A mbtu/hr	PSH H A mbtu/hr	SSH H A mbtu/hr	Total H A mbtu/hr	Total Heat In mbtu/hr	GrossHV BoilEff %	LowHV BoilEff %	HtLoss BoilEff %	Furn Clean Fact	PSH Clean Fact	SSH Clean Fact	RH Clean Fact	ECON Clean Fact	AirHtr Clean Fact	Ht In Burners mbtu/hr	Ht In GR mbtu/hr
LNB (OFA cooling)	8/17/93	8:59	157	299	170	1428	1634	87.35	90.85	87.58	1.03	1.28	1.04	0.83	1.02	1.04	1634	0
LNB	8/17/93	3:05	153	292	170	1401	1602	87.46	90.96	87.71	1.03	1.28	1.06	0.83	1.02	1.03	1602	0
LNB (low load)	8/18/93	9:42	121	210	130	1063	1225	86.70	90.18	86.93	1.04	1.32	1.04	0.88	1.03	1.11	1225	0
LNB 150 MWe	8/18/93	14:16	159	297	166	1427	1633	87.40	90.90	87.64	1.03	1.27	1.01	0.84	1.02	1.06	1633	0
GR-LNB 78	8/24/93	3:25	159	206	171	1259	1447	87.02	91.11	87.21	1.08	1.07	1.20	0.98	0.95	1.06	1289	158
LNB OFA cooling	8/24/93	10:38	150	214	160	1293	1483	87.18	90.67	87.40	1.11	1.05	1.09	0.89	0.96	1.07	1483	0
LNB OFA cooling	8/25/93	2:06	118	144	145	1012	1160	87.21	90.71	87.39	1.11	0.98	1.22	0.91	0.98	1.06	1160	0
LNB	8/25/93	8:38	116	141	132	968	1111	87.08	90.57	87.31	1.10	1.01	1.16	0.93	0.98	1.08	1111	0
LNB	8/25/93	13:08	147	221	140	1273	1460	87.21	90.70	87.54	1.11	1.10	0.95	0.88	0.97	1.11	1460	0
LNB	8/26/93	21:16	114	140	122	955	1105	86.41	89.87	87.08	1.04	0.91	1.01	0.86	1.04	1.12	1105	0
LNB	8/26/93	2:42	155	228	160	1303	1493	87.23	90.73	87.53	1.02	1.03	1.02	0.86	1.03	1.05	1493	0
LNB	8/27/93	8:26	109	127	115	894	1034	86.40	89.87	87.00	1.04	0.90	1.02	0.88	1.05	1.12	1034	0
LNB	8/27/93	6:17	150	209	160	1276	1460	87.42	90.92	87.70	1.03	0.96	1.03	0.85	1.02	1.03	1460	0
GR-LNB 79	9/8/93	11:15	154	236	160	1297	1492	86.97	91.17	87.32	1.02	1.09	1.03	0.87	1.03	1.05	1297	195
GR-LNB 79a	9/8/93	1:49	128	180	135	1075	1242	86.49	90.73	87.11	1.03	1.05	1.02	0.87	1.04	1.11	1068	174
GR-LNB 80a	9/9/93	6:55	117	161	120	962	1114	86.31	90.56	87.04	1.03	1.10	1.01	0.90	1.05	1.16	954	160
LNB-OFA	9/9/93	1:46	95	114	93	778	902	86.25	89.71	87.25	1.04	1.00	0.92	0.88	1.07	1.24	902	0
GR-LNB 80	9/9/93	14:15	144	208	153	1183	1365	86.64	90.90	87.09	1.02	1.08	1.07	0.90	1.03	1.08	1171	195
LNB-OFA	9/10/93	4:50	88	100	86	716	835	85.74	89.18	87.04	1.03	0.99	0.91	0.88	1.09	1.31	835	0
GR-LNB 81	9/10/93	1:46	117	162	117	947	1098	86.16	90.47	86.86	1.02	1.14	1.00	0.92	1.05	1.19	926	172
LNB	9/10/93	13:30	147	211	155	1254	1439	87.11	90.60	87.49	1.03	0.99	1.01	0.85	1.03	1.06	1439	0
LNB	9/11/93	19:30	136	195	144	1166	1341	86.88	90.37	87.22	1.03	1.01	1.01	0.84	1.03	1.06	1341	0
GR-LNB 82	9/11/93	4:10	151	235	152	1289	1491	86.50	90.75	87.17	1.02	1.08	0.98	0.85	1.03	1.10	1279	212
GR-LNB 83a	9/12/93	11:51	134	194	135	1112	1288	86.36	90.60	87.17	1.03	1.08	1.00	0.89	1.04	1.15	1106	182
GR-LNB 83	9/12/93	12:09	162	245	176	1355	1561	86.82	91.02	87.21	1.01	1.07	1.09	0.88	1.03	1.05	1357	204
GR-LNB 84a	9/13/93	5:35	124	172	127	1015	1174	86.42	90.65	87.28	1.03	1.10	1.02	0.90	1.05	1.20	1011	163
GR-LNB 84	9/13/93	18:03	153	229	157	1259	1442	87.24	91.34	87.73	1.01	1.10	1.05	0.90	1.03	1.13	1285	157
GR-LNB 85a	9/14/93	4:15	138	190	150	1121	1288	87.04	91.20	87.53	1.02	1.07	1.11	0.92	1.03	1.13	1131	157
LNB	9/14/93	11:05	125	170	132	1051	1204	87.20	90.69	87.57	1.04	1.00	1.02	0.87	1.04	1.10	1204	0
LNB-OFA	9/14/93	1:06	153	231	161	1317	1503	87.63	91.14	87.97	1.02	1.03	1.01	0.84	1.03	1.05	1503	0
GR-LNB 85	9/14/93	6:55	155	222	169	1266	1449	87.35	91.54	87.48	1.01	1.07	1.12	0.91	1.03	1.02	1268	181
GR-LNB 86a	9/15/93	0:50	139	195	155	1149	1320	87.03	91.23	87.36	1.02	1.05	1.12	0.89	1.03	1.08	1150	170
LNB	9/15/93	3:07	111	119	138	895	1024	87.38	90.88	87.74	1.03	0.89	1.24	0.92	1.04	1.10	1024	0
GR-LNB 86b	9/15/93	4:26	133	186	140	1068	1229	86.79	91.02	87.20	1.01	1.11	1.07	0.92	1.04	1.12	1066	163
GR-LNB 86	9/15/93	11:20	155	221	166	1252	1437	87.09	91.29	87.27	1.01	1.08	1.12	0.92	1.03	1.03	1254	183
GR-LNB 87a	9/16/93	5:46	132	176	137	1053	1214	86.69	90.90	87.15	1.01	1.05	1.06	0.92	1.04	1.10	1055	159
GR-LNB 87	9/16/93	15:24	148	210	155	1188	1372	86.61	90.76	87.23	1.01	1.10	1.09	0.93	1.03	1.15	1204	168
GR-LNB 88a	9/17/93	5:31	139	187	148	1099	1268	86.64	90.86	87.24	1.01	1.08	1.11	0.94	1.03	1.15	1099	170
GR-LNB 88	9/17/93	18:28	157	222	169	1258	1444	87.08	91.24	87.38	1.00	1.07	1.13	0.92	1.03	1.07	1268	177
GR-LNB 89	9/18/93	24:00	153	212	167	1223	1402	87.25	91.40	87.48	1.01	1.06	1.14	0.92	1.03	1.06	1238	164

Cherokee Unit 3, Average Test D
Pre Modification

Test No.	Date	Dur.	RH HA mbtu/hr	PSH HA mbtu/hr	SSH HA mbtu/hr	Total HA mbtu/hr	Total Heat In mbtu/hr	GrossHV BoilEff %	LowHV BoilEff %	HtLoss BoilEff %	Furn Clean Fact	PSH Clean Fact	SSH Clean Fact	RH Clean Fact	ECON Clean Fact	AirHtr Clean Fact	Ht In Burners mbtu/hr	Ht In GR mbtu/hr
GR-LNB 90a	9/19/93	10:06	142	187	156	1119	1286	86.96	91.10	87.32	1.01	1.06	1.16	0.94	1.03	1.11	1133	153
GR-LNB 90	9/19/93	13:54	161	224	176	1278	1467	87.15	91.24	87.33	1.00	1.06	1.16	0.93	1.02	1.04	1306	160
GR-LNB 91	9/20/93	24:00	156	209	174	1219	1401	87.02	91.21	87.16	0.99	1.05	1.20	0.95	1.02	1.04	1223	178
GR-LNB 92a	9/21/93	3:00	128	176	133	1027	1186	86.54	90.80	86.94	1.02	1.11	1.05	0.92	1.04	1.10	1017	169
GR-LNB 92	9/21/93	17:56	150	215	166	1239	1427	86.83	91.04	87.14	1.01	1.05	1.12	0.89	1.03	1.05	1238	189
GR-LNB 3 Mill a	9/22/93	7:59	122	164	132	998	1152	86.59	90.88	87.23	1.03	1.07	1.08	0.90	1.04	1.14	982	170
GR-LNB 3 Mill b	9/22/93	8:25	126	175	139	1066	1224	87.05	91.31	87.22	1.03	1.04	1.07	0.87	1.04	1.08	1053	171
GR-LNB 3 Mill c	9/23/93	24:00	128	183	135	1078	1238	87.05	91.31	87.18	1.03	1.07	1.03	0.88	1.04	1.08	1065	173
GR-LNB 3 Mill d	9/24/93	1:58	106	147	108	883	1021	86.44	90.73	86.49	1.03	1.11	0.97	0.88	1.06	1.19	870	151
LNB-OFA 3 Mill	9/24/93	3:33	81	68	79	674	780	86.47	89.93	86.33	1.05	0.67	0.84	0.82	1.08	1.22	780	0
GR-LNB 3 Mill e	9/24/93	6:10	126	183	127	1079	1240	87.04	91.28	87.18	1.04	1.05	0.95	0.85	1.03	1.09	1074	166
GR-LNB 93	9/24/93	12:09	143	217	145	1212	1395	86.84	91.00	87.06	1.02	1.08	0.99	0.86	1.03	1.10	1225	170
GR-LNB 94a	9/25/93	2:12	128	189	130	1075	1241	86.57	90.76	86.79	1.03	1.11	1.00	0.88	1.04	1.14	1080	162
LNB-OFA	9/25/93	2:24	105	148	99	887	1026	86.44	89.90	86.55	1.04	1.09	0.88	0.86	1.06	1.27	1026	0
GR-LNB 94	9/25/93	19:05	155	237	163	1291	1485	86.89	91.02	87.13	1.01	1.10	1.06	0.88	1.03	1.08	1313	172
GR-LNB 95a	9/26/93	4:15	129	181	135	1054	1216	86.64	90.89	86.91	1.02	1.10	1.06	0.91	1.04	1.15	1046	170
LNB-OFA	9/26/93	2:55	101	113	96	845	977	86.43	89.89	86.60	1.05	0.85	0.87	0.84	1.05	1.23	977	0
GR-LNB 95	9/26/93	16:33	146	216	155	1213	1398	86.78	90.96	86.99	1.02	1.09	1.06	0.89	1.03	1.11	1221	177
GR-LNB 96a	9/27/93	2:53	132	189	134	1100	1270	86.53	90.74	86.65	1.03	1.08	1.01	0.88	1.04	1.15	1099	171
LNB	9/27/93	19:45	149	220	151	1282	1470	87.22	90.72	87.47	1.03	1.00	0.97	0.83	1.03	1.05	1470	0
GR-LNB 96b	9/27/93	0:57	128	189	133	1085	1254	86.48	90.74	86.69	1.03	1.09	1.00	0.86	1.04	1.10	1071	183
GR-LNB 97a	9/28/93	9:13	138	201	142	1137	1313	86.54	90.76	86.76	1.02	1.10	1.04	0.90	1.04	1.14	1136	177
LNB	9/28/93	4:27	147	218	178	1313	1491	88.03	91.56	88.37	1.03	0.98	1.13	0.81	1.03	0.93	1491	0
GR-LNB 97	9/28/93	5:58	157	226	176	1281	1472	87.01	91.09	87.27	1.00	1.06	1.15	0.90	1.03	1.05	1315	157
GR-LNB 97b	9/28/93	2:48	133	180	144	1072	1237	86.62	90.64	86.84	1.02	1.07	1.11	0.92	1.04	1.13	1113	124
GR-LNB 98a	9/29/93	5:22	121	164	128	979	1133	86.34	90.33	86.51	1.02	1.10	1.07	0.92	1.05	1.20	1023	110
GR-LNB 98	9/29/93	18:37	155	231	166	1289	1482	86.97	91.11	87.20	1.01	1.08	1.07	0.88	1.03	1.06	1306	176
GR-LNB 99a	9/30/93	5:32	117	160	119	979	1135	86.20	90.44	86.28	1.04	1.05	0.98	0.88	1.05	1.16	973	163
GR-LNB 99	9/30/93	13:24	152	232	160	1285	1481	86.77	90.97	87.00	1.02	1.09	1.04	0.87	1.03	1.06	1286	195
GR-LNB 99b	9/30/93	2:27	131	189	133	1092	1269	86.09	90.36	86.30	1.03	1.07	1.00	0.88	1.04	1.14	1079	190
LNB-OFA	9/30/93	2:27	89	79	90	723	841	86.03	89.47	86.16	1.05	0.73	0.92	0.86	1.07	1.15	841	0
GR-LNB 100a	10/1/93	11:00	109	155	106	904	1053	85.83	90.07	86.00	1.03	1.13	0.94	0.89	1.06	1.26	901	153
GR-LNB 100	10/1/93	9:12	136	182	147	1085	1255	86.41	90.63	86.65	1.02	1.07	1.12	0.93	1.03	1.14	1080	175
GR-LNB 101	10/2/93	24:00	131	183	135	1064	1232	86.31	90.52	86.63	1.02	1.10	1.05	0.92	1.04	1.19	1063	169
GR-LNB 102	10/3/93	24:00	126	172	130	1010	1174	86.02	90.21	86.30	1.02	1.11	1.05	0.93	1.04	1.22	1015	159
GR-LNB 103	10/4/93	24:00	134	186	139	1078	1250	86.21	90.46	86.44	1.02	1.10	1.06	0.92	1.03	1.16	1068	181
GR-LNB 104	10/5/93	24:00	136	192	139	1100	1277	86.13	90.44	86.33	1.02	1.10	1.05	0.91	1.04	1.17	1078	200
GR-LNB 105	10/6/93	10:15	152	223	157	1241	1434	86.59	90.82	86.81	1.01	1.09	1.06	0.91	1.03	1.13	1237	196
GR-LNB 106	10/8/93	8:45	154	231	163	1291	1475	87.56	91.76	87.89	1.02	1.07	1.06	0.88	1.03	1.05	1290	184
GR-LNB 107	10/9/93	24:00	156	233	162	1286	1472	87.39	91.57	87.71	1.01	1.09	1.05	0.89	1.03	1.13	1293	179

Cherokee Unit 3, Average Test D
Pre Modification

Test No.	Date	Dur.	RH HA mbtu/hr	PSH HA mbtu/hr	SSH HA mbtu/hr	Total HA mbtu/hr	Total Heat In mbtu/hr	GrossHV BoilEff %	LowHV BoilEff %	HtLoss BoilEff %	Furn Clean Fact	PSH Clean Fact	SSH Clean Fact	RH Clean Fact	ECON Clean Fact	AirHtr Clean Fact	Ht In Burners mbtu/hr	Ht In GR mbtu/hr
GR-LNB 108	10/10/93	11:00	158	233	166	1290	1480	87.18	91.35	87.46	1.01	1.09	1.08	0.90	1.03	1.13	1300	180
GR-LNB 109a	10/13/93	4:07	155	223	169	1296	1489	87.02	91.29	87.38	1.02	1.03	1.09	0.88	1.03	1.06	1277	212
GR-LNB 109b	10/13/93	2:02	130	182	136	1088	1255	86.65	90.87	86.95	1.03	1.05	1.02	0.88	1.04	1.12	1082	173
GR-LNB 110a	10/14/93	6:02	143	198	152	1142	1317	86.67	90.92	87.00	1.01	1.08	1.11	0.93	1.03	1.16	1131	187
GR-LNB 110	10/14/93	14:56	160	221	178	1272	1465	86.88	91.24	87.23	1.00	1.05	1.18	0.93	1.02	1.10	1231	234
GR-LNB 110b	10/14/93	3:00	126	178	133	1048	1215	86.25	90.71	86.53	1.02	1.07	1.03	0.88	1.04	1.18	994	221
GR-LNB 111	10/15/93	12:49	146	198	162	1163	1341	86.73	91.09	87.09	1.00	1.06	1.16	0.93	1.03	1.13	1126	214
GR-LNB 3 Mill a	10/15/93	2:58	148	213	172	1257	1436	87.50	91.86	87.86	1.02	1.03	1.15	0.87	1.03	1.00	1217	219
GR-LNB 3 Mill b	10/15/93	7:05	138	200	147	1166	1338	87.11	91.38	87.46	1.03	1.05	1.04	0.87	1.03	1.08	1149	189
GR-LNB 3 Mill c	10/16/93	12:05	117	163	114	952	1104	86.22	90.46	86.50	1.03	1.13	0.97	0.91	1.05	1.25	945	159
GR-LNB 3 Mill d	10/16/93	10:28	161	245	168	1341	1541	87.04	91.37	87.44	1.01	1.09	1.05	0.88	1.03	1.07	1305	235
GR-LNB 3 Mill e	10/16/93	1:25	143	207	152	1201	1382	86.97	91.27	87.35	1.03	1.05	1.05	0.88	1.03	1.09	1177	204
GR-LNB 3 Mill f	10/17/93	23:46	137	186	157	1135	1300	87.31	91.66	87.62	1.02	1.02	1.15	0.89	1.03	1.08	1100	200
LNB-OFA 3 Mill	10/18/93	11:10	112	140	128	929	1060	87.65	91.16	87.93	1.03	0.99	1.11	0.89	1.05	1.15	1060	0
GR-LNB 3 Mill g	10/19/93	15:35	131	183	137	1106	1268	87.17	91.48	87.29	1.04	1.02	1.01	0.87	1.03	1.07	1079	189
GR-LNB 3 Mill h	10/20/93	7:35	133	189	139	1110	1272	87.26	91.58	87.41	1.03	1.07	1.04	0.89	1.04	1.12	1082	190
GR-LNB 112	10/20/93	4:09	131	185	130	1055	1218	86.62	90.89	86.88	1.02	1.13	1.02	0.92	1.04	1.21	1042	176
LNB-OFA	10/20/93	0:56	144	214	138	1167	1339	87.15	90.65	87.30	1.02	1.13	0.98	0.91	1.03	1.23	1339	0
GR-LNB 113	10/20/93	10:42	158	231	163	1285	1478	86.96	91.28	87.11	1.01	1.09	1.07	0.90	1.03	1.12	1254	223
GR-LNB 113	10/21/93	24:00	160	226	169	1273	1464	86.98	91.37	87.15	1.01	1.08	1.12	0.93	1.03	1.09	1226	238
GR-LNB 114	10/22/93	24:00	155	216	168	1242	1428	86.95	91.34	87.11	1.01	1.06	1.13	0.93	1.03	1.08	1194	234
GR-LNB 115	10/23/93	24:00	159	227	171	1290	1482	87.04	91.42	87.18	1.01	1.06	1.12	0.91	1.03	1.08	1245	238
GR-LNB 116	10/24/93	14:00	157	225	165	1267	1455	87.05	91.39	87.17	1.01	1.08	1.10	0.92	1.03	1.10	1230	226
GR-LNB 116a	10/24/93	10:00	159	230	169	1292	1486	86.94	91.30	87.03	1.01	1.08	1.10	0.91	1.03	1.07	1251	235
GR-LNB 117a	10/25/93	4:55	129	170	137	1042	1202	86.67	90.93	86.68	1.03	1.04	1.07	0.91	1.04	1.15	1027	175
GR-LNB 117	10/25/93	19:04	159	221	172	1266	1451	87.20	91.54	87.37	1.00	1.06	1.15	0.93	1.02	1.09	1229	223
GR-LNB 118	10/26/93	24:00	156	220	169	1262	1444	87.42	91.76	87.64	1.01	1.06	1.13	0.91	1.03	1.07	1224	220
GR-LNB 119	10/27/93	14:25	161	226	179	1298	1483	87.53	91.88	87.72	1.00	1.05	1.17	0.92	1.02	1.06	1261	222
GR-LNB 119a	10/27/93	9:34	158	219	175	1276	1460	87.40	91.72	87.52	1.01	1.04	1.16	0.92	1.02	1.00	1245	216
GR-LNB 120a	10/28/93	7:21	147	205	164	1210	1387	87.23	91.51	87.30	1.02	1.03	1.13	0.89	1.03	1.03	1190	197
GR-LNB 120	10/28/93	16:38	160	220	176	1275	1456	87.55	91.88	87.79	1.01	1.05	1.17	0.93	1.02	1.04	1241	215
GR-LNB 121	10/29/93	24:00	160	217	178	1264	1443	87.64	91.99	87.95	1.00	1.05	1.19	0.94	1.02	1.12	1226	216
GR-LNB 122	10/30/93	24:00	164	229	179	1305	1489	87.64	91.99	87.94	1.00	1.06	1.16	0.93	1.02	1.09	1265	224
GR-LNB 123	10/31/93	24:00	161	223	176	1282	1467	87.38	91.71	87.63	1.00	1.06	1.16	0.93	1.02	1.08	1247	221
GR-LNB 124	11/1/93	6:18	155	217	172	1259	1437	87.58	91.75	87.84	1.01	1.05	1.15	0.91	1.03	1.08	1268	169
LNB-OFA	11/1/93	1:08	125	167	134	1033	1176	87.75	91.27	88.07	1.04	1.03	1.06	0.89	1.04	1.14	1176	0
GR-LNB 125a	11/2/93	8:15	161	214	188	1277	1452	87.94	92.09	88.30	1.00	1.02	1.24	0.93	1.02	1.03	1289	163
LNB	11/2/93	0:29	158	213	185	1270	1447	87.75	91.88	88.10	1.00	1.02	1.22	0.92	1.02	1.01	1286	161
GR-LNB 125	11/2/93	10:09	158	213	185	1269	1446	87.74	91.88	88.09	1.00	1.02	1.23	0.92	1.02	1.01	1283	163
GR-LNB 126a	11/4/93	1:40	154	207	178	1239	1409	87.91	92.02	88.16	1.01	1.02	1.21	0.92	1.02	1.01	1262	146

Cherokee Unit 3, Average Test D
Pre Modification

Test No.	Date	Dur.	RH HA mbtu/hr	PSH HA mbtu/hr	SSH HA mbtu/hr	Total HA mbtu/hr	Total Heat In mbtu/hr	GrossHV BoilEff %	LowHV BoilEff %	HtLoss BoilEff %	Furn Clean Fact	PSH Clean Fact	SSH Clean Fact	RH Clean Fact	ECON Clean Fact	AirHtr Clean Fact	Ht In Burners mbtu/hr	Ht In GR mbtu/hr
GR-LNB 126	11/4/93	13:29	154	213	176	1263	1437	87.89	91.98	88.22	1.01	1.03	1.17	0.90	1.02	1.05	1290	147
GR-LNB 127a	11/5/93	7:20	144	201	155	1186	1359	87.24	91.28	87.84	1.03	1.04	1.09	0.90	1.03	1.25	1225	134
GR-LNB 127	11/5/93	5:54	156	227	171	1319	1499	88.01	92.10	87.90	1.02	1.02	1.08	0.87	1.03	1.06	1347	152
GR-LNB 128	11/8/93	4:55	161	227	171	1287	1471	87.49	91.82	87.81	1.01	1.07	1.12	0.92	1.03	1.07	1253	218
GR-LNB 129	11/9/93	8:30	163	235	175	1321	1508	87.60	91.92	87.76	1.01	1.07	1.12	0.91	1.03	1.02	1288	220
GR-LNB 129a	11/9/93	5:29	164	249	168	1379	1571	87.79	91.98	87.93	1.02	1.06	1.02	0.86	1.03	1.03	1381	190
GR-LNB 130	11/10/93	15:43	159	234	169	1316	1500	87.76	91.91	87.95	1.01	1.06	1.08	0.88	1.03	1.03	1328	172
LNB	11/10/93	7:50	151	222	167	1322	1499	88.16	91.70	88.41	1.03	0.98	1.05	0.82	1.02	0.97	1499	0
LNB	11/11/93	2:00	145	206	157	1245	1414	88.07	91.60	88.25	1.03	0.99	1.04	0.85	1.02	1.04	1414	0
LNB 3 Mill a	11/11/93	3:34	113	149	136	985	1123	87.71	91.23	87.92	1.04	0.98	1.13	0.84	1.04	1.04	1123	0
LNB 3 Mill b	11/11/93	9:20	113	146	130	986	1124	87.71	91.23	87.86	1.05	0.94	1.06	0.84	1.03	1.07	1124	0
LNB 3 Mill c	11/12/93	12:30	122	166	136	1064	1208	88.06	91.58	88.09	1.04	0.96	1.04	0.84	1.03	1.06	1208	0
LNB 3 Mill d	11/12/93	11:29	149	213	171	1311	1480	88.58	92.13	88.88	1.03	0.95	1.07	0.82	1.02	0.94	1480	0
LNB 3 Mill e	11/13/93	14:30	148	217	160	1283	1454	88.28	91.82	88.58	1.03	0.99	1.03	0.83	1.02	1.01	1454	0
LNB 3 Mill f	11/13/93	9:29	149	212	176	1317	1487	88.61	92.16	88.93	1.03	0.94	1.10	0.81	1.02	0.93	1487	0
LNB 3 Mill	11/14/93	24:00	145	208	164	1266	1429	88.55	92.10	88.92	1.03	0.97	1.07	0.83	1.02	0.98	1429	0
LNB	11/15/93	1:39	148	219	160	1282	1446	88.70	92.25	89.10	1.03	1.01	1.03	0.84	1.02	0.98	1446	0
GR-LNB 131	11/15/93	13:00	158	228	165	1276	1451	87.90	92.23	88.07	1.01	1.08	1.09	0.91	1.03	1.03	1241	210
GR-LNB 132	11/16/93	7:42	153	218	160	1235	1404	87.94	92.25	88.11	1.01	1.08	1.09	0.91	1.03	1.03	1208	197
GR-LNB 132a	11/16/93	16:17	141	191	150	1145	1316	86.96	91.22	87.07	1.02	1.03	1.08	0.91	1.03	1.18	1131	185
GR-LNB 133	11/17/93	0:40	137	192	141	1114	1279	87.09	91.33	87.21	1.03	1.09	1.05	0.91	1.03	1.20	1104	175
LNB	11/17/93	8:40	123	161	137	1070	1222	87.51	91.01	87.69	1.05	0.92	1.04	0.83	1.03	1.14	1222	0
LNB	12/3/93	5:15	146	224	157	1290	1466	87.99	91.52	88.28	1.03	1.02	1.00	0.82	1.03	1.05	1466	0
LNB	12/6/93	2:33	111	132	132	954	1091	87.36	90.86	87.35	1.05	0.88	1.11	0.84	1.04	1.10	1091	0
LNB	12/6/93	3:00	155	225	167	1352	1531	88.28	91.82	88.23	1.03	0.96	1.02	0.82	1.02	1.02	1531	0
LNB	12/6/93	1:55	158	234	159	1357	1539	88.19	91.73	88.11	1.03	0.99	0.96	0.84	1.02	1.04	1539	0
LNB	12/7/93	6:45	157	231	161	1369	1554	88.09	91.62	88.42	1.03	0.96	0.96	0.81	1.02	1.01	1554	0
LNB	12/8/93	4:03	158	248	157	1359	1548	87.79	91.31	88.09	1.02	1.06	0.96	0.84	1.03	1.08	1548	0
GR-LNB 134	12/8/93	3:40	158	246	172	1365	1559	87.55	91.93	87.84	1.02	1.06	1.05	0.84	1.03	0.99	1315	244
GR-LNB 134a	12/8/93	0:46	156	230	172	1361	1548	87.94	91.75	88.24	1.03	0.98	1.05	0.83	1.02	0.98	1466	81
GR-LNB 134b	12/8/93	2:44	158	236	179	1364	1546	88.18	92.01	88.54	1.02	1.02	1.10	0.85	1.03	0.95	1465	81
GR-LNB 134c	12/8/93	3:31	163	234	192	1358	1540	88.21	92.04	88.56	1.00	1.02	1.19	0.88	1.02	0.95	1458	81
GR-LNB 135	12/9/93	12:00	154	208	181	1255	1426	88.00	91.82	88.33	1.01	1.00	1.21	0.90	1.02	0.99	1352	74
GR-LNB 135a	12/9/93	2:59	160	234	174	1311	1494	87.72	91.53	88.08	1.01	1.07	1.12	0.90	1.02	1.04	1414	80
GR-LNB 135b	12/9/93	7:10	144	212	142	1227	1402	87.49	91.27	87.83	1.03	1.01	0.94	0.84	1.03	1.08	1332	69
GR-LNB 136	12/10/93	11:35	149	223	150	1272	1450	87.72	91.51	88.06	1.03	1.03	0.97	0.84	1.03	1.06	1381	70
GR-LNB 137	12/11/93	16:15	145	208	153	1215	1384	87.75	91.53	87.94	1.02	1.04	1.04	0.87	1.03	1.06	1319	65
GR-LNB 137a	12/11/93	7:44	161	245	168	1370	1557	88.02	91.82	88.13	1.02	1.04	1.02	0.85	1.03	1.02	1480	77
GR-LNB 138	12/12/93	24:00	162	249	166	1375	1562	88.07	91.88	88.13	1.02	1.05	1.01	0.85	1.03	1.02	1483	79
GR-LNB 139	12/13/93	7:48	164	245	184	1383	1566	88.30	92.12	88.48	1.01	1.05	1.12	0.87	1.03	1.02	1488	78

Cherokee Unit 3, Average Test D
Pre Modification

Test No.	Date	Dur.	RH H A mbtu/hr	PSH H A mbtu/hr	SSH H A mbtu/hr	Total H A mbtu/hr	Total Heat In mbtu/hr	GrossHV BoilEff %	LowHV BoilEff %	HtLoss BoilEff %	Furn Clean Fact	PSH Clean Fact	SSH Clean Fact	RH Clean Fact	ECON Clean Fact	AirHtr Clean Fact	Ht In Burners mbtu/hr	Ht In GR mbtu/hr
GR-LNB 139a	12/13/93	4:18	163	245	180	1370	1555	88.15	91.97	88.39	1.01	1.06	1.11	0.87	1.03	1.05	1476	78
LNB	12/13/93	5:18	157	213	168	1298	1475	88.05	91.58	88.31	1.01	0.96	1.07	0.87	1.02	1.06	1475	0
LNB-OFA	12/14/93	1:55	160	245	172	1376	1564	87.98	91.50	88.17	1.02	1.04	1.04	0.84	1.03	1.11	1564	0
GR-LNB 140	12/14/93	1:18	164	238	189	1383	1573	87.93	91.74	88.19	1.02	1.02	1.15	0.87	1.03	1.03	1492	81
LNB	12/14/93	8:30	155	229	175	1353	1535	88.18	91.71	88.44	1.02	0.98	1.08	0.83	1.02	1.01	1535	0
LNB	12/15/93	9:28	155	228	166	1338	1517	88.23	91.76	88.42	1.03	0.99	1.03	0.84	1.02	1.05	1517	0
LNB-OFA	12/15/93	5:29	157	239	160	1355	1534	88.29	91.83	88.43	1.02	1.02	0.97	0.83	1.02	1.06	1534	0
GR-LNB 141	12/15/93	5:15	147	204	163	1223	1390	87.92	91.74	88.07	1.03	1.01	1.12	0.89	1.03	1.07	1316	74
LNB	12/15/93	2:50	101	135	104	829	950	87.04	90.53	86.96	1.04	1.18	0.98	0.90	1.09	1.29	950	0
LNB	12/16/93	15:05	151	218	160	1289	1461	88.21	91.74	88.40	1.06	1.03	1.05	0.87	1.00	1.10	1461	0
GR-LNB 142	12/16/93	6:14	164	246	173	1385	1571	88.13	91.95	88.39	1.05	1.08	1.07	0.89	1.00	1.12	1489	83
GR-LNB 142a	12/16/93	1:15	114	152	121	960	1101	87.20	91.01	87.46	1.06	1.04	1.03	0.89	1.03	1.19	1038	63
GR-LNB 143	12/17/93	2:10	114	143	125	931	1069	87.09	90.90	87.32	1.05	1.04	1.11	0.92	1.03	1.23	1007	62
LNB-OFA	12/17/93	0:40	65	57	61	519	609	85.17	88.58	85.04	1.01	0.87	0.80	0.87	1.19	1.54	609	0
LNB	12/17/93	6:10	154	228	167	1330	1507	88.27	91.81	88.54	1.06	1.04	1.07	0.86	1.00	1.09	1507	0
LNB	12/20/93	2:25	140	208	140	1174	1338	87.66	91.17	87.84	1.05	1.12	0.99	0.89	1.02	1.21	1338	0
100% Gas Firing	12/20/93	0:34	96	120	91	770	882	87.18	90.67	84.48	1.05	1.12	0.92	0.93	1.08	1.30	882	0
LNB	12/22/93	2:35	131	188	130	1092	1248	87.49	90.99	87.67	1.05	1.10	0.99	0.89	1.02	1.21	1248	0
LNB	1/5/94	2:24	152	224	166	1312	1490	88.04	91.57	88.29	1.05	1.04	1.08	0.86	1.01	1.03	1490	0
LNB-OFA	1/5/94	2:26	152	229	155	1312	1491	87.93	91.46	88.17	1.06	1.05	1.00	0.85	1.00	1.06	1491	0
LNB-OFA	1/5/94	9:15	135	190	145	1156	1316	87.76	91.28	88.03	1.06	1.03	1.05	0.87	1.01	1.10	1316	0
LNB-OFA	1/6/94	8:47	109	135	122	896	1028	87.07	90.56	87.32	1.05	1.01	1.09	0.90	1.04	1.18	1028	0
LNB	1/6/94	15:12	152	223	164	1296	1472	88.05	91.58	88.34	1.05	1.05	1.08	0.88	1.01	1.08	1472	0
LNB	1/7/94	6:55	125	169	140	1065	1213	87.71	91.23	88.03	1.06	1.02	1.09	0.87	1.02	1.13	1213	0
LNB-OFA	1/7/94	1:09	132	180	141	1096	1249	87.71	91.23	87.99	1.05	1.04	1.07	0.90	1.01	1.16	1249	0
GR-LNB 144	1/7/94	15:40	153	213	163	1244	1419	87.66	91.49	87.86	1.04	1.07	1.12	0.92	1.01	1.10	1340	79
GR-LNB 145a	1/8/94	8:20	139	174	159	1101	1260	87.39	91.20	87.61	1.03	1.02	1.22	0.95	1.01	1.12	1189	71
GR-LNB 145	1/8/94	15:39	162	212	186	1285	1463	87.80	91.62	88.00	1.02	1.02	1.24	0.95	1.00	1.08	1382	81
GR-LNB 146a	1/9/94	2:10	159	179	211	1241	1410	87.98	91.82	88.12	1.01	0.90	1.46	0.97	0.99	1.05	1329	81
GR-LNB 146b	1/9/94	8:39	134	156	151	1001	1149	87.16	90.97	87.31	1.01	1.03	1.27	1.01	1.01	1.18	1084	65
GR-LNB 146	1/9/94	9:02	152	202	164	1201	1372	87.53	91.36	87.68	1.03	1.06	1.16	0.95	1.01	1.13	1293	79
LNB	1/9/94	3:35	121	160	136	1046	1193	87.64	91.15	87.80	1.06	0.96	1.07	0.86	1.02	1.10	1193	0
LNB	1/10/94	3:50	141	186	161	1149	1311	87.58	91.09	87.90	1.04	1.02	1.19	0.93	1.01	1.18	1311	0
GR-LNB 147	1/10/94	2:40	164	246	169	1368	1562	87.61	91.41	87.96	1.04	1.09	1.06	0.90	1.01	1.14	1480	82
GR-LNB 147a	1/10/94	4:04	131	178	141	1086	1248	86.98	90.85	87.29	1.05	1.04	1.08	0.90	1.02	1.20	1163	85
GR-LNB 147b	1/10/94	4:54	132	180	138	1092	1253	87.05	90.91	87.35	1.05	1.05	1.05	0.90	1.02	1.22	1169	84
GR-LNB 148a	1/11/94	6:32	121	161	122	965	1112	86.75	90.62	87.00	1.04	1.12	1.04	0.95	1.03	1.31	1034	78
GR-LNB 148	1/11/94	14:38	158	239	158	1350	1538	87.74	91.62	87.96	1.05	1.06	0.99	0.87	1.00	1.09	1435	103
GR-LNB 148b	1/11/94	2:48	129	174	136	1115	1275	87.41	91.26	87.63	1.07	0.96	1.00	0.85	1.01	1.09	1196	79
GR-LNB 149a	1/12/94	6:14	142	206	143	1178	1346	87.51	91.36	87.75	1.05	1.10	1.02	0.90	1.01	1.15	1263	83

Cherokee Unit 3, Average Test D
Pre Modification

Test No.	Date	Dur.	RH H A mbtu/hr	PSH H A mbtu/hr	SSH H A mbtu/hr	Total H A mbtu/hr	Total Heat In mbtu/hr	GrossHV BoilEff %	LowHV BoilEff %	HtLoss BoilEff %	Furn Clean Fact	PSH Clean Fact	SSH Clean Fact	RH Clean Fact	ECON Clean Fact	AirHtr Clean Fact	Ht In Burners mbtu/hr	Ht In GR mbtu/hr
GR-LNB 149	1/12/94	13:30	151	220	154	1257	1434	87.63	91.49	87.84	1.05	1.08	1.04	0.89	1.01	1.11	1344	90
GR-LNB A Mill off	1/12/94	1:09	146	193	154	1139	1302	87.42	91.28	87.63	1.03	1.09	1.14	0.97	1.01	1.14	1218	84
GR-LNB D Mill off	1/12/94	1:39	150	195	169	1181	1346	87.69	91.70	87.90	1.02	1.05	1.22	0.96	1.00	1.07	1227	119
GR-LNB D Mill off line	1/13/94	4:23	121	133	149	938	1075	87.23	91.14	87.41	1.02	0.96	1.31	0.97	1.02	1.12	993	81
GR-LNB 150	1/13/94	7:15	168	229	184	1333	1522	87.60	91.49	87.85	1.02	1.05	1.18	0.95	1.00	1.09	1418	104
GR-LNB D Mill off line	1/13/94	1:13	156	186	182	1177	1344	87.62	91.60	87.83	1.01	1.01	1.32	1.00	0.99	1.08	1231	113
GR-LNB 150a	1/13/94	6:00	146	203	151	1189	1361	87.34	91.21	87.56	1.04	1.06	1.07	0.91	1.01	1.12	1270	91
GR-LNB 151a	1/14/94	7:25	117	149	124	956	1100	86.85	90.69	87.02	1.05	1.03	1.05	0.91	1.03	1.18	1028	72
GR-LNB, ABC	1/14/94	7:50	146	178	174	1141	1303	87.58	91.44	87.84	1.02	1.00	1.29	0.97	1.00	1.09	1222	82
GR-LNB 151	1/14/94	7:54	145	193	157	1155	1321	87.40	91.25	87.67	1.03	1.06	1.15	0.94	1.01	1.11	1239	82
GR-LNB 156	1/19/94	24:00	127	165	137	1033	1185	87.15	91.01	87.41	1.05	1.04	1.10	0.92	1.02	1.13	1107	78
GR-LNB 157a	1/20/94	6:38	126	154	141	988	1130	87.38	91.24	87.70	1.03	1.04	1.19	0.97	1.02	1.17	1056	74
GR-LNB 157	1/20/94	3:50	160	212	177	1251	1425	87.78	91.72	88.04	1.02	1.06	1.21	0.97	1.00	1.13	1316	109

Cherokee Unit 3, Average Test D
Pre Modification

Test No.	Date	Dur.	CO raw ppm	CO2 raw %vol	NOx raw ppm	SO2 raw ppm	Econ In H2O DegF	Econ Wall Out DegF	Cold RH Flow lbs/hr	Hot RH DegF	SH AttmpO DegF	Rel Humd %	Amb Press ", HgA	Amb Temp Deg F	NG Temp Def F	Coal Temp Deg F	Econ H2O Prs PSIG	Econ H2O Fl lbs/hr
Base Cond. (OFA off)	11/11/92	8:42	119	10.73	239	302	468	489	736460	920	768	50.5	29.9	50	80	80	1924	768683
GR	11/11/92	1:01	250	10.76	204	270	513	533	1139355	1004	780	50.5	29.9	49	80	80	2043	1173710
Base Cond. (OFA off)	11/11/92	4:25	8	13.07	376	319	508	527	1129821	953	781	50.5	29.9	55	80	80	2042	1210615
Base Cond. OFA off	11/12/92	0:45	35	16.68	348	325	505	525	1129565	927	764	50.5	27.1	47	80	80	2047	1230000
BPMS GR 4	11/12/92	1:05	27	14.80	217	257	513	533	1133636	1005	791	50.5	24.0	53	80	80	2040	1168939
Base Cond. OFA off	11/12/92	1:15	8	15.75	363	313	508	528	1130000	950	784	50.5	23.8	56	80	80	2043	1210000
BPMS Base Cond. 5	11/13/92	2:55	5	15.33	387	303	510	530	1140852	970	786	50.5	22.8	53	80	80	2048	1216648
BPMS Base Cond. 6	11/13/92	1:00	79	15.54	305	312	506	526	1140000	922	769	50.5	25.1	63	80	80	2050	1240328
BPMS Base Cond. 7	11/13/92	1:00	502	15.96	262	319	506	526	1147869	910	764	50.5	25.1	68	80	80	2054	1252951
Base Cond.-1d	11/16/92	1:00	5	15.47	381	314	506	526	1055152	958	776	50.5	25.0	59	80	80	2015	1124848
GR-10c	11/16/92	1:00	150	16.26	309	345	503	523	1108525	909	761	50.5	25.0	74	80	80	2040	1209672
GR-10d	11/16/92	1:00	266	16.07	313	350	503	523	1109344	906	762	50.5	25.0	75	80	80	2043	1210492
Base Cond. OFA off	11/17/92	1:15	9	15.58	395	319	508	528	1128289	948	779	50.5	25.0	58	80	80	2046	1218158
GR-11c	11/17/92	1:00	83	15.05	200	271	508	528	1102459	988	786	50.5	25.0	65	80	80	2033	1153934
GR-11d	11/17/92	1:00	13	14.96	194	269	508	528	1098393	987	787	50.5	25.0	68	80	80	2030	1141429
Base Cond. OFA off	11/17/92	0:20	5	14.70	395	308	505	525	1071905	959	784	50.5	25.0	70	80	80	2023	1130000
Base Cond. OFA off	11/18/92	0:28	29	16.46	355	333	504	524	1099655	932	777	50.5	25.0	47	80	80	2037	1184483
GR-11e	11/18/92	1:04	13	14.83	194	270	510	530	1103846	989	792	50.5	25.0	60	80	80	2033	1147385
GR-12b	11/18/92	1:05	30	15.05	194	292	508	528	1099848	974	789	50.5	25.0	65	80	80	2032	1148636
Base Cond. OFA off	11/18/92	0:35	74	15.68	355	333	506	526	1084722	954	785	50.5	25.0	65	80	80	2025	1155556
GR-12 (5% Gas)	11/19/92	1:00	980	16.19	207	336	505	525	1113443	930	762	50.5	25.0	77	80	80	2040	1210000
GR-12a (10% Gas)	11/19/92	1:00	974	16.31	180	332	507	527	1116721	974	783	50.5	25.0	77	80	80	2039	1185082
GR-12c (23% Gas)	11/19/92	1:00	93	15.36	176	278	509	529	1085082	1009	763	50.5	24.9	77	80	80	2022	1098852
Base Cond. OFA off	11/19/92	0:20	14	15.54	353	322	504	524	1072381	973	784	50.5	24.9	77	80	80	2019	1138095
GR-13A; 18% Gas	11/20/92	0:58	543	15.96	167	290	507	527	1093220	988	783	50.5	24.8	49	80	80	2029	1141356
GR-13D; 18% Gas	11/20/92	1:00	43	15.47	183	287	508	528	1082623	1001	787	50.5	24.8	48	80	80	2023	1112295
GR-14B; 20% Gas	11/20/92	1:00	31	14.96	182	272	509	529	1081803	1007	788	50.5	24.7	48	80	80	2022	1108033
Base Cond. OFA off	11/30/92	1:50	226	16.00	348	329	506	526	1108468	959	784	50.5	25.0	60	80	80	2033	1181712
GR-BFr	11/30/92	0:26	150	14.69	218	290	509	528	1104444	969	794	50.5	25.0	61	80	80	2033	1175556
GR-BFl	11/30/92	0:27	38	14.53	213	287	506	526	1090357	957	783	50.5	25.0	60	80	80	2030	1168929
GR-21C	12/1/92	1:06	32	14.45	158	254	486	506	856025	971	775	50.5	25.1	56	80	80	1951	872653
GR-22	12/1/92	0:50	10	14.00	182	271	483	503	852769	906	774	50.5	25.1	56	80	80	1952	910222
Bias Firing	12/1/92	0:10	43	14.48	158	262	485	505	847234	947	783	50.5	25.1	56	80	80	1954	882677
Base Cond. OFA on	12/1/92	0:50	263	16.11	204	312	481	501	857056	878	747	50.5	25.1	54	80	80	1955	924722
Base Cond. OFA off	12/1/92	0:40	85	15.77	280	321	489	509	923356	941	780	50.5	25.1	55	80	80	1973	971791
Base Cond. OFA off	12/2/92	3:55	16	15.74	330	354	505	525	1076534	950	790	50.5	25.0	43	80	80	2020	1154807
Base Cond. OFA off	12/4/92	0:55	65	15.61	239	431	485	505	887952	957	777	50.5	25.3	35	80	80	1960	931117
OFA Test	12/4/92	2:10	157	15.22	189	414	480	500	788182	950	784	50.5	25.3	36	80	80	1942	864610
Base Cond. OFA off	12/7/92	2:10	141	15.37	272	324	489	509	864629	976	765	50.5	25.0	37	80	80	1958	930989
GR-22A	12/7/92	1:05	634	14.99	164	300	490	510	849507	988	773	50.5	25.0	45	80	80	1954	904634

Cherokee Unit 3, Average Test D
Pre Modification

Test No.	Date	Dur.	CO raw ppm	CO2 raw %vol	NOx raw ppm	SO2 raw ppm	Econ In H2O DegF	Econ Wall Out DegF	Cold RH Flow lbs/hr	Hot RH DegF	SH AttmpO DegF	Rel Humd %	Amb Press ", HgA	Amb Temp Deg F	NG Temp Def F	Coal Temp Deg F	Econ H2O Prs PSIG	Econ H2O Fl lbs/hr
GR-22B	12/7/92	1:00	22	14.87	162	285	490	510	842418	992	769	50.5	25.0	45	80	80	1953	884639
GR-22C	12/7/92	1:00	7	14.69	155	267	490	510	843079	995	767	50.5	25.0	45	80	80	1952	880215
Base Cond. OFA off	12/8/92	0:27	800	16.03	228	333	464	484	650326	929	751	50.5	24.9	44	80	80	1903	696312
GR-31C	12/8/92	1:00	195	14.69	150	267	468	488	657968	971	756	50.5	24.8	51	80	80	1903	685888
GR-31F	12/8/92	1:23	7	13.32	161	243	470	490	660274	971	765	50.5	24.8	52	80	80	1902	682228
GR-32A	12/8/92	1:00	227	14.86	157	284	464	484	651399	955	770	50.5	24.8	50	80	80	1907	702563
Base Cond. OFA off	12/9/92	0:41	256	16.77	222	337	463	483	660379	928	763	50.5	24.8	63	80	80	1913	725266
GR-32C	12/9/92	1:00	16	13.83	154	238	465	485	636338	964	772	50.5	24.8	67	80	80	1906	675228
GR-32C; 3Mills	12/9/92	0:56	12	14.31	136	247	468	488	658136	967	761	50.5	24.8	67	80	80	1910	690765
Base Cond. OFA off	12/9/92	0:15	13	14.65	270	305	472	492	698101	959	773	50.5	24.8	65	80	80	1921	746623
Base Cond. OFA off	12/14/92	2:00	64	15.24	309	319	495	515	1158182	947	774	50.5	24.9	41	80	80	1993	1050661
GR-12Z	12/14/92	1:02	314	15.24	226	294	504	524	1200000	955	782	50.5	24.8	44	80	80	2032	1174127
GR 2.7% Gas	12/14/92	0:17	51	15.16	220	294	505	525	1200000	955	786	50.5	24.8	39	80	80	2031	1169444
Base Cond. OFA off	12/15/92	1:37	326	16.06	309	325	501	521	875993	928	766	50.5	24.7	46	80	80	2022	1149189
GR 20% Gas	12/15/92	0:36	51	15.03	188	255	506	526	896641	985	780	50.5	24.6	50	80	80	2033	1147838
Base Cond. OFA off	12/16/92	0:48	9	15.70	351	300	502	522	1100000	935	769	50.5	25.0	36	80	80	2028	1169592
GR-12A1	12/16/92	2:19	71	15.29	205	276	506	526	1100000	952	781	50.5	24.9	39	80	80	2040	1191000
Test C1	1/15/93	1:00	30	15.37	228	276	508	528	1150000	978	780	50.5	25.0	52	80	80	2036	1177213
Test C2	1/15/93	1:00	17	15.23	201	268	509	529	1150000	991	779	50.5	25.0	61	80	80	2036	1160000
Test C3	1/15/93	0:58	12	15.15	178	264	509	529	1150000	998	776	50.5	24.9	64	80	80	2036	1150000
Test C4	1/15/93	0:50	75	15.16	171	257	510	530	1150000	1000	773	50.5	24.9	64	80	80	2036	1142353
Test B1	1/15/93	0:59	41	15.69	253	316	506	526	1150000	951	775	50.5	25.0	64	80	80	2042	1199667
Test B3	1/15/93	1:01	132	16.23	251	329	506	526	1150000	950	775	50.5	25.0	62	80	80	2043	1200323
Base Cond. OFA off	1/18/93	0:45	9	16.44	371	323	511	530	1150000	981	778	50.5	25.0	36	80	80	2051	1219783
Test B5	1/18/93	1:01	99	16.30	261	331	509	529	1150000	948	772	50.5	25.0	45	80	80	2052	1232097
Base Cond. OFA cooling	1/19/93	0:39	7	15.91	363	314	511	531	1150000	960	782	50.5	24.9	34	80	80	2045	1229500
GR-12R	1/19/93	1:00	18	15.00	234	283	509	529	1150000	939	778	50.5	24.9	34	80	80	2039	1211967
GR-13E	1/19/93	1:00	32	15.38	180	263	509	529	1150000	983	780	50.5	24.9	35	80	80	2025	1143443
GR-13C	1/20/93	1:10	27	15.33	193	269	511	531	1150000	990	783	50.5	24.9	59	80	80	2032	1167800
GR-12D	1/20/93	1:05	12	15.14	195	270	511	531	1150000	988	793	50.5	24.9	64	80	80	2031	1172097
GR-12E	1/20/93	0:59	55	15.74	210	303	509	529	1150000	979	793	50.5	24.9	64	80	80	2032	1182167
Base Cond. OFA off	1/20/93	0:15	97	17.02	333	340	507	527	1150000	963	783	50.5	24.9	64	80	80	2033	1203750
150 MWn Max NOx Red	1/21/93	1:05	54	15.45	183	267	511	531	1150000	1003	766	50.5	25.0	66	80	80	2026	1137727
Base Cond. OFA cooling	1/21/93	1:30	19	16.58	332	331	506	526	1150000	961	783	50.5	25.1	66	80	80	2023	1181209
120 MWn Max NOx Red	1/21/93	1:00	13	15.08	156	248	489	509	843012	972	771	50.5	25.1	70	80	80	1950	906540
GR Environ. #1	1/25/93	5:10	7	14.40	200	256	507	527	1030000	991	781	50.5	25.1	53	80	80	2003	1090129
Base Cond. OFA cooling	1/26/93	0:55	41	15.59	281	298	502	522	1030000	945	774	50.5	25.2	50	80	80	1995	1097143
GR Environ. Test #2	1/26/93	5:22	21	14.95	186	268	505	525	1030000	987	777	50.5	25.2	65	80	80	1995	1069815
Environ. #3	1/27/93	5:55	30	14.79	208	260	512	532	1030000	998	795	50.5	25.0	66	80	80	2027	1159101
Environ. #4 (No GR)	1/27/93	6:00	61	16.13	346	316	501	521	1030000	946	783	50.5	25.0	60	80	80	2004	1115616

Cherokee Unit 3, Average Test D
Pre Modification

Test No.	Date	Dur.	CO raw ppm	CO2 raw %vol	NOx raw ppm	SO2 raw ppm	Econ In H2O DegF	Econ Wall Out DegF	Cold RH Flow lbs/hr	Hot RH DegF	SH AttmpO DegF	Rel Humd %	Amb Press ", HgA	Amb Temp Deg F	NG Temp Def F	Coal Temp Deg F	Econ H2O Prs PSIG	Econ H2O Fl lbs/hr
Environ. #5 (No GR)	1/28/93	6:04	8	16.41	374	308	509	529	1030000	973	788	50.5	25.2	50	80	80	2036	1207233
Base Cond.	2/2/93	0:17	13	16.60	342		505	525	1090010	955	772	50.5	25.0	57	80	80	2022	1189688
LNB 120MW #1	3/8/93	2:00	263	15.69	249	348	478	498	845008	875	739	50.5	25.1	72	80	80	2002	965239
LNB 120MW #2	3/8/93	2:00	327	15.81	238	353	479	499	845008	889	750	50.5	25.0	80	80	80	1999	957829
LNB 150MW #1	3/9/93	2:00	9	15.51	371	325	505	525	1150000	950	787	50.5	25.0	71	80	80	2076	1235372
LNB 150MW #2	3/9/93	2:00	34	16.05	335	336	502	522	1150000	920	770	50.5	25.0	73	80	80	2057	1232308
LNB 90MW #1	3/10/93	2:00	29	14.57	306	283	456	476	649998	843	734	50.5	25.2	49	80	80	1907	744413
LNB 90MW #2	3/10/93	1:58	63	14.96	299	288	456	476	649998	854	738	50.5	25.2	49	80	80	1912	743794
LNB 150MW #3	3/11/93	2:00	16	15.89	348	295	503	523	1150000	956	787	50.5	25.1	41	80	80	2063	1194545
LNB 150MW #4	3/11/93	2:00	61	16.29	327	298	504	524	1150000	944	779	50.5	25.1	43	80	80	2060	1215620
3M1	3/22/93	1:02	162	16.05	154	288	501	521	917092	909	756	50.5	25.1	65	80	80	2057	1202540
3M2	3/22/93	1:03	150	16.22	156	283	501	521	910551	918	760	50.5	25.1	68	80	80	2049	1191563
3M3	3/22/93	0:59	16	15.64	182	273	502	522	908560	935	773	50.5	25.1	69	80	80	2050	1187000
3 Mill 7	4/13/93	1:00	101	16.23	224	340	479	499	739351	858	734	50.5	24.8	63	80	80	1961	947076
3 Mill 6	4/13/93	1:00	281	16.75	211	356	480	500	744881	865	735	50.5	24.8	64	80	80	1966	958825
Level 6 1/2	4/15/93	2:05	177	16.16	295	322	501	521	896884	921	764	50.5	25.0	51	80	80	2059	1170397
Level 4	4/15/93	1:10	145	16.09	295	321	501	521	897005	920	764	50.5	25.0	51	80	80	2059	1170000
Level 3	4/15/93	0:53	224	16.13	294	317	502	522	897065	923	765	50.5	25.0	53	80	80	2061	1170926
Level 5 1/2	4/15/93	1:58	233	16.48	287	323	501	521	900446	914	763	50.5	24.9	60	80	80	2061	1175882
Base Cond	4/15/93	5:25	232	16.32	290	322	501	521	898146	919	764	50.5	25.0	55	80	80	2060	1172638
Level 5 1/2	4/16/93	1:47	72	15.78	353	313	505	525	906870	949	788	50.5	24.9	59	80	80	2061	1181398
Level 6 1/2	4/16/93	1:19	8	15.93	344	324	505	525	912032	941	784	50.5	24.9	66	80	80	2060	1190750
Level 3	4/16/93	0:44	7	15.78	346	327	505	525	911503	943	786	50.5	24.9	69	80	80	2057	1191556
Level 4	4/16/93	1:00	7	15.79	346	328	505	525	912350	944	786	50.5	24.9	69	80	80	2059	1191311
North out, South in	4/16/93	0:20	290	15.07	367	298	505	525	905155	951	789	50.5	24.9	59	80	80	2057	1179048
South out, North in	4/16/93	0:20	9	16.02	341	323	505	525	905330	949	788	50.5	24.9	61	80	80	2055	1177143
Base Cond	4/16/93	6:25	38	15.81	346	322	505	525	910902	944	785	50.5	24.9	65	80	80	2060	1188329
Level 4	4/19/93	0:56	58	15.14	211	371	509	529	897676	988	786	50.5	24.8	63	80	80	2052	1149825
Level 3	4/19/93	0:52	56	15.15	211	371	509	529	897370	988	786	50.5	24.8	63	80	80	2051	1148679
Level 5 1/2	4/19/93	2:29	8	14.71	221	347	510	530	892484	995	788	50.5	24.9	64	80	80	2051	1132267
Level 6 1/2	4/19/93	1:10	8	14.72	229	356	511	531	893750	998	791	50.5	24.9	63	80	80	2053	1130000
Base Cond. OFA on	4/19/93	1:00	14	14.74	289	406	505	525	898922	929	776	50.5	24.8	60	80	80	2042	1174426
GR	4/19/93	5:42	12	14.79	220	353	510	530	892305	995	788	50.5	24.9	64	80	80	2051	1132678
Level 6 1/2	4/20/93	1:47	67	16.43	254	399	492	512	819065	876	743	50.5	25.2	49	80	80	2003	1063426
Base Cond 130MW	4/20/93	3:35	112	16.49	248	408	491	511	818653	876	743	50.5	25.2	51	80	80	2002	1062500
Base Cond 120MW	4/20/93	2:55	62	15.16	268	392	486	506	736009	951	767	50.5	25.2	61	80	80	1973	929630
Base Cond. OFA off	4/21/93	7:40	363	15.48	256	452	482	502	717584	927	759	50.5	25.2	65	80	80	1959	907662
Base Cond. OFA off	4/23/93	0:30	17	16.35	337	344	505	525	902553	961	783	50.5	24.7	81	80	80	2045	1175484
4M12 (OFA off)	4/23/93	1:00	6	16.02	301	297	502	522	914437	915	761	50.5	24.7	80	80	80	2054	1195574
4M13a (78,000 scfm OFA	4/23/93	0:20	49	15.10	186	280	502	522	943441	878	751	50.5	24.7	81	80	80	2062	1247143

Cherokee Unit 3, Average Test D
Pre Modification

Test No.	Date	Dur.	CO raw ppm	CO2 raw %vol	NOx raw ppm	SO2 raw ppm	Econ In H2O DegF	Econ Wall Out DegF	Cold RH Flow lbs/hr	Hot RH DegF	SH AttmpO DegF	Rel Humd %	Amb Press ", HgA	Amb Temp Deg F	NG Temp Def F	Coal Temp Deg F	Econ H2O Prs PSIG	Econ H2O Fl lbs/hr
4M13b (70,000 scfm OFA	4/23/93	0:50	32	15.04	205	274	502	522	949171	864	750	50.5	24.7	83	80	80	2071	1252692
Base Cond. OFA On	4/27/93	0:30	10	14.91	347	305	507	527	913394	970	785	50.5	25.1	66	80	80	2061	1193548
GR on 150MW, 11% Gas	4/27/93	0:53	24	15.20	253	283	506	526	904519	988	785	50.5	25.1	67	80	80	2043	1179444
GR on 150MW, 17% Gas	4/27/93	2:48	38	15.17	207	270	507	527	906973	986	790	50.5	25.0	74	80	80	2036	1167353
Base Cond. OFA on	4/28/93	0:44	9	14.88	317	300	499	519	856414	932	771	50.5	25.1	66	80	80	2025	1117778
GR on Auto	4/28/93	6:35	5	15.15	183	273	499	519	831638	976	784	50.5	25.1	76	80	80	2005	1063636
GR on Auto	5/3/93	7:00	7	14.47	207	268	502	522	860313	980	791	50.5	24.9	81	80	80	2055	1112167
Base Cond. OFA on	5/6/93	2:45	28	14.78	308	316	496	516	860901	900	762	50.5	24.8	72	80	80	2050	1141386
GR on Auto	5/6/93	1:15	19	14.91	194	277	500	520	851644	950	788	50.5	24.8	78	80	80	2066	1115526
Base Cond. OFA off	5/6/93	0:21	711	15.08	269	315	486	506	730814	943	763	50.5	24.8	80	80	80	1944	942245
GR on Auto 150MW	5/7/93	4:26	11	14.93	188	302	502	522	894600	956	780	50.5	24.7	74	80	80	2072	1183209
GR on Auto 160MW	5/7/93	1:59	7	15.15	202	315	509	529	955102	976	790	50.5	24.7	80	80	80	2104	1275667
GR on Auto 140MW	5/7/93	4:50	7	14.50	195	318	498	518	837812	968	785	50.5	24.7	67	80	80	2041	1097589
Base Cond. OFA off	5/7/93	0:35	7	14.87	365	331	500	520	875041	954	780	50.5	24.7	66	80	80	2051	1157778
GR on Auto	5/11/93	6:08	6	13.91	187	267	499	519	825740	976	788	50.5	25.3	72	80	80	2018	1050617
GR 13	5/25/93	15:04	7	14.84	197	281	505	525	890012	985	789	50.5	25.2	70	80	80	2029	1124878
GR 14	5/25/93	1:25	4	13.64	198	262	474	494	651233	922	772	50.5	25.2	73	80	80	1932	794645
GR 15	5/26/93	1:29	5	13.61	183	261	477	497	679763	932	774	50.5	25.1	71	80	80	1944	832471
LNB-OFA	5/26/93	0:42	20	12.94	228	280	461	481	590620	882	747	50.5	25.1	70	80	80	1904	711114
LNB	5/26/93	9:44	157	16.02	294	345	494	514	872218	913	756	50.5	25.1	73	80	80	2035	1102654
LNB	5/27/93	0:10	310	15.63	248	339	477	497	719552	918	761	50.5	25.0	82	80	80	1939	866804
LNB-OFA	5/27/93	0:45	34	15.10	293	334	504	525	922635	950	784	50.5	25.0	85	80	80	2049	1171087
GR-LNB 16	5/27/93	13:40	6	14.64	207	281	503	523	883820	982	791	50.5	25.0	84	80	80	2036	1105230
GR-LNB 17	5/28/93	2:57	5	13.32	190	258	478	498	682029	928	772	50.5	25.0	75	80	80	1938	837593
LNB	5/28/93	1:23	8	13.50	249	288	455	475	556886	878	746	50.5	25.0	75	80	80	1902	667571
GR-LNB 20b	6/3/93	8:51	18	15.96	173	296	501	521	873118	974	773	50.5	24.9	73	80	80	2022	1084260
LNB	6/3/93	1:05	26	14.68	293	307	462	482	604599	895	753	50.5	25.0	70	80	80	1929	727079
LNB (low load)	6/4/93	6:52	15	14.09	301	300	458	478	573344	891	745	50.5	25.0	67	80	80	1914	690770
LNB (high load)	6/4/93	5:25	14	16.20	320	344	502	522	923027	927	769	50.5	25.1	60	80	80	2069	1174094
LNB-OFA	6/4/93	2:31	90	15.51	262	337	503	523	973283	893	749	50.5	25.0	71	80	80	2073	1250544
GR-LNB	6/4/93	7:42	37	15.67	175	300	503	523	899583	976	776	50.5	24.9	74	80	80	2033	1122824
LNB	6/8/93	1:35	32	15.21	307	323	496	516	872973	918	771	50.5	24.8	77	80	80	2038	1111354
LNB-OFA	6/8/93	1:40	122	14.97	279	334	497	517	880816	910	769	50.5	24.8	78	80	80	2032	1122277
GR-LNB 22a	6/8/93	6:21	15	14.44	180	283	496	516	820143	963	787	50.5	24.9	80	80	80	2005	1023977
GR-LNB 22b	6/8/93	5:30	87	16.03	167	305	503	523	897541	982	777	50.5	24.9	77	80	80	2034	1122266
GR-LNB 23a	6/9/93	1:16	48	15.56	151	295	480	500	700903	951	754	50.5	25.1	69	80	80	1953	849520
LNB-OFA	6/9/93	0:30	51	14.42	157	307	459	478	548749	900	740	50.5	25.1	71	80	80	1898	665477
LNB	6/9/93	16:03	95	15.47	267	327	479	499	741448	899	754	50.5	25.1	75	80	80	1972	926623
GR-LNB 23b	6/9/93	4:28	6	14.42	208	276	499	519	845506	970	790	50.5	25.1	79	80	80	2009	1060322
LNB	6/10/93	8:47	477	15.80	220	335	478	499	721156	917	756	50.5	25.1	71	80	80	1970	890153

Cherokee Unit 3, Average Test C
Pre Modification

Test No.	Date	Dur.	CO raw ppm	CO2 raw %vol	NOx raw ppm	SO2 raw ppm	Econ In H2O DegF	Econ Wall Out DegF	Cold RH Flow lbs/hr	Hot RH DegF	SH AttmpO DegF	Rel Humd %	Amb Press ", HgA	Amb Temp Deg F	NG Temp Def F	Coal Temp Deg F	Econ H2O Prs PSIG	Econ H2O Fl lbs/hr
LNB-OFA	6/10/93	1:16	31	15.21	258	324	504	524	938467	923	775	50.5	25.2	77	80	80	2063	1197273
GR-LNB 24	6/10/93	2:57	10	14.34	209	282	506	526	901521	978	797	50.5	25.1	84	80	80	2041	1126527
LNB	6/10/93	0:37	9	15.62	348	357	503	523	950099	919	759	50.5	25.1	89	80	80	2077	1210000
GR-LNB 25a	6/11/93	5:28	17	14.81	183	320	495	515	817068	969	776	50.5	24.9	91	80	80	2019	1002441
GR-LNB 25b	6/11/93	9:06	14	14.87	198	327	505	525	904153	984	780	50.5	24.9	94	80	80	2065	1123265
GR-LNB 26a	6/12/93	11:22	44	15.32	175	328	497	517	832651	974	773	50.5	25.0	89	80	80	2020	1016721
GR-LNB 26b	6/12/93	2:13	28	13.76	223	306	462	482	570488	915	763	50.5	25.0	79	80	80	1917	686907
LNB-OFA	6/12/93	7:11	755	15.93	257	383	494	514	867137	925	755	50.5	25.0	96	80	80	2018	1091225
LNB-OFA	6/13/93	9:43	119	13.82	330	323	448	468	528734	843	731	50.5	25.1	79	80	80	1885	632203
GR-LNB 28	6/14/93	4:06	28	15.79	185	322	506	526	920485	977	783	50.5	25.1	94	80	80	2050	1156883
LNB	6/14/93	1:59	341	15.98	253	365	491	510	829895	894	745	50.5	25.1	89	80	80	2007	1048433
LNB	6/18/93	0:38	26	16.47	303	353	495	515	829648	978	773	50.5	25.2	63	80	80	2036	1008632
GR-LNB 29	6/18/93	14:24	8	15.11	188	308	503	523	874443	992	771	50.5	25.2	68	80	80	2027	1065390
GR-LNB 30a	6/19/93	0:30	3	13.51	213	280	479	499	644654	966	771	50.5	25.2	67	80	80	1903	764250
LNB	6/19/93	9:15	239	14.66	354	342	456	476	547037	920	751	50.5	25.2	71	80	80	1892	646084
GR-LNB 30b	6/19/93	11:53	59	15.85	162	325	505	525	884859	997	755	50.5	25.1	85	80	80	2037	1059484
GR-LNB 30c	6/19/93	1:33	5	14.31	184	290	473	493	614874	957	768	50.5	25.2	84	80	80	1949	737235
GR-LNB 23	6/23/93	7:35	35	15.76	165	317	506	526	919235	987	772	50.5	24.8	90	80	80	2029	1133311
GR-LNB 32b	6/23/93	1:09	18	15.26	166	281	494	514	790735	970	771	50.5	24.9	80	80	80	1970	970630
LNB-OFA cooling	6/24/93	6:25	151	15.32	305	346	456	476	547641	898	749	50.5	25.1	71	80	80	1903	647867
GR-LNB 33a	6/24/93	6:00	6	15.28	181	335	489	509	760134	970	767	50.5	25.1	83	80	80	1998	914695
GR-LNB 33	6/24/93	11:22	12	15.80	176	336	505	525	902696	987	769	50.5	25.1	83	80	80	2045	1109437
GR-LNB 34a	6/25/93	1:52	3	13.43	281	298	460	479	537754	922	767	50.5	25.2	78	80	80	1897	632393
LNB-OFA	6/25/93	4:03	37	14.04	301	331	453	473	545712	847	732	50.5	25.2	72	80	80	1885	648434
GR-LNB 34	6/25/93	8:00	17	15.74	175	349	500	520	867914	966	773	50.5	25.2	77	80	80	2046	1066600
LNB (some OFA)	6/28/93	1:03	72	16.45	313	357	505	525	936878	959	770	50.5	24.9	96	80	80	2059	1185469
LNB (some OFA)	6/29/93	12:15	415	16.43	279	376	489	509	806771	924	753	50.5	24.8	102	80	80	1980	1002311
LNB	6/30/93	11:51	405	16.18	265	367	481	501	737768	943	761	50.5	25.0	83	80	80	1977	905836
GR-LNB 35	6/30/93	1:48	46	15.09	184	312	508	528	926725	994	781	50.5	25.0	91	80	80	2047	1155138
GR-LNB 35a	6/30/93	6:05	4	14.30	207	292	509	529	918051	996	785	50.5	25.0	93	80	80	2041	1134344
GR-LNB 35b	6/30/93	1:53	4	13.61	203	267	499	519	821865	984	787	50.5	25.0	87	80	80	1989	1003674
GR-oLNB 36a	7/1/93	8:22	15	12.56	223	260	464	484	583597	913	760	50.5	25.0	83	80	80	1919	692337
GR-LNB 36	7/1/93	15:37	79	15.14	170	313	503	523	883595	985	765	50.5	24.9	95	80	80	2028	1078611
GR 37a	7/2/93	14:55	426	14.36	164	298	484	504	729430	958	746	50.5	24.8	95	80	80	1954	869968
GR 37	7/2/93	7:05	43	15.06	180	317	509	529	933226	996	770	50.5	24.9	96	80	80	2038	1152749
GR-LNB 38	7/3/93	7:46	87	14.99	167	313	507	527	913864	993	752	50.5	24.6	98	80	80	2037	1099083
GR-LNB 38a	7/3/93	8:43	37	13.17	153	262	504	524	886851	994	763	50.5	24.7	90	80	80	2021	1078573
GR-LNB 39a	7/4/93	17:27	16	11.68	142	253	478	498	686497	949	756	50.5	24.8	79	80	80	1928	823572
GR-LNB 39	7/4/93	6:33	9	12.60	149	267	506	526	906893	994	769	50.5	24.8	84	80	80	2039	1116149
GR-LNB 40a	7/5/93	11:52	5	10.62	145	234	467	487	607726	933	754	50.5	24.9	79	80	80	1897	724089

Cherokee Unit 3, Average Test D

Pre Modification

Test No.	Date	Dur.	CO raw ppm	CO2 raw %vol	NOx raw ppm	SO2 raw ppm	Econ In H2O DegF	Econ Wall Out DegF	Cold RH Flow lbs/hr	Hot RH DegF	SH AttmpO DegF	Rel Humd %	Amb Press ", HgA	Amb Temp Deg F	NG Temp Def F	Coal Temp Deg F	Econ H2O Prs PSIG	Econ H2O Fl lbs/hr
GR-LNB 40	7/5/93	12:08	4	11.63	136	253	501	521	867106	983	767	50.5	24.9	88	80	80	2013	1062573
GR-LNB 52a	7/17/93	8:31		13.44	172	272	469	489	638795	909	753	50.5	25.1	81	80	80	1922	772233
GR-LNB 52	7/17/93	5:45		14.95	177	302	503	523	884308	993	765	50.5	25.2	76	80	80	2009	1071428
LNB	7/19/93	1:53		15.98	204	365	479	499	712207	938	762	50.5	25.2	85	80	80	1957	885393
LNB-OFA	7/19/93	0:22		15.75	197	368	482	502	751461	918	747	50.5	25.2	86	80	80	1958	940635
GR-LNB 53a	7/19/93	3:29		14.98	168	302	486	506	741326	976	761	50.5	25.1	85	80	80	1960	906746
GR-LNB 53	7/19/93	7:06		15.04	188	300	505	525	912719	997	775	50.5	25.1	90	80	80	2030	1135691
LNB	7/21/93	8:34		14.79	316	316	447	467	515482	869	736	50.5	25.0	85	80	80	1900	616574
GR-LNB 54	7/21/93	4:52		15.21	186	296	503	523	878017	985	785	50.5	24.9	91	80	80	2022	1085269
LNB	7/23/93	2:35	49	15.35	276	330	487	508	589773	949	773	50.5	25.0	86	80	80	1887	775029
GR-LNB 55	7/23/93	4:53	7	14.39	194	311	503	523	883503	992	782	50.5	24.9	92	80	80	2050	1098871
GR-LNB 55a	7/23/93	1:08	9	14.12	175	307	494	514	792893	964	778	50.5	24.9	92	80	80	2002	996774
LNB	7/23/93	3:55	544	15.03	211	346	444	464	508626	836	706	50.5	24.9	91	80	80	1854	618671
LNB	7/24/93	1:52	395	13.80	199	266	446	466	525455	857	714	50.5	25.0	87	80	80	1825	635911
LNB-OFA	7/24/93	0:36	96	12.50	199	279	460	480	580655	885	751	50.5	25.0	92	80	80	1938	718518
GR-LNB 56	7/24/93	7:45	11	14.53	177	299	502	522	875177	984	782	50.5	25.0	93	80	80	2052	1087740
GR-LNB 56a	7/24/93	2:09	6	13.11	227	266	464	484	597143	899	744	50.5	25.1	87	80	80	1916	737877
GR-LNB 57a	7/25/93	1:10	4	11.79	285	237	448	468	488979	880	739	50.5	25.1	85	80	80	1867	590518
LNB-OFA	7/25/93	5:52	9	13.15	215	294	455	475	558063	845	735	50.5	25.1	79	80	80	1896	682022
GR-LNB 57b	7/25/93	10:19	8	13.85	185	283	488	508	765797	965	770	50.5	25.1	89	80	80	1979	940986
GR-LNB 57	7/25/93	6:14	11	15.17	173	306	506	526	917103	992	779	50.5	25.0	97	80	80	2056	1145384
GR-LNB 58a	7/26/93	10:15	7	12.68	194	258	477	497	676807	949	775	50.5	25.0	82	80	80	1907	820445
GR-LNB 58	7/26/93	8:34	6	14.95	184	289	507	527	923416	997	777	50.5	24.9	96	80	80	2021	1143938
GR-LNB 58b	7/26/93	5:09	5	14.06	180	258	495	515	818260	976	778	50.5	25.0	88	80	80	1958	1008551
GR-LNB 59a	7/27/93	10:48	4	13.21	206	250	476	496	680842	936	775	50.5	25.1	81	80	80	1942	829835
LNB-OFA	7/27/93	3:21	479	16.83	296	377	506	526	966641	949	774	50.5	25.1	93	80	80	2057	1242178
GR-LNB 59	7/27/93	9:16	9	14.97	180	297	497	517	836351	980	781	50.5	25.1	93	80	80	1988	1049247
GR-LNB 60a	7/28/93	11:06	6	14.70	176	294	491	511	767861	977	776	50.5	25.2	81	80	80	1948	939032
GR-LNB 60b	7/28/93	2:02	12	15.32	189	299	511	531	965784	1004	765	50.5	25.2	94	80	80	2063	1194553
LNB-OFA	7/28/93	2:21	381	16.45	327	371	508	528	975491	963	774	50.5	25.1	101	80	80	2083	1255070
GR-LNB 60	7/28/93	8:10	37	15.66	189	301	511	531	967666	996	777	50.5	25.1	100	80	80	2068	1214155
GR-LNB 61a	7/29/93	15:55	25	15.29	186	304	506	526	902996	997	778	50.5	25.2	92	80	80	2016	1118932
GR-LNB 61	7/29/93	8:04	80	15.50	177	310	507	527	909884	1002	764	50.5	25.1	103	80	80	2022	1112619
GR-LNB 62	7/30/93	10:04	165	15.39	165	307	503	523	872604	995	759	50.5	25.2	91	80	80	1995	1063028
LNB-OFA	7/30/93	4:32	325	15.75	300	358	505	525	943801	956	774	50.5	25.2	101	80	80	2027	1204982
GR-LNB 62a	7/30/93	9:00	41	14.79	189	288	507	527	913819	994	783	50.5	25.2	92	80	80	2029	1138872
GR-LNB 63a	7/31/93	17:10	37	15.46	172	310	505	525	906250	992	769	50.5	25.2	94	80	80	2009	1122978
GR-LNB 63b	7/31/93	6:49	67	15.71	169	316	507	527	919098	995	769	50.5	25.2	103	80	80	2037	1133217
GR-LNB 64a	8/1/93	1:25	29	15.12	161	301	498	518	816297	990	770	50.5	25.2	95	80	80	1960	991175
GR-LNB 64b	8/1/93	10:21	6	13.78	200	269	473	493	643164	926	765	50.5	25.3	85	80	80	1893	779138

Cherokee Unit 3, Average Test D
Pre Modification

Test No.	Date	Dur.	CO raw ppm	CO2 raw %vol	NOx raw ppm	SO2 raw ppm	Econ In H2O DegF	Econ Wall Out DegF	Cold RH Flow lbs/hr	Hot RH DegF	SH AttmpO DegF	Rel Humd %	Amb Press ", HgA	Amb Temp Deg F	NG Temp Def F	Coal Temp Deg F	Econ H2O Prs PSIG	Econ H2O Fl lbs/hr
GR-LNB 64c	8/1/93	12:14	23	15.31	173	291	505	525	889735	994	779	50.5	25.3	90	80	80	2023	1092870
GR-LNB 65a	8/2/93	8:55	5	12.99	197	243	468	488	616394	906	758	50.5	25.2	84	80	80	1905	750168
LNB-OFA	8/2/93	1:23	404	15.92	273	343	506	525	939354	966	774	50.5	25.2	81	80	80	2024	1196910
GR-LNB 65b	8/2/93	6:02	14	15.33	163	290	504	524	898630	983	777	50.5	25.2	84	80	80	2010	1122469
GR-LNB 65c	8/2/93	7:14	8	14.45	167		501	521	865854	983	769	50.5	25.2	84	80	80	1989	1068595
GR-LNB 66a	8/3/93	8:29	4	12.43	210		462	482	564511	916	763	50.5	25.3	74	80	80	1856	681123
GR-LNB 66b	8/3/93	9:34	4	14.64	178		501	521	859935	990	775	50.5	25.3	75	80	80	1987	1058443
GR-LNB 66c	8/3/93	5:55	6	15.32	174		505	525	899680	995	779	50.5	25.3	79	80	80	2010	1109886
GR-LNB 67	8/4/93	24:00	8	14.72	175		497	517	829130	978	777	50.5	25.2	80	80	80	1999	1023701
GR-LNB 68a	8/5/93	7:39	7	14.19	161		482	502	702850	954	773	50.5	25.2	75	80	80	1932	861996
GR-LNB 68b	8/5/93	15:50	7	14.90	192		507	527	914005	998	774	50.5	25.2	81	80	80	2026	1127368
GR-LNB 69	8/6/93	9:48	7	15.10	181		497	517	833590	983	776	50.5	25.2	73	80	80	1984	1027219
LNB	8/6/93	7:58	312	16.03	307		502	522	924066	948	765	50.5	25.1	86	80	80	2018	1178269
LNB-OFA	8/6/93	5:04	191	15.85	318		504	524	952122	946	760	50.5	25.1	93	80	80	2031	1217781
LNB	8/7/93	3:04	798	16.43	286		501	521	905338	960	776	50.5	25.0	81	80	80	2000	1149042
GR-LNB 70	8/7/93	3:53	850	15.43	178		499	519	834073	999	788	50.5	25.0	79	80	80	1974	1033833
LNB-OFA	8/7/93	8:05	348	15.60	290		503	523	925837	959	764	50.5	25.0	91	80	80	2026	1174140
LNB	8/7/93	6:28	210	15.81	310		504	524	941014	953	766	50.5	25.0	91	80	80	2037	1200396
LNB	8/9/93	8:04	234	15.63	269		495	515	869472	922	758	50.5	25.2	82	80	80	2005	1107058
GR-LNB 71 (10% Gas)	8/9/93	13:45	14	15.38	189		507	527	934273	988	783	50.5	25.3	98	80	80	2033	1181731
GR-LNB 72a (10%)	8/10/93	7:48	46	15.37	184		499	519	914960	991	769	50.5	25.2	88	80	80	2003	1117394
LNB	8/10/93	7:27	25	15.52	306		503	523	948745	926	759	50.5	25.2	92	80	80	2053	1219610
GR-LNB 72b (10%)	8/10/93	7:25	13	15.06	189		502	522	888649	977	777	50.5	25.3	82	80	80	2030	1125736
GR-LNB 73	8/11/93	3:22	9	14.53	197		497	518	853475	974	782	50.5	25.2	80	80	80	2011	1072260
LNB-OFA	8/11/93	9:49	171	15.90	267		506	526	963069	946	769	50.5	25.1	94	80	80	2060	1236831
LNB	8/11/93	2:45	10	15.40	281		501	521	916336	933	769	50.5	25.2	90	80	80	2028	1170904
LNB	8/12/93	7:36	97	15.33	228		473	493	688915	898	743	50.5	25.2	84	80	80	1942	857299
GR-LNB 74	8/12/93	14:33	9	15.25	183		506	526	916026	992	780	50.5	25.2	81	80	80	2038	1150589
GR-LNB 75	8/13/93	18:16	11	14.87	190		504	524	900509	985	776	50.5	25.1	91	80	80	2037	1126591
GR-LNB 76a	8/14/93	4:54	41	14.19	168		484	504	715491	975	761	50.5	25.0	90	80	80	1964	865469
LNB	8/14/93	1:46	82	12.07	249		453	473	526616	905	746	50.5	25.1	89	80	80	1917	641834
GR-LNB 76b	8/14/93	11:05	9	14.36	179		502	522	882874	983	779	50.5	25.1	89	80	80	2030	1106385
GR-LNB 77	8/15/93	1:10	22	13.73	171		480	500	685299	950	764	50.5	25.1	83	80	80	1943	843335
LNB	8/15/93	14:44	534	14.76	239		474	494	701217	917	744	50.5	25.1	84	80	80	1966	872200
LNB	8/15/93	6:58	217	15.95	278		504	524	940260	959	767	50.5	25.1	91	80	80	2058	1202964
LNB (low load)	8/16/93	7:38	710	14.65	210		468	488	627800	929	761	50.5	25.1	80	80	80	1940	765506
LNB (150 MWe)	8/16/93	3:21	32	15.50	323		506	526	954522	952	778	50.5	25.1	82	80	80	2064	1223021
LNB-OFA cooling	8/16/93	11:40	67	15.76	324		505	525	977554	925	756	50.5	25.0	100	80	80	2074	1261213
LNB	8/17/93	9:07	363	15.52	261		491	511	838400	914	759	50.5	25.1	86	80	80	2012	1064869
100% Gas (plant test)	8/17/93	0:34	979	10.24	77		441	461	503186	811	702	50.5	25.1	86	80	80	1882	614471

Cherokee Unit 3, Average Test D
Pre Modification

Test No.	Date	Dur.	CO raw ppm	CO2 raw %vol	NOx raw ppm	SO2 raw ppm	Econ In H2O DegF	Econ Wall Out DegF	Cold RH Flow lbs/hr	Hot RH DegF	SH AttmpO DegF	Rel Humd %	Amb Press ", HgA	Amb Temp Deg F	NG Temp Def F	Coal Temp Deg F	Econ H2O Prs PSIG	Econ H2O Fl lbs/hr
LNB (OFA cooling)	8/17/93	8:59	309	16.14	302		505	525	963717	932	765	50.5	25.1	99	80	80	2060	1243185
LNB	8/17/93	3:05	266	16.40	287		503	523	944875	933	765	50.5	25.1	90	80	80	2054	1214202
LNB (low load)	8/18/93	9:42	738	15.81	223		477	497	711620	915	756	50.5	25.1	87	80	80	1960	884230
LNB 150 MWe	8/18/93	14:16	24	15.79	317		504	524	965559	923	761	50.5	25.2	87	80	80	2062	1248041
GR-LNB 78	8/24/93	3:25	138	15.63	169		459	479	936348	983	764	50.5	25.1	95	80	80	2017	1031452
LNB OFA cooling	8/24/93	10:38	218	15.63	299		457	477	958038	953	777	50.5	25.0	99	80	80	2028	1093474
LNB OFA cooling	8/25/93	2:06	499	15.63	236		435	455	736333	933	749	50.5	25.0	91	80	80	1947	824576
LNB	8/25/93	8:38	694	15.63	232		432	452	709272	928	752	50.5	25.0	88	80	80	1945	788327
LNB	8/25/93	13:08	13	15.63	321		456	476	951552	934	789	50.5	25.0	83	80	80	2029	1088036
LNB	8/26/93	21:16	195	15.63	257		474	494	682870	874	742	50.5	25.2	83	80	80	1950	847754
LNB	8/26/93	2:42	24	15.63	313		505	525	920314	950	776	50.5	25.2	81	80	80	2049	1178896
LNB	8/27/93	8:26	34	15.63	298		467	487	636402	878	740	50.5	25.3	76	80	80	1936	782992
LNB	8/27/93	6:17	17	15.63	298		502	522	910390	924	760	50.5	25.3	74	80	80	2038	1166460
GR-LNB 79	9/8/93	11:15	49	15.63	174		507	527	910146	971	790	50.5	25.1	85	80	80	2044	1161124
GR-LNB 79a	9/8/93	1:49	67	15.63	158		489	509	749933	941	775	50.5	25.1	81	80	80	1977	946036
GR-LNB 80a	9/9/93	6:55	64	15.63	173		479	499	674509	939	777	50.5	25.2	76	80	80	1955	830995
LNB-OFA	9/9/93	1:46	77	15.63	239		458	478	550030	881	752	50.5	25.1	77	80	80	1908	671739
GR-LNB 80	9/9/93	14:15	195	15.63	158		500	520	835861	969	781	50.5	25.3	85	80	80	2003	1040148
LNB-OFA	9/10/93	4:50	114	15.63	305		450	470	512090	863	744	50.5	25.3	78	80	80	1894	616942
GR-LNB 81	9/10/93	1:46	13	15.63	159		481	501	663604	949	784	50.5	25.3	71	80	80	1942	809001
LNB	9/10/93	13:30	134	15.63	297		501	521	894549	930	768	50.5	25.1	86	80	80	2028	1140871
LNB	9/11/93	19:30	501	15.63	267		493	513	829857	921	768	50.5	25.0	89	80	80	2005	1054475
GR-LNB 82	9/11/93	4:10	22	15.63	180		506	526	910079	955	789	50.5	24.9	93	80	80	2037	1166076
GR-LNB 83a	9/12/93	11:51	13	15.63	165		493	513	783090	950	783	50.5	24.8	82	80	80	1981	980065
GR-LNB 83	9/12/93	12:09	50	15.63	172		512	532	954513	985	785	50.5	24.7	96	80	80	2058	1212694
GR-LNB 84a	9/13/93	5:35	12	15.63	160		485	505	711459	950	780	50.5	25.0	64	80	80	1952	880016
GR-LNB 84	9/13/93	18:03	50	15.63	177		506	526	885199	980	789	50.5	25.1	51	80	80	2021	1114655
GR-LNB 85a	9/14/93	4:15	125	15.63	158		496	516	788833	971	773	50.5	25.2	55	80	80	1980	975182
LNB	9/14/93	11:05	231	15.63	277		484	504	742577	921	764	50.5	25.2	62	80	80	1965	928489
LNB-OFA	9/14/93	1:06	308	15.63	271		507	527	933237	946	778	50.5	25.1	75	80	80	2049	1202090
GR-LNB 85	9/14/93	6:55	28	15.63	169		506	526	892118	985	777	50.5	25.1	73	80	80	2025	1114591
GR-LNB 86a	9/15/93	0:50	14	15.63	158		498	518	809649	967	772	50.5	25.1	66	80	80	1986	1002451
LNB	9/15/93	3:07	301	15.63	250		472	492	636515	923	732	50.5	25.1	66	80	80	1943	760575
GR-LNB 86b	9/15/93	4:26	17	15.63	166		491	511	752988	964	778	50.5	25.1	66	80	80	1984	920529
GR-LNB 86	9/15/93	11:20	12	15.63	179		506	526	884075	985	779	50.5	25.0	84	80	80	2028	1100045
GR-LNB 87a	9/16/93	5:46	7	15.63	179		489	509	746772	948	766	50.5	25.1	73	80	80	1970	916784
GR-LNB 87	9/16/93	15:24	14	15.63	171		501	521	837790	981	780	50.5	25.1	74	80	80	2009	1036682
GR-LNB 88a	9/17/93	5:31	12	15.63	156		494	514	774856	975	772	50.5	25.2	68	80	80	1974	946807
GR-LNB 88	9/17/93	18:28	22	15.63	170		507	527	888723	989	776	50.5	25.1	71	80	80	2026	1101554
GR-LNB 89	9/18/93	24:00	61	15.63	167		504	524	863809	985	773	50.5	25.0	65	80	80	2013	1068203

Cherokee Unit 3, Average Test D
Pre Modification

Test No.	Date	Dur.	CO raw ppm	CO2 raw %vol	NOx raw ppm	SO2 raw ppm	Econ In H2O DegF	Econ Wall Out DegF	Cold RH Flow lbs/hr	Hot RH DegF	SH AttmpO DegF	Rel Humd %	Amb Press ", HgA	Amb Temp Deg F	NG Temp Def F	Coal Temp Deg F	Econ H2O Prs PSIG	Econ H2O Fl lbs/hr
GR-LNB 90a	9/19/93	10:06	23	15.63	163		496	516	791457	980	765	50.5	25.0	63	80	80	1983	961743
GR-LNB 90	9/19/93	13:54	22	15.63	177		509	529	905264	994	772	50.5	25.0	76	80	80	2029	1118543
GR-LNB 91	9/20/93	24:00	192	15.63	163		505	525	867530	992	764	50.5	25.0	76	80	80	2014	1053315
GR-LNB 92a	9/21/93	3:00	253	15.63	156		488	508	724919	959	777	50.5	25.0	74	80	80	1959	884737
GR-LNB 92	9/21/93	17:56	130	15.63	161	190	504	524	875506	972	775	50.5	25.0	82	80	80	2023	1094892
GR-LNB 3 Mill a	9/22/93	7:59	32	15.63	137	254	484	504	701841	949	771	50.5	25.0	69	80	80	1948	859668
GR-LNB 3 Mill b	9/22/93	8:25	17	14.56	146	263	489	509	753668	938	769	50.5	25.0	68	80	80	1964	934756
GR-LNB 3 Mill c	9/23/93	24:00	15	14.40	151	302	490	510	760768	944	777	50.5	25.0	68	80	80	1965	946917
GR-LNB 3 Mill d	9/24/93	1:58	7	13.16	140	261	474	494	618280	929	777	50.5	25.0	67	80	80	1911	758238
LNB-OFA 3 Mill	9/24/93	3:33	23	11.52	166	258	440	460	500236	745	702	50.5	25.0	66	80	80	1881	613038
GR-LNB 3 Mill e	9/24/93	6:10	10	14.04	155	277	488	508	762679	917	776	50.5	25.1	65	80	80	1969	961735
GR-LNB 93	9/24/93	12:09	9	14.62	175	291	500	520	857716	951	786	50.5	25.1	72	80	80	2005	1084221
GR-LNB 94a	9/25/93	2:12	8	14.49	153	284	491	511	755004	948	786	50.5	25.1	66	80	80	1962	942488
LNB-OFA	9/25/93	2:24	8	13.16	175	285	472	492	634724	897	777	50.5	25.1	65	80	80	1920	775205
GR-LNB 94	9/25/93	19:05	11	15.25	179	308	508	528	913886	979	788	50.5	25.1	77	80	80	2030	1147317
GR-LNB 95a	9/26/93	4:15	8	14.61	154	275	490	510	742394	964	781	50.5	25.3	65	80	80	1954	911722
LNB-OFA	9/26/93	2:55	10	12.68	191	268	464	484	617885	819	732	50.5	25.4	63	80	80	1911	763717
GR-LNB 95	9/26/93	16:33	7	14.69	175	293	502	522	854891	971	784	50.5	25.3	71	80	80	2004	1072051
GR-LNB 96a	9/27/93	2:53	6	13.86	165	275	492	512	782263	941	779	50.5	25.3	67	80	80	1977	971849
LNB	9/27/93	19:45	44	15.28	338	341	503	523	917473	921	770	50.5	25.3	82	80	80	2032	1178328
GR-LNB 96b	9/27/93	0:57	25	14.75	150	292	492	511	762962	940	781	50.5	25.2	77	80	80	1967	955576
GR-LNB 97a	9/28/93	9:13	7	14.38	168	282	496	516	802460	964	785	50.5	25.3	70	80	80	1984	995126
LNB	9/28/93	4:27	907	17.90	255	391	506	525	931357	942	765	50.5	25.4	73	80	80	2035	1193829
GR-LNB 97	9/28/93	5:58	29	15.87	167	324	509	529	909780	986	774	50.5	25.3	78	80	80	2025	1129304
GR-LNB 97b	9/28/93	2:48	7	14.78	168	297	492	512	757785	964	771	50.5	25.4	72	80	80	1959	927068
GR-LNB 98a	9/29/93	5:22	6	14.04	178	282	484	504	691681	956	775	50.5	25.3	69	80	80	1940	837834
GR-LNB 98	9/29/93	18:37	13	15.35	177	309	508	528	911287	976	783	50.5	25.2	77	80	80	2028	1147567
GR-LNB 99a	9/30/93	5:32	5	13.36	175	263	480	500	694998	917	770	50.5	25.1	73	80	80	1944	860032
GR-LNB 99	9/30/93	13:24	8	15.03	180	300	507	527	904585	971	788	50.5	25.0	86	80	80	2030	1148508
GR-LNB 99b	9/30/93	2:27	6	14.03	162	275	493	513	772983	943	778	50.5	25.0	90	80	80	1973	962985
LNB-OFA	9/30/93	2:27	259	13.34	298	286	447	467	530406	794	710	50.5	25.0	88	80	80	1895	645540
GR-LNB 100a	10/1/93	11:00	6	13.01	184	237	475	495	638714	923	784	50.5	25.2	70	80	80	1936	780747
GR-LNB 100	10/1/93	9:12	6	14.57	158	252	493	513	764884	973	771	50.5	25.0	77	80	80	1975	935314
GR-LNB 101	10/2/93	24:00	5	14.21	160	252	491	511	749864	963	780	50.5	25.3	69	80	80	1970	921644
GR-LNB 102	10/3/93	24:00	5	13.84	166	246	486	506	712297	963	779	50.5	25.2	78	80	80	1957	867220
GR-LNB 103	10/4/93	24:00	7	14.23	161	259	492	512	761373	966	778	50.5	25.2	81	80	80	1974	931726
GR-LNB 104	10/5/93	24:00	5	13.94	167	269	494	514	775329	968	782	50.5	25.2	83	80	80	1978	955790
GR-LNB 105	10/6/93	10:15	9	14.46	170	278	504	524	874510	980	786	50.5	25.1	75	80	80	2024	1096262
GR-LNB 106	10/8/93	8:45	18	16.02	167	298	506	526	907830	975	785	50.5	25.2	54	80	80	2032	1153156
GR-LNB 107	10/9/93	24:00	11	15.06	179	281	507	527	904641	980	787	50.5	25.3	48	80	80	2029	1146133

Cherokee Unit 3, Average Test D
Pre Modification

Test No.	Date	Dur.	CO raw ppm	CO2 raw %vol	NOx raw ppm	SO2 raw ppm	Econ In H2O DegF	Econ Wall Out DegF	Cold RH Flow lbs/hr	Hot RH DegF	SH AttmpO DegF	Rel Humd %	Amb Press ", HgA	Amb Temp Deg F	NG Temp Def F	Coal Temp Deg F	Econ H2O Prs PSIG	Econ H2O Fl lbs/hr
GR-LNB 108	10/10/93	11:00	29	14.84	180	282	508	528	907114	987	785	50.5	25.2	51	80	80	2035	1143835
GR-LNB 109a	10/13/93	4:07	17	15.32	180	288	506	526	916372	964	773	50.5	25.1	75	80	80	2044	1162903
GR-LNB 109b	10/13/93	2:02	11	14.55	167	277	490	510	764606	940	774	50.5	25.1	70	80	80	1977	960169
GR-LNB 110a	10/14/93	6:02	18	14.67	170	279	497	517	805622	978	776	50.5	25.1	65	80	80	1994	988613
GR-LNB 110	10/14/93	14:56	17	15.28	177	287	508	528	901962	992	770	50.5	25.0	69	80	80	2031	1113023
GR-LNB 110b	10/14/93	3:00	7	13.87	174	256	488	508	739921	941	775	50.5	25.0	68	80	80	1976	915835
GR-LNB 111	10/15/93	12:49	59	15.07	160	286	500	520	824142	980	767	50.5	25.0	63	80	80	1990	1007217
GR-LNB 3 Mill a	10/15/93	2:58	30	16.14	174	307	504	524	881517	971	773	50.5	25.0	73	80	80	2013	1116145
GR-LNB 3 Mill b	10/15/93	7:05	15	15.20	175	290	496	516	820278	949	777	50.5	25.0	69	80	80	1983	1033302
GR-LNB 3 Mill c	10/16/93	12:05	4	13.55	177	264	480	500	667340	943	783	50.5	25.0	64	80	80	1923	818698
GR-LNB 3 Mill d	10/16/93	10:28	15	15.62	187	299	511	531	944598	979	786	50.5	25.0	72	80	80	2042	1202878
GR-LNB 3 Mill e	10/16/93	1:25	29	15.33	147	289	498	518	839565	958	779	50.5	25.0	66	80	80	2012	1066369
GR-LNB 3 Mill f	10/17/93	23:46	152	15.06	148	286	495	515	801669	958	765	50.5	24.9	59	80	80	1992	992905
LNB-OFA 3 Mill	10/18/93	11:10	148	14.72	158	314	475	495	656702	920	753	50.5	25.0	56	80	80	1944	800074
GR-LNB 3 Mill g	10/19/93	15:35	18	14.06	154	255	489	509	779809	930	771	50.5	25.1	66	80	80	1987	982222
GR-LNB 3 Mill h	10/20/93	7:35	12	14.01	151	211	491	511	776541	953	780	50.5	25.3	54	80	80	1987	974539
GR-LNB 112	10/20/93	4:09	19	13.94	169	234	490	510	738441	967	786	50.5	25.4	52	80	80	1970	910495
LNB-OFA	10/20/93	0:56	52	13.79	229	280	496	516	829004	961	793	50.5	25.4	55	80	80	2008	1026356
GR-LNB 113	10/20/93	10:42	15	14.36	175	270	506	526	903570	983	784	50.5	25.3	58	80	80	2039	1138509
GR-LNB 113	10/21/93	24:00	89	14.62	171	282	506	526	896565	992	779	50.5	25.3	63	80	80	2033	1117907
GR-LNB 114	10/22/93	24:00	91	14.66	164	292	504	524	875357	986	775	50.5	25.3	68	80	80	2020	1086784
GR-LNB 115	10/23/93	24:00	70	14.51	164	289	507	527	909758	987	778	50.5	25.3	70	80	80	2033	1139602
GR-LNB 116	10/24/93	14:00	85	14.47	161	290	506	526	893249	988	780	50.5	25.2	66	80	80	2023	1114402
GR-LNB 116a	10/24/93	10:00	97	14.45		289	507	527	910574	989	781	50.5	25.1	77	80	80	2034	1140962
GR-LNB 117a	10/25/93	4:55	18	13.53		275	485	505	735278	948	767	50.5	25.1	65	80	80	1963	906400
GR-LNB 117	10/25/93	19:04	65	14.83		288	506	526	893753	993	774	50.5	25.3	62	80	80	2025	1105426
GR-LNB 118	10/26/93	24:00	46	15.24		297	505	525	888159	986	775	50.5	25.4	54	80	80	2023	1109376
GR-LNB 119	10/27/93	14:25	263	15.35		296	508	528	914767	992	772	50.5	25.3	53	80	80	2041	1141615
GR-LNB 119a	10/27/93	9:34		15.57		311	505	525	895662	988	771	50.5	25.0	73	80	80	2034	1121570
GR-LNB 120a	10/28/93	7:21		14.92		301	498	519	849435	967	770	50.5	24.9	71	80	80	2023	1064614
GR-LNB 120	10/28/93	16:38	254	15.84		300	506	526	896947	992	771	50.5	24.9	57	80	80	2032	1115740
GR-LNB 121	10/29/93	24:00	203	15.43		282	505	525	892054	992	767	50.5	25.2	33	80	80	2027	1100690
GR-LNB 122	10/30/93	24:00	92	15.55		301	508	528	920269	993	772	50.5	25.2	41	80	80	2039	1143870
GR-LNB 123	10/31/93	24:00	52	15.29		313	506	526	904259	992	772	50.5	25.0	58	80	80	2034	1122829
GR-LNB 124	11/1/93	6:18		15.53		311	504	524	883998	983	773	50.5	25.2	50	80	80	2029	1106832
LNB-OFA	11/1/93	1:08		15.44		332	481	502	728828	934	768	50.5	25.3	45	80	80	1965	900387
GR-LNB 125a	11/2/93	8:15		16.94		325	506	526	903684	994	759	50.5	25.3	47	80	80	2023	1110101
LNB	11/2/93	0:29		16.83		318	506	526	898793	990	761	50.5	25.2	62	80	80	2020	1106317
GR-LNB 125	11/2/93	10:09		16.82		318	506	526	898530	990	761	50.5	25.2	62	80	80	2020	1105218
GR-LNB 126a	11/4/93	1:40		16.82			503	523	874776	985	763	50.5	25.0	50	80	80	2017	1079213

Cherokee Unit 3, Average Test D
Pre Modification

Test No.	Date	Dur.	CO raw ppm	CO2 raw %vol	NOx raw ppm	SO2 raw ppm	Econ In H2O DegF	Econ Wall Out DegF	Cold RH Flow lbs/hr	Hot RH DegF	SH AttmpO DegF	Rel Humd %	Amb Press ", HgA	Amb Temp Deg F	NG Temp Def F	Coal Temp Deg F	Econ H2O Prs PSIG	Econ H2O Fl lbs/hr
GR-LNB 126	11/4/93	13:29		16.44	173		503	523	888852	980	768	50.5	25.2	45	80	80	2028	1111931
GR-LNB 127a	11/5/93	7:20		14.50	158		496	516	830193	964	773	50.5	25.3	37	80	80	2001	1043887
GR-LNB 127	11/5/93	5:54		14.27	167		505	525	926081	964	775	50.5	25.3	39	80	80	2047	1186535
GR-LNB 128	11/8/93	4:55	238	15.74	185		506	526	902556	993	779	50.5	25.2	55	80	80	2033	1129743
GR-LNB 129	11/9/93	8:30	213	15.56	182		508	528	929341	991	779	50.5	25.3	62	80	80	2052	1168399
GR-LNB 129a	11/9/93	5:29	117	15.11	217		510	530	973667	964	784	50.5	25.3	57	80	80	2075	1254645
GR-LNB 130	11/10/93	15:43	395	15.53	198		507	527	927457	977	780	50.5	25.2	57	80	80	2041	1175109
LNB	11/10/93	7:50	839	16.48	319		504	524	942393	930	767	50.5	25.1	68	80	80	2050	1208894
LNB	11/11/93	2:00	246	15.36	334		499	519	881764	932	766	50.5	25.0	51	80	80	2026	1126630
LNB 3 Mill a	11/11/93	3:34	918	15.66	232		478	498	693531	912	756	50.5	24.9	65	80	80	1953	858258
LNB 3 Mill b	11/11/93	9:20	269	14.80	259	274	476	496	698408	889	751	50.5	24.8	60	80	80	1957	870796
LNB 3 Mill c	11/12/93	12:30	170	14.71	281	258	483	503	754027	901	757	50.5	24.6	46	80	80	1975	948076
LNB 3 Mill d	11/12/93	11:29	505	17.58	299	294	502	522	934460	921	759	50.5	24.7	51	80	80	2059	1202493
LNB 3 Mill e	11/13/93	14:30	82	16.50	340	271	501	521	911229	931	768	50.5	24.9	50	80	80	2033	1168930
LNB 3 Mill f	11/13/93	9:29	351	17.70		304	503	523	936780	925	758	50.5	24.8	51	80	80	2057	1206649
LNB 3 Mill	11/14/93	24:00	192	17.50		281	499	519	895562	931	764	50.5	25.1	41	80	80	2035	1148491
LNB	11/15/93	1:39	163	18.14		282	501	521	907330	935	773	50.5	25.2	36	80	80	2042	1163600
GR-LNB 131	11/15/93	13:00	18	15.79	188	241	505	525	894782	985	782	50.5	25.1	43	80	80	2033	1125170
GR-LNB 132	11/16/93	7:42	15	15.93	175	255	501	521	864824	981	781	50.5	25.1	41	80	80	2020	1084106
GR-LNB 132a	11/16/93	16:17	12	13.40	154	193	493	513	805245	955	767	50.5	25.2	52	80	80	1990	1003988
GR-LNB 133	11/17/93	0:40	7	13.40	140	204	490	510	773733	961	781	50.5	25.3	46	80	80	1985	965928
LNB	11/17/93	8:40	277	14.43	214	243	482	502	758497	891	750	50.5	25.3	44	80	80	1969	961648
LNB	12/3/93	5:15	321	16.06		298	503	523	915010	930	774	50.5	14.3	53	80	80	2033	1177595
LNB	12/6/93	2:33	859	14.72		274	472	492	675505	885	739	50.5	14.3	41	80	80	1951	840999
LNB	12/6/93	3:00	34	14.95		287	505	525	961915	925	763	50.5	14.3	43	80	80	2053	1248398
LNB	12/6/93	1:55	10	14.56	353	273	506	526	964390	931	770	50.5	14.3	47	80	80	2046	1251810
LNB	12/7/93	6:45	178	16.12	331	290	506	526	982732	909	763	50.5	14.3	58	80	80	2077	1279360
LNB	12/8/93	4:03	43	15.45	366	293	509	529	960348	950	785	50.5	14.3	60	80	80	2047	1242254
GR-LNB 134	12/8/93	3:40	290	16.19	168	293	509	529	960566	967	784	50.5	14.3	72	80	80	2055	1233704
GR-LNB 134a	12/8/93	0:46	237	16.58	210	323	507	527	965218	943	767	50.5	14.3	71	80	80	2050	1247447
GR-LNB 134b	12/8/93	2:44	839	17.72	191	344	508	528	958599	966	775	50.5	14.3	71	80	80	2050	1231152
GR-LNB 134c	12/8/93	3:31	999	18.25	178	351	511	531	960391	985	768	50.5	14.3	66	80	80	2051	1206368
GR-LNB 135	12/9/93	12:00	866	17.67	175	330	503	523	886318	980	761	50.5	14.3	61	80	80	2025	1101725
GR-LNB 135a	12/9/93	2:59	378	16.98	198	300	509	529	926560	986	778	50.5	14.3	70	80	80	2036	1159006
GR-LNB 135b	12/9/93	7:10	25	15.32	225	238	498	518	876032	919	771	50.5	14.3	64	80	80	2020	1120113
GR-LNB 136	12/10/93	11:35	84	15.66	214	251	502	522	902290	935	777	50.5	14.3	61	80	80	2036	1158928
GR-LNB 137	12/11/93	16:15	120	15.68	195	280	499	519	857776	951	773	50.5	14.3	58	80	80	2009	1084228
GR-LNB 137a	12/11/93	7:44		15.52	213	297	510	530	967143	959	781	50.5	14.3	60	80	80	2071	1249054
GR-LNB 138	12/12/93	24:00		15.45	212	277	511	531	973075	958	783	50.5	14.3	59	80	80	2074	1255267
GR-LNB 139	12/13/93	7:48		16.17	195	247	512	532	969476	981	780	50.5	14.3	47	80	80	2082	1245991

Cherokee Unit 3, Average Test D
Pre Modification

Test No.	Date	Dur.	CO raw ppm	CO2 raw %vol	NOx raw ppm	SO2 raw ppm	Econ In H2O DegF	Econ Wall Out DegF	Cold RH Flow lbs/hr	Hot RH DegF	SH AttmpO DegF	Rel Humd %	Amb Press ", HgA	Amb Temp Deg F	NG Temp Def F	Coal Temp Deg F	Econ H2O Prs PSIG	Econ H2O Fl lbs/hr
GR-LNB 139a	12/13/93	4:18	177	16.04	190	231	512	532	959305	984	782	50.5	14.3	47	80	80	2061	1231245
LNB	12/13/93	5:18	57	15.72	327	286	505	525	932560	935	756	50.5	14.3	53	80	80	2053	1180972
LNB-OFA	12/14/93	1:55	15	14.83	198	285	511	531	969707	957	780	50.5	14.3	52	80	80	2076	1257184
GR-LNB 140	12/14/93	1:18	833	15.96	196	298	510	530	964012	983	775	50.5	14.3	63	80	80	2070	1242405
LNB	12/14/93	8:30	171	16.53	285	308	506	526	955330	943	768	50.5	14.3	55	80	80	2069	1236159
LNB	12/15/93	9:28	17	15.63	315	282	505	525	947026	936	769	50.5	14.3	40	80	80	2062	1226517
LNB-OFA	12/15/93	5:29	122	15.17	261	277	507	527	959812	934	776	50.5	14.3	43	80	80	2068	1247848
GR-LNB 141	12/15/93	5:15	449	15.61	188	274	493	512	866460	936	768	50.5	14.3	43	80	80	2025	1081017
LNB	12/15/93	2:50	18	13.38	290	227	454	474	592909	944	766	50.5	14.3	40	80	80	1691	690629
LNB	12/16/93	15:05	420	15.38	317	268	486	506	929122	950	776	50.5	14.3	37	80	80	2043	1138641
GR-LNB 142	12/16/93	6:14	637	15.46	207	254	493	513	993458	975	787	50.5	14.3	37	80	80	2068	1219253
GR-LNB 142a	12/16/93	1:15	768	14.84	154	234	466	486	682221	927	767	50.5	14.3	40	80	80	1939	821732
GR-LNB 143	12/17/93	2:10	742	14.36	150	229	464	484	662344	942	764	50.5	14.3	39	80	80	1945	785103
LNB-OFA	12/17/93	0:40	9	10.75	333	169	422	442	370078	832	715	50.5	14.3	41	80	80	1861	446786
LNB	12/17/93	6:10	347	15.98	298	285	489	509	957819	961	779	50.5	14.3	38	80	80	2039	1174380
LNB	12/20/93	2:25	186	14.91	310	274	484	504	842268	959	789	50.5	14.3	35	80	80	1977	1021855
100% Gas Firing	12/20/93	0:34	15	8.27	102	39	448	468	561119	910	769	50.5	14.3	39	80	80	1844	645929
LNB	12/22/93	2:35	434	14.53	270	224	477	497	783556	941	784	50.5	14.3	44	80	80	1983	944581
LNB	1/5/94	2:24	142	16.42	334	297	489	509	942168	955	778	50.5	14.3	68	80	80	2055	1158414
LNB-OFA	1/5/94	2:26	688	15.80	285	276	489	509	948672	942	781	50.5	14.3	67	80	80	2049	1168027
LNB-OFA	1/5/94	9:15	830	15.74	232	298	478	498	827853	935	772	50.5	14.3	54	80	80	1999	1009498
LNB-OFA	1/6/94	8:47	924	15.21	194	286	457	477	636605	918	751	50.5	14.3	49	80	80	1942	758069
LNB	1/6/94	15:12	475	16.49	286	304	489	509	929193	962	780	50.5	14.3	43	80	80	2038	1139017
LNB	1/7/94	6:55	552	16.19	229	301	472	492	761517	931	765	50.5	14.3	30	80	80	1975	920629
LNB-OFA	1/7/94	1:09	793	15.66	179	287	477	496	786503	942	768	50.5	14.3	36	80	80	1971	942272
GR-LNB 144	1/7/94	15:40	815	15.63	188	273	489	509	891406	978	776	50.5	14.3	53	80	80	2021	1074773
GR-LNB 145a	1/8/94	8:20	886	15.76	156	271	480	500	792116	971	756	50.5	14.3	51	80	80	1986	930650
GR-LNB 145	1/8/94	15:39	997	16.31	176	283	493	513	928565	990	759	50.5	14.3	51	80	80	2037	1096957
GR-LNB 146a	1/9/94	2:10	1000	16.42	160	287	491	511	903039	991	729	50.5	14.3	42	80	80	2018	1041872
GR-LNB 146b	1/9/94	8:39	919	15.46	150	264	477	497	722449	984	744	50.5	14.3	44	80	80	1958	819845
GR-LNB 146	1/9/94	9:02	838	15.33	187	256	487	507	863592	984	768	50.5	14.3	51	80	80	2012	1023610
LNB	1/9/94	3:35	765	15.52	206	268	469	489	749786	912	755	50.5	14.3	48	80	80	1968	913339
LNB	1/10/94	3:50	673	15.65	218	273	481	501	824039	968	762	50.5	14.3	46	80	80	2001	982931
GR-LNB 147	1/10/94	2:40	762	15.63	205	268	495	515	981185	982	787	50.5	14.3	54	80	80	2052	1199787
GR-LNB 147a	1/10/94	4:04	322	14.62	170	244	476	496	774915	948	769	50.5	14.3	53	80	80	1973	934278
GR-LNB 147b	1/10/94	4:54	186	14.43	175	232	477	497	780534	945	771	50.5	14.3	47	80	80	1974	938847
GR-LNB 148a	1/11/94	6:32	41	13.77	174	224	470	490	687297	957	778	50.5	14.3	42	80	80	1943	812438
GR-LNB 148	1/11/94	14:38	511	15.35	217	255	492	512	975550	955	784	50.5	14.3	55	80	80	2058	1202950
GR-LNB 148b	1/11/94	2:48	373	15.15	174	254	474	494	808167	900	757	50.5	14.3	55	80	80	1981	986733
GR-LNB 149a	1/12/94	6:14	408	15.21	193	245	483	503	842118	961	785	50.5	14.3	48	80	80	1997	1021819

Cherokee Unit 3, Average Test D
Pre Modification

Test No.	Date	Dur.	CO raw ppm	CO2 raw %vol	NOx raw ppm	SO2 raw ppm	Econ In H2O DegF	Econ Wall Out DegF	Cold RH Flow lbs/hr	Hot RH DegF	SH AttmpO DegF	Rel Humd %	Amb Press ", HgA	Amb Temp Deg F	NG Temp Def F	Coal Temp Deg F	Econ H2O Prs PSIG	Econ H2O Fl lbs/hr
GR-LNB 149	1/12/94	13:30	521	15.32	206	248	488	508	902397	964	783	50.5	14.3	52	80	80	2023	1100096
GR-LNB A Mill off	1/12/94	1:09	680	15.40	194	251	485	505	820001	984	769	50.5	14.3	53	80	80	1974	958837
GR-LNB D Mill off	1/12/94	1:39	791	16.10	159	264	488	508	852270	986	761	50.5	14.3	54	80	80	2007	997742
GR-LNB D Mill off line	1/13/94	4:23	820	15.55	132	255	469	489	675626	961	735	50.5	14.3	55	80	80	1936	770077
GR-LNB 150	1/13/94	7:15	991	15.89	194	272	496	516	960179	994	768	50.5	14.3	59	80	80	2044	1146067
GR-LNB D Mill off line	1/13/94	1:13	957	16.02	151	277	489	509	852250	1000	744	50.5	14.3	60	80	80	1993	978561
GR-LNB 150a	1/13/94	6:00	589	15.32	177	257	484	504	853029	960	774	50.5	14.3	59	80	80	2007	1029683
GR-LNB 151a	1/14/94	7:25	187	14.48	160	243	466	486	682966	925	761	50.5	14.3	59	80	80	1944	813316
GR-LNB, ABC	1/14/94	7:50	983	15.87	156	272	486	506	825014	985	746	50.5	14.3	64	80	80	1987	956780
GR-LNB 151	1/14/94	7:54	592	15.89	182	269	484	504	830754	975	767	50.5	14.3	62	80	80	1996	981919
GR-LNB 156	1/19/94	24:00	610	15.46	163	292	473	493	739252	948	765	50.5	14.3	63	80	80	1964	881044
GR-LNB 157a	1/20/94	6:38	469	15.88	153	295	473	493	706935	966	756	50.5	14.3	38	80	80	1946	822271
GR-LNB 157	1/20/94	3:50	654	16.04	182	311	493	513	904599	993	762	50.5	14.3	38	80	80	2021	1058977

Cherokee Unit 3, Average Test C

Pre Modification

Test No.	Date	Dur.	Drum Press PSIG	PSH Out PSIG	Steam To Turb PSIG	RH In Press PSIG	RH In Temp Deg F	Hot RH Out Prs PSIG	DryGas HtLss %	Moist HtLss %	CombH2O HtLss %	Refuse HtLss %	Radiat HtLss %	Unmeas HtLss %	Total Htlss %	Comb Air Temp	Econ Gas Out Temp
Base Cond. (OFA off)	11/11/92	8:42	1905	1860	1815	280	590	271	7.26	1.11	4.27	0.61	0.35	1.31	14.91	80	658
GR	11/11/92	1:01	2010	1918	1826	438	660	424	6.29	0.88	5.57	0.48	0.20	0.83	14.24	80	719
Base Cond. (OFA off)	11/11/92	4:25	2006	1915	1821	430	639	413	5.90	1.11	4.26	0.61	0.19	0.81	12.87	80	703
Base Cond. OFA off	11/12/92	0:45	2011	1918	1826	433	619	420	4.50	1.10	4.24	0.61	0.18	0.79	11.42	80	686
BPMS GR 4	11/12/92	1:05	2007	1916	1824	435	664	420	4.76	0.89	5.50	0.49	0.20	0.84	12.68	80	726
Base Cond. OFA off	11/12/92	1:15	2008	1916	1823	429	637	412	5.01	1.11	4.26	0.61	0.19	0.81	11.98	80	708
BPMS Base Cond. 5	11/13/92	2:55	2013	1919	1825	437	649	421	5.06	1.11	4.25	0.61	0.19	0.80	12.02	80	702
BPMS Base Cond. 6	11/13/92	1:00	2015	1920	1824	430	619	410	4.92	1.10	4.25	0.61	0.18	0.78	11.83	80	693
BPMS Base Cond. 7	11/13/92	1:00	2019	1922	1825	431	612	409	4.85	1.11	4.25	0.61	0.17	0.76	11.75	80	691
Base Cond.-1d	11/16/92	1:00	1985	1904	1824	400	640	383	5.05	1.11	4.26	0.61	0.22	0.91	12.15	80	686
GR-10c	11/16/92	1:00	2003	1913	1823	414	608	391	4.81	1.11	4.26	0.61	0.19	0.81	11.78	80	684
GR-10d	11/16/92	1:00	2005	1916	1825	413	608	389	4.88	1.11	4.26	0.61	0.19	0.81	11.85	80	686
Base Cond. OFA off	11/17/92	1:15	2009	1918	1826	429	636	411	4.79	1.10	4.24	0.61	0.19	0.80	11.73	80	706
GR-11c	11/17/92	1:00	2000	1912	1825	416	655	395	4.71	0.88	5.60	0.48	0.21	0.86	12.74	80	713
GR-11d	11/17/92	1:00	1996	1910	1824	412	656	390	4.83	0.87	5.62	0.48	0.21	0.88	12.89	80	715
Base Cond. OFA off	11/17/92	0:20	1990	1905	1823	401	636	378	5.44	1.11	4.27	0.61	0.22	0.90	12.54	80	711
Base Cond. OFA off	11/18/92	0:28	2003	1913	1825	419	626	404	4.41	1.10	4.23	0.61	0.20	0.84	11.39	80	694
GR-11e	11/18/92	1:04	2001	1913	1825	422	659	406	4.80	0.87	5.60	0.48	0.21	0.87	12.83	80	725
GR-12b	11/18/92	1:05	2000	1912	1825	417	650	399	4.89	0.93	5.29	0.51	0.21	0.87	12.70	80	721
Base Cond. OFA off	11/18/92	0:35	1993	1909	1821	411	636	393	5.11	1.11	4.27	0.61	0.21	0.87	12.17	80	713
GR-12 (5% Gas)	11/19/92	1:00	2007	1915	1823	422	622	404	4.52	1.04	4.58	0.58	0.19	0.81	11.72	80	697
GR-12a (10% Gas)	11/19/92	1:00	2006	1915	1824	422	654	402	4.48	0.99	4.91	0.55	0.20	0.84	11.96	80	702
GR-12c (23% Gas)	11/19/92	1:00	1993	1908	1824	411	661	390	4.65	0.85	5.77	0.47	0.22	0.91	12.86	80	716
Base Cond. OFA off	11/19/92	0:20	1988	1904	1818	404	644	383	4.97	1.10	4.25	0.61	0.21	0.89	12.04	80	703
GR-13A; 18% Gas	11/20/92	0:58	2000	1913	1825	417	657	401	4.37	0.90	5.44	0.50	0.21	0.88	12.28	80	712
GR-13D; 18% Gas	11/20/92	1:00	1994	1909	1824	414	661	398	4.56	0.90	5.45	0.50	0.22	0.90	12.52	80	724
GR-14B; 20% Gas	11/20/92	1:00	1994	1909	1824	414	664	399	4.68	0.88	5.57	0.48	0.22	0.91	12.73	80	725
Base Cond. OFA off	11/30/92	1:50	1987	1903	1819	419	646	402	4.92	1.11	4.26	0.61	0.20	0.84	11.94	80	697
GR-BFr	11/30/92	0:26	1987	1904	1820	417	652	397	5.07	0.99	4.94	0.54	0.20	0.85	12.59	80	719
GR-BFl	11/30/92	0:27	1986	1903	1821	412	642	392	5.01	0.99	4.92	0.55	0.20	0.86	12.53	80	708
GR-21C	12/1/92	1:06	1923	1870	1816	325	626	312	4.72	0.87	5.59	0.48	0.31	1.18	13.16	80	686
GR-22	12/1/92	0:50	1922	1868	1814	323	586	309	4.98	1.01	4.76	0.56	0.30	1.15	12.76	80	679
Bias Firing	12/1/92	0:10	1925	1871	1819	320	615	306	4.51	0.86	5.62	0.48	0.31	1.17	12.95	80	684
Base Cond. OFA on	12/1/92	0:50	1925	1870	1815	325	570	312	4.45	1.10	4.23	0.61	0.30	1.13	11.81	80	661
Base Cond. OFA off	12/1/92	0:40	1941	1879	1816	349	621	335	4.76	1.10	4.24	0.61	0.28	1.08	12.07	80	681
Base Cond. OFA off	12/2/92	3:55	1981	1899	1817	413	635	401	4.72	1.10	4.24	0.61	0.21	0.87	11.76	80	699
Base Cond. OFA off	12/4/92	0:55	1932	1874	1815	335	612	332	4.64	1.10	4.23	0.61	0.29	1.12	11.99	80	671
OFA Test	12/4/92	2:10	1917	1866	1814	312	602	309	4.57	1.10	4.22	0.61	0.32	1.20	12.01	80	670
Base Cond. OFA off	12/7/92	2:10	1931	1871	1811	336	626	325	4.77	1.10	4.23	0.61	0.29	1.12	12.12	80	681
GR-22A	12/7/92	1:05	1927	1869	1811	328	625	315	4.70	0.98	4.97	0.54	0.30	1.14	12.62	80	698

Cherokee Unit 3, Average Test D

Pre Modification

Test No.	Date	Dur.	Drum Press PSIG	PSH Out PSIG	Steam To Turb PSIG	RH In Press PSIG	RH In Temp Deg F	Hot RH Out Prs PSIG	DryGas HtLss %	Moist HtLss %	CombH2O HtLss %	Refuse HtLss %	Radiat HtLss %	Unmeas HtLss %	Total Htlss %	Comb Air Temp	Econ Gas Out Temp
GR-22B	12/7/92	1:00	1927	1870	1813	324	625	310	4.68	0.93	5.24	0.51	0.30	1.16	12.83	80	702
GR-22C	12/7/92	1:00	1926	1869	1812	325	625	312	4.70	0.87	5.58	0.48	0.31	1.16	13.11	80	704
Base Cond. OFA off	12/8/92	0:27	1881	1844	1808	250	583	242	4.83	1.11	4.25	0.61	0.38	1.39	12.56	80	656
GR-31C	12/8/92	1:00	1882	1845	1808	252	595	241	4.83	0.87	5.61	0.48	0.38	1.39	13.56	80	679
GR-31F	12/8/92	1:23	1881	1844	1806	252	595	240	5.22	0.87	5.61	0.48	0.38	1.39	13.96	80	690
GR-32A	12/8/92	1:00	1886	1848	1810	247	590	235	4.82	0.98	4.96	0.54	0.38	1.38	13.06	80	677
Base Cond. OFA off	12/9/92	0:41	1891	1851	1810	244	583	227	4.65	1.11	4.25	0.61	0.37	1.36	12.34	80	661
GR-32C	12/9/92	1:00	1885	1848	1810	235	588	217	5.27	0.88	5.61	0.48	0.39	1.41	14.03	80	684
GR-32C; 3Mills	12/9/92	0:56	1889	1849	1810	242	591	222	4.81	0.87	5.59	0.48	0.38	1.38	13.51	80	687
Base Cond. OFA off	12/9/92	0:15	1899	1857	1810	255	597	233	5.29	1.11	4.25	0.61	0.36	1.32	12.94	80	689
Base Cond. OFA off	12/14/92	2:00	1962	1891	1821	377	624	367	4.67	1.10	4.22	0.61	0.25	0.99	11.84	80	687
GR-12Z	12/14/92	1:02	1997	1911	1824	413	639	397	4.62	1.04	4.57	0.58	0.20	0.85	11.86	80	706
GR 2.7% Gas	12/14/92	0:17	1996	1910	1824	413	640	398	4.66	1.07	4.39	0.59	0.20	0.86	11.77	80	709
Base Cond. OFA off	12/15/92	1:37	1988	1906	1823	403	622	387	4.66	1.10	4.24	0.61	0.21	0.88	11.71	80	696
GR 20% Gas	12/15/92	0:36	1999	1913	1829	411	653	393	4.42	0.88	5.48	0.49	0.21	0.87	12.35	80	708
Base Cond. OFA off	12/16/92	0:48	1995	1910	1825	411	621	397	4.55	1.10	4.22	0.61	0.20	0.86	11.54	80	694
GR-12A1	12/16/92	2:19	2006	1917	1828	420	638	405	4.44	0.98	4.88	0.55	0.20	0.83	11.87	80	705
Test C1	1/15/93	1:00	2005	1914	1823	417	654	397	4.67	1.02	4.72	0.56	0.20	0.85	12.01	80	707
Test C2	1/15/93	1:00	2006	1915	1824	417	660	394	4.76	0.97	5.03	0.53	0.20	0.86	12.36	80	715
Test C3	1/15/93	0:58	2005	1915	1824	416	662	391	4.77	0.92	5.35	0.51	0.21	0.86	12.61	80	716
Test C4	1/15/93	0:50	2005	1915	1825	417	662	391	4.66	0.87	5.65	0.48	0.21	0.87	12.73	80	716
Test B1	1/15/93	0:59	2008	1915	1822	415	639	389	4.86	1.10	4.25	0.61	0.19	0.82	11.84	80	707
Test B3	1/15/93	1:01	2008	1915	1823	415	640	388	4.68	1.10	4.24	0.61	0.19	0.82	11.65	80	706
Base Cond. OFA off	1/18/93	0:45	2016	1920	1825	437	661	420	4.46	1.10	4.23	0.61	0.18	0.80	11.38	80	709
Test B5	1/18/93	1:01	2016	1921	1826	437	641	420	4.48	1.10	4.23	0.61	0.18	0.79	11.39	80	704
Base Cond. OFA cooling	1/19/93	0:39	2011	1914	1816	439	645	423	4.55	1.10	4.23	0.61	0.18	0.79	11.46	80	720
GR-12R	1/19/93	1:00	2005	1910	1817	430	632	414	4.66	1.04	4.55	0.58	0.19	0.81	11.82	80	718
GR-13E	1/19/93	1:00	1996	1907	1818	421	658	406	4.40	0.90	5.42	0.50	0.21	0.87	12.29	80	718
GR-13C	1/20/93	1:10	1999	1907	1814	422	663	400	4.74	0.91	5.42	0.50	0.20	0.84	12.61	80	724
GR-12D	1/20/93	1:05	1998	1905	1812	420	661	396	4.92	0.94	5.24	0.52	0.20	0.84	12.65	80	728
GR-12E	1/20/93	0:59	2000	1905	1811	416	658	389	4.81	1.00	4.89	0.55	0.20	0.83	12.28	80	722
Base Cond. OFA off	1/20/93	0:15	2000	1905	1809	417	648	389	4.69	1.11	4.26	0.61	0.19	0.81	11.67	80	714
150 MWn Max NOx Red	1/21/93	1:05	1994	1904	1813	421	663	396	4.72	0.86	5.72	0.47	0.21	0.86	12.84	80	721
Base Cond. OFA cooling	1/21/93	1:30	1990	1899	1807	413	647	388	4.70	1.11	4.25	0.61	0.20	0.84	11.71	80	708
120 MWn Max NOx Red	1/21/93	1:00	1925	1865	1804	331	631	311	4.74	0.84	5.85	0.46	0.30	1.14	13.32	80	688
GR Environ. #1	1/25/93	5:10	1975	1892	1809	398	653	378	4.82	0.91	5.36	0.50	0.23	0.93	12.75	80	714
Base Cond. OFA cooling	1/26/93	0:55	1966	1886	1806	390	633	374	4.81	1.10	4.24	0.61	0.23	0.94	11.93	80	696
GR Environ. Test #2	1/26/93	5:22	1967	1887	1808	391	651	370	4.87	0.92	5.32	0.51	0.24	0.96	12.81	80	706
Environ. #3	1/27/93	5:55	1994	1903	1812	420	661	397	5.11	0.93	5.31	0.51	0.20	0.85	12.92	80	729
Environ. #4 (No GR)	1/27/93	6:00	1971	1889	1806	390	625	368	4.96	1.11	4.26	0.61	0.22	0.91	12.07	80	703

Cherokee Unit 3, Average Test D
Pre Modification

Test No.	Date	Dur.	Drum Press PSIG	PSH Out PSIG	Steam To Turb PSIG	RH In Press PSIG	RH In Temp Deg F	Hot RH Out Prs PSIG	DryGas HtLss %	Moist HtLss %	CombH2O HtLss %	Refuse HtLss %	Radiat HtLss %	Unmeas HtLss %	Total Htlss %	Comb Air Temp	Econ Gas Out Temp
Environ. #5 (No GR)	1/28/93	6:04	2001	1907	1813	428	650	408	4.81	1.11	4.26	0.61	0.19	0.81	11.79	80	710
Base Cond.	2/2/93	0:17	1992	1899	1806	414	642	393	4.73	1.11	4.26	0.61	0.20	0.84	11.74	80	694
LNB 120MW #1	3/8/93	2:00	1932	1888	1844	307	563	274	5.05	1.11	4.26	0.61	0.28	1.09	12.39	80	662
LNB 120MW #2	3/8/93	2:00	1928	1885	1842	304	577	269	5.21	1.11	4.28	0.61	0.28	1.09	12.58	80	671
LNB 150MW #1	3/9/93	2:00	1997	1919	1841	404	632	368	5.34	1.11	4.28	0.61	0.18	0.78	12.30	80	716
LNB 150MW #2	3/9/93	2:00	1979	1897	1815	387	614	349	5.17	1.11	4.28	0.61	0.18	0.78	12.13	80	703
LNB 90MW #1	3/10/93	2:00	1846	1821	1796	235	524	210	5.05	1.10	4.24	0.61	0.36	1.34	12.69	80	637
LNB 90MW #2	3/10/93	1:58	1850	1825	1800	236	532	213	5.05	1.10	4.25	0.61	0.36	1.34	12.71	80	640
LNB 150MW #3	3/11/93	2:00	1989	1916	1843	401	638	373	4.82	1.10	4.25	0.61	0.19	0.83	11.81	80	708
LNB 150MW #4	3/11/93	2:00	1985	1910	1834	406	633	376	4.74	1.10	4.25	0.61	0.19	0.80	11.70	80	704
3M1	3/22/93	1:02	1978	1905	1831	398	609	360	4.24	0.88	5.53	0.49	0.19	0.82	12.15	80	689
3M2	3/22/93	1:03	1971	1898	1825	394	617	356	4.20	0.88	5.54	0.49	0.20	0.83	12.12	80	689
3M3	3/22/93	0:59	1972	1899	1826	394	626	354	4.37	0.88	5.54	0.49	0.20	0.83	12.30	80	697
3 Mill 7	4/13/93	1:00	1898	1851	1804	311	560	282	4.37	1.10	4.22	0.61	0.29	1.11	11.69	80	654
3 Mill 6	4/13/93	1:00	1902	1854	1807	314	569	284	4.16	1.09	4.21	0.61	0.28	1.09	11.45	80	654
Level 6 1/2	4/15/93	2:05	1988	1916	1843	397	625	369	4.78	1.10	4.25	0.61	0.20	0.85	11.81	80	695
Level 4	4/15/93	1:10	1988	1915	1843	398	624	370	4.79	1.10	4.25	0.61	0.20	0.85	11.81	80	695
Level 3	4/15/93	0:53	1990	1917	1844	398	625	369	4.81	1.11	4.25	0.61	0.20	0.85	11.83	80	695
Level 5 1/2	4/15/93	1:58	1990	1916	1842	396	617	365	4.79	1.11	4.26	0.61	0.20	0.85	11.82	80	697
Base Cond	4/15/93	5:25	1989	1915	1842	397	622	367	4.78	1.11	4.26	0.61	0.20	0.85	11.80	80	696
Level 5 1/2	4/16/93	1:47	1989	1913	1838	404	644	373	5.06	1.11	4.26	0.61	0.20	0.84	12.08	80	717
Level 6 1/2	4/16/93	1:19	1986	1911	1835	403	637	370	5.08	1.11	4.27	0.61	0.20	0.83	12.10	80	714
Level 3	4/16/93	0:44	1982	1906	1830	401	637	366	5.17	1.11	4.27	0.61	0.20	0.83	12.19	80	716
Level 4	4/16/93	1:00	1984	1908	1832	401	637	366	5.17	1.11	4.27	0.61	0.20	0.83	12.19	80	716
North out, South in	4/16/93	0:20	1985	1910	1835	403	645	372	5.29	1.11	4.27	0.61	0.20	0.84	12.31	80	717
South out, North in	4/16/93	0:20	1983	1908	1833	402	643	371	5.00	1.11	4.27	0.61	0.20	0.84	12.03	80	717
Base Cond	4/16/93	6:25	1986	1911	1835	403	639	370	5.12	1.11	4.27	0.61	0.20	0.83	12.13	80	716
Level 4	4/19/93	0:56	1976	1905	1833	402	657	370	4.75	0.89	5.51	0.49	0.21	0.87	12.72	80	722
Level 3	4/19/93	0:52	1976	1905	1833	402	657	370	4.75	0.89	5.51	0.49	0.21	0.87	12.72	80	722
Level 5 1/2	4/19/93	2:29	1977	1906	1836	400	656	366	4.95	0.89	5.53	0.49	0.21	0.88	12.96	80	731
Level 6 1/2	4/19/93	1:10	1979	1908	1838	399	657	364	4.98	0.89	5.53	0.49	0.21	0.88	12.98	80	734
Base Cond. OFA on	4/19/93	1:00	1965	1894	1824	396	618	365	5.12	1.10	4.24	0.61	0.20	0.85	12.12	80	711
GR	4/19/93	5:42	1976	1906	1836	399	657	366	4.92	0.89	5.53	0.49	0.21	0.88	12.93	80	730
Level 6 1/2	4/20/93	1:47	1932	1875	1819	358	579	334	4.32	1.10	4.22	0.61	0.24	0.97	11.47	80	675
Base Cond 130MW	4/20/93	3:35	1931	1874	1817	357	579	332	4.33	1.10	4.22	0.61	0.24	0.98	11.47	80	674
Base Cond 120MW	4/20/93	2:55	1907	1861	1815	322	622	295	5.14	1.11	4.26	0.61	0.29	1.12	12.52	80	678
Base Cond. OFA off	4/21/93	7:40	1894	1850	1807	310	608	282	5.13	1.11	4.26	0.61	0.30	1.15	12.57	80	669
Base Cond. OFA off	4/23/93	0:30	1970	1895	1820	401	646	367	5.11	1.11	4.28	0.61	0.20	0.85	12.16	80	706
4M12 (OFA off)	4/23/93	1:00	1979	1904	1829	400	612	366	4.94	1.11	4.26	0.61	0.19	0.83	11.93	80	693
4M13a (78,000 scfm OFA	4/23/93	0:20	1984	1905	1825	410	589	376	5.11	1.11	4.25	0.61	0.17	0.76	12.02	80	693

Cherokee Unit 3, Average Test D
Pre Modification

Test No.	Date	Dur.	Drum Press PSIG	PSH Out PSIG	Steam To Turb PSIG	RH In Press PSIG	RH In Temp Deg F	Hot RH Out Prs PSIG	DryGas HtLss %	Moist HtLss %	CombH2O HtLss %	Refuse HtLss %	Radiat HtLss %	Unmeas HtLss %	Total Htlss %	Comb Air Temp	Econ Gas Out Temp
4M13b (70,000 scfm OFA	4/23/93	0:50	1993	1913	1833	411	581	376	5.09	1.10	4.25	0.61	0.17	0.76	11.98	80	694
Base Cond. OFA On	4/27/93	0:30	1985	1909	1833	411	655	380	5.33	1.11	4.26	0.61	0.19	0.83	12.33	80	718
GR on 150MW, 11% Gas	4/27/93	0:53	1967	1892	1817	408	659	378	4.94	0.98	5.00	0.54	0.20	0.84	12.49	80	711
GR on 150MW, 17% Gas	4/27/93	2:48	1962	1886	1810	407	661	374	4.92	0.92	5.38	0.50	0.20	0.85	12.77	80	716
Base Cond. OFA on	4/28/93	0:44	1954	1888	1822	379	621	350	5.26	1.11	4.26	0.61	0.22	0.91	12.37	80	704
GR on Auto	4/28/93	6:35	1937	1874	1811	368	645	337	4.93	0.93	5.32	0.51	0.24	0.97	12.90	80	707
GR on Auto	5/3/93	7:00	1982	1917	1853	387	646	359	5.15	0.92	5.37	0.50	0.22	0.91	13.08	80	716
Base Cond. OFA on	5/6/93	2:45	1977	1913	1849	387	590	366	5.18	1.10	4.25	0.61	0.21	0.89	12.24	80	688
GR on Auto	5/6/93	1:15	1992	1930	1868	385	627	362	5.06	0.94	5.26	0.52	0.22	0.92	12.92	80	703
Base Cond. OFA off	5/6/93	0:21	1878	1833	1787	325	623	304	5.16	1.11	4.26	0.61	0.29	1.11	12.53	80	671
GR on Auto 150MW	5/7/93	4:26	1998	1927	1856	406	631	382	4.94	0.91	5.40	0.50	0.20	0.84	12.79	80	705
GR on Auto 160MW	5/7/93	1:59	2024	1941	1859	435	653	407	5.05	0.92	5.40	0.50	0.16	0.73	12.77	80	717
GR on Auto 140MW	5/7/93	4:50	1969	1909	1848	382	636	361	4.99	0.91	5.37	0.50	0.23	0.94	12.94	80	702
Base Cond. OFA off	5/7/93	0:35	1978	1910	1843	399	630	380	5.36	1.11	4.26	0.61	0.21	0.87	12.42	80	703
GR on Auto	5/11/93	6:08	1950	1891	1833	372	642	346	5.33	0.92	5.37	0.51	0.25	0.98	13.35	80	709
GR 13	5/25/93	15:04	1960	1891	1822	399	655	374	5.02	0.92	5.35	0.51	0.22	0.90	12.92	80	714
GR 14	5/25/93	1:25	1876	1844	1812	275	587	253	5.33	0.93	5.30	0.51	0.34	1.28	13.68	80	671
GR 15	5/26/93	1:29	1886	1851	1815	290	598	269	5.33	0.93	5.30	0.51	0.33	1.24	13.63	80	675
LNB-OFA	5/26/93	0:42	1850	1826	1802	245	544	226	5.80	1.10	4.24	0.61	0.38	1.37	13.50	80	649
LNB	5/26/93	9:44	1967	1903	1839	379	605	355	5.12	1.11	4.27	0.61	0.23	0.93	12.27	80	677
LNB	5/27/93	0:10	1879	1838	1797	302	596	276	5.17	1.11	4.27	0.61	0.32	1.20	12.67	80	663
LNB-OFA	5/27/93	0:45	1977	1904	1832	402	642	372	5.51	1.11	4.28	0.61	0.20	0.85	12.57	80	711
GR-LNB 16	5/27/93	13:40	1965	1900	1835	386	650	355	5.25	0.93	5.31	0.51	0.23	0.92	13.15	80	712
GR-LNB 17	5/28/93	2:57	1878	1843	1808	291	595	269	5.45	0.94	5.21	0.52	0.33	1.23	13.68	80	673
LNB	5/28/93	1:23	1847	1828	1808	230	540	212	5.93	1.11	4.27	0.61	0.39	1.42	13.74	80	636
GR-LNB 20b	6/3/93	8:51	1951	1888	1826	386	647	360	4.78	0.92	5.36	0.51	0.23	0.94	12.75	80	702
LNB	6/3/93	1:05	1871	1847	1823	256	562	240	5.58	1.11	4.28	0.61	0.37	1.36	13.30	80	647
LNB (low load)	6/4/93	6:52	1858	1836	1815	243	553	227	5.84	1.11	4.28	0.61	0.38	1.40	13.62	80	636
LNB (high load)	6/4/93	5:25	1996	1927	1858	411	618	392	5.02	1.11	4.27	0.61	0.20	0.85	12.06	80	690
LNB-OFA	6/4/93	2:31	1996	1918	1841	426	600	402	5.03	1.11	4.26	0.61	0.17	0.76	11.94	80	686
GR-LNB	6/4/93	7:42	1961	1894	1827	399	653	374	4.85	0.92	5.36	0.51	0.22	0.90	12.75	80	704
LNB	6/8/93	1:35	1970	1909	1847	380	608	355	5.44	1.11	4.28	0.61	0.23	0.92	12.59	80	685
LNB-OFA	6/8/93	1:40	1962	1900	1837	381	604	355	5.29	1.11	4.26	0.61	0.22	0.91	12.40	80	689
GR-LNB 22a	6/8/93	6:21	1939	1885	1830	357	634	330	5.29	0.92	5.36	0.51	0.26	1.01	13.35	80	703
GR-LNB 22b	6/8/93	5:30	1963	1897	1832	395	653	365	4.74	0.92	5.39	0.50	0.22	0.90	12.67	80	705
GR-LNB 23a	6/9/93	1:16	1893	1857	1821	303	614	282	4.55	0.93	5.26	0.51	0.32	1.21	12.78	80	668
LNB-OFA	6/9/93	0:30	1844	1826	1806	229	565	210	5.07	1.10	4.23	0.61	0.39	1.42	12.82	80	638
LNB	6/9/93	16:03	1907	1864	1822	317	583	294	5.31	1.11	4.27	0.61	0.29	1.13	12.72	80	662
GR-LNB 23b	6/9/93	4:28	1939	1882	1825	370	639	342	5.19	0.92	5.36	0.51	0.24	0.97	13.20	80	703
LNB	6/10/93	8:47	1907	1868	1829	310	600	290	5.05	1.11	4.26	0.61	0.31	1.17	12.51	80	659

Cherokee Unit 3, Average Test D
Pre Modification

Test No.	Date	Dur.	Drum Press PSIG	PSH Out PSIG	Steam To Turb PSIG	RH In Press PSIG	RH In Temp Deg F	Hot RH Out Prs PSIG	DryGas HtLss %	Moist HtLss %	CombH2O HtLss %	Refuse HtLss %	Radiat HtLss %	Unmeas HtLss %	Total Htlss %	Comb Air Temp	Econ Gas Out Temp
LNB-OFA	6/10/93	1:16	1988	1917	1847	410	619	385	5.36	1.11	4.27	0.61	0.19	0.82	12.37	80	705
GR-LNB 24	6/10/93	2:57	1968	1903	1837	396	653	366	5.42	0.92	5.41	0.50	0.22	0.89	13.37	80	725
LNB	6/10/93	0:37	1998	1928	1857	409	610	376	5.47	1.12	4.29	0.61	0.19	0.81	12.48	80	686
GR-LNB 25a	6/11/93	5:28	1944	1895	1847	352	634	321	5.29	0.94	5.30	0.51	0.26	1.03	13.34	80	701
GR-LNB 25b	6/11/93	9:06	1985	1924	1863	393	651	359	5.35	0.94	5.33	0.51	0.22	0.90	13.25	80	714
GR-LNB 26a	6/12/93	11:22	1943	1893	1843	362	639	333	5.22	0.94	5.32	0.51	0.26	1.01	13.26	80	708
GR-LNB 26b	6/12/93	2:13	1853	1836	1819	238	576	216	5.58	1.01	4.83	0.56	0.38	1.40	13.76	80	657
LNB-OFA	6/12/93	7:11	1936	1880	1823	368	616	333	5.30	1.11	4.29	0.61	0.23	0.94	12.48	80	682
LNB-OFA	6/13/93	9:43	1821	1809	1797	213	517	192	5.81	1.11	4.27	0.61	0.40	1.46	13.66	80	634
GR-LNB 28	6/14/93	4:06	1967	1902	1837	398	655	362	5.04	0.93	5.39	0.51	0.21	0.86	12.93	80	710
LNB	6/14/93	1:59	1927	1879	1829	350	591	317	5.31	1.11	4.29	0.61	0.25	0.99	12.56	80	666
LNB	6/18/93	0:38	1966	1915	1864	371	639	352	4.76	1.11	4.26	0.61	0.26	1.02	12.01	80	695
GR-LNB 29	6/18/93	14:24	1955	1896	1837	392	649	369	4.89	0.91	5.41	0.50	0.24	0.95	12.90	80	708
GR-LNB 30a	6/19/93	0:30	1844	1815	1786	281	614	261	5.24	0.90	5.44	0.50	0.35	1.30	13.73	80	681
LNB	6/19/93	9:15	1836	1816	1797	232	571	215	5.76	1.11	4.29	0.61	0.40	1.44	13.61	80	641
GR-LNB 30b	6/19/93	11:53	1965	1905	1845	389	649	358	4.95	0.91	5.50	0.50	0.23	0.95	13.02	80	717
GR-LNB 30c	6/19/93	1:33	1887	1863	1839	258	601	232	5.34	0.93	5.35	0.51	0.36	1.33	13.82	80	674
GR-LNB 23	6/23/93	7:35	1952	1885	1818	400	660	365	4.91	0.91	5.47	0.50	0.21	0.88	12.88	80	703
GR-LNB 32b	6/23/93	1:09	1899	1852	1805	341	636	310	4.91	0.92	5.39	0.50	0.27	1.07	13.07	80	690
LNB-OFA cooling	6/24/93	6:25	1842	1826	1810	227	563	207	5.17	1.11	4.26	0.61	0.40	1.44	12.99	80	646
GR-LNB 33a	6/24/93	6:00	1930	1888	1847	328	626	300	5.01	0.92	5.38	0.51	0.29	1.13	13.24	80	690
GR-LNB 33	6/24/93	11:22	1971	1907	1844	399	654	370	4.84	0.91	5.46	0.50	0.22	0.91	12.83	80	706
GR-LNB 34a	6/25/93	1:52	1838	1822	1807	222	576	200	5.59	0.95	5.18	0.52	0.40	1.46	14.10	80	657
LNB-OFA	6/25/93	4:03	1828	1812	1796	224	524	205	5.43	1.10	4.25	0.61	0.40	1.44	13.24	80	638
GR-LNB 34	6/25/93	8:00	1974	1916	1858	383	642	357	4.89	0.92	5.40	0.50	0.24	0.96	12.91	80	711
LNB (some OFA)	6/28/93	1:03	1980	1911	1841	407	643	374	5.34	1.12	4.30	0.61	0.20	0.83	12.39	80	691
LNB (some OFA)	6/29/93	12:15	1906	1855	1805	336	607	298	5.38	1.12	4.31	0.61	0.26	1.04	12.72	80	666
LNB	6/30/93	11:51	1909	1867	1826	316	612	289	5.36	1.12	4.30	0.61	0.30	1.15	12.84	80	666
GR-LNB 35	6/30/93	1:48	1970	1901	1832	405	661	370	5.18	0.93	5.36	0.51	0.20	0.86	13.04	80	708
GR-LNB 35a	6/30/93	6:05	1965	1898	1831	400	660	364	5.47	0.93	5.36	0.51	0.21	0.88	13.35	80	713
GR-LNB 35b	6/30/93	1:53	1918	1865	1813	355	642	323	5.57	0.93	5.34	0.51	0.26	1.03	13.64	80	705
GR-0LNB 36a	7/1/93	8:22	1859	1838	1817	240	569	215	5.87	0.97	5.05	0.53	0.38	1.39	14.20	80	655
GR-LNB 36	7/1/93	15:37	1955	1893	1831	382	650	347	5.26	0.94	5.33	0.51	0.23	0.94	13.20	80	701
GR 37a	7/2/93	14:55	1886	1848	1810	306	618	273	5.37	0.95	5.23	0.52	0.31	1.18	13.55	80	676
GR 37	7/2/93	7:05	1960	1891	1821	408	662	372	5.32	0.93	5.35	0.51	0.20	0.85	13.17	80	712
GR-LNB 38	7/3/93	7:46	1960	1897	1833	397	649	361	5.41	0.94	5.33	0.51	0.22	0.90	13.32	80	712
GR-LNB 38a	7/3/93	8:43	1946	1886	1826	391	654	361	5.97	0.94	5.32	0.51	0.23	0.93	13.90	80	705
GR-LNB 39a	7/4/93	17:27	1865	1832	1799	298	608	277	6.48	0.97	5.08	0.53	0.33	1.23	14.63	80	670
GR-LNB 39	7/4/93	6:33	1966	1902	1838	404	657	378	6.14	0.94	5.26	0.52	0.22	0.89	13.98	80	708
GR-LNB 40a	7/5/93	11:52	1839	1814	1790	259	591	240	7.09	0.99	4.95	0.54	0.37	1.35	15.29	80	658

Cherokee Unit 3, Average Test D
Pre Modification

Test No.	Date	Dur.	Drum Press PSIG	PSH Out PSIG	Steam To Turb PSIG	RH In Press PSIG	RH In Temp Deg F	Hot RH Out Prs PSIG	DryGas HtLss %	Moist HtLss %	CombH2O HtLss %	Refuse HtLss %	Radiat HtLss %	Unmeas HtLss %	Total Htlss %	Comb Air Temp	Econ Gas Out Temp
GR-LNB 40	7/5/93	12:08	1943	1884	1824	382	646	355	6.70	0.95	5.24	0.52	0.24	0.96	14.60	80	703
GR-LNB 52a	7/17/93	8:31	1862	1833	1804	268	576	244	5.49	0.93	5.32	0.51	0.35	1.30	13.89	80	661
GR-LNB 52	7/17/93	5:45	1941	1878	1815	394	655	369	5.08	0.92	5.37	0.51	0.23	0.94	13.04	80	711
LNB	7/19/93	1:53	1894	1855	1815	304	617	277	4.84	1.10	4.25	0.61	0.31	1.17	12.29	80	669
LNB-OFA	7/19/93	0:22	1893	1848	1804	319	615	289	4.71	1.10	4.24	0.61	0.29	1.11	12.06	80	667
GR-LNB 53a	7/19/93	3:29	1895	1853	1810	321	628	292	4.89	0.93	5.29	0.51	0.30	1.14	13.05	80	686
GR-LNB 53	7/19/93	7:06	1956	1887	1819	401	659	367	4.99	0.92	5.34	0.51	0.21	0.87	12.85	80	710
LNB	7/21/93	8:34	1842	1828	1813	210	530	189	5.95	1.12	4.30	0.61	0.41	1.48	13.88	80	628
GR-LNB 54	7/21/93	4:52	1948	1886	1823	382	653	348	5.46	0.93	5.41	0.51	0.23	0.93	13.47	80	721
LNB	7/23/93	2:35	1826	1804	1781	240	519	215	5.45	1.11	4.28	0.61	0.35	1.30	13.10	80	673
GR-LNB 55	7/23/93	4:53	1977	1913	1850	387	650	354	5.36	0.93	5.35	0.51	0.22	0.92	13.29	80	711
GR-LNB 55a	7/23/93	1:08	1933	1883	1833	340	632	306	5.49	0.93	5.32	0.51	0.26	1.04	13.56	80	697
LNB	7/23/93	3:55	1796	1782	1768	199	508	173	5.41	1.11	4.27	0.61	0.41	1.48	13.29	80	609
LNB	7/24/93	1:52	1768	1750	1734	213	523	191	5.64	1.11	4.26	0.61	0.40	1.46	13.47	80	610
LNB-OFA	7/24/93	0:36	1879	1857	1835	238	550	213	6.41	1.11	4.27	0.61	0.37	1.36	14.13	80	644
GR-LNB 56	7/24/93	7:45	1980	1917	1855	383	647	350	5.39	0.93	5.36	0.51	0.23	0.93	13.35	80	716
GR-LNB 56a	7/24/93	2:09	1855	1831	1806	247	557	221	5.70	0.94	5.27	0.51	0.36	1.34	14.13	80	649
GR-LNB 57a	7/25/93	1:10	1811	1798	1785	196	532	174	6.24	0.94	5.26	0.51	0.42	1.51	14.88	80	629
LNB-OFA	7/25/93	5:52	1839	1820	1802	229	513	208	5.78	1.10	4.25	0.61	0.39	1.40	13.53	80	639
GR-LNB 57b	7/25/93	10:19	1912	1865	1817	331	621	302	5.53	0.93	5.33	0.51	0.29	1.10	13.69	80	689
GR-LNB 57	7/25/93	6:14	1979	1911	1842	399	657	361	5.20	0.93	5.35	0.51	0.21	0.87	13.07	80	711
GR-LNB 58a	7/26/93	10:15	1844	1809	1774	291	608	267	5.93	0.93	5.29	0.51	0.33	1.24	14.24	80	679
GR-LNB 58	7/26/93	8:34	1945	1874	1804	403	663	367	5.28	0.94	5.33	0.51	0.21	0.87	13.12	80	714
GR-LNB 58b	7/26/93	5:09	1886	1832	1778	353	640	320	5.51	0.94	5.28	0.51	0.26	1.02	13.53	80	699
GR-LNB 59a	7/27/93	10:48	1877	1841	1806	291	597	266	5.76	0.94	5.27	0.52	0.33	1.23	14.04	80	682
LNB-OFA	7/27/93	3:21	1977	1899	1821	421	643	387	5.10	1.12	4.29	0.61	0.18	0.77	12.06	80	708
GR-LNB 59	7/27/93	9:16	1915	1858	1801	359	645	324	5.30	0.94	5.31	0.51	0.25	0.98	13.29	80	702
GR-LNB 60a	7/28/93	11:06	1882	1836	1790	336	634	311	5.28	0.94	5.29	0.51	0.28	1.10	13.41	80	700
GR-LNB 60b	7/28/93	2:02	1985	1908	1832	430	661	396	5.32	0.93	5.37	0.51	0.18	0.80	13.12	80	721
LNB-OFA	7/28/93	2:21	2001	1922	1843	422	649	383	5.25	1.12	4.30	0.61	0.17	0.75	12.20	80	705
GR-LNB 60	7/28/93	8:10	1985	1909	1832	422	666	382	5.26	0.94	5.34	0.51	0.18	0.79	13.02	80	719
GR-LNB 61a	7/29/93	15:55	1939	1873	1807	397	658	364	5.27	0.94	5.33	0.51	0.22	0.89	13.15	80	716
GR-LNB 61	7/29/93	8:04	1943	1878	1813	395	658	356	5.31	0.94	5.37	0.51	0.22	0.89	13.24	80	711
GR-LNB 62	7/30/93	10:04	1919	1860	1802	383	654	352	5.21	0.94	5.33	0.51	0.24	0.95	13.18	80	704
LNB-OFA	7/30/93	4:32	1944	1871	1799	406	644	368	5.42	1.12	4.29	0.61	0.19	0.81	12.44	80	699
GR-LNB 62a	7/30/93	9:00	1951	1884	1818	401	660	369	5.42	0.94	5.33	0.51	0.21	0.87	13.28	80	714
GR-LNB 63a	7/31/93	17:10	1931	1866	1800	397	660	364	5.22	0.94	5.33	0.51	0.22	0.89	13.11	80	706
GR-LNB 63b	7/31/93	6:49	1955	1889	1823	397	661	357	5.30	0.95	5.29	0.52	0.21	0.87	13.14	80	712
GR-LNB 64a	8/1/93	1:25	1886	1835	1784	351	647	317	5.38	0.95	5.30	0.52	0.26	1.04	13.44	80	705
GR-LNB 64b	8/1/93	10:21	1828	1800	1772	269	592	243	5.56	0.94	5.26	0.52	0.35	1.29	13.91	80	671

Cherokee Unit 3, Average Test D
Pre Modification

Test No.	Date	Dur.	Drum Press PSIG	PSH Out PSIG	Steam To Turb PSIG	RH In Press PSIG	RH In Temp Deg F	Hot RH Out Prs PSIG	DryGas HtLss %	Moist HtLss %	CombH2O HtLss %	Refuse HtLss %	Radiat HtLss %	Unmeas HtLss %	Total Htlss %	Comb Air Temp	Econ Gas Out Temp
GR-LNB 64c	8/1/93	12:14	1947	1884	1821	390	656	357	5.32	0.94	5.32	0.51	0.22	0.92	13.24	80	723
GR-LNB 65a	8/2/93	8:55	1842	1816	1791	257	574	234	5.86	0.95	5.23	0.52	0.36	1.32	14.24	80	666
LNB-OFA	8/2/93	1:23	1946	1872	1798	415	657	387	5.28	1.11	4.29	0.61	0.19	0.82	12.30	80	711
GR-LNB 65b	8/2/93	6:02	1935	1869	1803	395	659	366	5.17	0.94	5.33	0.51	0.22	0.90	13.05	80	715
GR-LNB 65c	8/2/93	7:14	1917	1855	1793	380	652	349	5.42	0.93	5.34	0.51	0.24	0.95	13.39	80	711
GR-LNB 66a	8/3/93	8:29	1799	1778	1758	237	577	219	5.88	0.93	5.27	0.51	0.39	1.41	14.38	80	662
GR-LNB 66b	8/3/93	9:34	1917	1857	1796	384	653	361	5.24	0.93	5.34	0.51	0.24	0.96	13.22	80	713
GR-LNB 66c	8/3/93	5:55	1938	1872	1805	402	660	376	5.13	0.93	5.34	0.51	0.22	0.90	13.04	80	722
GR-LNB 67	8/4/93	24:00	1931	1875	1819	365	641	340	5.29	0.94	5.28	0.52	0.25	1.01	13.29	80	710
GR-LNB 68a	8/5/93	7:39	1871	1833	1795	305	616	284	5.33	0.95	5.23	0.52	0.32	1.20	13.53	80	686
GR-LNB 68b	8/5/93	15:50	1955	1886	1816	407	661	380	5.31	0.94	5.29	0.51	0.21	0.88	13.15	80	724
GR-LNB 69	8/6/93	9:48	1918	1861	1803	370	645	347	5.15	0.94	5.26	0.52	0.25	1.00	13.12	80	712
LNB	8/6/93	7:58	1942	1870	1798	402	638	372	5.40	1.12	4.30	0.61	0.20	0.84	12.46	80	689
LNB-OFA	8/6/93	5:04	1954	1876	1798	410	640	375	5.44	1.12	4.30	0.61	0.18	0.80	12.45	80	688
LNB	8/7/93	3:04	1926	1857	1787	398	642	370	5.12	1.11	4.29	0.61	0.21	0.87	12.21	80	693
GR-LNB 70	8/7/93	3:53	1906	1848	1789	372	645	347	5.38	1.03	4.79	0.56	0.25	0.99	13.00	80	716
LNB-OFA	8/7/93	8:05	1950	1877	1805	401	646	367	5.55	1.12	4.30	0.61	0.20	0.84	12.61	80	690
LNB	8/7/93	6:28	1959	1885	1810	409	643	375	5.48	1.12	4.30	0.61	0.19	0.82	12.51	80	689
LNB	8/9/93	8:04	1931	1869	1808	376	614	350	5.42	1.11	4.29	0.61	0.23	0.92	12.57	80	674
GR-LNB 71 (10% Gas)	8/9/93	13:45	1954	1880	1805	403	664	365	5.40	1.00	4.98	0.55	0.20	0.83	12.95	80	710
GR-LNB 72a (10%)	8/10/93	7:48	1927	1859	1791	401	663	369	5.32	1.01	4.91	0.55	0.22	0.89	12.90	80	708
LNB	8/10/93	7:27	1972	1874	1772	407	621	372	5.56	1.12	4.30	0.61	0.18	0.79	12.56	80	685
GR-LNB 72b (10%)	8/10/93	7:25	1955	1893	1831	388	651	356	5.26	1.00	4.91	0.55	0.22	0.90	12.84	80	699
GR-LNB 73	8/11/93	3:22	1940	1883	1827	376	641	350	5.22	1.00	4.90	0.55	0.24	0.96	12.86	80	696
LNB-OFA	8/11/93	9:49	1980	1905	1830	414	639	377	5.43	1.12	4.30	0.61	0.18	0.77	12.40	80	693
LNB	8/11/93	2:45	1950	1885	1820	396	624	364	5.54	1.11	4.29	0.61	0.20	0.85	12.60	80	689
LNB	8/12/93	7:36	1878	1846	1815	289	576	265	5.55	1.11	4.29	0.61	0.32	1.20	13.09	80	648
GR-LNB 74	8/12/93	14:33	1964	1898	1832	407	661	379	5.22	1.00	4.92	0.55	0.21	0.86	12.75	80	711
GR-LNB 75	8/13/93	18:16	1963	1899	1835	395	653	364	5.44	1.00	4.94	0.55	0.22	0.89	13.04	80	711
GR-LNB 76a	8/14/93	4:54	1899	1865	1831	307	623	280	5.67	1.01	4.88	0.55	0.31	1.18	13.61	80	684
LNB	8/14/93	1:46	1857	1846	1834	213	549	189	6.83	1.11	4.28	0.61	0.40	1.45	14.69	80	629
GR-LNB 76b	8/14/93	11:05	1957	1896	1835	387	651	355	5.64	1.00	4.94	0.55	0.22	0.91	13.26	80	708
GR-LNB 77	8/15/93	1:10	1880	1848	1817	293	613	268	5.85	1.01	4.87	0.55	0.32	1.22	13.83	80	679
LNB	8/15/93	14:44	1902	1867	1832	298	587	274	5.81	1.12	4.29	0.61	0.31	1.19	13.33	80	654
LNB	8/15/93	6:58	1981	1910	1839	407	650	371	5.45	1.12	4.30	0.61	0.19	0.81	12.48	80	691
LNB (low load)	8/16/93	7:38	1880	1855	1831	267	589	246	6.04	1.12	4.31	0.61	0.35	1.31	13.73	80	664
LNB (150 MWe)	8/16/93	3:21	1988	1914	1841	422	646	395	5.53	1.12	4.29	0.61	0.18	0.79	12.52	80	709
LNB-OFA cooling	8/16/93	11:40	1991	1916	1840	417	623	379	5.52	1.12	4.30	0.61	0.17	0.75	12.46	80	690
LNB	8/17/93	9:07	1938	1752	1564	360	604	333	5.48	1.11	4.29	0.61	0.24	0.97	12.70	80	680
100% Gas (plant test)	8/17/93	0:34	1824	1699	1574	199	482	178	7.33	1.11	4.26	0.61	0.41	1.47	15.18	80	606

Cherokee Unit 3, Average Test D
Pre Modification

Test No.	Date	Dur.	Drum Press PSIG	PSH Out PSIG	Steam To Turb PSIG	RH In Press PSIG	RH In Temp Deg F	Hot RH Out Prs PSIG	DryGas HtLss %	Moist HtLss %	CombH2O HtLss %	Refuse HtLss %	Radiat HtLss %	Unmeas HtLss %	Total Htlss %	Comb Air Temp	Econ Gas Out Temp
LNB (OFA cooling)	8/17/93	8:59	1978	989	0	412	626	374	5.45	1.12	4.30	0.61	0.17	0.77	12.42	80	695
LNB	8/17/93	3:05	1974	987	0	409	628	377	5.29	1.12	4.30	0.61	0.19	0.80	12.29	80	693
LNB (low load)	8/18/93	9:42	1894	947	0	301	589	275	5.56	1.12	4.30	0.61	0.31	1.17	13.07	80	670
LNB 150 MWe	8/18/93	14:16	1982	991	0	420	615	389	5.41	1.11	4.29	0.61	0.17	0.76	12.36	80	691
GR-LNB 78	8/24/93	3:25	1947	1887	1826	408	664	373	5.05	0.99	4.98	0.54	0.25	0.98	12.79	80	693
LNB OFA cooling	8/24/93	10:38	1952	1888	1824	407	658	367	5.42	1.11	4.29	0.61	0.23	0.93	12.60	80	680
LNB OFA cooling	8/25/93	2:06	1881	1848	1815	306	624	274	5.07	1.11	4.26	0.61	0.33	1.24	12.61	80	645
LNB	8/25/93	8:38	1881	1852	1822	297	614	271	5.08	1.11	4.26	0.61	0.34	1.28	12.69	80	645
LNB	8/25/93	13:08	1956	1895	1833	414	644	386	5.29	1.11	4.28	0.61	0.23	0.94	12.46	80	688
LNB	8/26/93	21:16	1887	1855	1822	285	556	261	5.37	1.11	4.28	0.61	0.32	1.22	12.92	80	653
LNB	8/26/93	2:42	1972	1904	1835	402	633	374	5.42	1.11	4.29	0.61	0.20	0.84	12.47	80	693
LNB	8/27/93	8:26	1877	1849	1822	268	548	248	5.36	1.11	4.28	0.61	0.35	1.29	13.00	80	642
LNB	8/27/93	6:17	1965	1898	1831	399	613	375	5.25	1.11	4.28	0.61	0.20	0.85	12.30	80	682
GR-LNB 79	9/8/93	11:15	1969	1902	1834	401	651	372	5.00	0.97	5.12	0.53	0.21	0.86	12.68	80	712
GR-LNB 79a	9/8/93	1:49	1907	1867	1826	325	615	301	4.85	0.95	5.18	0.52	0.29	1.11	12.89	80	683
GR-LNB 80a	9/9/93	6:55	1891	1860	1828	292	604	272	4.74	0.95	5.19	0.52	0.33	1.24	12.96	80	676
LNB-OFA	9/9/93	1:46	1847	1832	1817	228	546	211	4.98	1.11	4.25	0.61	0.39	1.42	12.75	80	644
GR-LNB 80	9/9/93	14:15	1933	1877	1821	363	642	333	4.99	0.95	5.20	0.52	0.25	0.99	12.91	80	701
LNB-OFA	9/10/93	4:50	1838	1824	1811	209	529	191	5.09	1.11	4.26	0.61	0.41	1.48	12.96	80	632
GR-LNB 81	9/10/93	1:46	1882	1851	1821	289	610	270	4.82	0.94	5.28	0.51	0.34	1.26	13.14	80	686
LNB	9/10/93	13:30	1954	1889	1824	386	620	356	5.40	1.11	4.29	0.61	0.21	0.89	12.51	80	685
LNB	9/11/93	19:30	1932	1876	1821	355	610	325	5.52	1.12	4.30	0.61	0.25	0.98	12.78	80	677
GR-LNB 82	9/11/93	4:10	1957	1891	1825	395	641	362	5.08	0.96	5.21	0.52	0.20	0.86	12.83	80	711
GR-LNB 83a	9/12/93	11:51	1909	1864	1819	339	623	313	4.83	0.95	5.18	0.52	0.27	1.07	12.83	80	691
GR-LNB 83	9/12/93	12:09	1975	1901	1827	415	665	377	5.17	0.97	5.14	0.53	0.18	0.80	12.79	80	713
GR-LNB 84a	9/13/93	5:35	1886	1851	1816	314	616	298	4.61	0.95	5.14	0.52	0.31	1.18	12.72	80	679
GR-LNB 84	9/13/93	18:03	1946	1882	1819	391	652	363	4.66	0.98	4.95	0.54	0.22	0.91	12.27	80	708
GR-LNB 85a	9/14/93	4:15	1910	1861	1814	340	637	311	4.60	0.97	5.03	0.53	0.27	1.07	12.47	80	693
LNB	9/14/93	11:05	1896	1854	1812	313	599	285	5.03	1.11	4.26	0.61	0.29	1.13	12.43	80	663
LNB-OFA	9/14/93	1:06	1965	1895	1825	401	637	366	5.05	1.11	4.26	0.61	0.19	0.82	12.03	80	699
GR-LNB 85	9/14/93	6:55	1944	1882	1820	388	655	354	4.83	0.97	5.07	0.53	0.22	0.90	12.52	80	708
GR-LNB 86a	9/15/93	0:50	1911	1863	1814	349	640	318	4.76	0.96	5.09	0.53	0.26	1.03	12.64	80	699
LNB	9/15/93	3:07	1876	1852	1829	264	585	237	4.66	1.10	4.23	0.61	0.35	1.31	12.26	80	649
GR-LNB 86b	9/15/93	4:26	1913	1872	1830	323	627	293	4.77	0.96	5.13	0.53	0.29	1.12	12.80	80	698
GR-LNB 86	9/15/93	11:20	1949	1887	1826	379	653	339	4.98	0.97	5.10	0.53	0.23	0.92	12.73	80	711
GR-LNB 87a	9/16/93	5:46	1901	1859	1816	314	611	279	4.82	0.96	5.12	0.53	0.29	1.13	12.85	80	689
GR-LNB 87	9/16/93	15:24	1938	1881	1824	359	644	324	4.95	0.97	5.07	0.53	0.25	0.99	12.77	80	709
GR-LNB 88a	9/17/93	5:31	1914	1866	1819	330	633	298	4.77	0.96	5.12	0.53	0.28	1.09	12.76	80	695
GR-LNB 88	9/17/93	18:28	1954	1889	1825	386	654	351	4.92	0.97	5.06	0.53	0.22	0.91	12.62	80	714
GR-LNB 89	9/18/93	24:00	1943	1882	1821	376	650	344	4.80	0.98	5.01	0.54	0.24	0.95	12.52	80	705

Cherokee Unit 3, Average Test D
Pre Modification

Test No.	Date	Dur.	Drum Press PSIG	PSH Out PSIG	Steam To Turb PSIG	RH In Press PSIG	RH In Temp Deg F	Hot RH Out Prs PSIG	DryGas HtLss %	Moist HtLss %	CombH2O HtLss %	Refuse HtLss %	Radiat HtLss %	Unmeas HtLss %	Total Htlss %	Comb Air Temp	Econ Gas Out Temp
GR-LNB 90a	9/19/93	10:06	1919	1869	1819	342	638	313	4.80	0.97	5.03	0.54	0.28	1.07	12.68	80	697
GR-LNB 90	9/19/93	13:54	1960	1890	1821	394	658	358	5.04	0.99	4.98	0.54	0.22	0.89	12.67	80	712
GR-LNB 91	9/20/93	24:00	1945	1884	1823	376	651	341	5.03	0.97	5.10	0.53	0.24	0.96	12.84	80	712
GR-LNB 92a	9/21/93	3:00	1895	1854	1814	308	623	278	4.91	0.95	5.21	0.52	0.31	1.17	13.06	80	690
GR-LNB 92	9/21/93	17:56	1950	1888	1826	379	648	345	5.07	0.97	5.14	0.53	0.23	0.93	12.86	80	706
GR-LNB 3 Mill a	9/22/93	7:59	1886	1851	1815	303	616	281	4.59	0.94	5.20	0.52	0.32	1.20	12.77	80	680
GR-LNB 3 Mill b	9/22/93	8:25	1901	1857	1813	327	617	305	4.77	0.95	5.13	0.52	0.29	1.12	12.78	80	680
GR-LNB 3 Mill c	9/23/93	24:00	1903	1857	1811	330	621	308	4.83	0.95	5.13	0.52	0.29	1.10	12.82	80	687
GR-LNB 3 Mill d	9/24/93	1:58	1857	1829	1801	264	598	245	5.20	0.94	5.18	0.52	0.36	1.32	13.51	80	669
LNB-OFA 3 Mill	9/24/93	3:33	1830	1817	1803	198	443	183	5.86	1.09	4.21	0.61	0.41	1.49	13.67	80	615
GR-LNB 3 Mill e	9/24/93	6:10	1908	1861	1815	331	603	310	4.89	0.95	5.09	0.53	0.28	1.09	12.82	80	681
GR-LNB 93	9/24/93	12:09	1938	1877	1815	374	635	347	5.20	0.97	5.05	0.53	0.23	0.95	12.94	80	701
GR-LNB 94a	9/25/93	2:12	1900	1853	1806	320	625	288	5.21	0.96	5.11	0.53	0.29	1.11	13.21	80	692
LNB-OFA	9/25/93	2:24	1863	1833	1804	259	576	231	5.83	1.10	4.25	0.61	0.35	1.30	13.45	80	671
GR-LNB 94	9/25/93	19:05	1960	1888	1816	396	658	360	5.23	0.98	5.04	0.54	0.21	0.87	12.87	80	718
GR-LNB 95a	9/26/93	4:15	1894	1849	1804	317	630	287	5.02	0.95	5.16	0.52	0.30	1.14	13.09	80	690
LNB-OFA	9/26/93	2:55	1855	1829	1803	249	511	226	5.78	1.10	4.24	0.61	0.36	1.31	13.40	80	646
GR-LNB 95	9/26/93	16:33	1937	1874	1811	370	646	337	5.22	0.97	5.09	0.53	0.24	0.96	13.01	80	703
GR-LNB 96a	9/27/93	2:53	1913	1863	1814	333	619	304	5.38	0.96	5.13	0.53	0.28	1.08	13.35	80	693
LNB	9/27/93	19:45	1957	1886	1815	391	617	355	5.48	1.11	4.28	0.61	0.20	0.84	12.53	80	689
GR-LNB 96b	9/27/93	0:57	1898	1852	1806	322	621	288	5.25	0.95	5.22	0.52	0.28	1.09	13.31	80	691
GR-LNB 97a	9/28/93	9:13	1915	1864	1813	346	636	315	5.30	0.96	5.15	0.53	0.27	1.05	13.24	80	701
LNB	9/28/93	4:27	1962	1889	1815	403	645	371	4.61	1.11	4.28	0.61	0.19	0.83	11.63	80	696
GR-LNB 97	9/28/93	5:58	1956	1885	1815	396	660	360	5.11	1.00	4.98	0.54	0.21	0.88	12.73	80	717
GR-LNB 97b	9/28/93	2:48	1898	1852	1805	323	631	292	5.28	1.00	4.92	0.55	0.29	1.12	13.16	80	691
GR-LNB 98a	9/29/93	5:22	1880	1843	1807	293	619	265	5.50	1.00	4.89	0.55	0.33	1.22	13.49	80	685
GR-LNB 98	9/29/93	18:37	1956	1885	1815	396	655	361	5.15	0.98	5.05	0.54	0.21	0.87	12.80	80	712
GR-LNB 99a	9/30/93	5:32	1881	1845	1809	289	592	260	5.54	0.95	5.19	0.52	0.32	1.20	13.72	80	672
GR-LNB 99	9/30/93	13:24	1957	1888	1819	391	653	356	5.28	0.97	5.14	0.53	0.21	0.88	13.00	80	708
GR-LNB 99b	9/30/93	2:27	1908	1861	1813	327	620	294	5.61	0.95	5.26	0.52	0.28	1.08	13.70	80	694
LNB-OFA	9/30/93	2:27	1840	1825	1809	205	476	180	6.01	1.11	4.27	0.61	0.40	1.45	13.84	80	621
GR-LNB 100a	10/1/93	11:00	1878	1848	1818	267	594	242	5.69	0.95	5.20	0.52	0.35	1.29	14.00	80	679
GR-LNB 100	10/1/93	9:12	1912	1865	1818	325	634	291	5.29	0.96	5.17	0.52	0.29	1.11	13.35	80	694
GR-LNB 101	10/2/93	24:00	1909	1864	1818	319	628	288	5.32	0.96	5.15	0.53	0.29	1.13	13.37	80	696
GR-LNB 102	10/3/93	24:00	1895	1855	1816	299	624	267	5.56	0.96	5.15	0.53	0.31	1.19	13.70	80	692
GR-LNB 103	10/4/93	24:00	1909	1864	1819	321	630	287	5.47	0.95	5.22	0.52	0.29	1.11	13.56	80	701
GR-LNB 104	10/5/93	24:00	1910	1864	1819	333	633	303	5.55	0.94	5.29	0.51	0.28	1.09	13.67	80	703
GR-LNB 105	10/6/93	10:15	1949	1889	1830	387	650	361	5.38	0.96	5.16	0.53	0.23	0.93	13.19	80	714
GR-LNB 106	10/8/93	8:45	1958	1889	1820	396	653	364	4.49	0.96	5.05	0.53	0.21	0.87	12.11	80	705
GR-LNB 107	10/9/93	24:00	1961	1891	1822	398	654	369	4.69	0.97	5.02	0.53	0.21	0.88	12.29	80	709

Cherokee Unit 3, Average Test D
Pre Modification

Test No.	Date	Dur.	Drum Press PSIG	PSH Out PSIG	Steam To Turb PSIG	RH In Press PSIG	RH In Temp Deg F	Hot RH Out Prs PSIG	DryGas HtLss %	Moist HtLss %	CombH2O HtLss %	Refuse HtLss %	Radiat HtLss %	Unmeas HtLss %	Total Htlss %	Comb Air Temp	Econ Gas Out Temp
GR-LNB 108	10/10/93	11:00	1965	1895	1824	399	658	368	4.91	0.97	5.03	0.53	0.21	0.88	12.54	80	711
GR-LNB 109a	10/13/93	4:07	1968	1899	1829	393	645	356	4.91	0.95	5.18	0.52	0.20	0.86	12.62	80	699
GR-LNB 109b	10/13/93	2:02	1911	1865	1818	321	616	287	5.06	0.95	5.14	0.53	0.28	1.09	13.05	80	681
GR-LNB 110a	10/14/93	6:02	1927	1875	1824	347	640	316	5.05	0.95	5.17	0.52	0.27	1.05	13.00	80	700
GR-LNB 110	10/14/93	14:56	1959	1892	1825	393	657	359	4.92	0.93	5.29	0.51	0.22	0.90	12.77	80	712
GR-LNB 110b	10/14/93	3:00	1912	1868	1825	311	615	280	5.21	0.91	5.43	0.50	0.30	1.14	13.47	80	685
GR-LNB 111	10/15/93	12:49	1924	1869	1814	360	644	330	4.90	0.93	5.29	0.51	0.26	1.02	12.91	80	704
GR-LNB 3 Mill a	10/15/93	2:58	1944	1878	1811	382	654	348	4.35	0.93	5.21	0.52	0.22	0.91	12.14	80	698
GR-LNB 3 Mill b	10/15/93	7:05	1918	1861	1804	349	630	316	4.67	0.95	5.15	0.52	0.25	1.00	12.54	80	694
GR-LNB 3 Mill c	10/16/93	12:05	1866	1830	1795	278	604	249	5.28	0.94	5.17	0.52	0.33	1.25	13.50	80	683
GR-LNB 3 Mill d	10/16/93	10:28	1967	1890	1812	410	659	373	4.85	0.94	5.25	0.52	0.19	0.81	12.56	80	718
GR-LNB 3 Mill e	10/16/93	1:25	1943	1884	1825	358	635	324	4.78	0.94	5.21	0.52	0.24	0.97	12.65	80	696
GR-LNB 3 Mill f	10/17/93	23:46	1928	1875	1823	345	633	316	4.42	0.93	5.20	0.52	0.27	1.05	12.38	80	687
LNB-OFA 3 Mill	10/18/93	11:10	1888	1855	1821	273	592	246	4.56	1.09	4.20	0.61	0.34	1.27	12.07	80	658
GR-LNB 3 Mill g	10/19/93	15:35	1924	1874	1824	331	609	301	4.74	0.93	5.17	0.52	0.27	1.07	12.71	80	678
GR-LNB 3 Mill h	10/20/93	7:35	1925	1875	1826	334	625	306	4.63	0.93	5.16	0.52	0.28	1.07	12.59	80	682
GR-LNB 112	10/20/93	4:09	1911	1867	1822	318	626	293	5.05	0.94	5.17	0.52	0.30	1.14	13.12	80	692
LNB-OFA	10/20/93	0:56	1944	1886	1827	359	631	333	5.47	1.10	4.25	0.61	0.26	1.01	12.70	80	702
GR-LNB 113	10/20/93	10:42	1970	1900	1830	397	653	367	5.11	0.94	5.23	0.52	0.21	0.88	12.89	80	710
GR-LNB 113	10/21/93	24:00	1965	1896	1828	394	655	363	4.99	0.93	5.30	0.51	0.22	0.90	12.85	80	710
GR-LNB 114	10/22/93	24:00	1952	1887	1822	382	650	349	4.98	0.93	5.31	0.51	0.23	0.93	12.89	80	705
GR-LNB 115	10/23/93	24:00	1960	1890	1821	399	656	366	5.00	0.93	5.29	0.51	0.21	0.88	12.82	80	709
GR-LNB 116	10/24/93	14:00	1950	1885	1820	395	655	367	5.00	0.93	5.25	0.51	0.22	0.90	12.83	80	709
GR-LNB 116a	10/24/93	10:00	1959	1890	1822	398	659	364	5.15	0.93	5.29	0.51	0.21	0.88	12.97	80	711
GR-LNB 117a	10/25/93	4:55	1898	1856	1815	313	613	285	5.23	0.94	5.17	0.52	0.30	1.15	13.32	80	677
GR-LNB 117	10/25/93	19:04	1955	1888	1822	393	657	363	4.82	0.93	5.23	0.52	0.22	0.91	12.63	80	709
GR-LNB 118	10/26/93	24:00	1955	1888	1820	389	654	359	4.57	0.93	5.21	0.52	0.22	0.91	12.36	80	704
GR-LNB 119	10/27/93	14:25	1972	1900	1828	404	659	374	4.55	0.94	5.20	0.52	0.21	0.87	12.28	80	710
GR-LNB 119a	10/27/93	9:34	1967	1896	1826	387	654	350	4.70	0.94	5.21	0.52	0.22	0.90	12.48	80	704
GR-LNB 120a	10/28/93	7:21	1960	1896	1832	362	639	326	4.86	0.95	5.17	0.52	0.24	0.96	12.70	80	696
GR-LNB 120	10/28/93	16:38	1965	1896	1825	392	655	358	4.45	0.94	5.19	0.52	0.22	0.90	12.21	80	707
GR-LNB 121	10/29/93	24:00	1961	1894	1827	397	653	372	4.29	0.93	5.18	0.52	0.22	0.91	12.05	80	709
GR-LNB 122	10/30/93	24:00	1970	1899	1827	411	657	385	4.36	0.93	5.19	0.52	0.21	0.86	12.06	80	714
GR-LNB 123	10/31/93	24:00	1966	1896	1826	397	656	365	4.61	0.94	5.21	0.52	0.22	0.89	12.37	80	710
GR-LNB 124	11/1/93	6:18	1962	1895	1828	385	652	353	4.53	0.97	4.99	0.54	0.22	0.91	12.16	80	706
LNB-OFA	11/1/93	1:08	1905	1861	1818	308	605	281	4.54	1.10	4.22	0.61	0.30	1.16	11.93	80	671
GR-LNB 125a	11/2/93	8:15	1956	1887	1817	399	658	371	4.12	0.98	4.95	0.54	0.22	0.90	11.70	80	708
LNB	11/2/93	0:29	1953	1883	1813	390	657	356	4.30	0.98	4.95	0.54	0.22	0.90	11.90	80	706
GR-LNB 125	11/2/93	10:09	1953	1883	1813	390	657	355	4.31	0.98	4.96	0.54	0.22	0.90	11.91	80	706
GR-LNB 126a	11/4/93	1:40	1950	1885	1819	380	652	348	4.24	0.99	4.90	0.55	0.23	0.94	11.84	80	702

Cherokee Unit 3, Average Test D
Pre Modification

Test No.	Date	Dur.	Drum Press PSIG	PSH Out PSIG	Steam To Turb PSIG	RH In Press PSIG	RH In Temp Deg F	Hot RH Out Prs PSIG	DryGas HtLss %	Moist HtLss %	CombH2O HtLss %	Refuse HtLss %	Radiat HtLss %	Unmeas HtLss %	Total Htlss %	Comb Air Temp	Econ Gas Out Temp
GR-LNB 126	11/4/93	13:29	1961	1893	1826	390	652	360	4.24	0.99	4.88	0.55	0.22	0.91	11.78	80	701
GR-LNB 127a	11/5/93	7:20	1937	1879	1821	364	634	340	4.55	0.99	4.84	0.55	0.25	0.99	12.16	80	694
GR-LNB 127	11/5/93	5:54	1975	1902	1828	409	645	384	4.68	0.98	4.86	0.55	0.20	0.83	12.10	80	702
GR-LNB 128	11/8/93	4:55	1967	1896	1825	397	657	367	4.44	0.94	5.19	0.52	0.21	0.89	12.19	80	710
GR-LNB 129	11/9/93	8:30	1983	1907	1832	408	660	375	4.56	0.94	5.18	0.52	0.20	0.84	12.24	80	714
GR-LNB 129a	11/9/93	5:29	2001	1918	1835	424	647	390	4.63	0.97	5.01	0.54	0.17	0.76	12.07	80	712
GR-LNB 130	11/10/93	15:43	1971	1896	1821	405	654	373	4.52	0.97	4.97	0.54	0.20	0.84	12.05	80	709
LNB	11/10/93	7:50	1975	1900	1823	401	629	363	4.63	1.10	4.25	0.61	0.19	0.81	11.59	80	691
LNB	11/11/93	2:00	1957	1891	1825	377	620	345	4.70	1.10	4.23	0.61	0.22	0.90	11.75	80	681
LNB 3 Mill a	11/11/93	3:34	1894	1856	1818	285	598	255	4.62	1.10	4.23	0.61	0.32	1.21	12.08	80	658
LNB 3 Mill b	11/11/93	9:20	1897	1859	1821	287	579	257	4.71	1.10	4.22	0.61	0.32	1.19	12.14	80	654
LNB 3 Mill c	11/12/93	12:30	1912	1866	1821	319	591	293	4.60	1.09	4.21	0.61	0.29	1.10	11.91	80	662
LNB 3 Mill d	11/12/93	11:29	1987	1912	1837	402	622	370	4.18	1.10	4.23	0.61	0.19	0.82	11.12	80	684
LNB 3 Mill e	11/13/93	14:30	1963	1891	1818	392	625	360	4.43	1.10	4.23	0.61	0.20	0.85	11.42	80	686
LNB 3 Mill f	11/13/93	9:29	1985	1909	1833	403	626	370	4.13	1.10	4.23	0.61	0.19	0.81	11.07	80	682
LNB 3 Mill	11/14/93	24:00	1967	1898	1829	388	624	360	4.07	1.10	4.22	0.61	0.21	0.88	11.08	80	683
LNB	11/15/93	1:39	1974	1903	1831	396	628	369	3.91	1.10	4.22	0.61	0.21	0.86	10.90	80	691
GR-LNB 131	11/15/93	13:00	1968	1897	1826	394	652	365	4.21	0.94	5.14	0.52	0.22	0.89	11.93	80	710
GR-LNB 132	11/16/93	7:42	1956	1891	1826	380	647	352	4.15	0.94	5.11	0.52	0.23	0.94	11.89	80	706
GR-LNB 132a	11/16/93	16:17	1929	1872	1816	346	622	316	5.04	0.94	5.12	0.52	0.26	1.03	12.93	80	690
GR-LNB 133	11/17/93	0:40	1926	1875	1823	335	626	307	4.88	0.95	5.09	0.53	0.28	1.08	12.79	80	687
LNB	11/17/93	8:40	1911	1862	1813	320	582	295	5.00	1.10	4.23	0.61	0.28	1.09	12.31	80	658
LNB	12/3/93	5:15	1963	1888	1814	393	629	362	4.72	1.10	4.24	0.61	0.20	0.84	11.72	80	690
LNB	12/6/93	2:33	1894	1858	1822	282	570	260	5.14	1.10	4.25	0.61	0.33	1.23	12.65	80	651
LNB	12/6/93	3:00	1980	1898	1817	420	623	391	4.89	1.10	4.23	0.61	0.17	0.76	11.77	80	688
LNB	12/6/93	1:55	1973	1891	1808	420	623	390	5.02	1.10	4.23	0.61	0.17	0.76	11.89	80	691
LNB	12/7/93	6:45	2003	1918	1833	422	611	387	4.73	1.10	4.25	0.61	0.16	0.73	11.58	80	688
LNB	12/8/93	4:03	1974	1892	1810	418	640	385	5.00	1.10	4.25	0.61	0.18	0.77	11.91	80	700
GR-LNB 134	12/8/93	3:40	1980	1898	1816	416	657	379	4.50	0.93	5.26	0.51	0.18	0.78	12.16	80	708
GR-LNB 134a	12/8/93	0:46	1973	1892	1810	414	638	376	4.60	1.05	4.59	0.58	0.17	0.76	11.76	80	700
GR-LNB 134b	12/8/93	2:44	1975	1893	1810	413	655	375	4.29	1.05	4.59	0.58	0.18	0.78	11.46	80	701
GR-LNB 134c	12/8/93	3:31	1978	1897	1815	418	666	380	4.23	1.05	4.60	0.58	0.18	0.80	11.44	80	713
GR-LNB 135	12/9/93	12:00	1957	1888	1820	384	651	350	4.32	1.05	4.59	0.58	0.22	0.92	11.67	80	705
GR-LNB 135a	12/9/93	2:59	1965	1890	1814	401	660	364	4.63	1.05	4.61	0.58	0.20	0.85	11.92	80	723
GR-LNB 135b	12/9/93	7:10	1951	1883	1816	373	609	339	4.85	1.05	4.56	0.58	0.22	0.91	12.17	80	699
GR-LNB 136	12/10/93	11:35	1966	1894	1823	388	624	356	4.69	1.05	4.55	0.58	0.21	0.87	11.94	80	700
GR-LNB 137	12/11/93	16:15	1941	1878	1814	369	630	338	4.71	1.05	4.54	0.58	0.23	0.94	12.06	80	699
GR-LNB 137a	12/11/93	7:44	1995	1912	1830	421	646	387	4.75	1.05	4.56	0.58	0.17	0.76	11.87	80	708
GR-LNB 138	12/12/93	24:00	1998	1914	1831	423	646	388	4.75	1.05	4.57	0.58	0.17	0.76	11.87	80	711
GR-LNB 139	12/13/93	7:48	2007	1924	1841	427	662	395	4.41	1.04	4.55	0.58	0.17	0.76	11.52	80	708

Cherokee Unit 3, Average Test D
Pre Modification

Test No.	Date	Dur.	Drum Press PSIG	PSH Out PSIG	Steam To Turb PSIG	RH In Press PSIG	RH In Temp Deg F	Hot RH Out Prs PSIG	DryGas HtLss %	Moist HtLss %	CombH2O HtLss %	Refuse HtLss %	Radiat HtLss %	Unmeas HtLss %	Total Htlss %	Comb Air Temp	Econ Gas Out Temp
GR-LNB 139a	12/13/93	4:18	1988	1906	1824	424	664	393	4.47	1.04	4.55	0.58	0.18	0.78	11.61	80	707
LNB	12/13/93	5:18	1982	1907	1833	403	618	371	4.72	1.10	4.24	0.61	0.19	0.83	11.69	80	692
LNB-OFA	12/14/93	1:55	2001	1918	1835	426	647	396	4.96	1.10	4.24	0.61	0.17	0.76	11.83	80	708
GR-LNB 140	12/14/93	1:18	1995	1913	1831	424	662	390	4.67	1.05	4.58	0.58	0.18	0.77	11.81	80	701
LNB	12/14/93	8:30	1994	1915	1835	415	637	382	4.65	1.10	4.25	0.61	0.18	0.78	11.56	80	689
LNB	12/15/93	9:28	1989	1911	1833	415	628	387	4.67	1.10	4.23	0.61	0.18	0.79	11.58	80	686
LNB-OFA	12/15/93	5:29	1994	1914	1833	420	627	391	4.70	1.10	4.22	0.61	0.17	0.77	11.57	80	694
GR-LNB 141	12/15/93	5:15	1958	1893	1829	378	618	348	4.56	1.04	4.57	0.58	0.24	0.95	11.93	80	690
LNB	12/15/93	2:50	1637	1604	1574	247	614	225	5.34	1.10	4.22	0.61	0.38	1.39	13.04	80	643
LNB	12/16/93	15:05	1974	1904	1834	405	643	378	4.57	1.10	4.22	0.61	0.21	0.89	11.60	80	681
GR-LNB 142	12/16/93	6:14	1995	1914	1832	440	665	411	4.46	1.04	4.56	0.58	0.18	0.80	11.61	80	708
GR-LNB 142a	12/16/93	1:15	1883	1849	1813	290	605	265	4.76	1.04	4.60	0.57	0.33	1.25	12.54	80	669
GR-LNB 143	12/17/93	2:10	1890	1858	1826	281	610	258	4.84	1.03	4.60	0.57	0.35	1.29	12.68	80	664
LNB-OFA	12/17/93	0:40	1814	1810	1804	143	487	124	6.85	1.10	4.24	0.61	0.47	1.67	14.96	80	611
LNB	12/17/93	6:10	1970	1894	1819	422	657	395	4.48	1.10	4.22	0.61	0.20	0.85	11.46	80	687
LNB	12/20/93	2:25	1914	1855	1795	368	643	342	4.95	1.10	4.23	0.61	0.26	1.02	12.16	80	695
100% Gas Firing	12/20/93	0:34	1794	1768	1747	228	577	205	7.78	1.09	4.20	0.61	0.40	1.45	15.52	80	635
LNB	12/22/93	2:35	1924	1874	1824	333	622	305	5.00	1.10	4.23	0.61	0.29	1.11	12.33	80	684
LNB	1/5/94	2:24	1981	1911	1840	405	650	371	4.67	1.10	4.25	0.61	0.21	0.87	11.71	80	688
LNB-OFA	1/5/94	2:26	1976	1904	1832	406	641	371	4.81	1.10	4.25	0.61	0.20	0.85	11.83	80	702
LNB-OFA	1/5/94	9:15	1933	1879	1825	351	625	320	4.73	1.10	4.24	0.61	0.26	1.03	11.97	80	685
LNB-OFA	1/6/94	8:47	1885	1854	1824	264	588	238	5.04	1.10	4.25	0.61	0.36	1.31	12.68	80	663
LNB	1/6/94	15:12	1968	1898	1828	405	653	376	4.60	1.10	4.25	0.61	0.21	0.89	11.66	80	694
LNB	1/7/94	6:55	1914	1868	1823	326	617	302	4.59	1.10	4.24	0.61	0.30	1.13	11.97	80	663
LNB-OFA	1/7/94	1:09	1909	1860	1811	336	622	310	4.68	1.10	4.23	0.61	0.29	1.10	12.01	80	680
GR-LNB 144	1/7/94	15:40	1955	1889	1823	383	653	349	4.73	1.04	4.61	0.58	0.24	0.95	12.14	80	705
GR-LNB 145a	1/8/94	8:20	1925	1875	1826	337	636	305	4.77	1.04	4.61	0.57	0.29	1.11	12.39	80	692
GR-LNB 145	1/8/94	15:39	1967	1898	1830	406	660	374	4.64	1.04	4.61	0.58	0.22	0.91	12.00	80	717
GR-LNB 146a	1/9/94	2:10	1952	1889	1826	396	658	367	4.46	1.04	4.61	0.57	0.24	0.96	11.88	80	702
GR-LNB 146b	1/9/94	8:39	1899	1861	1822	309	629	283	4.90	1.04	4.62	0.57	0.32	1.22	12.69	80	699
GR-LNB 146	1/9/94	9:02	1947	1887	1827	372	650	338	4.84	1.04	4.62	0.57	0.25	1.00	12.32	80	708
LNB	1/9/94	3:35	1907	1862	1818	312	602	281	4.80	1.10	4.24	0.61	0.30	1.14	12.20	80	670
LNB	1/10/94	3:50	1938	1882	1827	355	641	326	4.82	1.10	4.24	0.61	0.27	1.05	12.10	80	695
GR-LNB 147	1/10/94	2:40	1979	1899	1818	427	666	391	4.83	1.05	4.59	0.58	0.19	0.81	12.04	80	724
GR-LNB 147a	1/10/94	4:04	1910	1861	1813	326	626	293	5.03	1.03	4.68	0.57	0.29	1.12	12.71	80	681
GR-LNB 147b	1/10/94	4:54	1912	1864	1815	329	623	298	4.99	1.03	4.67	0.57	0.29	1.11	12.65	80	686
GR-LNB 148a	1/11/94	6:32	1885	1850	1814	289	618	263	5.14	1.02	4.68	0.57	0.34	1.25	13.00	80	680
GR-LNB 148	1/11/94	14:38	1985	1906	1827	419	649	383	4.77	1.03	4.67	0.57	0.19	0.82	12.04	80	710
GR-LNB 148b	1/11/94	2:48	1918	1865	1811	333	597	297	4.80	1.03	4.64	0.57	0.27	1.06	12.37	80	675
GR-LNB 149a	1/12/94	6:14	1933	1875	1816	358	641	324	4.74	1.03	4.63	0.57	0.26	1.02	12.25	80	700

Cherokee Unit 3, Average Test D
Pre Modification

Test No.	Date	Dur.	Drum Press PSIG	PSH Out PSIG	Steam To Turb PSIG	RH In Press PSIG	RH In Temp Deg F	Hot RH Out Prs PSIG	DryGas HtLss %	Moist HtLss %	CombH2O HtLss %	Refuse HtLss %	Radiat HtLss %	Unmeas HtLss %	Total Htlss %	Comb Air Temp	Econ Gas Out Temp
GR-LNB 149	1/12/94	13:30	1954	1887	1820	387	648	352	4.75	1.03	4.64	0.57	0.23	0.93	12.16	80	705
GR-LNB A Mill off	1/12/94	1:09	1912	1857	1804	349	646	315	4.76	1.03	4.66	0.57	0.28	1.07	12.37	80	706
GR-LNB D Mill off	1/12/94	1:39	1944	1886	1828	365	651	330	4.45	1.00	4.81	0.56	0.26	1.03	12.10	80	708
GR-LNB D Mill off line	1/13/94	4:23	1880	1846	1812	280	617	248	4.66	1.02	4.72	0.56	0.35	1.28	12.59	80	673
GR-LNB 150	1/13/94	7:15	1975	1898	1821	415	664	377	4.80	1.03	4.70	0.57	0.20	0.86	12.15	80	723
GR-LNB D Mill off line	1/13/94	1:13	1932	1873	1815	363	653	325	4.53	1.01	4.78	0.56	0.26	1.03	12.17	80	712
GR-LNB 150a	1/13/94	6:00	1943	1882	1821	360	636	323	4.90	1.03	4.68	0.57	0.25	1.00	12.44	80	702
GR-LNB 151a	1/14/94	7:25	1889	1852	1815	278	598	244	5.13	1.03	4.67	0.57	0.33	1.25	12.98	80	667
GR-LNB, ABC	1/14/94	7:50	1926	1871	1816	349	648	313	4.58	1.03	4.64	0.57	0.27	1.07	12.16	80	699
GR-LNB 151	1/14/94	7:54	1933	1878	1822	354	643	320	4.75	1.04	4.66	0.57	0.27	1.05	12.33	80	704
GR-LNB 156	1/19/94	24:00	1903	1860	1818	306	619	272	4.83	1.03	4.67	0.57	0.31	1.17	12.59	80	682
GR-LNB 157a	1/20/94	6:38	1887	1850	1813	301	623	275	4.49	1.03	4.65	0.57	0.33	1.23	12.30	80	685
GR-LNB 157	1/20/94	3:50	1955	1890	1825	398	658	370	4.47	1.02	4.73	0.56	0.23	0.95	11.96	80	720

Cherokee Unit 3, Average Test D

Pre Modification

Test No.	Date	Dur.	AH Gas Out Temp	AH Air In Temp	AH Air Out Temp	Calc Coal Flow lbs/hr	Msd Coal Flow lbs/hr	Calc TAir Flow scfm	Msd TAir Flow scfm	Heat Rate Gross	Heat Rate Net	Boiler Eff %	OFA	Carbon In Ash, %
Base Cond. (OFA off)	11/11/92	8:42	311	50	612	95421	N/A	219588	192210	9521	10471	85.09	N/A	
GR	11/11/92	1:01	299	49	626	113190	N/A	313411	230148	9343	10021	85.76	N/A	
Base Cond. (OFA off)	11/11/92	4:25	305	55	620	140720	N/A	323921	248175	9477	10149	87.13	N/A	
Base Cond. OFA off	11/12/92	0:45	295	47	606	139961	149248	309088	243139	9515	10212	88.58	0.00%	
BPMS GR 4	11/12/92	1:05	302	53	630	114695	123794	322842	232694	9377	10066	87.32	21.03%	
Base Cond. OFA off	11/12/92	1:15	307	56	624	140390	148999	323563	248446	9479	10153	88.02	0.00%	
BPMS Base Cond. 5	11/13/92	2:55	304	53	617	142362	148467	337232	254849	9439	10108	87.98	0.00%	3.54
BPMS Base Cond. 6	11/13/92	1:00	300	63	608	141044	148922	328990	242242	9562	10266	88.17	4.87%	7.47
BPMS Base Cond. 7	11/13/92	1:00	303	68	608	141483	148650	321988	236964	9598	10305	88.25	9.28%	11.43
Base Cond.-1d	11/16/92	1:00	305	59	613	131564	138735	308732	237391	9457	10153	87.85	0.00%	
GR-10c	11/16/92	1:00	305	74	607	137268	146919	307396	236962	9605	10320	88.22	3.80%	
GR-10d	11/16/92	1:00	306	75	608	137421	137259	311632	235031	9625	10343	88.15	6.35%	
Base Cond. OFA off	11/17/92	1:15	295	58	616	140413	150342	327111	251397	9519	10218	88.27	0.00%	
GR-11c	11/17/92	1:00	305	65	626	110086	119373	309070	224777	9481	10181	87.26	19.62%	4.18
GR-11d	11/17/92	1:00	309	68	629	108995	119678	307719	222068	9465	10168	87.11	23.19%	2.71
Base Cond. OFA off	11/17/92	0:20	311	70	626	134059	146628	326970	247246	9461	10154	87.46	0.00%	
Base Cond. OFA off	11/18/92	0:28	288	47	609	136025	147633	301466	244558	9437	10144	88.61	0.00%	
GR-11e	11/18/92	1:04	306	60	632	109854	121891	311275	226522	9428	10129	87.17	23.56%	2.85
GR-12b	11/18/92	1:05	308	65	631	115754	128210	311550	225788	9450	10162	87.30	22.58%	3.27
Base Cond. OFA off	11/18/92	0:35	311	65	629	135727	148463	314236	245788	9494	10183	87.83	0.00%	
GR-12 (5% Gas)	11/19/92	1:00	297	77	610	131242	142706	303658	228005	9546	10259	88.28	12.62%	10.24
GR-12a (10% Gas)	11/19/92	1:00	301	77	616	125387	133940	297806	224106	9472	10164	88.04	15.23%	7.82
GR-12c (23% Gas)	11/19/92	1:00	309	77	631	104612	112632	291978	218445	9334	10019	87.14	24.49%	2.77
Base Cond. OFA off	11/19/92	0:20	303	77	619	135016	148181	311396	244664	9441	10129	87.96	0.00%	
GR-13A; 18% Gas	11/20/92	0:58	298	49	626	111898	119919	291967	217317	9399	10087	87.72	21.63%	4.34
GR-13D; 18% Gas	11/20/92	1:00	301	48	634	110655	123400	298249	219718	9318	10008	87.48	23.64%	
GR-14B; 20% Gas	11/20/92	1:00	301	48	636	108464	122185	304511	220152	9326	10014	87.27	23.65%	4.93
Base Cond. OFA off	11/30/92	1:50	307	60	619	138225	147065	311795	243850	9452	10124	88.06	0.00%	
GR-BFr	11/30/92	0:26	306	61	625	124321	127957	323701	226601	9486	10194	87.41	22.13%	
GR-BFf	11/30/92	0:27	300	60	616	123102	127166	323842	226345	9519	10239	87.47	21.99%	
GR-21C	12/1/92	1:06	297	56	616	86699	87553	249070	191800	9363	10086	86.84	25.40%	2.75
GR-22	12/1/92	0:50	290	56	604	99718	105288	266603	201618	9511	10279	87.24	22.09%	6.77
Bias Firing	12/1/92	0:10	288	56	611	85602	92460	249034	193233	9508	10255	87.05	24.26%	
Base Cond. OFA on	12/1/92	0:50	287	54	593	108167	109430	252098	202208	9528	10285	88.19	8.85%	
Base Cond. OFA off	12/1/92	0:40	296	55	613	116558	125800	266216	221698	9402	10128	87.93	0.00%	
Base Cond. OFA off	12/2/92	3:55	294	43	619	134387	146291	304530	244387	9435	10116	88.24	0.00%	
Base Cond. OFA off	12/4/92	0:55	288	35	609	113673	130350	262484	218621	9608	10437	88.01	0.00%	
OFA Test	12/4/92	2:10	281	36	604	105538	126214	248353	205575	9546	10446	87.99	10.97%	
Base Cond. OFA off	12/7/92	2:10	291	37	615	114409	125310	267802	223175	9544	10354	87.88	0.00%	
GR-22A	12/7/92	1:05	294	45	621	100069	109350	257614	203782	9562	10418	87.38	19.72%	3.95

Cherokee Unit 3, Average Test D
Pre Modification

Test No.	Date	Dur.	AH Gas Out Temp	AH Air In Temp	AH Air Out Temp	Calc Coal Flow lbs/hr	Msd Coal Flow lbs/hr	Calc TAir Flow scfm	Msd TAir Flow scfm	Heat Rate Gross	Heat Rate Net	Boiler Eff %	OFA	Carbon In Ash, %
GR-22B	12/7/92	1:00	295	45	625	94323	100862	253349	200290	9522	10381	87.17	23.90%	2.47
GR-22C	12/7/92	1:00	299	45	629	88644	95311	250894	194496	9515	10369	86.89	26.85%	1.62
Base Cond. OFA off	12/8/92	0:27	304	44	611	87540	92405	194790	184147	9760	10843	87.44	0.00%	
GR-31C	12/8/92	1:00	305	51	624	70866	73803	200947	170678	9890	10984	86.44	19.82%	3.98
GR-31F	12/8/92	1:23	302	52	630	70399	77769	215285	173095	10054	11210	86.04	29.93%	1.22
GR-32A	12/8/92	1:00	298	50	621	79710	86022	205526	173693	9817	10901	86.94	18.67%	3.84
Base Cond. OFA off	12/9/92	0:41	304	63	613	90429	94963	196880	187241	9874	10937	87.66	0.00%	
GR-32C	12/9/92	1:00	312	67	628	69844	75170	208499	166006	9856	10967	85.97	32.34%	1.77
GR-32C; 3Mills	12/9/92	0:56	299	67	623	71250	80115	206995	176241	9762	10801	86.49	29.03%	10.29
Base Cond. OFA off	12/9/92	0:15	304	65	624	95016	101770	230457	205862	9704	10663	87.06	0.00%	
Base Cond. OFA off	12/14/92	2:00	286	41	610	127673	139474	297553	234352	9689	10240	88.16	0.00%	
GR-12Z	12/14/92	1:02	288	44	617	131479	144100	313498	229446	9631	10210	88.14	15.98%	8.75
GR 2.7% Gas	12/14/92	0:17	286	39	617	134689	147684	316719	227458	9561	10139	88.23	20.07%	
Base Cond. OFA off	12/15/92	1:37	296	46	617	129836	144850	291733	237785	9235	9771	88.29	0.00%	
GR 20% Gas	12/15/92	0:36	289	50	618	108043	120207	295711	223123	9191	9734	87.65	23.98%	
Base Cond. OFA off	12/16/92	0:48	286	36	610	135250	150817	307145	243911	9459	10009	88.46	0.00%	
GR-12A1	12/16/92	2:19	285	39	615	124136	137087	309062	227194	9449	10005	88.13	18.73%	6.68
Test C1	1/15/93	1:00	293	52	619	129234	126697	318993	231773	9562	10276	87.99	14.63%	
Test C2	1/15/93	1:00	301	61	627	122975	123840	316589	228682	9539	10247	87.64	18.91%	
Test C3	1/15/93	0:58	305	64	631	116628	117907	313534	221631	9533	10232	87.39	22.43%	
Test C4	1/15/93	0:50	305	64	633	109761	112246	307057	219438	9495	10186	87.27	22.99%	4.69
Test B1	1/15/93	0:59	300	64	617	139887	144035	323987	235867	9632	10354	88.16	15.44%	
Test B3	1/15/93	1:01	298	62	617	139538	146413	313779	234121	9617	10335	88.35	15.40%	
Base Cond. OFA off	1/18/93	0:45	290	36	621	142799	146807	315639	249671	9462	10115	88.62	0.00%	
Test B5	1/18/93	1:01	290	45	614	141516	147902	315377	236019	9525	10226	88.61	14.08%	
Base Cond. OFA cooling	1/19/93	0:39	289	34	625	142187	154259	322910	251230	9468	10167	88.54	2.33%	
GR-12R	1/19/93	1:00	286	34	621	132746	145890	328366	235829	9579	10318	88.18	19.85%	
GR-13E	1/19/93	1:00	292	35	632	112787	120224	301800	218946	9505	10210	87.71	22.93%	
GR-13C	1/20/93	1:10	307	59	638	115745	121859	311284	234599	9546	10253	87.39	23.26%	
GR-12D	1/20/93	1:05	309	64	639	120063	127012	318836	226863	9592	10304	87.35	22.59%	
GR-12E	1/20/93	0:59	308	64	634	127283	139859	313531	229434	9621	10338	87.72	18.74%	
Base Cond. OFA off	1/20/93	0:15	309	64	633	140760	149755	303339	240941	9619	10292	88.33	0.00%	
150 MWn Max NOx Red	1/21/93	1:05	313	66	639	109132	117113	304221	220284	9528	10223	87.16	23.78%	3.51
Base Cond. OFA cooling	1/21/93	1:30	304	66	624	139004	151266	308885	240390	9682	10399	88.29	1.40%	
120 MWn Max NOx Red	1/21/93	1:00	310	70	626	85199	94476	248955	190749	9425	10212	86.68	23.93%	
GR Environ. #1	1/25/93	5:10	297	53	627	109308	119855	307256	223404	9423	10143	87.25	21.96%	
Base Cond. OFA cooling	1/26/93	0:55	296	50	612	128790	135478	298826	232800	9490	10224	88.07	3.31%	
GR Environ. Test #2	1/26/93	5:22	306	65	625	108980	121438	296303	216046	9482	10203	87.19	23.03%	
Environ. #3	1/27/93	5:55	314	66	639	116374	126034	316272	229275	9418	10117	87.08	21.71%	
Environ. #4 (No GR)	1/27/93	6:00	309	60	626	131023	138086	292160	239155	9570	10281	87.93	0.00%	

Cherokee Unit 3, Average Test E

Pre Modification

Test No.	Date	Dur.	AH Gas Out Temp	AH Air In Temp	AH Air Out Temp	Calc Coal Flow lbs/hr	Msd Coal Flow lbs/hr	Calc TAir Flow scfm	Msd TAir Flow scfm	Heat Rate Gross	Heat Rate Net	Boiler Eff %	OFA	Carbon In Ash, %
Environ. #5 (No GR)	1/28/93	6:04	306	50	625	139606	147180	312665	249938	9432	10101	88.21	0.00%	
Base Cond.	2/2/93	0:17	305	57	616	138217	140728	304125	242538	9667	10350	88.26	0.00%	
LNB 120MW #1	3/8/93	2:00	308	72	601	112721	121832	258180	213576	9853	10576	87.61	0.00%	11.23
LNB 120MW #2	3/8/93	2:00	318	80	611	113254	122881	258302	211837	9882	10602	87.42	0.00%	8.63
LNB 150MW #1	3/9/93	2:00	318	71	630	144518	153587	334835	251015	9868	10562	87.70	0.00%	4.87
LNB 150MW #2	3/9/93	2:00	318	73	623	142136	156992	319930	243876	9943	10651	87.87	0.00%	6.09
LNB 90MW #1	3/10/93	2:00	292	49	589	88914	101579	215864	194021	10080	11025	87.31	0.00%	4.13
LNB 90MW #2	3/10/93	1:58	298	49	595	89253	100139	211036	190408	10034	10964	87.29	0.00%	4.81
LNB 150MW #3	3/11/93	2:00	301	41	623	140628	149725	315744	244440	9727	10406	88.19	0.00%	5.99
LNB 150MW #4	3/11/93	2:00	302	43	621	141453	158012	310936	242136	9736	10417	88.30	0.00%	7.20
3M1	3/22/93	1:02	294	65	604	107276	116948	281586	213141	9408	10083	87.85	23.06%	
3M2	3/22/93	1:03	294	68	605	106881	119073	277476	214502	9400	10085	87.88	21.22%	
3M3	3/22/93	0:59	295	69	609	107574	119279	288225	221879	9381	10062	87.70	20.15%	
3 Mill 7	4/13/93	1:00	284	63	588	107272	134388	238431	217012	9433	10200	88.31	0.00%	
3 Mill 6	4/13/93	1:00	280	64	586	108328	135251	235134	216033	9419	10174	88.55	0.00%	
Level 6 1/2	4/15/93	2:05	302	51	616	132176	159181	296998	236762	9245	9897	88.19	0.00%	
Level 4	4/15/93	1:10	302	51	616	132081	159312	297387	236963	9240	9892	88.19	0.00%	
Level 3	4/15/93	0:53	303	53	617	132366	158899	298147	236303	9250	9898	88.17	0.00%	
Level 5 1/2	4/15/93	1:58	307	60	619	132167	159566	290952	235825	9282	9937	88.18	0.00%	
Base Cond	4/15/93	5:25	304	55	617	132182	159378	293836	236260	9260	9911	88.20	0.00%	
Level 5 1/2	4/16/93	1:47	310	59	630	135162	160046	309954	247500	9223	9871	87.92	0.00%	
Level 6 1/2	4/16/93	1:19	313	66	629	135361	161663	308524	247523	9270	9925	87.90	0.00%	
Level 3	4/16/93	0:44	315	69	630	135550	164101	311653	248308	9296	9954	87.81	0.00%	
Level 4	4/16/93	1:00	315	69	630	135705	163807	311884	248259	9297	9954	87.81	0.00%	
North out, South in	4/16/93	0:20	310	59	631	135478	160538	323244	247553	9257	9907	87.69	0.00%	
South out, North in	4/16/93	0:20	310	61	630	134606	160878	304846	247562	9208	9857	87.97	0.00%	
Base Cond	4/16/93	6:25	313	65	630	135460	161809	310573	247714	9267	9921	87.87	0.00%	
Level 4	4/19/93	0:56	306	63	629	108837	127394	301200	225868	9201	9877	87.28	20.70%	
Level 3	4/19/93	0:52	306	63	629	108733	127295	300860	225729	9195	9870	87.28	20.74%	
Level 5 1/2	4/19/93	2:29	310	64	636	107787	125604	307713	229197	9157	9838	87.04	21.82%	
Level 6 1/2	4/19/93	1:10	311	63	639	108196	125345	310904	230268	9173	9851	87.02	21.83%	
Base Cond. OFA on	4/19/93	1:00	298	60	615	132138	151710	320537	236365	9303	10023	87.88	14.85%	
GR	4/19/93	5:42	310	64	636	107835	125698	306573	228332	9163	9842	87.07	21.88%	
Level 6 1/2	4/20/93	1:47	284	49	598	118536	134468	260175	224896	9335	10046	88.53	0.00%	
Base Cond 130MW	4/20/93	3:35	285	51	597	118485	134726	259183	224650	9340	10053	88.53	0.00%	
Base Cond 120MW	4/20/93	2:55	305	61	612	110982	125821	261474	218887	9235	9901	87.48	0.00%	
Base Cond. OFA off	4/21/93	7:40	310	65	610	107591	124093	246885	211507	9268	10035	87.43	0.00%	
Base Cond. OFA off	4/23/93	0:30	319	81	625	134843	162342	305081	243990	9310	9958	87.84	0.00%	9.81
4M12 (OFA off)	4/23/93	1:00	308	80	613	133541	134012	291323	240464	9383	10023	88.07	0.00%	8.00
4M13a (78,000 scfm OF	4/23/93	0:20	303	81	602	135843	138591	308665	230443	9531	10248	87.98	25.29%	

Cherokee Unit 3, Average Test D
Pre Modification

Test No.	Date	Dur.	AH Gas Out Temp	AH Air In Temp	AH Air Out Temp	Calc Coal Flow lbs/hr	Msd Coal Flow lbs/hr	Calc TAir Flow scfm	Msd TAir Flow scfm	Heat Rate Gross	Heat Rate Net	Boiler Eff %	OFA	Carbon In Ash, %
4M13b (70,000 scfm OFA	4/23/93	0:50	301	83	600	135673	137289	311028	233023	9543	10259	88.02	22.33%	
Base Cond. OFA On	4/27/93	0:30	310	66	625	137393	163077	330669	249563	9360	10056	87.67	5.56%	
GR on 150MW, 11% Gas	4/27/93	0:53	307	67	622	121810	143288	313796	235246	9398	10084	87.51	11.70%	
GR on 150MW, 17% Gas	4/27/93	2:48	313	74	627	113324	136540	306297	226405	9316	10004	87.23	23.41%	
Base Cond. OFA on	4/28/93	0:44	306	66	617	128025	147200	309999	238462	9481	10224	87.63	5.27%	
GR on Auto	4/28/93	6:35	311	76	625	105563	124223	284692	216279	9367	10097	87.10	23.06%	
GR on Auto	5/3/93	7:00	312	81	626	109090	126679	305069	228883	9459	10204	86.92	22.97%	
Base Cond. OFA on	5/6/93	2:45	301	72	604	128448	147181	311053	237273	9469	10203	87.76	4.94%	
GR on Auto	5/6/93	1:15	313	78	621	109881	123762	295850	218626	9364	10077	87.08	21.47%	
Base Cond. OFA off	5/6/93	0:21	305	80	605	111951	125645	265709	217774	9340	10070	87.47	0.00%	
GR on Auto 150MW	5/7/93	4:26	310	74	619	112649	125465	307406	223455	9451	10162	87.21	23.48%	
GR on Auto 160MW	5/7/93	1:59	318	80	627	121216	135030	326859	231918	9471	10148	87.23	22.52%	
GR on Auto 140MW	5/7/93	4:50	306	67	617	106629	118424	294642	217963	9387	10118	87.06	23.69%	
Base Cond. OFA off	5/7/93	0:35	310	66	621	133176	147419	314300	243468	9387	10072	87.58	0.00%	
GR on Auto	5/11/93	6:08	312	72	625	104108	121603	301282	218598	9240	9960	86.65	22.50%	
GR 13	5/25/93	15:04	312	70	627	110684	133638	302823	225159	9279	9956	87.08	23.02%	
GR 14	5/25/93	1:25	306	73	611	81198	97285	235120	185230	9449	10333	86.32	25.08%	
GR 15	5/26/93	1:29	306	71	611	84832	102103	245649	192062	9395	10239	86.37	24.03%	
LNB-OFA	5/26/93	0:42	298	70	595	85765	103731	229497	186468	9574	10513	86.50	17.28%	
LNB	5/26/93	9:44	316	73	611	125678	149916	282354	229683	9462	10142	87.73	0.00%	
LNB	5/27/93	0:10	312	82	608	103797	128327	241565	212013	9248	10030	87.33	0.00%	
LNB-OFA	5/27/93	0:45	320	85	623	135091	157739	325151	241483	9407	10097	87.43	10.51%	
GR-LNB 16	5/27/93	13:40	318	84	626	110253	126788	304984	227015	9364	10060	86.85	21.75%	
GR-LNB 17	5/28/93	2:57	305	75	607	86180	98305	252690	197193	9464	10332	86.32	22.70%	
LNB	5/28/93	1:23	312	75	595	81863	95551	213575	192218	9694	10709	86.26	0.00%	
GR-LNB 20b	6/3/93	8:51	316	73	625	107116	127768	282557	210403	9285	9967	87.25	24.18%	
LNB	6/3/93	1:05	316	70	603	88649	106473	222910	196080	9541	10361	86.70	0.00%	
LNB (low load)	6/4/93	6:52	317	67	598	84677	100776	217567	190380	9663	10551	86.38	0.00%	
LNB (high load)	6/4/93	5:25	313	60	617	133437	156584	309642	241367	9388	10043	87.94	0.00%	
LNB-OFA	6/4/93	2:31	305	71	603	137915	163045	320582	238263	9534	10231	88.06	10.22%	
GR-LNB	6/4/93	7:42	316	74	625	110334	131376	287430	213422	9297	9965	87.25	24.22%	
LNB	6/8/93	1:35	319	77	615	127379	144516	299745	236646	9416	10127	87.41	0.00%	
LNB-OFA	6/8/93	1:40	309	78	610	127822	148618	309610	235405	9432	10181	87.60	5.39%	
GR-LNB 22a	6/8/93	6:21	317	80	625	101957	117116	291093	212158	9335	10079	86.65	22.73%	
GR-LNB 22b	6/8/93	5:30	316	77	624	110084	128249	288750	215138	9268	9929	87.33	24.54%	
GR-LNB 23a	6/9/93	1:16	298	69	604	87779	101362	233663	187305	9212	10015	87.22	25.33%	
LNB-OFA	6/9/93	0:30	291	71	589	81446	88693	206327	171211	9475	10513	87.18	17.08%	
LNB	6/9/93	16:03	316	75	606	108345	123012	259188	214188	9523	10378	87.28	0.00%	
GR-LNB 23b	6/9/93	4:28	313	79	620	105101	121378	304466	223166	9366	10121	86.80	22.16%	
LNB	6/10/93	8:47	310	71	603	105994	122276	249527	211843	9352	10147	87.49	0.00%	

Cherokee Unit 3, Average Test D
Pre Modification

Test No.	Date	Dur.	AH Gas Out Temp	AH Air In Temp	AH Air Out Temp	Calc Coal Flow lbs/hr	Msd Coal Flow lbs/hr	Calc TAir Flow scfm	Msd TAir Flow scfm	Heat Rate Gross	Heat Rate Net	Boiler Eff %	OFA	Carbon In Ash, %
LNB-OFA	6/10/93	1:16	315	77	621	135703	156185	333008	240132	9427	10111	87.63	8.23%	
GR-LNB 24	6/10/93	2:57	323	84	637	110517	129533	317340	228295	9313	9989	86.63	22.56%	
LNB	6/10/93	0:37	326	89	615	136793	155000	320293	245179	9454	10101	87.52	0.00%	
GR-LNB 25a	6/11/93	5:28	322	91	626	101957	114675	278267	209279	9260	9959	86.66	22.66%	
GR-LNB 25b	6/11/93	9:06	327	94	632	112416	126248	307218	222800	9296	9951	86.75	22.19%	
GR-LNB 26a	6/12/93	11:22	327	89	635	103242	117561	274365	205936	9228	9925	86.74	23.76%	
GR-LNB 26b	6/12/93	2:13	312	79	608	77735	80993	210382	173515	9485	10502	86.24	19.72%	
LNB-OFA	6/12/93	7:11	323	96	613	125768	149855	287453	221490	9450	10174	87.52	8.35%	
LNB-OFA	6/13/93	9:43	312	79	595	76903	90810	198932	171221	9772	10812	86.34	5.48%	
GR-LNB 28	6/14/93	4:06	327	94	628	113195	135219	303259	221655	9393	10060	87.07	23.44%	
LNB	6/14/93	1:59	324	89	608	120039	139502	278747	221993	9557	10283	87.44	0.00%	
LNB	6/18/93	0:38	305	63	620	121009	140139	268164	232919	9172	9774	87.99	0.00%	
GR-LNB 29	6/18/93	14:24	310	68	624	105693	131749	288491	218273	9272	9954	87.10	24.08%	
GR-LNB 30a	6/19/93	0:30	303	67	615	78474	102170	235465	186016	9292	10187	86.27	25.50%	
LNB	6/19/93	9:15	322	71	605	81061	107893	196978	181229	9602	10686	86.39	0.00%	
GR-LNB 30b	6/19/93	11:53	325	85	637	105584	135338	282259	212397	9246	9910	86.98	25.55%	
GR-LNB 30c	6/19/93	1:33	318	84	620	77325	90969	219651	174718	9463	10409	86.18	26.40%	
GR-LNB 23	6/23/93	7:35	321	90	623	110131	136188	294849	216811	9341	10003	87.12	24.84%	
GR-LNB 32b	6/23/93	1:09	313	80	620	96516	115763	262244	197925	9285	9989	86.93	25.24%	
LNB-OFA cooling	6/24/93	6:25	309	71	602	80146	97092	191678	172577	9526	10443	87.01	5.98%	
GR-LNB 33a	6/24/93	6:00	318	83	622	92834	110361	251472	196457	9216	9955	86.76	25.23%	
GR-LNB 33	6/24/93	11:22	319	83	625	108227	134555	287684	215139	9219	9875	87.17	25.17%	
GR-LNB 34a	6/25/93	1:52	312	78	610	68421	81307	200840	166204	9542	10660	85.90	24.86%	
LNB-OFA	6/25/93	4:03	300	72	592	78347	96415	200423	173363	9720	10909	86.76	13.26%	
GR-LNB 34	6/25/93	8:00	319	77	632	104912	124594	278148	209807	9255	9953	87.09	24.86%	
LNB (some OFA)	6/28/93	1:03	332	96	621	137238	158831	311915	240977	9472	10221	87.61	0.18%	
LNB (some OFA)	6/29/93	12:15	334	102	611	117110	136939	267207	218918	9528	10413	87.28	2.95%	
LNB	6/30/93	11:51	330	83	615	108672	129149	249030	210612	9437	10372	87.16	0.00%	
GR-LNB 35	6/30/93	1:48	323	91	624	114578	131099	312689	225995	9398	10178	86.96	22.58%	
GR-LNB 35a	6/30/93	6:05	323	93	626	113256	127039	323285	233001	9360	10150	86.65	21.66%	
GR-LNB 35b	6/30/93	1:53	316	87	622	101543	115123	300326	223189	9347	10202	86.36	21.50%	
GR-0LNB 36a	7/1/93	8:22	307	83	600	75163	85948	227877	183412	9583	10794	85.80	21.37%	
GR-LNB 36	7/1/93	15:37	326	95	626	109011	123691	294930	214425	9341	10142	86.80	22.56%	
GR 37a	7/2/93	14:55	318	95	613	91390	105540	255425	192716	9411	10360	86.45	22.82%	
GR 37	7/2/93	7:05	328	96	630	115392	132985	315965	224382	9415	10194	86.83	22.12%	
GR-LNB 38	7/3/93	7:46	331	98	633	112169	127237	305047	219199	9260	10023	86.68	22.06%	
GR-LNB 38a	7/3/93	8:43	325	90	629	110737	125133	332351	214154	9346	10133	86.10	20.06%	
GR-LNB 39a	7/4/93	17:27	314	79	612	89454	99692	286123	186634	9496	10500	85.37	18.45%	
GR-LNB 39	7/4/93	6:33	321	84	628	114795	129375	355054	219205	9387	10162	86.02	18.30%	
GR-LNB 40a	7/5/93	11:52	311	79	607	81700	89000	280221	177264	9653	10723	84.71	16.78%	

Cherokee Unit 3, Average Test D
Pre Modification

Test No.	Date	Dur.	AH Gas Out Temp	AH Air In Temp	AH Air Out Temp	Calc Coal Flow lbs/hr	Msd Coal Flow lbs/hr	Calc TAir Flow scfm	Msd TAir Flow scfm	Heat Rate Gross	Heat Rate Net	Boiler Eff %	OFA	Carbon In Ash, %
GR-LNB 40	7/5/93	12:08	323	88	627	110736	121149	365433	213890	9443	10257	85.40	17.17%	
GR-LNB 52a	7/17/93	8:31	309	81	604	79101	93020	233042	179699	9660	10802	86.11	25.31%	
GR-LNB 52	7/17/93	5:45	316	76	626	107944	128357	296938	219497	9329	10135	86.96	22.98%	
LNB	7/19/93	1:53	302	85	598	106496	125543	242125	213817	9479	10313	87.71	0.00%	
LNB-OFA	7/19/93	0:22	294	86	588	110577	132874	253703	216790	9502	10421	87.94	7.55%	
GR-LNB 53a	7/19/93	3:29	307	85	606	93598	108145	253075	198618	9439	10375	86.95	24.09%	
GR-LNB 53	7/19/93	7:06	313	90	615	113352	135716	309678	223835	9454	10254	87.15	22.46%	
LNB	7/21/93	8:34	334	85	594	76228	87944	183344	175788	9841	11279	86.12	0.00%	
GR-LNB 54	7/21/93	4:52	337	91	603	108745	131321	297865	219369	9462	10292	86.53	22.92%	
LNB	7/23/93	2:35	321	86	599	91398	105394	217672	181205	10482	11819	86.90	0.00%	
GR-LNB 55	7/23/93	4:53	320	92	627	110471	129216	312881	224082	9383	10223	86.71	21.74%	
GR-LNB 55a	7/23/93	1:08	320	92	624	100763	113980	288603	208479	9508	10432	86.44	22.01%	
LNB	7/23/93	3:55	315	91	579	75018	92037	180400	173970	10029	11447	86.71	0.92%	
LNB	7/24/93	1:52	306	87	568	78094	95440	199109	182387	9970	11250	86.53	0.00%	
LNB-OFA	7/24/93	0:36	314	92	596	88171	104569	245401	186576	9807	10957	85.87	11.17%	
GR-LNB 56	7/24/93	7:45	323	93	633	109225	128540	306685	220171	9374	10213	86.65	22.11%	
GR-LNB 56a	7/24/93	2:09	313	87	601	76098	84126	228334	173585	9746	10988	85.87	24.18%	
GR-LNB 57a	7/25/93	1:10	309	85	589	62811	70494	205563	161845	10025	11442	85.12	23.93%	
LNB-OFA	7/25/93	5:52	301	79	587	81925	92005	219864	175681	9810	11081	86.47	24.44%	
GR-LNB 57b	7/25/93	10:19	318	89	619	95992	112530	280533	203531	9433	10391	86.31	22.71%	
GR-LNB 57	7/25/93	6:14	325	97	629	114215	132522	313346	222568	9384	10195	86.93	22.30%	
GR-LNB 58a	7/26/93	10:15	313	82	615	85467	98283	262961	193771	9478	10536	85.76	22.67%	
GR-LNB 58	7/26/93	8:34	324	96	631	114931	130539	316485	224715	9432	10251	86.88	21.88%	
GR-LNB 58b	7/26/93	5:09	320	88	624	103155	113917	294895	210698	9418	10322	86.47	21.45%	
GR-LNB 59a	7/27/93	10:48	315	81	617	86014	95322	256860	192711	9518	10683	85.96	22.80%	
LNB-OFA	7/27/93	3:21	327	93	626	141613	160374	317689	242944	9522	10323	87.94	1.76%	
GR-LNB 59	7/27/93	9:16	325	93	627	106270	119460	292285	213115	9498	10385	86.71	21.87%	
GR-LNB 60a	7/28/93	11:06	320	81	628	97255	109445	269493	203508	9356	10227	86.59	22.52%	
GR-LNB 60b	7/28/93	2:02	333	94	636	120122	138525	325557	228036	9370	10160	86.88	22.13%	
LNB-OFA	7/28/93	2:21	329	101	624	143731	160010	325566	247702	9521	10315	87.80	2.51%	
GR-LNB 60	7/28/93	8:10	334	100	635	120987	134997	321416	227971	9448	10247	86.98	22.07%	
GR-LNB 61a	7/29/93	15:55	329	92	635	113186	127894	304762	221114	9390	10217	86.85	22.18%	
GR-LNB 61	7/29/93	8:04	335	103	634	112810	131783	303893	218047	9377	10197	86.76	22.84%	
GR-LNB 62	7/30/93	10:04	328	91	630	108598	124443	290349	211712	9339	10180	86.82	22.66%	
LNB-OFA	7/30/93	4:32	326	101	618	138517	165217	328322	242314	9600	10445	87.56	5.32%	
GR-LNB 62a	7/30/93	9:00	328	92	630	114381	130376	319178	225616	9479	10322	86.72	21.49%	
GR-LNB 63a	7/31/93	17:10	329	94	628	112988	128949	304343	216384	9431	10260	86.89	22.26%	
GR-LNB 63b	7/31/93	6:49	336	103	635	115516	124145	306271	216882	9391	10200	86.86	21.27%	
GR-LNB 64a	8/1/93	1:25	331	95	635	102747	113573	278895	204553	9354	10234	86.56	22.16%	
GR-LNB 64b	8/1/93	10:21	317	85	614	81407	90176	236379	183972	9604	10764	86.09	24.08%	

Cherokee Unit 3, Average Test D
Pre Modification

Test No.	Date	Dur.	AH Gas Out Temp	AH Air In Temp	AH Air Out Temp	Calc Coal Flow lbs/hr	Msd Coal Flow lbs/hr	Calc TAir Flow scfm	Msd TAir Flow scfm	Heat Rate Gross	Heat Rate Net	Boiler Eff %	OFA	Carbon In Ash, %
GR-LNB 64c	8/1/93	12:14	332	90	642	111057	125008	298343	217308	9388	10216	86.76	22.41%	
GR-LNB 65a	8/2/93	8:55	316	84	611	78544	84685	234870	179557	9716	10936	85.76	23.45%	
LNB-OFA	8/2/93	1:23	322	81	629	138466	157723	320343	237609	9508	10321	87.70	2.08%	
GR-LNB 65b	8/2/93	6:02	325	84	634	112140	128465	297910	213646	9443	10277	86.95	22.54%	
GR-LNB 65c	8/2/93	7:14	324	84	632	107432	125688	290205	211496	9423	10292	86.61	23.02%	
GR-LNB 66a	8/3/93	8:29	308	74	608	71855	82153	222335	173390	9658	10946	85.62	25.00%	
GR-LNB 66b	8/3/93	9:34	318	75	630	106999	126516	298918	216394	9355	10213	86.78	22.03%	
GR-LNB 66c	8/3/93	5:55	323	79	638	111634	130251	300029	217833	9333	10152	86.96	22.35%	
GR-LNB 67	8/4/93	24:00	321	80	632	104594	115911	286945	208422	9399	10292	86.71	22.04%	
GR-LNB 68a	8/5/93	7:39	313	75	620	90167	96583	252926	191039	9427	10430	86.47	23.43%	
GR-LNB 68b	8/5/93	15:50	324	81	637	114545	127578	312197	220991	9365	10176	86.85	20.75%	
GR-LNB 69	8/6/93	9:48	319	73	633	105202	115261	279028	208024	9374	10254	86.88	22.04%	
LNB	8/6/93	7:58	329	86	620	135507	152301	307106	235303	9582	10390	87.54	0.00%	
LNB-OFA	8/6/93	5:04	329	93	617	139200	156646	319811	240153	9606	10405	87.55	1.24%	
LNB	8/7/93	3:04	323	81	623	133043	152559	293279	230595	9490	10309	87.79	0.00%	
GR-LNB 70	8/7/93	3:53	328	79	641	115672	129955	281698	207263	9362	10223	87.00	13.11%	
LNB-OFA	8/7/93	8:05	329	91	619	136082	151935	315462	235797	9534	10341	87.39	1.34%	
LNB	8/7/93	6:28	330	91	618	137961	152516	316815	239395	9577	10375	87.49	0.00%	
LNB	8/9/93	8:04	324	82	610	127397	143447	298101	229959	9624	10490	87.43	0.00%	
GR-LNB 71 (10% Gas)	8/9/93	13:45	331	98	629	124813	141025	323971	224046	9577	10416	87.05	17.84%	
GR-LNB 72a (10%)	8/10/93	7:48	325	88	628	121811	136004	311569	219910	9441	10274	87.10	17.55%	
LNB	8/10/93	7:27	328	92	614	138553	159493	329661	243708	9775	10614	87.44	0.00%	
GR-LNB 72b (10%)	8/10/93	7:25	319	82	617	119944	136607	311369	220653	9585	10463	87.16	17.64%	
GR-LNB 73	8/11/93	3:22	308	80	614	114651	133712	304084	220455	9486	10370	87.14	17.60%	
LNB-OFA	8/11/93	9:49	328	94	619	141129	162624	328878	245466	9648	10454	87.60	1.53%	
LNB	8/11/93	2:45	326	90	617	134064	149499	319320	241401	9657	10494	87.40	0.00%	
LNB	8/12/93	7:36	325	84	602	102169	114134	243465	203969	9710	10817	86.91	0.00%	
GR-LNB 74	8/12/93	14:33	319	81	627	122857	141508	315138	222362	9486	10325	87.25	18.04%	
GR-LNB 75	8/13/93	18:16	324	91	629	120404	143834	316033	220957	9505	10366	86.96	18.04%	
GR-LNB 76a	8/14/93	4:54	322	90	621	97749	113733	262877	192824	9396	10379	86.39	17.46%	
LNB	8/14/93	1:46	321	89	592	80714	90963	230800	187627	9938	11150	85.31	0.00%	
GR-LNB 76b	8/14/93	11:05	325	89	627	118872	139606	319917	219864	9494	10357	86.74	17.54%	
GR-LNB 77	8/15/93	1:10	320	83	619	94016	107749	259165	187601	9530	10560	86.17	17.27%	
LNB	8/15/93	14:44	326	84	605	104787	124717	252824	203571	9703	10740	86.67	0.81%	
LNB	8/15/93	6:58	330	91	621	139032	164521	319722	237720	9575	10366	87.52	0.62%	
LNB (low load)	8/16/93	7:38	335	80	620	94604	111147	230812	193269	9625	10737	86.27	0.00%	
LNB (150 MWe)	8/16/93	3:21	327	82	631	140409	163924	330826	246741	9540	10340	87.48	0.00%	
LNB-OFA cooling	8/16/93	11:40	331	100	616	142241	164060	332982	244498	9655	10465	87.54	1.95%	
LNB	8/17/93	9:07	325	86	615	124002	137788	290545	224890	9658	10554	87.30	0.00%	
100% Gas (plant test)	8/17/93	0:34	304	86	577	73951	0	161443	170693	10238	11428	84.82	0.00%	

Cherokee Unit 3, Average Test D
Pre Modification

Test No.	Date	Dur.	AH Gas Out Temp	AH Air In Temp	AH Air Out Temp	Calc Coal Flow lbs/hr	Msd Coal Flow lbs/hr	Calc TAir Flow scfm	Msd TAir Flow scfm	Heat Rate Gross	Heat Rate Net	Boiler Eff %	OFA	Carbon In Ash, %
LNB (OFA cooling)	8/17/93	8:59	333	99	623	148384	158004	341536	242598	10176	11031	87.58	1.88%	
LNB	8/17/93	3:05	329	90	621	145491	153659	328978	238257	10131	10989	87.71	0.00%	
LNB (low load)	8/18/93	9:42	334	87	619	111224	119253	256656	204399	10101	11172	86.93	0.00%	
LNB 150 MWe	8/18/93	14:16	326	87	618	148284	157239	345915	244593	10211	11080	87.64	0.00%	
GR-LNB 78	8/24/93	3:25	318	95	615	117053	147575	296876	216487	9071	9838	87.21	19.82%	
LNB OFA cooling	8/24/93	10:38	324	99	609	134604	162076	319508	242758	9267	10020	87.40	2.50%	
LNB OFA cooling	8/25/93	2:06	309	91	587	105315	129722	245925	214667	9233	10024	87.39	1.91%	
LNB	8/25/93	8:38	310	88	591	100894	124726	237139	209651	9280	10123	87.31	0.00%	
LNB	8/25/93	13:08	318	83	612	132513	159731	316824	247077	9284	9984	87.54	0.00%	
LNB	8/26/93	21:16	322	83	603	100277	113516	252716	205520	9731	10848	87.08	0.00%	
LNB	8/26/93	2:42	324	81	618	135579	149582	321161	244242	9492	10284	87.53	0.00%	
LNB	8/27/93	8:26	321	76	599	93838	109436	232628	197534	9722	10760	87.00	0.00%	
LNB	8/27/93	6:17	316	74	612	132554	148689	312143	238653	9507	10317	87.70	0.00%	
GR-LNB 79	9/8/93	11:15	318	85	629	117756	130192	311182	219460	9439	10248	87.32	18.63%	
GR-LNB 79a	9/8/93	1:49	312	81	616	96950	103679	271189	194649	9526	10482	87.11	20.64%	
GR-LNB 80a	9/9/93	6:55	307	76	613	86601	94789	246725	184430	9478	10524	87.04	22.29%	
LNB-OFA	9/9/93	1:46	303	77	596	81879	90390	221179	176686	9795	11126	87.25	5.24%	
GR-LNB 80	9/9/93	14:15	319	85	627	106284	118889	287894	207267	9352	10204	87.09	20.38%	
LNB-OFA	9/10/93	4:50	308	78	593	75788	84546	213997	169294	9913	11266	87.04	3.54%	
GR-LNB 81	9/10/93	1:46	312	71	626	84099	92785	240680	180373	9366	10392	86.86	24.05%	
LNB	9/10/93	13:30	323	86	617	130674	144896	315148	237494	9512	10319	87.49	0.00%	
LNB	9/11/93	19:30	329	89	618	121777	132188	291420	224267	9541	10450	87.22	0.37%	
GR-LNB 82	9/11/93	4:10	323	93	629	116087	122810	330669	220738	9500	10335	87.17	18.35%	
GR-LNB 83a	9/12/93	11:51	311	82	618	100367	103309	291989	204346	9411	10335	87.17	19.71%	
GR-LNB 83	9/12/93	12:09	326	96	632	123161	123174	331210	222367	9413	10193	87.21	17.91%	
GR-LNB 84a	9/13/93	5:35	300	64	612	91790	90344	267381	192148	9390	10442	87.28	20.62%	
GR-LNB 84	9/13/93	18:03	300	51	622	116688	127576	308293	219520	9202	10008	87.73	17.19%	
GR-LNB 85a	9/14/93	4:15	298	55	619	102703	111036	274184	199390	9202	10077	87.53	19.32%	
LNB	9/14/93	11:05	307	62	605	109330	123501	260591	216210	9417	10357	87.57	0.00%	
LNB-OFA	9/14/93	1:06	307	75	616	136479	164492	325728	240505	9376	10181	87.97	3.56%	
GR-LNB 85	9/14/93	6:55	310	73	626	115131	137398	287766	215025	9194	9988	87.48	19.61%	
GR-LNB 86a	9/15/93	0:50	307	66	624	104429	123752	272160	202384	9231	10089	87.36	20.23%	
LNB	9/15/93	3:07	290	66	593	92960	114937	222813	199104	9276	10306	87.74	0.00%	
GR-LNB 86b	9/15/93	4:26	307	66	626	96768	114013	255614	195843	9230	10166	87.20	21.31%	
GR-LNB 86	9/15/93	11:20	317	84	630	113876	126174	289789	216897	9208	10012	87.27	19.56%	
GR-LNB 87a	9/16/93	5:46	310	73	619	95779	102457	255311	195838	9315	10289	87.15	21.22%	
GR-LNB 87	9/16/93	15:24	315	74	629	109303	116804	299788	211933	9251	10099	87.23	18.27%	
GR-LNB 88a	9/17/93	5:31	307	68	622	99764	105406	274834	199621	9242	10144	87.24	20.22%	
GR-LNB 88	9/17/93	18:28	313	71	631	115080	121003	297014	216191	9204	10002	87.38	18.83%	
GR-LNB 89	9/18/93	24:00	307	65	625	112388	120938	283716	211284	9177	9987	87.48	19.07%	

Cherokee Unit 3, Average Test D
Pre Modification

Test No.	Date	Dur.	AH Gas Out Temp	AH Air In Temp	AH Air Out Temp	Calc Coal Flow lbs/hr	Msd Coal Flow lbs/hr	Calc TAir Flow scfm	Msd TAir Flow scfm	Heat Rate Gross	Heat Rate Net	Boiler Eff %	OFA	Carbon In Ash, %
GR-LNB 90a	9/19/93	10:06	307	63	624	102865	113334	266803	199891	9143	10005	87.32	19.58%	
GR-LNB 90	9/19/93	13:54	318	76	630	118596	142137	296715	219053	9171	9952	87.33	18.05%	
GR-LNB 91	9/20/93	24:00	320	76	633	110995	132963	278774	210599	9122	9918	87.16	20.04%	
GR-LNB 92a	9/21/93	3:00	316	74	625	92301	105678	244816	187661	9327	10241	86.94	22.88%	
GR-LNB 92	9/21/93	17:56	322	82	628	112357	125848	294045	211239	9346	10156	87.14	19.52%	
GR-LNB 3 Mill a	9/22/93	7:59	300	69	612	89138	99840	251669	188060	9350	10254	87.23	22.15%	
GR-LNB 3 Mill b	9/22/93	8:25	293	68	605	95611	104796	260884	195196	9370	10198	87.22	21.22%	
GR-LNB 3 Mill c	9/23/93	24:00	294	68	608	96702	104347	264056	199335	9360	10176	87.18	21.01%	
GR-LNB 3 Mill d	9/24/93	1:58	291	67	604	78987	84017	231855	176006	9517	10533	86.49	23.35%	
LNB-OFA 3 Mill	9/24/93	3:33	277	66	563	70772	77449	206672	162304	10372	11963	86.33	20.96%	
GR-LNB 3 Mill e	9/24/93	6:10	291	65	602	97473	102655	271215	202006	9488	10338	87.18	20.13%	
GR-LNB 93	9/24/93	12:09	311	72	621	111231	121077	300291	213502	9418	10250	87.06	18.33%	
GR-LNB 94a	9/25/93	2:12	311	66	624	98036	99753	266967	192762	9379	10290	86.79	20.22%	
LNB-OFA	9/25/93	2:24	302	65	608	93154	97849	249736	182642	9540	10593	86.55	21.50%	
GR-LNB 94	9/25/93	19:05	322	77	637	119198	127311	309538	217890	9313	10109	87.13	17.86%	
GR-LNB 95a	9/26/93	4:15	305	65	622	95006	99184	261787	191570	9280	10209	86.91	21.16%	
LNB-OFA	9/26/93	2:55	293	63	587	88733	91670	249052	178143	9832	11009	86.60	21.80%	
GR-LNB 95	9/26/93	16:33	314	71	625	110855	118588	297667	210955	9331	10166	86.99	18.84%	
GR-LNB 96a	9/27/93	2:53	309	67	620	99821	105124	280347	201088	9361	10275	86.65	19.83%	
LNB	9/27/93	19:45	321	82	616	133431	141215	321673	243127	9529	10345	87.47	0.48%	
GR-LNB 96b	9/27/93	0:57	318	77	623	97262	98280	265294	189650	9454	10394	86.69	22.68%	
GR-LNB 97a	9/28/93	9:13	313	70	626	103105	105331	285040	204855	9309	10189	86.76	19.88%	
LNB	9/28/93	4:27	317	73	621	135363	144545	283410	230272	9385	10160	88.37	0.00%	
GR-LNB 97	9/28/93	5:58	324	78	636	119429	127251	298510	213319	9240	10022	87.27	19.18%	
GR-LNB 97b	9/28/93	2:48	315	72	624	101042	104569	265526	194464	9272	10161	86.84	18.60%	
GR-LNB 98a	9/29/93	5:22	313	69	622	92861	96888	252731	188531	9319	10234	86.51	18.18%	
GR-LNB 98	9/29/93	18:37	320	77	630	118547	125216	306753	217802	9354	10148	87.20	18.63%	
GR-LNB 99a	9/30/93	5:32	308	73	609	88275	92069	256767	187077	9544	10510	86.28	21.76%	
GR-LNB 99	9/30/93	13:24	323	86	628	116759	123327	313075	218364	9414	10151	87.00	18.56%	
GR-LNB 99b	9/30/93	2:27	323	90	626	97960	107255	283061	197604	9462	10308	86.30	20.62%	
LNB-OFA	9/30/93	2:27	312	88	583	76313	83239	205945	168982	10133	11511	86.16	3.92%	
GR-LNB 100a	10/1/93	11:00	309	70	617	81763	89706	247973	181919	9540	10562	86.00	22.78%	
GR-LNB 100	10/1/93	9:12	316	77	625	98068	110264	271831	196599	9292	10104	86.65	20.78%	
GR-LNB 101	10/2/93	24:00	312	69	625	96512	106063	275524	196058	9323	10162	86.63	20.54%	
GR-LNB 102	10/3/93	24:00	316	78	625	92146	98804	267998	192393	9372	10264	86.30	20.99%	
GR-LNB 103	10/4/93	24:00	319	81	630	96999	102332	275709	198625	9339	10156	86.44	21.31%	
GR-LNB 104	10/5/93	24:00	320	83	630	97825	102543	284706	202754	9378	10197	86.33	20.77%	
GR-LNB 105	10/6/93	10:15	319	75	632	112323	116453	310244	216460	9327	10131	86.81	18.81%	
GR-LNB 106	10/8/93	8:45	298	54	622	117155	135993	297606	215108	9297	10093	87.89	19.10%	
GR-LNB 107	10/9/93	24:00	294	48	623	117345	133682	313617	218954	9238	10032	87.71	17.93%	

Cherokee Unit 3, Average Test D

Pre Modification

Test No.	Date	Dur.	AH Gas Out Temp	AH Air In Temp	AH Air Out Temp	Calc Coal Flow lbs/hr	Msd Coal Flow lbs/hr	Calc TAir Flow scfm	Msd TAir Flow scfm	Heat Rate Gross	Heat Rate Net	Boiler Eff %	OFA	Carbon In Ash, %
GR-LNB 108	10/10/93	11:00	302	51	625	118041	128091	316616	219289	9248	10038	87.46	17.78%	
GR-LNB 109a	10/13/93	4:07	311	75	621	115981	129226	313634	217498	9411	10197	87.38	19.87%	
GR-LNB 109b	10/13/93	2:02	305	70	615	98246	106626	274169	195799	9436	10346	86.95	21.55%	
GR-LNB 110a	10/14/93	6:02	307	65	627	102633	115612	286453	205061	9253	10091	87.00	20.93%	
GR-LNB 110	10/14/93	14:56	312	69	632	111767	129883	306409	216301	9219	9984	87.23	21.89%	
GR-LNB 110b	10/14/93	3:00	306	68	619	90211	120374	271236	193348	9444	10393	86.53	23.97%	
GR-LNB 111	10/15/93	12:49	308	63	630	102263	119322	283641	205285	9203	9984	87.09	22.52%	
GR-LNB 3 Mill a	10/15/93	2:58	295	73	613	110532	136622	288876	213940	9302	10082	87.86	22.06%	
GR-LNB 3 Mill b	10/15/93	7:05	297	69	614	104279	118149	284230	209026	9380	10236	87.46	21.22%	
GR-LNB 3 Mill c	10/16/93	12:05	300	64	617	85759	97988	255616	191574	9421	10512	86.50	22.85%	
GR-LNB 3 Mill d	10/16/93	10:28	313	72	633	118518	140119	320142	224874	9359	10138	87.44	21.22%	
GR-LNB 3 Mill e	10/16/93	1:25	305	66	622	106901	123907	290672	204794	9406	10204	87.35	20.99%	
GR-LNB 3 Mill f	10/17/93	23:46	286	59	607	99865	125496	273930	203394	9258	10020	87.62	22.19%	
LNB-OFA 3 Mill	10/18/93	11:10	273	56	589	96210	118422	240654	187027	9354	10303	87.93	19.70%	
GR-LNB 3 Mill g	10/19/93	15:35	286	66	597	97978	119772	275683	204933	9456	10391	87.29	21.76%	
GR-LNB 3 Mill h	10/20/93	7:35	280	54	599	98242	120293	277647	204782	9386	10311	87.41	21.51%	
GR-LNB 112	10/20/93	4:09	297	52	618	94572	109509	272188	199263	9359	10291	86.88	21.85%	
LNB-OFA	10/20/93	0:56	299	55	618	121545	147347	311624	224156	9314	10188	87.30	17.33%	
GR-LNB 113	10/20/93	10:42	307	58	626	113856	133983	314262	220076	9366	10158	87.11	20.67%	
GR-LNB 113	10/21/93	24:00	307	63	624	111346	131855	306643	220403	9296	10088	87.15	22.26%	
GR-LNB 114	10/22/93	24:00	307	68	622	108366	130087	297819	216629	9287	10095	87.11	22.71%	
GR-LNB 115	10/23/93	24:00	305	70	623	112995	132397	311785	221084	9313	10101	87.18	21.96%	
GR-LNB 116	10/24/93	14:00	304	66	625	111670	126462	306451	218947	9294	10090	87.17	21.46%	
GR-LNB 116a	10/24/93	10:00	311	77	627	113536	130629	311704	220654	9332	10118	87.03	21.85%	
GR-LNB 117a	10/25/93	4:55	298	65	610	93260	103392	264784	195229	9473	10453	86.68	22.14%	
GR-LNB 117	10/25/93	19:04	301	62	624	111542	125820	301084	218580	9221	10004	87.37	21.55%	
GR-LNB 118	10/26/93	24:00	294	54	619	111142	124392	295072	215759	9251	10044	87.64	21.84%	
GR-LNB 119	10/27/93	14:25	295	53	622	114505	127229	298178	218216	9209	9977	87.72	21.65%	
GR-LNB 119a	10/27/93	9:34	306	73	623	113018	125818	286643	213987	9282	10062	87.52	22.08%	
GR-LNB 120a	10/28/93	7:21	304	71	620	108008	116546	280066	208779	9356	10190	87.30	21.90%	
GR-LNB 120	10/28/93	16:38	297	57	622	112702	125883	288823	217868	9208	9982	87.79	21.80%	
GR-LNB 121	10/29/93	24:00	284	33	621	111329	127834	296779	217065	9173	9951	87.95	21.33%	
GR-LNB 122	10/30/93	24:00	288	41	624	114860	131394	303485	221186	9203	9979	87.94	21.48%	
GR-LNB 123	10/31/93	24:00	297	58	624	113177	130201	301169	219332	9236	10017	87.64	21.41%	
GR-LNB 124	11/1/93	6:18	293	50	621	115166	130933	294416	215363	9284	10084	87.84	19.99%	
LNB-OFA	11/1/93	1:08	281	45	602	106797	129293	256263	200469	9423	10408	88.07	16.47%	
GR-LNB 125a	11/2/93	8:15	290	47	622	116997	134508	281875	214569	9120	9883	88.30	20.98%	
LNB	11/2/93	0:29	298	62	622	116783	139863	282619	214638	9180	9950	92.33	20.74%	
GR-LNB 125	11/2/93	10:09	298	62	622	116526	139622	282392	214404	9177	9947	88.09	20.86%	
GR-LNB 126a	11/4/93	1:40	294	50	621	114620	129573	268652	209490	9182	9970	88.16	20.76%	

Cherokee Unit 3, Average Test D

Pre Modification

Test No.	Date	Dur.	AH Gas Out Temp	AH Air In Temp	AH Air Out Temp	Calc Coal Flow lbs/hr	Msd Coal Flow lbs/hr	Calc TAir Flow scfm	Msd TAir Flow scfm	Heat Rate Gross	Heat Rate Net	Boiler Eff %	OFA	Carbon In Ash, %
GR-LNB 126	11/4/93	13:29	289	45	617	117149	129402	285562	213649	9239	10029	88.22	19.65%	
GR-LNB 127a	11/5/93	7:20	281	37	613	111238	122209	315809	208091	9404	10266	87.84	16.62%	
GR-LNB 127	11/5/93	5:54	282	39	611	122263	134412	307363	221892	9382	10176	87.90	18.80%	
GR-LNB 128	11/8/93	4:55	295	55	622	113732	130624	298782	219770	9256	10034	87.81	21.27%	
GR-LNB 129	11/9/93	8:30	298	62	625	116930	124003	298549	222588	9277	10047	87.76	21.36%	5.15
GR-LNB 129a	11/9/93	5:29	293	57	617	125401	128619	321398	234137	9419	10201	87.93	18.50%	
GR-LNB 130	11/10/93	15:43	293	57	618	120549	125906	303160	225277	9323	10107	87.95	19.62%	6.69, 8.69
LNB	11/10/93	7:50	300	68	609	136104	145758	301606	243412	9462	10236	88.41	0.00%	4.41
LNB	11/11/93	2:00	288	51	599	128349	135371	299460	240911	9439	10249	88.25	0.00%	
LNB 3 Mill a	11/11/93	3:34	289	65	593	101986	112835	235266	208283	9496	10431	87.92	0.00%	
LNB 3 Mill b	11/11/93	9:20	282	60	587	102041	112696	246076	211771	9586	10595	87.86	0.00%	
LNB 3 Mill c	11/12/93	12:30	276	46	588	109663	114823	258292	221314	9522	10469	88.09	0.00%	
LNB 3 Mill d	11/12/93	11:29	290	51	603	134370	155369	284489	239384	9436	10202	88.88	0.00%	
LNB 3 Mill e	11/13/93	14:30	289	50	604	131971	150696	296454	241735	9443	10232	88.58	0.00%	
LNB 3 Mill f	11/13/93	9:29	289	51	601	134978	156313	285566	238693	9430	10193	88.93	0.00%	
LNB 3 Mill	11/14/93	24:00	283	41	601	129746	155474	280712	237224	9404	10191	88.92	0.00%	
LNB	11/15/93	1:39	282	36	608	131242	159456	277134	238277	9372	10140	89.10	0.00%	
GR-LNB 131	11/15/93	13:00	284	43	616	112669	138420	283991	224019	9254	10059	88.07	22.10%	
GR-LNB 132	11/16/93	7:42	282	41	616	109648	130996	272787	217597	9257	10075	88.11	22.08%	
GR-LNB 132a	11/16/93	16:17	288	52	612	102674	123870	296917	205351	9468	10382	87.07	19.94%	
GR-LNB 133	11/17/93	0:40	282	46	608	100222	118692	289250	203232	9447	10333	87.21	20.50%	
LNB	11/17/93	8:40	288	44	597	110962	132037	275124	212695	9659	10604	87.69	0.00%	
LNB	12/3/93	5:15	298	53	613	133061	144983	306408	240232	9499	10311	88.28	0.00%	
LNB	12/6/93	2:33	300	41	599	99047	114617	229904	201062	9775	10911	87.35	0.00%	
LNB	12/6/93	3:00	291	43	605	138996	156760	317723	247314	9506	10323	88.23	0.00%	
LNB	12/6/93	1:55	292	47	606	139695	160134	325883	251332	9517	10332	88.11	0.00%	
LNB	12/7/93	6:45	299	58	607	141062	157127	327194	249915	9580	10396	88.42	0.00%	
LNB	12/8/93	4:03	303	60	616	140531	158838	337084	255401	9497	10306	88.09	0.00%	
GR-LNB 134	12/8/93	3:40	304	72	620	119433	138275	310189	221915	9485	10300	87.84	21.51%	
GR-LNB 134a	12/8/93	0:46	304	71	615	133141	153853	314035	230147	9524	10356	88.24	12.74%	
GR-LNB 134b	12/8/93	2:44	303	71	616	133004	155466	297357	225616	9424	10233	88.54	13.47%	
GR-LNB 134c	12/8/93	3:31	306	66	628	132393	155085	286586	223579	9246	10025	88.56	14.00%	
GR-LNB 135	12/9/93	12:00	304	61	624	122705	140171	270912	214665	9242	10040	88.33	14.46%	
GR-LNB 135a	12/9/93	2:59	310	70	635	128403	150762	298901	225977	9249	10051	88.08	13.38%	
GR-LNB 135b	12/9/93	7:10	299	64	614	120972	138699	305484	224404	9577	10531	87.83	12.74%	
GR-LNB 136	12/10/93	11:35	296	61	613	125344	140522	310645	227625	9500	10389	88.06	12.48%	
GR-LNB 137	12/11/93	16:15	297	58	618	119739	131712	286350	216505	9398	10294	87.94	13.27%	
GR-LNB 137a	12/11/93	7:44	298	60	618	134330	153111	318604	233215	9420	10242	88.13	12.56%	
GR-LNB 138	12/12/93	24:00	298	59	620	134660	156753	316683	232940	9436	10253	88.13	12.63%	
GR-LNB 139	12/13/93	7:48	291	47	617	135122	154517	310301	228791	9325	10118	88.48	12.91%	

Cherokee Unit 3, Average Test D
Pre Modification

Test No.	Date	Dur.	AH Gas Out Temp	AH Air In Temp	AH Air Out Temp	Calc Coal Flow lbs/hr	Msd Coal Flow lbs/hr	Calc TAir Flow scfm	Msd TAir Flow scfm	Heat Rate Gross	Heat Rate Net	Boiler Eff %	OFA	Carbon In Ash, %
GR-LNB 139a	12/13/93	4:18	291	47	617	134009	155833	316307	227653	9331	10132	88.39	12.66%	
LNB	12/13/93	5:18	293	53	610	133870	161547	313051	243245	9416	10251	88.31	0.00%	
LNB-OFA	12/14/93	1:55	292	52	614	141974	164709	345848	230943	9439	10291	88.17	14.85%	
GR-LNB 140	12/14/93	1:18	300	63	615	135497	161124	323814	230530	9389	10201	88.19	12.29%	
LNB	12/14/93	8:30	300	55	613	139333	160556	310898	239735	9459	10273	88.44	0.00%	
LNB	12/15/93	9:28	290	40	606	137698	157104	317610	244378	9457	10285	88.42	0.00%	
LNB-OFA	12/15/93	5:29	286	43	607	139287	156081	327352	240166	9466	10318	88.43	8.28%	
GR-LNB 141	12/15/93	5:15	290	43	612	119469	136657	282099	213125	9526	10513	88.07	13.79%	
LNB	12/15/93	2:50	284	40	591	86246	98420	216323	199225	9842	11400	86.96	0.00%	
LNB	12/16/93	15:05	283	37	601	132676	147937	310580	242540	9392	10233	88.40	0.00%	
GR-LNB 142	12/16/93	6:14	284	37	613	135161	161828	330708	236507	9357	10181	88.39	12.17%	
GR-LNB 142a	12/16/93	1:15	290	40	609	94213	107402	238760	179796	9570	10616	87.46	15.67%	
GR-LNB 143	12/17/93	2:10	287	39	605	91390	106748	237891	182796	9509	10553	87.32	15.66%	
LNB-OFA	12/17/93	0:40	296	41	587	55318	58055	173521	121691	10676	13015	85.04	20.70%	
LNB	12/17/93	6:10	286	38	605	136809	162222	314239	243507	9267	10043	88.54	0.00%	
LNB	12/20/93	2:25	289	35	614	121446	121607	291998	233768	9323	10200	87.84	0.00%	
100% Gas Firing	12/20/93	0:34	269	39	579	80058	51	211676	208245	9671	10827	84.48	0.00%	
LNB	12/22/93	2:35	290	44	613	113294	135333	278646	226092	9393	10249	87.67	0.00%	
LNB	1/5/94	2:24	300	68	609	135271	147520	305738	243031	9354	10116	88.29	0.00%	
LNB-OFA	1/5/94	2:26	300	67	614	135407	148526	314930	240631	9404	10213	88.17	3.56%	
LNB-OFA	1/5/94	9:15	295	54	610	119495	131794	277569	218178	9419	10316	88.03	2.08%	
LNB-OFA	1/6/94	8:47	301	49	609	93312	103863	221133	184621	9716	10854	87.32	2.33%	
LNB	1/6/94	15:12	298	43	616	133673	150891	298747	237896	9273	10030	88.34	0.00%	
LNB	1/7/94	6:55	294	30	605	110162	119364	250528	209883	9431	10333	88.03	0.00%	
LNB-OFA	1/7/94	1:09	291	36	613	113386	120699	264088	204185	9342	10249	87.99	11.43%	
GR-LNB 144	1/7/94	15:40	299	53	622	121635	138358	291560	220257	9221	10025	87.86	13.70%	
GR-LNB 145a	1/8/94	8:20	302	51	623	107935	122836	257051	199257	9195	10079	87.61	15.10%	
GR-LNB 145	1/8/94	15:39	304	51	632	125471	146527	288542	220472	9109	9878	88.00	13.88%	
GR-LNB 146a	1/9/94	2:10	297	42	622	120661	140531	271657	213181	8987	9757	88.12	14.69%	
GR-LNB 146b	1/9/94	8:39	305	44	634	98416	111365	234644	189715	9153	10104	87.31	16.20%	
GR-LNB 146	1/9/94	9:02	300	51	627	117435	138971	283261	216733	9162	9983	87.68	14.07%	
LNB	1/9/94	3:35	295	48	608	108271	123120	248750	201739	9544	10548	87.80	0.02%	
LNB	1/10/94	3:50	298	46	621	119039	137666	280676	216822	9286	10127	87.90	0.01%	
GR-LNB 147	1/10/94	2:40	303	54	631	134381	155998	331291	233086	9298	10073	87.96	12.08%	
GR-LNB 147a	1/10/94	4:04	299	53	613	105585	121044	278133	200523	9447	10421	87.29	14.70%	
GR-LNB 147b	1/10/94	4:54	295	47	614	106168	120307	281723	204128	9428	10388	87.35	14.45%	
GR-LNB 148a	1/11/94	6:32	291	42	615	93894	107394	258805	194218	9431	10535	87.00	15.42%	
GR-LNB 148	1/11/94	14:38	298	55	618	130318	143563	322907	234355	9400	10205	87.96	13.59%	
GR-LNB 148b	1/11/94	2:48	295	55	605	108570	112420	270954	203986	9550	10520	87.63	14.72%	
GR-LNB 149a	1/12/94	6:14	294	48	619	114624	122689	286050	216406	9312	10190	87.75	14.11%	

Cherokee Unit 3, Average Test D

Pre Modification

Test No.	Date	Dur.	AH Gas Out Temp	AH Air In Temp	AH Air Out Temp	Calc Coal Flow lbs/hr	Msd Coal Flow lbs/hr	Calc TAir Flow scfm	Msd TAir Flow scfm	Heat Rate Gross	Heat Rate Net	Boiler Eff %	OFA	Carbon In Ash, %
GR-LNB 149	1/12/94	13:30	296	52	619	122024	132348	301048	224520	9317	10155	87.84	13.83%	
GR-LNB A Mill off	1/12/94	1:09	298	53	625	110619	125459	271576	214568	9167	10028	87.63	14.95%	
GR-LNB D Mill off	1/12/94	1:39	295	54	623	111431	124105	267114	211571	9081	9883	87.90	17.75%	
GR-LNB D Mill off line	1/13/94	4:23	296	55	612	90176	96301	219087	181847	9270	10206	87.41	18.15%	
GR-LNB 150	1/13/94	7:15	307	59	632	128758	142794	309661	229501	9196	9974	87.85	14.16%	
GR-LNB D Mill off line	1/13/94	1:13	298	60	625	111747	129950	268350	212931	9013	9815	87.83	17.53%	
GR-LNB 150a	1/13/94	6:00	303	59	624	115289	126753	285904	213233	9351	10241	87.56	14.68%	
GR-LNB 151a	1/14/94	7:25	301	59	610	93341	97495	242118	186662	9590	10693	87.02	16.13%	
GR-LNB, ABC	1/14/94	7:50	296	64	616	110912	122235	268284	212467	9120	9874	87.84	14.91%	
GR-LNB 151	1/14/94	7:54	304	62	626	112463	119481	272095	210589	9214	10079	87.67	14.80%	
GR-LNB 156	1/19/94	24:00	302	63	615	100531	106606	250306	195405	9416	10396	87.41	15.90%	
GR-LNB 157a	1/20/94	6:38	291	38	619	95851	100031	233990	188348	9264	10191	87.70	16.84%	
GR-LNB 157	1/20/94	3:50	294	38	633	119466	127123	286592	217610	9067	9858	88.04	15.64%	

Cheorkee Unit #3, Average Test Data

Post Modification

Test No.	Date	Dur.	CEMS O2 % Dry	Plant O2 % Wet	COc ppm	CO2c %	NOxc ppm	NOx lb/mbtu	SO2c ppm	SO2 lb/mbtu	Reb Gas scfm	South OFA scfm	North OFA scfm	Steam lbs/hr	Mill A	Mill B (0=On)	Mill C	Mill D	Coal Flow lbs/hr
LNB OFA Cooling	8/17/94	3:08	4.04		589	17.03	201	.275			0	1946	6336		0	0	0	0	113427
GR-LNB	8/17/94	1:15	4.33		639	16.54	168	.228			1574	22239	24438		0	0	0	0	105744
Test A (LNB)	8/17/94	0:33	3.68		52	17.04	246	.336			0	0	7424		0	0	0	0	113539
Test B (GR-LNB)	8/17/94	0:40	4.59		189	16.38	172	.233			1790	30369	32143		0	0	0	0	104933
C (LNB)	8/18/94	0:24	3.61		255	17.06	227	.310			0	0	5793		0	0	0	0	113527
D (GR-LNB rear fired)	8/18/94	0:31	4.42		34	16.51	167	.226			1831	31047	32827		0	0	0	0	104654
E (GR-LNB front fired)	8/18/94	0:36	4.36		19	16.47	165	.223			1788	29978	31260		0	0	0	0	104776
F (GR-LNB)	8/18/94	0:36	3.88		93	16.57	160	.216			1779	29906	31271		0	0	0	0	104790
GR-LNB (50k)	8/29/94	0:22	4.51	3.90	97	16.62	199	.268			1920	23585	24752	1109565	0	0	0	0	116311
GR-LNB (<3k)	8/29/94	0:21	3.56	2.75	452	16.69	222	.299			1911	0	1855	1108636	0	0	0	0	115678
GR-LNB (RW)	8/30/94	0:19	4.50	3.96	169	16.44	204	.275			1973	23531	25158	1143000	0	0	0	0	120129
GR-LNB (BW)	8/30/94	0:23	4.27	3.62	43	16.03	200	.268			3760	23339	25188	1145833	0	0	0	0	110898
LNB-OFA 100A	8/31/94	1:00	4.05	3.03	79	16.73	311	.423			0	0	0	1137869	0	0	0	0	128750
LNB-OFA 100D	8/31/94	0:25	4.65	4.26	159	16.61	284	.387			0	14540	15998	1138462	0	0	0	0	129214
LNB-OFA 100E	8/31/94	0:34	4.73	4.25	59	16.53	277	.377			0	21047	22067	1139429	0	0	0	0	129393
LNB-OFA 110A	8/31/94	0:38	4.05	3.58	95	16.62	280	.383			0	9491	11108	1137949	0	0	0	0	128735
LNB-OFA 110B	8/31/94	0:28	3.93	3.44	265	16.63	270	.369			0	10046	10931	1137586	0	0	0	0	128402
LNB	9/1/94	1:39	3.94	2.98	45	16.78	283	.387			0	0	0	1097778	0	0	0	0	124423
GR-LNB 140A	9/1/94	0:30	4.31	3.81	41	16.12	219	.295			2446	24017	24570	1124516	0	0	0	0	115440
GR-LNB 140C	9/1/94	0:30	4.46	3.66	4	16.04	210	.283			2499	29792	29603	1122903	0	0	0	0	115141
GR-LNB 140D	9/1/94	0:30	4.49	3.68	3	15.99	205	.276			2452	32466	32032	1119677	0	0	0	0	114824
LNB (0.5% Gas)	9/1/94	2:18	2.78	2.34	875	16.79	242	.330			139	0	0	1119784	0	0	0	0	125263
Baseline (LNB)	9/2/94	0:30	3.45	2.70	107	16.89	276	.377			0	0	0	1118710	0	0	0	0	125958
GR-LNB 150C	9/2/94	0:30	4.39	3.70	93	16.41	229	.311			1465	23795	23606	1116452	0	0	0	0	119357
GR-LNB 150D	9/2/94	0:37	4.37	3.56	69	16.37	228	.308			1462	24525	24455	1118158	0	0	0	0	119504
LNB	9/7/94	1:56	3.96	3.10	242	16.67	317	.432			0	0	0	1112991	0	0	0	0	126621
GR-LNB 150E	9/7/94	0:30	4.94	3.98	107	15.89	259	.349			2467	28808	29554	1110000	0	0	0	0	114968
GR-LNB 150F	9/7/94	0:30	4.19	3.33	8	16.01	207	.279			2462	29460	30440	1109032	0	0	0	0	114681
RR GR-LNB 150E	9/7/94	0:30	4.07	3.26	11	15.98	203	.273			2467	29357	30403	1110645	0	0	0	0	114508
GR-LNB R.1	9/7/94	0:21	4.19	3.28	52	16.20	217	.293			1500	29403	30206	1110455	0	0	0	0	119425
LNB	9/8/94	0:53	4.31	3.64	61	16.62	333	.454			0	0	0	1108704	0	0	0	0	126047
GR-LNB 150I	9/8/94	0:30	3.97	2.85	30	15.65	207	.278			4004	25140	25899	1108387	0	0	0	0	105990
.5gas,OFAcooling	9/8/94	2:04	3.38	2.58	722	16.53	296	.403			157	0	6747	1095600	0	0	0	0	124006
LNB(OFAcooling)	9/8/94	0:28	3.89	3.18	333	16.51	328	.446			0	0	7283	1100345	0	0	0	0	125401

Cheorkee Unit #3, Average Test Data

Post Modification

Test No.	Date	Dur.	CEMS O2 % Dry	Plant O2 % Wet	COc ppm	CO2c %	NOxc ppm	NOx lb/mbtu	SO2c ppm	SO2 lb/mbtu	Reb Gas scfm	South OFA scfm	North OFA scfm	Steam lbs/hr	Mill A	Mill B	Mill C	Mill D	Coal Flow lbs/hr
															0=On				
LNB	9/9/94	0:45	3.69	3.11	31	16.52	312	.427			0	0	0	1111522	0	0	0	0	126478
GR-LNB.R6%	9/9/94	0:22	4.25	3.58	20	16.05	220	.297			1587	29633	30153	1112174	0	0	0	0	118723
GR-LNB.R8%	9/9/94	0:11	4.32	3.43	7	15.92	210	.284			2077	33072	33443	1110000	0	0	0	0	116001
GR-LNB.R10%	9/9/94	0:18	4.05	3.11	5	15.80	269	.363			2543	33325	33765	1110000	0	0	0	0	114229
GR-LNB.B12%	9/9/94	0:17	3.95	3.03	5	15.70	193	.260			2991	33089	33831	1109444	0	0	0	0	111395
LNB-OFAcooling	9/9/94	0:14	3.75	2.86	12	16.44	343	.469			0	0	9113	1106000	0	0	0	0	126003
LNB	9/21/94	0:55	4.59	3.80	51	16.69	298	.405	348	.664	0	0	0	936478	0	0	0	0	105554
LNB	9/21/94	2:05	4.23	3.13	39	16.81	325	.443	361	.688	0	0	0	1101905	0	0	0	0	123744
LNB	9/21/94	1:45	3.72	2.79	131	16.90	291	.397	362	.691	0	0	0	1110660	0	0	0	0	123926
LNB	9/21/94	2:51	2.63	2.36	890	17.12	227	.309	366	.699	0	0	0	1111628	0	0	0	0	122678
LNB 150	10/3/94	4:13	3.72	3.40	40	16.36	334	.455	346	.660	0	0	0	1275591	0	0	0	0	143436
LNB 150	10/3/94	3:54	3.72	3.41	29	16.49	316	.430	346	.660	0	0	0	1216723	0	0	0	0	137895
LNB	10/3/94	1:48	3.90	3.53	63	16.54	290	.395	346	.661	0	0	0	1125476	0	0	0	0	127252
LNB(on dispatch)	10/4/94	4:10	4.32	3.86	232	16.49	277	.377	347	.661	0	0	0	883894	0	0	0	0	99627
LNB(on dispatch)	10/4/94	6:15	3.88	3.39	31	16.65	325	.443	345	.657	0	0	0	1195284	0	0	0	0	136524
LNB 150	10/4/94	2:22	3.36	2.97	62	16.79	292	.398	350	.668	0	0	0	1265944	0	0	0	0	137516
LNB-OFA	10/4/94	0:10	4.01	3.74	65	16.67	279	.381	349	.667	0	9907	8959	1270000	0	0	0	0	138301
LNB-OFA	10/4/94	0:45	4.43	3.94	51	16.60	257	.350	349	.666	0	25012	23560	1280000	0	0	0	0	138698
GR-LNB (6%)	10/4/94	0:20	3.62	2.79	64	16.34	207	.281	330	.624	1652	28508	26606	1269524	0	0	0	0	130415
GR-LNB (8%)	10/4/94	0:26	3.49	2.82	61	16.28	199	.270	324	.612	2093	29750	27565	1263333	0	0	0	0	128485
GR-LNB (10%)	10/4/94	0:15	3.33	2.45	27	16.19	193	.261	318	.600	2550	30860	28857	1261875	0	0	0	0	126407
GR-LNB (15%)	10/4/94	0:17	3.18	2.29	11	15.90	185	.247	302	.566	3934	33217	31281	1258889	0	0	0	0	119331
LNB	10/5/94	2:36	3.22	2.73	165	16.44	294	.401	352	.670	0	0	84	1240255	0	0	0	0	136998
LNB	10/5/94	0:43	3.97	3.27	15	16.24	346	.472	351	.669	0	0	4364	1242045	0	0	0	0	138464
LNB(pre-test)	10/14/94	3:35	3.37	2.83	323	16.78	291	.396	347	.663	0	0	0	1212449	0	0	0	0	133807
LNB	10/14/94	0:24	3.58	3.08	106	16.69	319	.435	348	.664	0	0	0	1248000	0	0	0	0	137536
GR-LNB 3 Mill	10/14/94	0:20	3.31	3.18	115	16.05	190	.256	313	.591	2527	30179	29822	1128095	0	0	0	1	113675
LNB 4 Mill	10/18/94	0:34	3.75	2.89	149	16.85	305	.416	349	.667	0	0	0	1245429	0	0	0	0	135389
GR-LNB 3 Mill	10/18/94	0:53	4.05	3.60	155	16.11	188	.253	323	.608	2536	30612	29757	1045000	0	0	0	1	104044
GR-LNB 3 Mill	10/18/94	0:24	3.68	3.22	16	15.86	171	.229	301	.563	3932	32130	30732	1079200	0	0	0	1	100564
LNB(pre-test)	10/20/94	2:29	3.30	3.11	189	16.85	296	.403	347	.662	0	0	0	1258933	0	0	0	0	138932
LNB a	10/20/94	1:04	3.60	3.06	146	16.73	306	.416	349	.665	0	0	0	1260154	0	0	0	0	139463
LNB b	10/20/94	0:19	3.73	3.19	72	16.70	317	.432	350	.667	0	0	0	1261000	0	0	0	0	139659
LNB c	10/20/94	0:32	3.73	3.24	67	16.68	319	.435	350	.668	0	0	0	1260000	0	0	0	0	139731

Cheorkee Unit #3, Average Test Data

Post Modification

Test No.	Date	Dur.	CEMS O2 % Dry	Plant O2 % Wet	COc ppm	CO2c %	NOxc ppm	NOx lb/mbtu	SO2c ppm	SO2 lb/mbtu	Reb Gas scfm	South OFA scfm	North OFA scfm	Steam lbs/hr	Mill A	Mill B	Mill C	Mill D	Coal Flow lbs/hr
																0=On			
LNB d	10/20/94	2:42	3.59	3.05	149	16.64	305	.416	351	.670	0	0	0	1230788	0	0	0	0	136352
GR-LNB a	10/20/94	0:26	3.34	2.91	74	16.10	188	.254	319	.602	2514	31422	30815	1210741	0	0	0	0	121720
GR-LNB b	10/20/94	0:20	2.86	2.57	131	16.16	181	.244	320	.604	2518	30143	29804	1209048	0	0	0	0	121704
LNB	10/21/94	2:58	3.60	2.65	130	16.68	307	.418	356	.678	0	0	0	1220670	0	0	0	0	135203
LNB-OFA	10/21/94	0:28	4.33	3.87	65	16.51	232	.317	362	.690	0	30777	30215	1229655	0	0	0	0	135251
GR-LNB #1	10/21/94	0:28	3.10	2.61	64	16.14	190	.257	333	.628	2473	29106	28931	1222759	0	0	0	0	123055
GR-LNB #2	10/21/94	0:10	2.97	2.48	50	16.15	187	.253	332	.628	2477	28877	28530	1220000	0	0	0	0	123114
GR-LNB #3	10/21/94	0:10	2.91	2.58	106	16.16	187	.252	333	.630	2480	28738	28229	1222727	0	0	0	0	123830
GR-LNB #4	10/21/94	0:14	2.81	2.56	117	16.16	188	.254	332	.628	2482	28712	28229	1218667	0	0	0	0	122821
GR-LNB #5	10/21/94	0:13	2.79	2.54	137	16.15	186	.251	333	.629	2483	28729	28229	1220000	0	0	0	0	122754
LNB	10/24/94	5:10	4.13	3.14	239	16.63	289	.395	354	.675	0	0	0	965693	1	0	0	0	109849
LNB	10/25/94	2:54	4.17	2.95	317	16.63	286	.390	353	.674	0	0	0	1002602	1	0	0	0	114028
GR-LNB (50k)	10/25/94	0:19	4.13	3.59	156	15.95	197	.265	318	.599	2451	26303	26315	1026000	1	0	0	0	104257
GR-LNB (60k)	10/25/94	0:12	4.33	3.60	44	15.93	201	.270	318	.599	2449	29667	29599	1026154	1	0	0	0	104355
LNB	10/25/94	0:11	4.39	3.23	228	16.53	298	.400	358	.681	0	0	0	1006459	1	0	0	0	115976
LNB	11/2/94	4:00	3.99	2.60	2	10.17	251	.343	1	.002	0	0	0	1161068	0	0	0	0	0
GR-LNB	11/2/94	1:08	4.00	2.87	71	10.17	202	.274	1	.002	1557	9828	8208	1170870	0	0	0	0	0
GR-LNB	11/2/94	0:14	3.99	2.99	20	10.19	173	.234	1	.002	1560	17624	16793	1178667	0	0	0	0	0
GR-LNB	11/2/94	0:24	4.10	3.11	4	10.18	146	.197	2	.004	1557	24160	23667	1180000	0	0	0	0	0
LNB	11/3/94	1:19	3.94	2.59	8	10.14	162	.222	3	.006	0	0	0	917828	0	0	0	0	0
LNB-OFA(14k)	11/3/94	0:18	2.82	1.87	164	10.15	91	.124	4	.008	0	8439	7141	943652	0	0	0	0	0
LNB-OFA(60k)	11/3/94	0:12	3.31	2.69	274	10.15	58	.079	4	.007	0	29119	28249	940632	0	0	0	0	0
GR-LNB 1	11/3/94	0:14	2.75	1.70	459	10.13	79	.106	1	.003	1134	11749	10156	948571	0	0	0	0	0
GR-LNB 2	11/3/94	0:12	3.61	2.59	223	10.17	87	.119	1	.002	1143	18575	17499	945668	0	0	0	0	0
GR-LNB 3	11/3/94	1:11	3.90	3.11	188	10.13	79	.106	1	.002	2057	27019	25871	938198	0	0	0	0	0
GR-LNB 4	11/3/94	0:24	4.03	3.24	437	10.06	73	.097	3	.005	3103	30818	29842	928934	0	0	0	0	0
GR-LNB 5	11/3/94	0:14	3.80	3.06	373	10.09	73	.097	2	.004	3766	31145	29755	928717	0	0	0	0	0
LNB	11/4/94	1:17	2.84	1.91	21	10.10	208	.283	3	.006	0	0	0	1155641	0	0	0	0	0
LNB-OFA	11/4/94	0:17	2.93	2.29	102	10.13	108	.148	3	.006	0	26329	25340	1156667	0	0	0	0	0
GR-LNB 1	11/4/94	0:23	2.65	1.72	316	10.08	110	.150	2	.004	1159	19561	18184	1174583	0	0	0	0	0
GR-LNB 2	11/4/94	0:12	2.63	1.78	104	10.11	107	.145	1	.003	1964	24835	23485	1183077	0	0	0	0	0
GR-LNB 3	11/4/94	0:20	2.96	2.30	11	10.10	121	.164	2	.003	1145	23282	21708	1160952	0	0	0	0	0
GR-LNB 4	11/4/94	0:14	2.83	2.07	102	10.11	113	.153	1	.003	2059	26534	24796	1175333	0	0	0	0	0
GR-LNB 5	11/4/94	1:39	3.09	2.43	207	10.10	108	.145	2	.003	3770	29173	27298	1159700	0	0	0	0	0

Cheorkee Unit #3, Average Test Data

Post Modification

Test No.	Date	Dur.	CEMS O2 % Dry	Plant O2 % Wet	COc ppm	CO2c %	NOxc ppm	NOx lb/mbtu	SO2c ppm	SO2 lb/mbtu	Reb Gas scfm	South OFA scfm	North OFA scfm	Steam lbs/hr	Mill A	Mill B 0=On	Mill C	Mill D	Coal Flow lbs/hr
LNB	11/7/94	1:43	2.83	1.98	30	10.08	164	.225	3	.005	0	0	0	910874	0	0	0	0	0
GR-LNB	11/7/94	0:24	2.95	2.24	460	9.98	74	.100	3	.007	1142	22705	23423	917025	0	0	0	0	0
GR-LNB	11/7/94	1:35	3.09	2.29	120	10.07	86	.117	2	.004	2004	21657	22539	930763	0	0	0	0	0
LNB (D out)	11/7/94	0:15	3.31	2.31	303	10.01	122	.166	2	.003	125	0	2408	908066	0	0	0	0	0
GR-LNB	11/7/94	0:16	4.59	3.25	1	10.06	98	.134	1	.003	1127	22552	24025	939974	0	0	0	0	0
GR-LNB	11/7/94	0:12	3.98	2.67	80	10.08	82	.110	1	.002	1915	22253	23554	935959	0	0	0	0	0
LNB	11/8/94	1:03	2.69	1.71	85	10.09	147	.201	1	.002	0	0	0	917594	0	0	0	0	0
GR-LNB(varied OFA)	11/8/94	0:33	2.80	1.74	263	10.08	75	.102	1	.002	1434	20196	18670	927040	0	0	0	0	0
GR-LNB(OFA op)	11/8/94	2:55	3.03	2.05	110	10.09	80	.108	1	.002	1414	20546	19077	930000	0	0	0	0	0
GR-LNB(D@80%)	11/8/94	0:40	3.10	2.24	276	10.08	75	.102	0	.001	1472	21108	19077	925250	0	0	0	0	0
LNB 1	11/9/94	0:18	2.85	1.64	12	10.12	150	.205	1	.003	0	0	0	909096	0	0	0	0	0
GR-LNB 1	11/9/94	3:29	3.39	2.80	297	10.06	80	.108	2	.003	1878	21406	18873	949455	0	0	0	0	0
GR-LNB 2	11/9/94	0:39	3.00	2.23	170	10.06	74	.100	1	.002	1774	20218	18298	952800	0	0	0	0	0
GR-LNB 3	11/9/94	0:32	3.18	2.44	12	10.06	108	.145	1	.002	1985	21405	19871	1084528	0	0	0	0	0
GR-LNB 4	11/9/94	5:31	3.25	2.36	32	10.07	126	.170	1	.001	2060	22741	21369	1179970	0	0	0	0	0
GR-LNB 5	11/9/94	0:31	4.01	2.88	52	9.93	100	.136	0	.000	1947	21053	18797	979889	0	0	0	0	0
LNB 2	11/9/94	0:45	4.05	2.58	21	10.08	73	.099	0	.001	207	0	0	727470	0	0	0	0	0
GR-LNB 6	11/9/94	0:15	3.89	3.01	318	10.04	46	.062	1	.001	1103	20306	17627	752259	0	0	0	0	0
GR-LNB 7	11/9/94	0:11	3.33	2.75	399	10.02	43	.057	0	.000	1811	23037	20875	756596	0	0	0	0	0
GR-LNB 8	11/9/94	0:16	4.22	3.40	69	10.08	49	.067	1	.001	1329	19425	16673	746665	0	0	0	0	0
LNB(120)	11/10/94	1:15	4.14	2.99	54	10.09	169	.231	1	.002	0	0	0	922657	0	0	0	0	0
LNB(150)	11/10/94	0:27	3.06	2.13	2	10.16	223	.304	1	.002	0	0	0	1151786	0	0	0	0	0
GR-LNB(43k)	11/10/94	0:48	3.11	2.06	174	10.13	129	.174	1	.001	2030	22647	20473	1160000	0	0	0	0	0
GR-LNB(46k)	11/10/94	1:42	3.06	1.84	161	10.08	118	.159	0	.000	2059	23997	22442	1164175	0	0	0	0	0
GR-LNB(53k)	11/10/94	1:29	3.26	2.26	66	10.07	116	.157	0	.000	2058	27089	25747	1157111	0	0	0	0	0
GR-LNB(61k)	11/10/94	9:45	3.52	2.55	23	10.10	113	.152	0	.000	2073	31630	29746	1160909	0	0	0	0	0
GR-LNB	11/11/94	9:12	3.66	2.65	13	10.09	115	.155	0	.000	2086	31757	29780	1159440	0	0	0	0	0
100% Gas Testing 11/2/94-11/11/94 (SR's calculated with Inner+Outer Total OFA)																			
LNB(coal/gas)	12/1/94	2:41	3.33	2.65	34	14.05	312	.425	246	.468	0	0	0	1280432	gas	0	0	0	140338
Test 21	1/19/95	1:00	3.92	3.21	12	15.87	193	.260	375	.705	2808	30405	29755	1042295	0	0	0	0	105086
Test 22	1/19/95	1:02	3.99	3.50	12	16.09	199	.269	387	.732	1832	30365	30264	1046032	0	0	0	0	110163
Test 24	1/19/95	0:33	5.23	4.69	79	16.45	251	.342	419	.800	0	0	0	755388	0	0	0	0	89094
Test 25	1/19/95	0:30	5.51	5.14	36	16.39	224	.306	414	.790	0	11022	8335	768385	0	0	0	0	90321
Test 27	1/19/95	0:25	5.16	4.72	17	16.50	199	.272	413	.787	0	24346	22096	769978	0	0	0	0	89995

Cheorkee Unit #3, Average Test Data

Post Modification

Test No.	Date	Dur.	CEMS O2 % Dry	Plant O2 % Wet	COc ppm	CO2c %	NOxc ppm	NOx lb/mbtu	SO2c ppm	SO2 lb/mbtu	Reb Gas scfm	South OFA scfm	North OFA scfm	Steam lbs/hr	Mill A	Mill B (0=On)	Mill C	Mill D	Coal Flow lbs/hr
Test 30	1/20/95	1:01	5.36	4.97	16	15.57	187	.253	376	.710	1362	27206	26552	768234	0	0	0	0	82063
Test 31	1/20/95	1:00	5.16	4.94	13	15.06	207	.277	336	.630	2721	29036	28907	761751	0	0	0	0	75428
Test 32	1/20/95	1:05	5.27	5.03	13	15.29	184	.247	342	.643	2027	28990	28992	760789	0	0	0	0	79161
Test 33	1/20/95	0:40	5.19	5.06	16	15.56	171	.232	352	.664	1340	29029	29008	762120	0	0	0	0	82664
Test 1(R)	1/24/95	1:00	4.59	3.73	73	16.49	438	.598	348	.664	0	0	0	1168197	0	0	0	0	131893
Test 16	1/25/95	0:20	3.49	2.80	22	15.85	224	.301	308	.579	2968	31572	29701	1170000	0	0	0	0	116109
Test 17	1/25/95	0:40	3.64	3.11	18	16.07	229	.308	319	.602	1997	31584	29695	1171905	0	0	0	0	121061
Test 40 3 Mill	1/25/95	1:00	3.50	3.26	45	16.09	170	.230	321	.606	1750	23197	23341	1075574	0	0	0	0	109660
Test 41 3 Mill	1/25/95	1:00	4.04	3.74	40	15.47	168	.225	291	.546	3616	31902	32044	1069016	0	0	0	0	101488
Test 42 3 Mill	1/25/95	1:00	4.04	3.75	17	15.66	173	.233	302	.568	2760	31965	32040	1066557	0	0	0	0	106197
Test 43 3 Mill	1/25/95	0:45	4.28	3.96	20	15.86	179	.242	316	.596	1841	31889	31613	1076522	0	0	0	0	110748
Test 2(R2)	1/25/95	0:39	4.78	3.78	86	16.31	391	.533	341	.651	0	0	0	1197000	0	0	0	0	135349
Test 2(R)	1/25/95	0:30	5.18	4.50	49	16.17	386	.527	336	.640	0	0	0	1199677	0	0	0	0	135449
Test 14(R)	1/25/95	0:20	3.16	2.73	38	16.02	194	.262	312	.591	2057	31832	29943	1190476	0	0	0	0	123748
Test 15(R)	1/25/95	0:50	2.98	2.43	40	15.67	178	.239	295	.553	3654	31635	29753	1190980	0	0	0	0	115931
Test 16(R)	1/26/95	0:24	3.49	2.97	39	15.71	186	.250	300	.564	3003	31662	29786	1195600	0	0	0	0	118542
Test 44	1/26/95	0:25	3.10	2.85	27	16.21	200	.270	366	.692	1752	31956	30533	1189615	0	0	0	0	125572
Test 45	1/26/95	0:30	3.16	2.86	26	16.12	193	.261	364	.688	2073	31683	30292	1186774	0	0	0	0	123877
Test 46	1/26/95	0:48	2.92	2.36	23	15.84	185	.248	342	.642	3511	31468	30056	1185102	0	0	0	0	116754
Test 47	1/26/95	0:30	3.09	2.56	21	15.95	192	.259	341	.643	2871	31527	30403	1183548	0	0	0	0	119887
LNB 3 Mill	1/27/95	0:45	4.10	3.78	44	16.38	326	.446	386	.737	0	0	0	902758	0	0	0	1	111133
Test 50	1/27/95	0:42	3.82	3.98	109	15.92	189	.255	376	.712	1630	24128	22117	901697	0	0	0	1	102860
Test 51	1/27/95	0:31	3.83	3.58	62	15.50	171	.230	339	.634	3494	31122	29692	901542	0	0	0	1	93204
Test 52	1/27/95	0:30	3.72	3.52	58	15.83	174	.234	350	.658	2558	31129	29751	901172	0	0	0	1	97741

Cheorkee Unit #3, Average Test Data

Post Modification

Test No.	Date	Dur.	Gas Heat % totl	Coal Stoich	Reburn Stoich	Exit Stoich	Gross Power MWe	Net Power MWe	Msd Tot Air scfm	Steam lbs/hr	Main Steam Temp	RH At flow lbs/hr	SH At flow lbs/hr	Air Htr H A mbtu/hr	Econ H A mbtu/hr	Furn H A mbtu/hr	RH H A mbtu/hr	PSH H A mbtu/hr
LNB OFA Cooling	8/17/94	3:08	0.00	1.196	1.196	1.233	133							162				188
GR-LNB	8/17/94	1:15	7.29	1.120	1.042	1.252	143							164				187
Test A (LNB)	8/17/94	0:33	0.00	1.173	1.173	1.207	148							160				185
Test B (GR-LNB)	8/17/94	0:40	8.25	1.076	0.991	1.271	148							169				189
C (LNB)	8/18/94	0:24	0.00	1.176	1.176	1.202	151							158				184
D (GR-LNB rear fired)	8/18/94	0:31	8.45	1.057	0.971	1.258	150							166				192
E (GR-LNB front fired)	8/18/94	0:36	8.26	1.065	0.981	1.256	144							166				192
F (GR-LNB)	8/18/94	0:36	8.22	1.025	0.944	1.219	154							162				190
GR-LNB (50k)	8/29/94	0:22	8.00	1.155	1.066	1.265	150	138	206870	1109565	1000	0	22093	189	31	651	151	226
GR-LNB (<3k)	8/29/94	0:21	8.02	1.295	1.195	1.203	150	139	214513	1108636	998	0	30894	180	31	643	153	215
GR-LNB (RW)	8/30/94	0:19	7.96	1.159	1.071	1.264	154	142	208067	1143000	999	0	16385	190	30	680	152	225
GR-LNB (BW)	8/30/94	0:23	15.17	1.232	1.052	1.246	154	143	204697	1145833	999	0	22998	189	29	672	156	223
LNB-OFA 100A	8/31/94	1:00	0.00	1.233	1.233	1.233	152	141	220707	1137869	995	0	13381	184	29	681	150	217
LNB-OFA 100D	8/31/94	0:25	0.00	1.153	1.153	1.277	152	140	214397	1138462	995	0	8778	191	30	686	148	225
LNB-OFA 100E	8/31/94	0:34	0.00	1.109	1.109	1.283	152	141	209364	1139429	995	0	12423	194	31	682	150	229
LNB-OFA 110A	8/31/94	0:38	0.00	1.150	1.150	1.233	152	141	208712	1137949	997	0	13284	186	29	681	149	223
LNB-OFA 110B	8/31/94	0:28	0.00	1.139	1.139	1.225	152	141	207282	1137586	995	0	16031	184	30	677	149	220
LNB	9/1/94	1:39	0.00	1.225	1.225	1.225	148	137	209802	1097778	996	0	13216	177	28	662	143	207
GR-LNB 140A	9/1/94	0:30	10.05	1.161	1.049	1.250	151	140	196179	1124516	996	0	15584	187	31	671	151	222
GR-LNB 140C	9/1/94	0:30	10.27	1.128	1.017	1.261	152	140	193262	1122903	996	0	20922	189	31	665	153	222
GR-LNB 140D	9/1/94	0:30	10.13	1.105	0.997	1.263	151	140	190478	1119677	996	0	21940	189	32	660	152	221
LNB (0.5% Gas)	9/1/94	2:18	0.58	1.156	1.149	1.149	150	139	202513	1119784	996	0	22432	169	28	663	148	202
Baseline (LNB)	9/2/94	0:30	0.00	1.191	1.191	1.191	151	140	208861	1118710	995	0	24656	180	30	657	149	211
GR-LNB 150C	9/2/94	0:30	6.08	1.125	1.060	1.257	151	140	199505	1116452	998	0	24405	190	32	654	153	224
GR-LNB 150D	9/2/94	0:37	6.07	1.118	1.052	1.255	151	140	195903	1118158	997	0	22747	190	32	657	152	224
LNB	9/7/94	1:56	0.00	1.227	1.227	1.227	148	137	207057	1112991	986	0	3702	180	31	684	140	208
GR-LNB 150E	9/7/94	0:30	10.17	1.174	1.059	1.296	150	138	197605	1110000	996	0	10780	192	34	668	148	221
GR-LNB 150F	9/7/94	0:30	10.17	1.106	0.998	1.241	149	138	181168	1109032	997	0	9961	185	35	670	146	217
RR GR-LNB 150E	9/7/94	0:30	10.20	1.096	0.989	1.231	150	138	180486	1110645	997	0	12670	183	34	666	147	217
GR-LNB R.1	9/7/94	0:21	6.23	1.063	0.999	1.241	150	138	182526	1110455	996	0	13283	185	35	666	147	217
LNB	9/8/94	0:53	0.00	1.251	1.251	1.251	149	138	217212	1108704	995	0	15209	185	34	662	145	217
GR-LNB 150I	9/8/94	0:30	16.61	1.210	1.016	1.225	150	139	183179	1108387	995	0	19277	183	34	657	149	215
.5gas,OFAcooling	9/8/94	2:04	0.67	1.167	1.160	1.187	147	136	201192	1095600	994	0	10012	173	31	664	141	208
LNB(OFAcooling)	9/8/94	0:28	0.00	1.191	1.191	1.221	149	138	211844	1100345	998	0	16615	181	32	656	145	215

Cheorkee Unit #3, Average Test Data

Post Modification

Test No.	Date	Dur.	Gas Heat % totl	Coal Stoich	Reburn Stoich	Exit Stoich	Gross Power MWe	Net Power MWe	Msd Tot Air scfm	Steam lbs/hr	Main Steam Temp	RH At flow lbs/hr	SH At flow lbs/hr	Air Htr H A mbtu/hr	Econ H A mbtu/hr	Furn H A mbtu/hr	RH H A mbtu/hr	PSH H A mbtu/hr
LNB	9/9/94	0:45	0.00	1.208	1.208	1.208	149	138	206763	1111522	994	0	10390	179	31	673	143	215
GR-LNB.R6%	9/9/94	0:22	6.56	1.070	1.003	1.246	148	137	183982	1112174	988	0	5963	183	31	680	141	221
GR-LNB.R8%	9/9/94	0:11	8.63	1.069	0.981	1.251	148	137	180236	1110000	991	0	8005	184	30	675	142	222
GR-LNB.R10%	9/9/94	0:18	10.44	1.068	0.961	1.232	148	137	174788	1110000	991	0	8113	183	33	676	142	221
GR-LNB.B12%	9/9/94	0:17	12.41	1.082	0.953	1.224	148	137	174196	1109444	995	0	9759	182	32	671	143	221
LNB-OFAcooling	9/9/94	0:14	0.00	1.175	1.175	1.212	149	138	209451	1106000	998	0	12797	180	30	665	145	216
LNB	9/21/94	0:55	0.00	1.273	1.273	1.273	125	115	183089	936478	964	0	5060	152	26	585	118	173
LNB	9/21/94	2:05	0.00	1.246	1.246	1.246	147	137	214675	1101905	984	0	5463	178	30	668	140	219
LNB	9/21/94	1:45	0.00	1.210	1.210	1.210	147	137	207342	1110660	975	0	3294	172	29	680	138	213
LNB	9/21/94	2:51	0.00	1.140	1.140	1.140	147	136	191978	1111628	972	0	2334	160	26	684	134	200
LNB 150	10/3/94	4:13	0.00	1.210	1.210	1.210	163	150	237496	1275591	953	0	3348	197	28	770	197	235
LNB 150	10/3/94	3:54	0.00	1.210	1.210	1.210	157	145	227760	1216723	962	0	3400	191	28	738	188	230
LNB	10/3/94	1:48	0.00	1.223	1.223	1.223	146	134	209101	1125476	950	0	3688	177	27	695	165	206
LNB(on dispatch)	10/4/94	4:10	0.00	1.253	1.253	1.253	116	105	164867	883894	936	0	3938	138	22	565	115	146
LNB(on dispatch)	10/4/94	6:15	0.00	1.221	1.221	1.221	157	145	228378	1195284	977	0	7654	195	29	716	188	238
LNB 150	10/4/94	2:22	0.00	1.185	1.185	1.185	161	149	226319	1265944	952	0	3309	186	28	765	149	225
LNB-OFA	10/4/94	0:10	0.00	1.159	1.159	1.231	162	149	225592	1270000	945	0	3300	191	29	769	154	231
LNB-OFA	10/4/94	0:45	0.00	1.078	1.078	1.261	162	149	221408	1280000	938	0	3292	196	30	773	153	237
GR-LNB (6%)	10/4/94	0:20	6.26	1.057	0.993	1.202	163	151	205631	1269524	967	0	3374	189	29	762	153	243
GR-LNB (8%)	10/4/94	0:26	7.91	1.057	0.977	1.194	164	152	201907	1263333	977	0	4119	189	29	756	155	247
GR-LNB (10%)	10/4/94	0:15	9.62	1.055	0.957	1.183	165	153	198476	1261875	983	0	6377	189	30	751	156	247
GR-LNB (15%)	10/4/94	0:17	14.81	1.082	0.928	1.172	166	154	194541	1258889	988	0	9894	188	31	743	159	249
LNB	10/5/94	2:36	0.00	1.176	1.176	1.176	161	149	225778	1240255	978	0	3850	185	32	744	147	238
LNB	10/5/94	0:43	0.00	1.211	1.211	1.227	163	151	240935	1242045	983	0	7558	198	38	737	152	249
LNB(pre-test)	10/14/94	3:35	0.00	1.186	1.186	1.186	158	146	222914	1212449	968	0	3509	180	27	737	147	223
LNB	10/14/94	0:24	0.00	1.200	1.200	1.200	162	150	235299	1248000	968	0	4504	190	30	752	151	239
GR-LNB 3 Mill	10/14/94	0:20	10.49	1.036	0.932	1.181	150	138	182971	1128095	979	0	6869	168	30	689	141	215
LNB 4 Mill	10/18/94	0:34	0.00	1.213	1.213	1.213	158	146	227831	1245429	941	0	3392	188	29	761	143	224
GR-LNB 3 Mill	10/18/94	0:53	11.39	1.077	0.959	1.232	140	128	171915	1045000	980	0	8189	161	26	642	127	193
GR-LNB 3 Mill	10/18/94	0:24	17.12	1.111	0.928	1.204	144	133	171102	1079200	983	0	9027	164	26	659	131	203
LNB(pre-test)	10/20/94	2:29	0.00	1.181	1.181	1.181	166	154	231179	1258933	985	0	5413	193	29	751	154	248
LNB a	10/20/94	1:04	0.00	1.201	1.201	1.201	166	154	235979	1260154	984	0	6464	196	30	751	156	249
LNB b	10/20/94	0:19	0.00	1.210	1.210	1.210	166	154	237873	1261000	984	0	6512	198	31	750	156	251
LNB c	10/20/94	0:32	0.00	1.211	1.211	1.211	166	154	238339	1260000	984	0	6463	198	31	750	156	251

Cheorkee Unit #3, Average Test Data

Post Modification

Test No.	Date	Dur.	Gas Heat % totl	Coal Stoich	Reburn Stoich	Exit Stoich	Gross Power MWe	Net Power MWe	Msd Tot Air scfm	Steam lbs/hr	Main Steam Temp	RH At flow lbs/hr	SH At flow lbs/hr	Air Htr H A mbtu/hr	Econ H A mbtu/hr	Furn H A mbtu/hr	RH H A mbtu/hr	PSH H A mbtu/hr
LNB d	10/20/94	2:42	0.00	1.202	1.202	1.202	162	150	229319	1230788	978	0	5748	190	30	739	152	240
GR-LNB a	10/20/94	0:26	9.82	1.037	0.939	1.184	161	148	191371	1210741	988	0	9851	185	28	722	152	242
GR-LNB b	10/20/94	0:20	9.84	1.013	0.918	1.153	162	150	186590	1209048	995	0	14859	181	28	714	155	238
LNB	10/21/94	2:58	0.00	1.201	1.201	1.201	161	149	226534	1220670	978	0	3636	186	29	738	150	235
LNB-OFA	10/21/94	0:28	0.00	1.015	1.015	1.253	160	147	204548	1229655	961	0	3476	192	30	745	148	235
GR-LNB #1	10/21/94	0:28	9.58	1.038	0.943	1.168	161	148	186096	1222759	979	0	4096	182	28	739	149	236
GR-LNB #2	10/21/94	0:10	9.59	1.034	0.939	1.161	161	149	186106	1220000	984	0	4683	181	29	735	151	238
GR-LNB #3	10/21/94	0:10	9.55	1.031	0.937	1.156	161	149	183471	1222727	984	0	4405	182	31	739	151	238
GR-LNB #4	10/21/94	0:14	9.63	1.024	0.929	1.151	162	149	187367	1218667	988	0	8369	180	28	729	153	238
GR-LNB #5	10/21/94	0:13	9.64	1.022	0.928	1.149	163	150	187196	1220000	992	0	10014	180	28	724	155	238
LNB	10/24/94	5:10	0.00	1.239	1.239	1.239	132	122	187081	965693	992	0	5244	154	24	602	122	177
LNB	10/25/94	2:54	0.00	1.241	1.241	1.241	137	127	194705	1002602	993	0	7276	158	25	620	130	178
GR-LNB (50k)	10/25/94	0:19	11.03	1.116	0.997	1.236	140	129	172606	1026000	997	0	13237	162	30	623	133	190
GR-LNB (60k)	10/25/94	0:12	11.07	1.090	0.974	1.249	140	129	170699	1026154	992	0	11836	164	30	625	134	192
LNB	10/25/94	0:11	0.00	1.255	1.255	1.255	137	127	198071	1006459	992	0	5216	163	31	629	129	186
LNB	11/2/94	4:00	0.00	1.203	1.203	1.213	159	149	244550	1161068	995	1135	27833	185	29	675	162	228
GR-LNB	11/2/94	1:08	5.18	1.194	1.118	1.214	160	150	234519	1170870	996	1582	23299	187	30	685	163	237
GR-LNB	11/2/94	0:14	5.19	1.105	1.035	1.213	161	150	228330	1178667	992	606	19216	186	29	692	161	239
GR-LNB	11/2/94	0:24	5.18	1.037	0.972	1.221	161	150	222340	1180000	994	0	15788	187	30	697	159	242
LNB	11/3/94	1:19	0.00	1.185	1.185	1.210	127	118	188684	917828	988	0	6352	143	23	577	122	169
LNB-OFA(14k)	11/3/94	0:18	0.00	1.041	1.041	1.141	127	118	164796	943652	951	0	3075	134	22	603	121	162
LNB-OFA(60k)	11/3/94	0:12	0.00	0.795	0.795	1.170	125	116	147078	940632	937	0	3133	135	22	602	117	157
GR-LNB 1	11/3/94	0:14	4.80	1.049	0.988	1.137	125	116	162124	948571	932	0	3055	132	22	609	118	157
GR-LNB 2	11/3/94	0:12	4.83	1.009	0.950	1.189	125	116	164817	945668	935	0	3071	138	23	606	118	161
GR-LNB 3	11/3/94	1:11	8.38	0.962	0.862	1.208	126	116	157334	938198	952	30	2904	141	23	599	119	166
GR-LNB 4	11/3/94	0:24	12.12	0.990	0.835	1.216	126	116	154021	928934	963	0	3119	142	23	592	119	170
GR-LNB 5	11/3/94	0:14	14.34	1.013	0.820	1.201	126	117	153658	928717	974	0	3384	140	22	588	119	173
LNB	11/4/94	1:17	0.00	1.122	1.122	1.143	159	149	225234	1155641	993	2951	30680	177	29	669	163	220
LNB-OFA	11/4/94	0:17	0.00	0.878	0.878	1.148	157	147	194490	1156667	992	0	13697	174	29	689	154	231
GR-LNB 1	11/4/94	0:23	3.91	0.978	0.931	1.131	160	149	199660	1174583	992	0	12841	175	28	700	157	236
GR-LNB 2	11/4/94	0:12	6.45	0.952	0.877	1.130	161	150	195579	1183077	992	0	11849	176	29	705	159	236
GR-LNB 3	11/4/94	0:20	3.86	0.953	0.908	1.149	158	147	196321	1160952	992	0	11869	175	29	694	154	231
GR-LNB 4	11/4/94	0:14	6.74	0.951	0.871	1.142	159	149	193206	1175333	989	0	12390	176	30	702	156	233
GR-LNB 5	11/4/94	1:39	11.68	1.013	0.857	1.157	157	147	190638	1159700	993	0	12858	176	31	692	154	233

Cheorkee Unit #3, Average Test Data

Post Modification

Test No.	Date	Dur.	Gas Heat % totl	Coal Stoich	Reburn Stoich	Exit Stoich	Gross Power MWe	Net Power MWe	Msd Tot Air scfm	Steam lbs/hr	Main Steam Temp	RH At flow lbs/hr	SH At flow lbs/hr	Air Htr H A mbtu/hr	Econ H A mbtu/hr	Furn H A mbtu/hr	RH H A mbtu/hr	PSH H A mbtu/hr
LNB	11/7/94	1:43	0.00	1.118	1.118	1.142	127	118	179555	910874	995	0	7173	132	22	571	123	163
GR-LNB	11/7/94	0:24	4.83	0.893	0.840	1.149	123	114	154152	917025	960	0	3494	127	23	587	116	161
GR-LNB	11/7/94	1:35	8.18	0.961	0.864	1.157	125	116	156641	930763	965	0	3481	131	23	593	119	164
LNB (D out)	11/7/94	0:15	0.55	1.160	1.152	1.172	125	116	192922	908066	992	0	9841	132	26	566	120	164
GR-LNB	11/7/94	0:16	4.67	1.014	0.958	1.255	129	119	174548	939974	983	0	4645	151	29	593	125	181
GR-LNB	11/7/94	0:12	7.69	1.016	0.920	1.213	128	119	165910	935959	984	0	5705	144	29	590	122	175
LNB	11/8/94	1:03	0.00	1.118	1.118	1.134	129	120	181106	917594	995	0	17956	137	23	562	127	164
GR-LNB(varied OFA)	11/8/94	0:33	5.99	0.987	0.916	1.140	128	119	157570	927040	992	0	6189	137	22	581	123	176
GR-LNB(OFA op)	11/8/94	2:55	5.91	1.002	0.930	1.153	128	119	157795	930000	987	0	5048	139	23	586	121	176
GR-LNB(D@80%)	11/8/94	0:40	6.14	1.005	0.930	1.158	128	119	158059	925250	986	0	5549	139	22	583	121	176
LNB 1	11/9/94	0:18	0.00	1.118	1.118	1.143	127	118	180225	909096	996	0	11074	137	23	566	122	168
GR-LNB 1	11/9/94	3:29	7.71	1.025	0.928	1.175	126	117	156626	949455	941	0	2896	135	21	611	119	152
GR-LNB 2	11/9/94	0:39	7.31	0.998	0.909	1.152	127	118	157098	952800	951	0	2958	132	21	610	120	154
GR-LNB 3	11/9/94	0:32	7.28	1.023	0.933	1.162	145	135	191383	1084528	984	0	5152	153	21	668	140	197
GR-LNB 4	11/9/94	5:31	6.80	1.029	0.944	1.167	160	149	208246	1179970	994	0	10578	175	26	709	158	226
GR-LNB 5	11/9/94	0:31	7.69	1.081	0.982	1.218	135	125	168945	979889	973	0	4377	155	27	626	130	179
LNB 2	11/9/94	0:45	1.21	1.219	1.202	1.218	97	89	145192	727470	922	0	3838	106	17	483	94	93
GR-LNB 6	11/9/94	0:15	6.17	0.969	0.900	1.207	97	88	120876	752259	884	0	3833	104	18	504	94	87
GR-LNB 7	11/9/94	0:11	9.67	0.929	0.822	1.172	98	89	117573	756596	893	0	3777	102	17	504	95	89
GR-LNB 8	11/9/94	0:16	7.41	1.023	0.935	1.229	96	87	121405	746665	884	0	3837	106	17	502	93	88
LNB(120)	11/10/94	1:15	0.00	1.176	1.176	1.226	129	119	187741	922657	995	0	14761	149	25	567	129	173
LNB(150)	11/10/94	0:27	0.00	1.148	1.148	1.155	159	148	232371	1151786	996	4589	37422	175	27	659	168	218
GR-LNB(43k)	11/10/94	0:48	6.76	1.022	0.937	1.159	159	148	205471	1160000	994	2418	22600	177	29	682	162	231
GR-LNB(46k)	11/10/94	1:42	6.85	1.024	0.938	1.155	159	149	202503	1164175	994	646	20786	177	28	686	162	232
GR-LNB(53k)	11/10/94	1:29	6.85	1.020	0.946	1.167	158	147	199579	1157111	994	0	18566	177	28	685	158	231
GR-LNB(61k)	11/10/94	9:45	6.89	0.998	0.965	1.183	158	147	197545	1160909	994	0	15637	180	32	689	157	233
GR-LNB	11/11/94	9:12	6.97	1.064	0.973	1.192	158	147	197979	1159440	994	0	15367	181	28	690	157	234
100% Gas Testing 11/2/94-11/11/94 (SR's ca																		
LNB(coal/gas)	12/1/94	2:41	0.00	1.184	1.184	1.184	165	153	238196	1280432	957	0	3607	193	31	774	154	245
Test 21	1/19/95	1:00	12.35	1.086	0.955	1.222	136	124	169881	1042295	996	0	12353	170	31	642	135	203
Test 22	1/19/95	1:02	8.06	1.043	0.961	1.227	137	124	171290	1046032	994	0	9693	171	31	646	134	205
Test 24	1/19/95	0:33	0.00	1.273	1.273	1.324	102	90	153165	755388	998	0	9710	136	24	483	104	144
Test 25	1/19/95	0:30	0.00	1.226	1.226	1.348	103	91	145884	768385	992	0	8719	141	24	493	104	150
Test 27	1/19/95	0:25	0.00	1.031	1.031	1.319	103	91	131427	769978	985	0	7880	138	25	495	102	149

Cheorkee Unit #3, Average Test Data

Post Modification

Test No.	Date	Dur.	Gas Heat % totl	Coal Stoich	Reburn Stoich	Exit Stoich	Gross Power MWe	Net Power MWe	Msd Tot Air scfm	Steam lbs/hr	Main Steam Temp	RH At flow lbs/hr	SH At flow lbs/hr	Air Htr H A mbtu/hr	Econ H A mbtu/hr	Furn H A mbtu/hr	RH H A mbtu/hr	PSH H A mbtu/hr
Test 30	1/20/95	1:01	8.05	1.082	0.997	1.333	99	87	124710	768234	962	0	5317	133	25	502	97	131
Test 31	1/20/95	1:00	15.99	1.135	0.958	1.315	100	88	121190	761751	983	0	5322	133	25	496	97	138
Test 32	1/20/95	1:05	11.90	1.096	0.969	1.324	101	89	123472	760789	989	0	5381	135	24	494	98	141
Test 33	1/20/95	0:40	7.88	1.043	0.963	1.319	101	89	124136	762120	985	0	5392	134	25	495	98	141
Test 1(R)	1/24/95	1:00	0.00	1.266	1.266	1.273	157	144	240133	1168197	976	0	10516	198	34	712	156	235
Test 16	1/25/95	0:20	11.88	1.057	0.935	1.193	154	142	176451	1170000	967	0	4614	179	31	732	144	211
Test 17	1/25/95	0:40	8.00	1.026	0.946	1.204	154	141	178597	1171905	962	0	4625	180	33	734	144	210
Test 40 3 Mill	1/25/95	1:00	7.76	1.055	0.975	1.194	136	124	164640	1075574	917	0	4907	153	28	693	125	168
Test 41 3 Mill	1/25/95	1:00	15.82	1.107	0.936	1.230	138	126	165890	1069016	943	0	4939	162	30	682	129	186
Test 42 3 Mill	1/25/95	1:00	12.05	1.062	0.937	1.231	139	127	169244	1066557	951	0	4944	163	32	680	130	190
Test 43 3 Mill	1/25/95	0:45	8.06	1.039	0.957	1.249	139	127	169884	1076522	932	0	4933	164	31	689	129	184
Test 2(R2)	1/25/95	0:39	0.00	1.282	1.282	1.288	158	145	248560	1197000	975	0	7173	198	36	740	151	232
Test 2(R)	1/25/95	0:30	0.00	1.280	1.280	1.320	158	145	246770	1199677	968	0	6086	203	35	743	151	234
Test 14(R)	1/25/95	0:20	8.07	0.997	0.919	1.172	158	145	183697	1190476	983	0	5424	180	33	740	146	225
Test 15(R)	1/25/95	0:50	14.25	1.055	0.909	1.160	159	146	179149	1190980	988	0	7247	180	33	735	149	227
Test 16(R)	1/26/95	0:24	11.79	1.061	0.940	1.193	157	144	181397	1195600	970	0	4533	182	32	747	141	214
Test 44	1/26/95	0:25	6.85	0.977	0.912	1.168	157	144	184063	1189615	984	0	5671	179	34	738	147	228
Test 45	1/26/95	0:30	8.11	0.996	0.918	1.172	158	145	183731	1186774	988	0	7277	181	34	733	149	229
Test 46	1/26/95	0:48	13.69	1.042	0.903	1.156	159	146	180276	1185102	994	0	10782	180	35	726	153	229
Test 47	1/26/95	0:30	11.21	1.025	0.913	1.167	158	146	183309	1183548	993	0	11016	182	35	725	152	231
LNB 3 Mill	1/27/95	0:45	0.00	1.221	1.221	1.237	134	122	200303	902758	997	0	12606	150	35	632	124	165
Test 50	1/27/95	0:42	7.71	1.063	0.983	1.216	134	122	165722	901697	998	0	17967	146	36	623	126	163
Test 51	1/27/95	0:31	16.51	1.090	0.914	1.215	134	122	156884	901542	998	0	23656	146	35	617	128	156
Test 52	1/27/95	0:30	12.13	1.027	0.906	1.208	134	122	155392	901172	998	0	25146	145	36	614	128	156

Cheorkee Unit #3, Average Test Data

Post Modification

Test No.	Date	Dur.	SSH HA mbtu/hr	Total HA mbtu/hr	Total Heat In mbtu/hr	GrossHV BoilEff %	LowHV BoilEff %	HtLoss BoilEff %	Furn Clean Fact	PSH Clean Fact	SSH Clean Fact	RH Clean Fact	ECON Clean Fact	AirHtr Clean Fact	Ht In Burners mbtu/hr	Ht In GR mbtu/hr	CO raw ppm	CO2 raw %vol	NOx raw ppm
LNB OFA Cooling	8/17/94	3:08	141		1249	87.25	90.74	87.56		1.11	1.08			1.12	1249	0	556	16.05	190
GR-LNB	8/17/94	1:15	141		1256	86.82	90.70	87.11		1.10	1.08			1.13	1165	91	593	15.31	156
Test A (LNB)	8/17/94	0:33	144		1251	87.24	90.73	87.54		1.09	1.10			1.10	1251	0	50	16.39	237
Test B (GR-LNB)	8/17/94	0:40	139		1260	86.60	90.52	86.86		1.12	1.07			1.17	1156	104	173	14.92	157
C (LNB)	8/18/94	0:24	144		1250	87.25	90.75	87.57		1.09	1.11			1.09	1250	0	247	16.48	220
D (GR-LNB rear fired)	8/18/94	0:31	137		1259	86.65	90.59	86.95		1.13	1.05			1.15	1153	106	31	15.20	154
E (GR-LNB front fired	8/18/94	0:36	137		1258	86.71	90.64	86.98		1.13	1.05			1.14	1154	104	18	15.22	152
F (GR-LNB)	8/18/94	0:36	138		1258	86.78	90.71	87.08		1.12	1.06			1.12	1154	103	89	15.75	152
GR-LNB (50k)	8/29/94	0:22	151	1210	1393	86.87	90.79	87.18	1.00	1.16	1.05	0.93	1.22	1.16	1281	111	89	15.21	182
GR-LNB (<3k)	8/29/94	0:21	164	1206	1385	87.06	90.99	87.40	0.99	1.11	1.15	0.94	1.22	1.11	1274	111	439	16.16	215
GR-LNB (RW)	8/30/94	0:19	163	1251	1438	87.00	90.93	87.27	1.01	1.10	1.10	0.90	1.14	1.11	1323	114	155	15.06	187
GR-LNB (BW)	8/30/94	0:23	167	1248	1440	86.68	90.99	86.94	1.00	1.10	1.13	0.93	1.13	1.11	1221	218	40	14.89	186
LNB-OFA 100A	8/31/94	1:00	164	1241	1418	87.53	91.04	87.75	1.02	1.07	1.11	0.89	1.12	1.09	1418	0	75	15.75	292
LNB-OFA 100D	8/31/94	0:25	154	1244	1423	87.39	90.89	87.58	1.02	1.11	1.04	0.88	1.16	1.12	1423	0	145	15.08	258
LNB-OFA 100E	8/31/94	0:34	152	1244	1425	87.29	90.79	87.46	1.01	1.13	1.03	0.89	1.19	1.14	1425	0	53	14.94	250
LNB-OFA 110A	8/31/94	0:38	159	1241	1418	87.51	91.02	87.69	1.02	1.10	1.08	0.89	1.12	1.10	1418	0	89	15.64	264
LNB-OFA 110B	8/31/94	0:28	162	1238	1414	87.54	91.05	87.74	1.01	1.09	1.10	0.89	1.16	1.09	1414	0	252	15.77	256
LNB	9/1/94	1:39	161	1201	1370	87.62	91.14	87.85	1.02	1.06	1.12	0.88	1.13	1.08	1370	0	42	15.90	269
GR-LNB 140A	9/1/94	0:30	156	1231	1414	87.10	91.14	87.29	1.01	1.11	1.07	0.91	1.20	1.12	1272	142	38	14.94	203
GR-LNB 140C	9/1/94	0:30	158	1229	1413	86.98	91.03	87.15	1.00	1.12	1.09	0.93	1.21	1.14	1268	145	4	14.74	193
GR-LNB 140D	9/1/94	0:30	158	1223	1407	86.93	90.97	87.09	1.00	1.12	1.09	0.93	1.25	1.14	1265	142	3	14.65	188
LNB (0.5% Gas)	9/1/94	2:18	178	1219	1388	87.80	91.36	88.05	1.01	1.02	1.23	0.90	1.10	1.02	1380	8	889	17.00	245
Baseline (LNB)	9/2/94	0:30	167	1214	1387	87.51	91.02	87.77	1.00	1.08	1.15	0.91	1.19	1.09	1387	0	107	16.47	269
GR-LNB 150C	9/2/94	0:30	156	1219	1400	87.07	90.90	87.30	1.00	1.14	1.08	0.94	1.26	1.16	1315	85	85	15.13	211
GR-LNB 150D	9/2/94	0:37	155	1219	1401	87.01	90.83	87.23	1.00	1.14	1.07	0.93	1.25	1.15	1316	85	64	15.12	211
LNB	9/7/94	1:56	155	1219	1395	87.38	90.88	87.59	1.03	1.04	1.06	0.84	1.21	1.08	1395	0	229	15.78	300
GR-LNB 150E	9/7/94	0:30	150	1222	1410	86.70	90.73	86.84	1.02	1.12	1.04	0.90	1.35	1.16	1266	143	95	14.18	231
GR-LNB 150F	9/7/94	0:30	153	1221	1406	86.83	90.87	87.00	1.02	1.10	1.06	0.89	1.37	1.12	1263	143	7	14.95	193
RR GR-LNB 150E	9/7/94	0:30	156	1220	1405	86.84	90.88	87.00	1.02	1.10	1.08	0.90	1.35	1.11	1261	143	11	15.02	191
GR-LNB R.1	9/7/94	0:21	155	1220	1403	86.95	90.78	87.12	1.01	1.10	1.08	0.90	1.37	1.12	1315	87	48	15.12	202
LNB	9/8/94	0:53	154	1212	1388	87.30	90.80	87.50	1.01	1.11	1.07	0.89	1.36	1.13	1388	0	56	15.41	309
GR-LNB 150I	9/8/94	0:30	158	1212	1400	86.57	90.96	86.74	1.01	1.10	1.10	0.91	1.34	1.11	1167	233	29	14.80	196
.5gas,OFAcooling	9/8/94	2:04	157	1202	1375	87.40	90.94	87.59	1.02	1.07	1.09	0.87	1.25	1.06	1366	9	710	16.18	289
LNB(OFAcooling)	9/8/94	0:28	156	1204	1381	87.18	90.68	87.35	1.01	1.11	1.09	0.90	1.28	1.11	1381	0	317	15.69	311

Cheorkee Unit #3, Average Test Data

Post Modification

Test No.	Date	Dur.	SSH HA mbtu/hr	Total HA mbtu/hr	Total Heat In mbtu/hr	GrossHV BoilEff %	LowHV BoilEff %	HtLoss BoilEff %	Furn Clean Fact	PSH Clean Fact	SSH Clean Fact	RH Clean Fact	ECON Clean Fact	AirHtr Clean Fact	Ht In Burners mbtu/hr	Ht In GR mbtu/hr	CO raw ppm	CO2 raw %vol	NOx raw ppm
LNB	9/9/94	0:45	155	1218	1393	87.41	90.91	87.57	1.02	1.09	1.07	0.87	1.22	1.08	1393	0	30	15.88	300
GR-LNB.R6%	9/9/94	0:22	144	1218	1399	87.03	90.88	87.16	1.03	1.11	0.99	0.85	1.21	1.10	1308	92	19	14.92	204
GR-LNB.R8%	9/9/94	0:11	146	1215	1398	86.88	90.84	87.00	1.02	1.12	1.00	0.86	1.18	1.11	1278	121	6	14.74	194
GR-LNB.R10%	9/9/94	0:18	148	1220	1405	86.86	90.91	86.96	1.02	1.11	1.01	0.86	1.29	1.10	1258	147	5	14.87	254
GR-LNB.B12%	9/9/94	0:17	149	1215	1401	86.76	90.92	86.86	1.02	1.12	1.03	0.87	1.24	1.10	1227	174	5	14.87	183
LNB-OFAcooling	9/9/94	0:14	155	1211	1388	87.26	90.76	87.40	1.02	1.10	1.08	0.89	1.20	1.10	1388	0	12	15.75	329
LNB	9/21/94	0:55	116	1018	1163	87.51	91.02	87.70	1.04	1.07	0.92	0.84	1.25	1.10	1163	0	46	15.21	272
LNB	9/21/94	2:05	138	1195	1363	87.65	91.17	87.88	1.02	1.12	0.96	0.86	1.19	1.08	1363	0	36	15.65	302
LNB	9/21/94	1:45	141	1200	1365	87.93	91.46	88.18	1.03	1.07	0.97	0.84	1.13	1.03	1365	0	126	16.22	279
LNB	9/21/94	2:51	151	1194	1351	88.40	91.94	88.69	1.04	1.01	1.04	0.82	1.01	0.96	1351	0	909	17.48	231
LNB 150	10/3/94	4:13	162	1392	1580	88.11	91.64	88.21	1.02	1.00	0.98	1.04	0.93	1.02	1580	0	39	15.71	320
LNB 150	10/3/94	3:54	152	1337	1519	88.03	91.55	88.17	1.03	1.04	0.97	1.04	0.98	1.04	1519	0	28	15.83	303
LNB	10/3/94	1:48	141	1232	1402	87.90	91.42	88.05	1.03	1.00	0.95	0.97	1.03	1.04	1402	0	60	15.72	276
LNB(on dispatch)	10/4/94	4:10	114	962	1097	87.58	91.09	87.72	1.05	0.95	0.94	0.85	1.16	1.06	1097	0	215	15.28	256
LNB(on dispatch)	10/4/94	6:15	149	1321	1504	87.81	91.33	88.00	1.02	1.10	0.96	1.07	1.05	1.09	1504	0	30	15.82	309
LNB 150	10/4/94	2:22	167	1335	1515	88.11	91.64	88.33	1.03	0.97	1.02	0.80	0.92	0.97	1515	0	61	16.45	286
LNB-OFA	10/4/94	0:10	159	1341	1523	88.05	91.58	88.24	1.03	0.99	0.97	0.81	0.98	0.99	1523	0	62	15.73	264
LNB-OFA	10/4/94	0:45	150	1344	1528	87.97	91.49	88.14	1.02	1.00	0.91	0.81	0.99	1.01	1528	0	47	15.28	236
GR-LNB (6%)	10/4/94	0:20	161	1347	1533	87.90	91.78	88.09	1.02	1.05	0.99	0.82	0.95	0.99	1437	96	61	15.77	200
GR-LNB (8%)	10/4/94	0:26	163	1350	1537	87.83	91.79	88.02	1.02	1.07	1.00	0.83	0.98	0.99	1415	122	60	15.83	194
GR-LNB (10%)	10/4/94	0:15	168	1352	1540	87.77	91.82	87.95	1.01	1.07	1.03	0.84	1.01	1.00	1392	148	27	15.90	190
GR-LNB (15%)	10/4/94	0:17	169	1351	1543	87.54	91.87	87.72	1.01	1.09	1.05	0.86	1.04	1.00	1314	229	11	15.74	183
LNB	10/5/94	2:36	165	1326	1509	87.88	91.40	88.01	1.02	1.05	1.03	0.80	1.11	0.99	1509	0	163	16.23	290
LNB	10/5/94	0:43	159	1335	1525	87.54	91.05	87.62	1.01	1.10	1.00	0.83	1.31	1.06	1525	0	14	15.36	327
LNB(pre-test)	10/14/94	3:35	163	1298	1474	88.04	91.57	88.26	1.03	1.01	1.04	0.82	0.96	0.99	1474	0	317	16.43	285
LNB	10/14/94	0:24	160	1332	1515	87.92	91.44	88.12	1.02	1.05	0.99	0.82	1.01	1.01	1515	0	102	16.15	309
GR-LNB 3 Mill	10/14/94	0:20	152	1227	1399	87.70	91.80	87.86	1.03	1.06	1.03	0.84	1.16	0.99	1252	147	113	15.77	187
LNB 4 Mill	10/18/94	0:34	155	1311	1491	87.93	91.46	88.18	1.03	0.98	0.96	0.77	0.96	1.00	1491	0	143	16.14	293
GR-LNB 3 Mill	10/18/94	0:53	145	1132	1293	87.54	91.68	87.73	1.03	1.05	1.05	0.82	1.08	1.04	1146	147	147	15.16	177
GR-LNB 3 Mill	10/18/94	0:24	149	1168	1337	87.41	91.86	87.61	1.03	1.06	1.05	0.82	1.05	1.02	1108	229	16	15.26	165
LNB(pre-test)	10/20/94	2:29	167	1349	1530	88.19	91.72	88.42	1.02	1.08	1.03	0.83	0.99	1.02	1530	0	186	16.57	291
LNB a	10/20/94	1:04	166	1352	1536	87.99	91.52	88.20	1.01	1.08	1.02	0.84	1.02	1.04	1536	0	141	16.17	295
LNB b	10/20/94	0:19	165	1353	1538	87.93	91.45	88.13	1.01	1.09	1.02	0.84	1.03	1.04	1538	0	69	16.01	304
LNB c	10/20/94	0:32	164	1353	1539	87.90	91.42	88.10	1.01	1.09	1.01	0.84	1.04	1.04	1539	0	65	16.00	306

Cheorkee Unit #3, Average Test Data

Post Modification

Test No.	Date	Dur.	SSH HA mbtu/hr	Total HA mbtu/hr	Total Heat In mbtu/hr	GrossHV BoilEff %	LowHV BoilEff %	HtLoss BoilEff %	Furn Clean Fact	PSH Clean Fact	SSH Clean Fact	RH Clean Fact	ECON Clean Fact	AirHtr Clean Fact	Ht In Burners mbtu/hr	Ht In GR mbtu/hr	CO raw ppm	CO2 raw %vol	NOx raw ppm
LNB d	10/20/94	2:42	161	1321	1502	87.92	91.45	88.11	1.02	1.07	1.01	0.83	1.03	1.03	1502	0	145	16.09	295
GR-LNB a	10/20/94	0:26	159	1303	1487	87.61	91.67	87.78	1.01	1.10	1.02	0.85	1.00	1.02	1341	146	72	15.79	184
GR-LNB b	10/20/94	0:20	170	1304	1487	87.68	91.74	87.87	1.01	1.09	1.09	0.87	1.00	1.01	1341	146	132	16.28	182
LNB	10/21/94	2:58	162	1313	1489	88.15	91.68	88.33	1.02	1.05	1.03	0.83	0.99	1.01	1489	0	126	16.12	297
LNB-OFA	10/21/94	0:28	152	1309	1490	87.88	91.41	88.03	1.02	1.05	0.95	0.81	1.02	1.04	1490	0	61	15.28	215
GR-LNB #1	10/21/94	0:28	162	1315	1499	87.72	91.77	87.90	1.02	1.06	1.02	0.82	0.98	0.98	1355	144	64	16.05	189
GR-LNB #2	10/21/94	0:10	163	1316	1500	87.73	91.78	87.91	1.02	1.07	1.03	0.83	1.01	0.99	1356	144	50	16.18	187
GR-LNB #3	10/21/94	0:10	165	1323	1508	87.75	91.80	87.93	1.02	1.06	1.04	0.83	1.07	0.98	1364	144	107	16.24	188
GR-LNB #4	10/21/94	0:14	166	1314	1497	87.78	91.83	87.96	1.02	1.08	1.06	0.85	0.98	0.98	1353	144	119	16.33	190
GR-LNB #5	10/21/94	0:13	168	1313	1496	87.77	91.82	87.95	1.01	1.08	1.08	0.86	0.98	0.99	1352	144	138	16.34	189
LNB	10/24/94	5:10	139	1064	1210	87.92	91.45	88.10	1.03	1.05	1.07	0.84	1.13	1.07	1210	0	224	15.58	271
LNB	10/25/94	2:54	152	1105	1256	87.97	91.49	88.14	1.03	1.01	1.14	0.87	1.09	1.06	1256	0	297	15.54	268
GR-LNB (50k)	10/25/94	0:19	153	1129	1291	87.51	91.63	87.65	1.02	1.06	1.13	0.88	1.30	1.07	1148	142	146	14.94	185
GR-LNB (60k)	10/25/94	0:12	148	1130	1292	87.43	91.54	87.57	1.02	1.07	1.09	0.88	1.31	1.08	1149	143	41	14.75	186
LNB	10/25/94	0:11	147	1122	1277	87.82	91.34	87.98	1.03	1.04	1.09	0.85	1.35	1.08	1277	0	211	15.25	275
LNB	11/2/94	4:00	167	1260	1428	88.26	91.79	85.79	1.00	1.11	1.12	0.95	1.10	1.08	1428	0	2	9.61	237
GR-LNB	11/2/94	1:08	161	1276	1448	88.07	91.95	85.78	1.00	1.14	1.07	0.95	1.10	1.08	1358	90	67	9.60	191
GR-LNB	11/2/94	0:14	158	1279	1451	88.12	92.00	85.85	1.00	1.14	1.04	0.93	1.07	1.07	1360	91	19	9.62	163
GR-LNB	11/2/94	0:24	156	1283	1457	88.10	91.98	85.82	1.01	1.14	1.02	0.92	1.10	1.07	1366	90	4	9.56	137
LNB	11/3/94	1:19	128	1018	1149	88.58	92.13	86.42	1.04	1.07	1.03	0.89	1.12	1.05	1149	0	8	9.61	154
LNB-OFA(14k)	11/3/94	0:18	125	1032	1159	89.04	92.60	87.11	1.05	0.98	0.98	0.85	1.05	0.95	1159	0	166	10.26	92
LNB-OFA(60k)	11/3/94	0:12	119	1019	1144	89.01	92.58	87.07	1.05	0.96	0.94	0.83	1.04	0.96	1144	0	269	9.97	57
GR-LNB 1	11/3/94	0:14	121	1028	1156	88.87	92.75	87.08	1.05	0.94	0.94	0.83	1.05	0.92	1091	65	466	10.27	80
GR-LNB 2	11/3/94	0:12	118	1025	1156	88.70	92.57	86.83	1.05	0.97	0.92	0.83	1.08	0.97	1090	66	215	9.82	85
GR-LNB 3	11/3/94	1:11	118	1025	1160	88.38	92.50	86.51	1.05	1.02	0.93	0.84	1.10	1.00	1041	119	178	9.62	75
GR-LNB 4	11/3/94	0:24	118	1023	1161	88.09	92.49	86.29	1.05	1.05	0.94	0.85	1.12	1.02	981	180	413	9.48	68
GR-LNB 5	11/3/94	0:14	120	1022	1162	87.98	92.56	86.27	1.04	1.08	0.96	0.86	1.07	1.02	943	219	356	9.64	70
LNB	11/4/94	1:17	173	1254	1415	88.61	92.16	86.30	0.99	1.08	1.17	0.97	1.09	1.04	1415	0	22	10.18	209
LNB-OFA	11/4/94	0:17	154	1257	1416	88.74	92.30	86.52	1.01	1.12	1.03	0.91	1.09	1.02	1416	0	102	10.17	108
GR-LNB 1	11/4/94	0:23	159	1280	1444	88.65	92.46	86.54	1.01	1.12	1.04	0.91	1.05	1.00	1377	67	323	10.28	113
GR-LNB 2	11/4/94	0:12	162	1290	1458	88.52	92.51	86.48	1.01	1.11	1.06	0.91	1.05	1.00	1344	114	106	10.32	109
GR-LNB 3	11/4/94	0:20	156	1264	1428	88.56	92.37	86.41	1.02	1.11	1.04	0.90	1.09	1.01	1361	66	11	10.13	121
GR-LNB 4	11/4/94	0:14	159	1280	1447	88.46	92.46	86.40	1.01	1.10	1.05	0.90	1.09	1.00	1330	117	104	10.20	114
GR-LNB 5	11/4/94	1:39	155	1264	1435	88.06	92.44	86.12	1.01	1.12	1.03	0.90	1.15	1.02	1216	219	206	10.04	107

Cheorkee Unit #3, Average Test Data

Post Modification

Test No.	Date	Dur.	SSH H A mbtu/hr	Total H A mbtu/hr	Total Heat In mbtu/hr	GrossHV BoilEff %	LowHV BoilEff %	HtLoss BoilEff %	Furn Clean Fact	PSH Clean Fact	SSH Clean Fact	RH Clean Fact	ECON Clean Fact	AirHtr Clean Fact	Ht In Burners mbtu/hr	Ht In GR mbtu/hr	CO raw ppm	CO2 raw %vol	NOx raw ppm
LNB	11/7/94	1:43	137	1016	1147	88.56	92.11	86.38	1.04	1.04	1.11	0.90	1.12	0.98	1147	0	31	10.16	174
GR-LNB	11/7/94	0:24	120	1008	1141	88.33	92.19	86.24	1.05	1.01	0.97	0.84	1.14	0.93	1074	66	462	10.01	74
GR-LNB	11/7/94	1:35	125	1025	1164	88.09	92.18	86.08	1.05	1.02	0.99	0.85	1.12	0.94	1048	116	121	10.02	86
LNB (D out)	11/7/94	0:15	132	1009	1142	88.35	91.93	86.08	1.03	1.06	1.08	0.89	1.33	0.99	1135	7	305	9.83	119
GR-LNB	11/7/94	0:16	124	1052	1198	87.81	91.63	85.42	1.04	1.10	0.97	0.88	1.38	1.07	1132	65	1	9.17	89
GR-LNB	11/7/94	0:12	128	1045	1191	87.79	91.83	85.60	1.04	1.08	1.01	0.87	1.39	1.03	1079	111	76	9.53	77
LNB	11/8/94	1:03	142	1018	1147	88.69	92.25	86.60	1.02	1.05	1.16	0.93	1.15	1.01	1147	0	87	10.27	150
GR-LNB(varied OFA)	11/8/94	0:33	127	1029	1162	88.53	92.48	86.62	1.04	1.10	1.02	0.88	1.08	1.00	1079	83	266	10.19	76
GR-LNB(OFA op)	11/8/94	2:55	126	1032	1165	88.56	92.51	86.66	1.04	1.09	1.00	0.87	1.10	1.00	1083	82	109	10.07	80
GR-LNB(D@80%)	11/8/94	0:40	124	1026	1158	88.59	92.55	86.71	1.04	1.10	0.99	0.87	1.08	1.01	1073	85	275	10.02	75
LNB 1	11/9/94	0:18	132	1012	1139	88.81	92.37	86.79	1.03	1.09	1.08	0.90	1.15	1.02	1139	0	12	10.21	152
GR-LNB 1	11/9/94	3:29	130	1032	1166	88.58	92.65	86.74	1.06	0.91	1.01	0.63	0.98	0.95	1057	109	291	9.84	79
GR-LNB 2	11/9/94	0:39	134	1039	1172	88.62	92.66	86.78	1.05	0.92	1.04	0.84	1.00	0.93	1070	103	171	10.06	74
GR-LNB 3	11/9/94	0:32	153	1179	1330	88.64	92.67	86.70	1.04	1.03	1.08	0.87	0.84	0.95	1215	115	12	9.96	107
GR-LNB 4	11/9/94	5:31	171	1289	1456	88.56	92.57	86.51	1.02	1.06	1.12	0.91	0.94	0.99	1336	120	32	9.93	124
GR-LNB 5	11/9/94	0:31	141	1103	1248	88.32	92.36	86.19	1.04	1.01	1.05	0.87	1.19	1.03	1135	113	53	9.35	94
LNB 2	11/9/94	0:45	111	799	899	88.84	92.47	86.96	1.06	0.79	1.07	0.85	1.10	0.99	887	12	20	9.48	68
GR-LNB 6	11/9/94	0:15	109	811	914	88.80	92.75	87.10	1.06	0.69	1.02	0.82	1.11	0.93	850	64	303	9.54	44
GR-LNB 7	11/9/94	0:11	112	816	920	88.74	92.94	87.16	1.06	0.71	1.04	0.82	1.05	0.90	815	105	392	9.84	42
GR-LNB 8	11/9/94	0:16	106	806	909	88.68	92.71	86.97	1.06	0.71	1.00	0.81	1.08	0.95	832	77	64	9.39	46
LNB(120)	11/10/94	1:15	132	1026	1160	88.44	91.99	86.19	1.02	1.10	1.07	0.94	1.22	1.10	1160	0	55	9.45	157
LNB(150)	11/10/94	0:27	179	1250	1409	88.70	92.26	86.48	0.99	1.08	1.21	1.00	1.06	1.04	1409	0	2	10.13	222
GR-LNB(43k)	11/10/94	0:48	162	1266	1433	88.35	92.34	86.27	1.00	1.12	1.08	0.95	1.07	1.03	1316	117	174	10.07	128
GR-LNB(46k)	11/10/94	1:42	163	1271	1440	88.25	92.25	86.10	1.00	1.12	1.08	0.94	1.06	1.02	1321	120	160	10.05	118
GR-LNB(53k)	11/10/94	1:29	160	1262	1431	88.20	92.20	86.01	1.01	1.12	1.07	0.93	1.06	1.03	1312	120	65	9.92	115
GR-LNB(61k)	11/10/94	9:45	158	1269	1438	88.24	92.25	86.09	1.01	1.12	1.05	0.92	1.20	1.04	1318	120	22	9.80	110
GR-LNB	11/11/94	9:12	156	1264	1433	88.23	92.24	86.07	1.01	1.13	1.04	0.92	1.04	1.05	1312	121	12	9.72	111
100% Gas Testing 11/2/94-11/11/94 (SR's c																			
LNB(coal/gas)	12/1/94	2:41	157	1361	1546	88.07	91.60	87.43	1.03	1.04	0.95	0.81	1.01	1.00	1546	0	33	13.79	306
Test 21	1/19/95	1:00	146	1156	1321	87.56	91.76	87.70	1.04	1.11	1.06	0.88	1.32	1.10	1157	163	11	15.06	183
Test 22	1/19/95	1:02	141	1158	1320	87.74	91.71	87.88	1.04	1.12	1.03	0.87	1.32	1.10	1213	106	11	15.20	188
Test 24	1/19/95	0:33	104	859	981	87.56	91.07	87.68	1.04	1.17	0.99	0.92	1.56	1.24	981	0	69	14.40	220
Test 25	1/19/95	0:30	100	871	995	87.50	91.01	87.61	1.04	1.19	0.94	0.90	1.50	1.26	995	0	31	14.09	192
Test 27	1/19/95	0:25	98	869	991	87.65	91.17	87.79	1.04	1.18	0.92	0.88	1.52	1.23	991	0	15	14.51	175

Cheorkee Unit #3, Average Test Data

Post Modification

Test No.	Date	Dur.	SSH H A mbtu/hr	Total H A mbtu/hr	Total Heat In mbtu/hr	GrossHV BoilEff %	LowHV BoilEff %	HtLoss BoilEff %	Furn Clean Fact	PSH Clean Fact	SSH Clean Fact	RH Clean Fact	ECON Clean Fact	AirHtr Clean Fact	Ht In Burners mbtu/hr	Ht In GR mbtu/hr	CO raw ppm	CO2 raw %vol	NOx raw ppm
Test 30	1/20/95	1:01	104	859	983	87.37	91.32	87.37	1.05	1.04	0.97	0.83	1.56	1.18	904	79	14	13.51	162
Test 31	1/20/95	1:00	105	860	989	86.95	91.32	86.92	1.05	1.10	0.98	0.84	1.55	1.19	831	158	11	13.24	182
Test 32	1/20/95	1:05	104	861	990	87.03	91.17	87.00	1.05	1.13	0.97	0.86	1.52	1.21	872	118	11	13.36	160
Test 33	1/20/95	0:40	103	862	988	87.22	91.15	87.20	1.05	1.13	0.97	0.85	1.58	1.20	911	78	14	13.66	150
Test 1(R)	1/24/95	1:00	140	1276	1453	87.86	91.38	88.00	1.05	1.14	0.94	0.92	1.28	1.15	1453	0	67	15.02	399
Test 16	1/25/95	0:20	158	1276	1451	87.94	92.13	88.06	1.06	1.01	1.05	0.84	1.15	1.02	1279	172	21	15.42	218
Test 17	1/25/95	0:40	156	1276	1449	88.06	92.03	88.18	1.07	1.00	1.03	0.83	1.20	1.03	1333	116	18	15.49	220
Test 40 3 Mill	1/25/95	1:00	139	1153	1309	88.06	92.02	88.18	1.08	0.88	0.98	0.78	1.12	0.95	1208	102	44	15.63	166
Test 41 3 Mill	1/25/95	1:00	134	1162	1328	87.49	91.88	87.57	1.07	0.98	0.96	0.81	1.24	1.02	1118	210	38	14.57	158
Test 42 3 Mill	1/25/95	1:00	135	1166	1330	87.70	91.89	87.78	1.07	1.01	0.96	0.82	1.30	1.02	1170	160	16	14.75	163
Test 43 3 Mill	1/25/95	0:45	133	1166	1327	87.90	91.87	87.97	1.07	0.96	0.94	0.81	1.27	1.02	1220	107	18	14.73	166
Test 2(R2)	1/25/95	0:39	152	1312	1491	87.99	91.51	88.08	1.06	1.08	0.99	0.86	1.30	1.11	1491	0	77	14.69	352
Test 2(R)	1/25/95	0:30	146	1310	1492	87.79	91.31	87.84	1.06	1.09	0.95	0.86	1.27	1.14	1492	0	43	14.21	339
Test 14(R)	1/25/95	0:20	162	1307	1483	88.14	92.12	88.25	1.06	1.05	1.06	0.84	1.21	1.02	1363	120	37	15.87	192
Test 15(R)	1/25/95	0:50	164	1309	1489	87.87	92.19	87.98	1.06	1.07	1.08	0.86	1.21	1.02	1277	212	40	15.68	178
Test 16(R)	1/26/95	0:24	166	1300	1480	87.85	92.03	87.94	1.07	1.00	1.08	0.80	1.15	1.02	1306	174	38	15.28	181
Test 44	1/26/95	0:25	159	1307	1485	87.99	91.90	88.14	1.06	1.07	1.04	0.84	1.25	1.01	1383	102	27	16.12	199
Test 45	1/26/95	0:30	161	1306	1485	87.94	91.92	88.08	1.06	1.08	1.06	0.86	1.24	1.03	1364	120	26	15.98	191
Test 46	1/26/95	0:48	165	1307	1490	87.75	92.03	87.89	1.05	1.09	1.09	0.88	1.28	1.03	1286	204	24	15.91	185
Test 47	1/26/95	0:30	163	1306	1487	87.83	91.97	87.97	1.05	1.10	1.08	0.88	1.30	1.04	1320	167	21	15.88	191
LNB 3 Mill	1/27/95	0:45	124	1080	1224	88.20	91.74	88.30	1.21	1.14	1.06	0.96	1.89	1.18	1224	0	42	15.37	306
Test 50	1/27/95	0:42	130	1078	1228	87.83	91.77	87.91	1.20	1.13	1.11	0.98	1.96	1.16	1133	95	104	15.19	180
Test 51	1/27/95	0:31	140	1075	1230	87.47	91.89	87.56	1.19	1.09	1.20	1.00	1.92	1.16	1027	203	59	14.79	163
Test 52	1/27/95	0:30	140	1074	1225	87.67	91.86	87.79	1.18	1.09	1.21	1.00	1.93	1.16	1077	149	56	15.20	167

Cheorkee Unit #3, Average Test Data

Post Modification

Test No.	Date	Dur.	SO2 raw ppm	Econ In H2O DegF	Econ Wall Out DegF	Cold RH Flow lbs/hr	Hot RH DegF	SH AttmpO DegF	Rel Humd %	Amb Press ", HgA	Amb Temp Deg F	NG Temp Def F	Coal Temp Deg F	Econ H2O Prs PSIG	Econ H2O Fl lbs/hr	Drum Press PSIG	PSH Out PSIG	Steam To Turb PSIG
LNB OFA Cooling	8/17/94	3:08						780										
GR-LNB	8/17/94	1:15						779										
Test A (LNB)	8/17/94	0:33						776										
Test B (GR-LNB)	8/17/94	0:40						782										
C (LNB)	8/18/94	0:24						776										
D (GR-LNB rear fired)	8/18/94	0:31						785										
E (GR-LNB front fired)	8/18/94	0:36						785										
F (GR-LNB)	8/18/94	0:36						783										
GR-LNB (50k)	8/29/94	0:22		499	523	811700	999	790	50.5	14.3	88	80	80	2014	1042174	1943	1883	1824
GR-LNB (<3k)	8/29/94	0:21		499	523	813789	1003	772	50.5	14.3	88	80	80	2011	1028636	1941	1881	1822
GR-LNB (RW)	8/30/94	0:19		501	523	833448	996	783	50.5	14.3	87	80	80	2026	1091000	1953	1889	1825
GR-LNB (BW)	8/30/94	0:23		502	524	835391	1005	777	50.5	14.3	87	80	80	2025	1078750	1953	1889	1825
LNB-OFA 100A	8/31/94	1:00		499	521	826044	989	777	50.5	14.3	76	80	80	2020	1085574	1947	1885	1822
LNB-OFA 100D	8/31/94	0:25		499	521	826614	983	790	50.5	14.3	78	80	80	2022	1095769	1949	1886	1823
LNB-OFA 100E	8/31/94	0:34		500	523	829383	987	791	50.5	14.3	79	80	80	2024	1092286	1951	1888	1824
LNB-OFA 110A	8/31/94	0:38		500	522	828107	987	784	50.5	14.3	79	80	80	2022	1087692	1949	1886	1823
LNB-OFA 110B	8/31/94	0:28		500	522	828981	986	779	50.5	14.3	78	80	80	2021	1082069	1948	1885	1822
LNB	9/1/94	1:39		495	518	799327	980	775	50.5	14.3	69	80	80	2010	1047497	1938	1880	1823
GR-LNB 140A	9/1/94	0:30		498	521	817103	995	785	50.5	14.3	72	80	80	2020	1070645	1947	1887	1826
GR-LNB 140C	9/1/94	0:30		499	523	820045	998	782	50.5	14.3	76	80	80	2021	1062581	1949	1888	1828
GR-LNB 140D	9/1/94	0:30		498	522	818605	997	781	50.5	14.3	77	80	80	2018	1055161	1946	1886	1826
LNB (0.5% Gas)	9/1/94	2:18		498	520	819750	987	759	50.5	14.3	78	80	80	2017	1054892	1945	1885	1826
Baseline (LNB)	9/2/94	0:30		498	521	813779	990	769	50.5	14.3	72	80	80	2015	1048065	1943	1884	1825
GR-LNB 150C	9/2/94	0:30		498	523	813081	1002	784	50.5	14.3	73	80	80	2016	1047097	1944	1885	1826
GR-LNB 150D	9/2/94	0:37		498	523	814670	999	784	50.5	14.3	77	80	80	2017	1050526	1945	1886	1827
LNB	9/7/94	1:56		494	518	808973	959	778	50.5	14.3	82	80	80	2015	1083419	1941	1882	1823
GR-LNB 150E	9/7/94	0:30		495	522	808325	990	790	50.5	14.3	86	80	80	2016	1066129	1943	1884	1825
GR-LNB 150F	9/7/94	0:30		494	520	808605	984	786	50.5	14.3	90	80	80	2014	1066452	1940	1882	1822
RR GR-LNB 150E	9/7/94	0:30		494	521	809922	987	784	50.5	14.3	91	80	80	2015	1060968	1941	1883	1823
GR-LNB R.1	9/7/94	0:21		494	521	810580	987	783	50.5	14.3	92	80	80	2014	1060909	1941	1882	1822
LNB	9/8/94	0:53		494	521	803494	984	784	50.5	14.3	78	80	80	2009	1053148	1937	1878	1820
GR-LNB 150I	9/8/94	0:30		495	522	808899	990	779	50.5	14.3	89	80	80	2012	1047419	1940	1882	1823
.5gas,OFAcooling	9/8/94	2:04		494	519	801171	972	778	50.5	14.3	93	80	80	2011	1053167	1938	1881	1823
LNB(OFAcooling)	9/8/94	0:28		496	521	806122	985	782	50.5	14.3	95	80	80	2012	1045172	1939	1881	1823

Cheorkee Unit #3, Average Test Data

Post Modification

Test No.	Date	Dur.	SO2 raw ppm	Econ In H2O DegF	Econ Wall Out DegF	Cold RH Flow lbs/hr	Hot RH DegF	SH AttmpO DegF	Rel Humd %	Amb Press ", HgA	Amb Temp Deg F	NG Temp Def F	Coal Temp Deg F	Econ H2O Prs PSIG	Econ H2O Fl lbs/hr	Drum Press PSIG	PSH Out PSIG	Steam To Turb PSIG
LNB	9/9/94	0:45		495	519	806305	975	783	50.5	14.3	85	80	80	2015	1067609	1943	1883	1824
GR-LNB.R6%	9/9/94	0:22		495	519	809019	964	792	50.5	14.3	89	80	80	2018	1079130	1945	1886	1826
GR-LNB.R8%	9/9/94	0:11		496	519	808955	969	792	50.5	14.3	91	80	80	2017	1072500	1944	1884	1825
GR-LNB.R10%	9/9/94	0:18		494	519	808419	971	790	50.5	14.3	92	80	80	2018	1073077	1944	1885	1825
GR-LNB.B12%	9/9/94	0:17		496	520	807355	976	790	50.5	14.3	94	80	80	2014	1064444	1942	1882	1823
LNB-OFAcooling	9/9/94	0:14		496	520	806524	983	784	50.5	14.3	96	80	80	2011	1055333	1939	1879	1820
LNB	9/21/94	0:55	318	479	503	705244	910	777	50.5	14.3	70	80	80	1954	897281	1888	1849	1808
LNB	9/21/94	2:05	336	496	520	821270	953	794	50.5	14.3	72	80	80	2008	1060714	1936	1877	1818
LNB	9/21/94	1:45	348	496	518	828132	938	785	50.5	14.3	66	80	80	2013	1076218	1940	1881	1822
LNB	9/21/94	2:51	374	496	516	827793	926	771	50.5	14.3	55	80	80	2012	1077791	1938	1880	1823
LNB 150	10/3/94	4:13	332	509	527	941684	931	773	50.5	14.3	67	80	80	2071	1247992	1989	1910	1831
LNB 150	10/3/94	3:54	332	505	524	901863	932	779	50.5	14.3	67	80	80	2051	1188340	1972	1900	1828
LNB	10/3/94	1:48	329	496	517	838070	911	770	50.5	14.3	66	80	80	2023	1100204	1948	1887	1827
LNB(on dispatch)	10/4/94	4:10	321	471	494	668437	872	751	50.5	14.3	67	80	80	1954	852892	1888	1854	1819
LNB(on dispatch)	10/4/94	6:15	328	505	525	886498	956	791	50.5	14.3	67	80	80	2044	1155183	1967	1898	1828
LNB 150	10/4/94	2:22	343	508	526	935442	922	765	50.5	14.3	68	80	80	2065	1238182	1984	1907	1829
LNB-OFA	10/4/94	0:10	329	507	527	938161	927	769	50.5	14.3	70	80	80	2063	1244545	1982	1903	1824
LNB-OFA	10/4/94	0:45	321	508	527	944936	915	773	50.5	14.3	70	80	80	2072	1254783	1990	1911	1832
GR-LNB (6%)	10/4/94	0:20	318	510	528	936635	942	782	50.5	14.3	70	80	80	2070	1238571	1989	1910	1831
GR-LNB (8%)	10/4/94	0:26	315	510	529	934141	955	786	50.5	14.3	70	80	80	2070	1231111	1989	1910	1831
GR-LNB (10%)	10/4/94	0:15	312	510	530	933228	965	786	50.5	14.3	70	80	80	2070	1225625	1990	1911	1833
GR-LNB (15%)	10/4/94	0:17	299	510	531	931481	977	787	50.5	14.3	70	80	80	2067	1212778	1987	1909	1830
LNB	10/5/94	2:36	347	506	528	919057	945	782	50.5	14.3	83	80	80	2061	1207261	1981	1905	1829
LNB	10/5/94	0:43	332	505	530	923736	959	792	50.5	14.3	85	80	80	2062	1202045	1983	1906	1829
LNB(pre-test)	10/14/94	3:35	340	505	524	899536	940	772	50.5	14.3	73	80	80	2047	1184388	1968	1896	1824
LNB	10/14/94	0:24	337	508	527	924742	944	781	50.5	14.3	76	80	80	2059	1219200	1978	1901	1824
GR-LNB 3 Mill	10/14/94	0:20	308	497	520	844097	946	779	50.5	14.3	76	80	80	2026	1095714	1950	1888	1826
LNB 4 Mill	10/18/94	0:34	335	505	524	923859	900	766	50.5	14.3	69	80	80	2057	1223429	1977	1900	1824
GR-LNB 3 Mill	10/18/94	0:53	304	492	513	785675	928	773	50.5	14.3	68	80	80	1997	1005333	1926	1872	1819
GR-LNB 3 Mill	10/18/94	0:24	289	495	516	810663	934	777	50.5	14.3	68	80	80	2007	1041020	1934	1876	1819
LNB(pre-test)	10/20/94	2:29	341	510	529	930584	966	788	50.5	14.3	58	80	80	2065	1223200	1983	1905	1827
LNB a	10/20/94	1:04	337	510	530	933268	966	788	50.5	14.3	65	80	80	2066	1224000	1984	1907	1829
LNB b	10/20/94	0:19	336	511	530	934105	968	790	50.5	14.3	67	80	80	2067	1225000	1985	1907	1829
LNB c	10/20/94	0:32	336	510	530	933836	968	790	50.5	14.3	68	80	80	2067	1224242	1985	1907	1829

Cheorkee Unit #3, Average Test Data

Post Modification

Test No.	Date	Dur.	SO2 raw ppm	Econ In H2O DegF	Econ Wall Out DegF	Cold RH Flow lbs/hr	Hot RH DegF	SH AttmpO DegF	Rel Humd %	Amb Press ", HgA	Amb Temp Deg F	NG Temp Def F	Coal Temp Deg F	Econ H2O Prs PSIG	Econ H2O Fl lbs/hr	Drum Press PSIG	PSH Out PSIG	Steam To Turb PSIG
LNB d	10/20/94	2:42	340	507	527	912817	957	784	50.5	14.3	71	80	80	2058	1197015	1978	1903	1829
GR-LNB a	10/20/94	0:26	313	507	527	900393	966	790	50.5	14.3	73	80	80	2050	1168148	1972	1900	1828
GR-LNB b	10/20/94	0:20	323	508	528	899246	982	783	50.5	14.3	73	80	80	2049	1154762	1971	1900	1828
LNB	10/21/94	2:58	344	507	526	906219	954	783	50.5	14.3	65	80	80	2051	1191453	1972	1899	1825
LNB-OFA	10/21/94	0:28	335	506	526	912253	934	781	50.5	14.3	73	80	80	2054	1202069	1975	1900	1826
GR-LNB #1	10/21/94	0:28	331	507	526	908190	953	784	50.5	14.3	74	80	80	2055	1193793	1976	1902	1828
GR-LNB #2	10/21/94	0:10	333	507	526	906738	961	786	50.5	14.3	73	80	80	2054	1190909	1976	1902	1828
GR-LNB #3	10/21/94	0:10	335	506	526	906367	962	784	50.5	14.3	73	80	80	2054	1193636	1975	1901	1827
GR-LNB #4	10/21/94	0:14	336	508	527	905578	970	784	50.5	14.3	73	80	80	2051	1179333	1972	1899	1825
GR-LNB #5	10/21/94	0:13	337	508	527	906234	978	784	50.5	14.3	73	80	80	2053	1175000	1975	1901	1827
LNB	10/24/94	5:10	332	485	507	727889	941	775	50.5	14.3	60	80	80	1980	930391	1911	1868	1826
LNB	10/25/94	2:54	330	489	510	754285	956	766	50.5	14.3	62	80	80	1989	964931	1919	1871	1824
GR-LNB (50k)	10/25/94	0:19	298	488	514	772147	964	771	50.5	14.3	68	80	80	1999	976912	1929	1880	1831
GR-LNB (60k)	10/25/94	0:12	295	490	514	772107	963	774	50.5	14.3	69	80	80	1997	980971	1926	1877	1828
LNB	10/25/94	0:11	330	485	512	758450	954	775	50.5	14.3	69	80	80	1989	979213	1918	1870	1823
LNB	11/2/94	4:00	1	504	526	860233	1004	776	50.5	14.3	57	80	80	2016	1086496	1943	1878	1813
GR-LNB	11/2/94	1:08	1	505	526	865771	1004	786	50.5	14.3	55	80	80	2037	1104928	1961	1895	1828
GR-LNB	11/2/94	0:14	1	506	526	870058	997	789	50.5	14.3	54	80	80	2048	1118667	1972	1904	1837
GR-LNB	11/2/94	0:24	2	504	526	872159	995	794	50.5	14.3	55	80	80	2053	1128800	1977	1909	1842
LNB	11/3/94	1:19	3	480	501	686477	947	776	50.5	14.3	45	80	80	1963	880404	1895	1859	1822
LNB-OFA(14k)	11/3/94	0:18	4	479	499	704774	907	760	50.5	14.3	44	80	80	1987	918722	1918	1880	1842
LNB-OFA(60k)	11/3/94	0:12	4	478	498	702952	882	756	50.5	14.3	43	80	80	1976	915278	1907	1869	1832
GR-LNB 1	11/3/94	0:14	1	477	498	707915	875	754	50.5	14.3	44	80	80	1995	926289	1926	1888	1850
GR-LNB 2	11/3/94	0:12	1	477	498	705558	879	759	50.5	14.3	43	80	80	1991	921667	1922	1884	1846
GR-LNB 3	11/3/94	1:11	1	478	499	700083	897	768	50.5	14.3	45	80	80	1990	912804	1921	1884	1846
GR-LNB 4	11/3/94	0:24	2	478	500	692560	912	775	50.5	14.3	45	80	80	1978	902479	1910	1873	1835
GR-LNB 5	11/3/94	0:14	2	479	500	691635	921	780	50.5	14.3	45	80	80	1987	898326	1918	1880	1843
LNB	11/4/94	1:17	3	504	525	854436	1003	768	50.5	14.3	41	80	80	2025	1076410	1950	1887	1824
LNB-OFA	11/4/94	0:17	3	502	523	851703	989	789	50.5	14.3	42	80	80	2027	1105000	1952	1887	1823
GR-LNB 1	11/4/94	0:23	2	504	524	865607	990	789	50.5	14.3	42	80	80	2063	1126250	1986	1921	1855
GR-LNB 2	11/4/94	0:12	1	504	525	869957	992	788	50.5	14.3	42	80	80	2076	1138462	1999	1934	1868
GR-LNB 3	11/4/94	0:20	2	502	523	855708	987	788	50.5	14.3	44	80	80	2038	1111905	1962	1898	1833
GR-LNB 4	11/4/94	0:14	1	502	524	865796	985	787	50.5	14.3	45	80	80	2061	1131333	1985	1919	1854
GR-LNB 5	11/4/94	1:39	2	501	523	854279	988	791	50.5	14.3	46	80	80	2034	1110600	1958	1894	1829

Cheorkee Unit #3, Average Test Data

Post Modification

Test No.	Date	Dur.	SO2 raw ppm	Econ In H2O DegF	Econ Wall Out DegF	Cold RH Flow lbs/hr	Hot RH DegF	SH AttmpO DegF	Rel Humd %	Amb Press ", HgA	Amb Temp Deg F	NG Temp Def F	Coal Temp Deg F	Econ H2O Prs PSIG	Econ H2O Fl lbs/hr	Drum Press PSIG	PSH Out PSIG	Steam To Turb PSIG
LNB	11/7/94	1:43	3	479	501	681301	958	768	50.5	14.3	67	80	80	1973	872120	1907	1869	1832
GR-LNB	11/7/94	0:24	3	476	498	687500	908	766	50.5	14.3	80	80	80	1942	887829	1876	1836	1797
GR-LNB	11/7/94	1:35	2	478	499	695488	915	767	50.5	14.3	80	80	80	1973	903752	1906	1866	1825
LNB (D out)	11/7/94	0:15	2	475	501	681412	945	769	50.5	14.3	79	80	80	1947	861992	1880	1842	1804
GR-LNB	11/7/94	0:16	1	477	504	701142	943	785	50.5	14.3	76	80	80	2003	912536	1934	1894	1853
GR-LNB	11/7/94	0:12	1	476	503	699582	939	778	50.5	14.3	76	80	80	1997	905594	1929	1889	1848
LNB	11/8/94	1:03	1	481	503	690200	967	761	50.5	14.3	49	80	80	1966	859931	1900	1863	1826
GR-LNB(varied OFA)	11/8/94	0:33	1	481	502	694408	950	783	50.5	14.3	48	80	80	1988	890654	1919	1882	1844
GR-LNB(OFA op)	11/8/94	2:55	1	481	502	696962	940	782	50.5	14.3	45	80	80	1991	897271	1923	1885	1848
GR-LNB(D@80%)	11/8/94	0:40	0	481	501	693401	941	783	50.5	14.3	42	80	80	1982	891622	1913	1876	1839
LNB 1	11/9/94	0:18	1	479	502	681989	959	774	50.5	14.3	41	80	80	1958	863433	1892	1855	1819
GR-LNB 1	11/9/94	3:29	2	479	498	709457	893	747	50.5	14.3	46	80	80	1955	925134	1887	1847	1807
GR-LNB 2	11/9/94	0:39	1	479	498	711483	901	750	50.5	14.3	52	80	80	1969	925877	1901	1860	1820
GR-LNB 3	11/9/94	0:32	1	494	511	801736	952	773	50.5	14.3	52	80	80	2021	1045847	1948	1891	1836
GR-LNB 4	11/9/94	5:31	1	504	523	867950	994	779	50.5	14.3	49	80	80	2054	1137590	1977	1909	1842
GR-LNB 5	11/9/94	0:31	0	485	509	728195	956	767	50.5	14.3	45	80	80	1982	967967	1912	1868	1823
LNB 2	11/9/94	0:45	0	453	474	548391	855	719	50.5	14.3	45	80	80	1912	699783	1850	1832	1813
GR-LNB 6	11/9/94	0:15	1	452	473	565049	805	709	50.5	14.3	45	80	80	1924	729800	1861	1842	1822
GR-LNB 7	11/9/94	0:11	0	453	473	568404	808	712	50.5	14.3	44	80	80	1946	730165	1883	1862	1843
GR-LNB 8	11/9/94	0:16	1	452	473	560502	804	710	50.5	14.3	44	80	80	1909	725196	1846	1827	1807
LNB(120)	11/10/94	1:15	1	481	504	689772	976	774	50.5	14.3	46	80	80	1957	869549	1891	1853	1816
LNB(150)	11/10/94	0:27	1	504	525	850431	1013	762	50.5	14.3	47	80	80	2026	1061071	1953	1890	1828
GR-LNB(43k)	11/10/94	0:48	1	503	524	854965	1000	783	50.5	14.3	48	80	80	2039	1096531	1964	1900	1835
GR-LNB(46k)	11/10/94	1:42	0	504	524	859041	1002	783	50.5	14.3	54	80	80	2049	1104369	1973	1908	1843
GR-LNB(53k)	11/10/94	1:29	0	503	524	854097	999	785	50.5	14.3	55	80	80	2037	1099556	1962	1897	1832
GR-LNB(61k)	11/10/94	9:45	0	500	524	856880	994	789	50.5	14.3	50	80	80	2043	1108094	1967	1902	1837
GR-LNB	11/11/94	9:12	0	503	524	856270	994	790	50.5	14.3	48	80	80	2041	1107649	1965	1901	1836
100% Gas Testing 11/2/94-11/11/94 (SR's c																		
LNB(coal/gas)	12/1/94	2:41	241	507	526	935691	937	780	50.5	14.3	76	80	80	2071	1253272	1989	1909	1829
Test 21	1/19/95	1:00	356	480	506	702467	988	783	50.5	14.3	53	80	80	2000	992734	1943	1885	1827
Test 22	1/19/95	1:02	366	479	506	704213	983	788	50.5	14.3	53	80	80	2002	997971	1945	1886	1828
Test 24	1/19/95	0:33	367	451	481	512866	974	782	50.5	14.3	48	80	80	1929	709453	1880	1852	1824
Test 25	1/19/95	0:30	356	453	482	521349	965	788	50.5	14.3	47	80	80	1933	724262	1884	1854	1825
Test 27	1/19/95	0:25	363	452	481	523254	950	787	50.5	14.3	45	80	80	1933	727547	1884	1854	1825

Cheorkee Unit #3, Average Test Data

Post Modification

Test No.	Date	Dur.	SO2 raw ppm	Econ In H2O DegF	Econ Wall Out DegF	Cold RH Flow lbs/hr	Hot RH DegF	SH AttmpO DegF	Rel Humd %	Amb Press ", HgA	Amb Temp Deg F	NG Temp Def F	Coal Temp Deg F	Econ H2O Prs PSIG	Econ H2O Fl lbs/hr	Drum Press PSIG	PSH Out PSIG	Steam To Turb PSIG
Test 30	1/20/95	1:01	326	448	478	520143	908	760	50.5	14.3	50	80	80	1930	733013	1881	1851	1820
Test 31	1/20/95	1:00	296	449	479	516331	931	773	50.5	14.3	52	80	80	1930	725507	1881	1851	1820
Test 32	1/20/95	1:05	298	450	480	515585	942	779	50.5	14.3	52	80	80	1930	725056	1882	1851	1821
Test 33	1/20/95	0:40	309	449	479	517065	938	778	50.5	14.3	54	80	80	1931	725773	1883	1852	1820
Test 1(R)	1/24/95	1:00	317	482	507	922972	965	794	50.5	14.3	51	80	80	2035	1108033	1973	1899	1824
Test 16	1/25/95	0:20	300	478	502	923459	930	769	50.5	14.3	46	80	80	2035	1128095	1972	1898	1824
Test 17	1/25/95	0:40	307	478	502	924220	925	768	50.5	14.3	46	80	80	2034	1128095	1970	1897	1823
Test 40 3 Mill	1/25/95	1:00	312	467	490	853942	852	741	50.5	14.3	64	80	80	2004	1043934	1944	1882	1819
Test 41 3 Mill	1/25/95	1:00	274	468	493	845764	888	762	50.5	14.3	66	80	80	2003	1031311	1944	1881	1819
Test 42 3 Mill	1/25/95	1:00	285	468	494	845948	897	767	50.5	14.3	65	80	80	2004	1029016	1946	1884	1820
Test 43 3 Mill	1/25/95	0:45	293	467	493	854228	880	758	50.5	14.3	62	80	80	2007	1041957	1949	1886	1822
Test 2(R2)	1/25/95	0:39	307	479	505	940963	948	785	50.5	14.3	54	80	80	2048	1149000	1984	1906	1827
Test 2(R)	1/25/95	0:30	295	479	505	944091	940	787	50.5	14.3	55	80	80	2049	1153226	1985	1907	1829
Test 14(R)	1/25/95	0:20	310	479	504	938854	942	780	50.5	14.3	51	80	80	2048	1144762	1984	1907	1829
Test 15(R)	1/25/95	0:50	295	480	505	936472	959	781	50.5	14.3	50	80	80	2047	1141373	1984	1906	1829
Test 16(R)	1/26/95	0:24	291	480	502	943674	920	768	50.5	14.3	51	80	80	2047	1154400	1983	1906	1828
Test 44	1/26/95	0:25	364	478	503	935783	946	783	50.5	14.3	59	80	80	2046	1142308	1983	1906	1828
Test 45	1/26/95	0:30	361	479	504	933791	957	784	50.5	14.3	57	80	80	2046	1136452	1983	1905	1828
Test 46	1/26/95	0:48	343	480	506	932893	970	783	50.5	14.3	55	80	80	2045	1127959	1983	1905	1828
Test 47	1/26/95	0:30	340	480	506	933121	970	785	50.5	14.3	54	80	80	2045	1128065	1983	1905	1828
LNB 3 Mill	1/27/95	0:45	363	351	393	822191	928	776	50.5	14.3	50	80	80	1963	814965	1909	1865	1821
Test 50	1/27/95	0:42	359	350	394	820813	936	768	50.5	14.3	56	80	80	1962	804710	1908	1865	1822
Test 51	1/27/95	0:31	323	351	395	819892	941	753	50.5	14.3	55	80	80	1960	796547	1907	1864	1821
Test 52	1/27/95	0:30	336	352	395	819807	940	751	50.5	14.3	56	80	80	1959	793331	1906	1863	1820

Cheorkee Unit #3, Average Test Data

Post Modification

Test No.	Date	Dur.	RH In Press PSIG	RH In Temp Deg F	Hot RH Out Prs PSIG	DryGas HtLss %	Moist HtLss %	CombH2O HtLss %	Refuse HtLss %	Radiat HtLss %	Unmeas HtLss %	Total Htlss %	Comb Air Temp	Econ Gas Out Temp	AH Gas Out Temp	AH Air In Temp	AH Air Out Temp
LNB OFA Cooling	8/17/94	3:08	329		316	5.04	1.11	4.27	0.61			12.44			313		624
GR-LNB	8/17/94	1:15	352		332	5.15	1.03	4.74	0.56			12.89			315		621
Test A (LNB)	8/17/94	0:33	364		339	5.06	1.11	4.28	0.61			12.46			318		627
Test B (GR-LNB)	8/17/94	0:40	362		337	5.35	1.02	4.81	0.56			13.14			319		627
C (LNB)	8/18/94	0:24	371		348	5.03	1.11	4.28	0.61			12.43			318		625
D (GR-LNB rear fired)	8/18/94	0:31	370		349	5.25	1.02	4.82	0.56			13.05			319		626
E (GR-LNB front fired)	8/18/94	0:36	354		334	5.23	1.02	4.81	0.56			13.02			317		624
F (GR-LNB)	8/18/94	0:36	384		363	5.12	1.02	4.81	0.56			12.92			321		629
GR-LNB (50k)	8/29/94	0:22	369	646	347	5.22	1.02	4.79	0.56	0.24	0.98	12.82	80	730	317	88	637
GR-LNB (<3k)	8/29/94	0:21	371	646	350	4.99	1.02	4.80	0.56	0.25	0.98	12.60	80	727	319	88	641
GR-LNB (RW)	8/30/94	0:19	380	649	359	5.21	1.02	4.78	0.56	0.23	0.93	12.73	80	713	314	87	622
GR-LNB (BW)	8/30/94	0:23	382	650	360	5.18	0.94	5.26	0.52	0.23	0.93	13.06	80	717	318	87	628
LNB-OFA 100A	8/31/94	1:00	381	645	365	5.10	1.11	4.27	0.61	0.23	0.94	12.25	80	705	311	76	624
LNB-OFA 100D	8/31/94	0:25	379	643	362	5.28	1.11	4.26	0.61	0.23	0.93	12.42	80	710	310	78	622
LNB-OFA 100E	8/31/94	0:34	379	645	361	5.39	1.11	4.27	0.61	0.23	0.93	12.54	80	719	313	79	629
LNB-OFA 110A	8/31/94	0:38	379	646	361	5.15	1.11	4.27	0.61	0.23	0.94	12.31	80	714	312	79	629
LNB-OFA 110B	8/31/94	0:28	379	645	361	5.11	1.11	4.27	0.61	0.23	0.94	12.26	80	715	312	78	629
LNB	9/1/94	1:39	369	639	356	4.95	1.11	4.26	0.61	0.25	0.98	12.15	80	699	306	69	621
GR-LNB 140A	9/1/94	0:30	379	644	364	5.07	1.00	4.91	0.55	0.24	0.95	12.71	80	714	309	72	627
GR-LNB 140C	9/1/94	0:30	379	644	364	5.19	0.99	4.93	0.55	0.24	0.96	12.85	80	719	311	76	630
GR-LNB 140D	9/1/94	0:30	377	643	361	5.25	1.00	4.92	0.55	0.24	0.96	12.91	80	720	312	77	632
LNB (0.5% Gas)	9/1/94	2:18	375	643	358	4.73	1.10	4.31	0.61	0.24	0.96	11.95	80	705	312	78	627
Baseline (LNB)	9/2/94	0:30	377	641	363	5.02	1.11	4.28	0.61	0.24	0.97	12.23	80	718	317	72	639
GR-LNB 150C	9/2/94	0:30	377	645	363	5.22	1.04	4.66	0.57	0.24	0.97	12.70	80	729	314	73	639
GR-LNB 150D	9/2/94	0:37	376	644	360	5.28	1.04	4.67	0.57	0.24	0.97	12.77	80	728	317	77	640
LNB	9/7/94	1:56	369	631	354	5.23	1.11	4.28	0.61	0.24	0.95	12.41	80	698	318	82	624
GR-LNB 150E	9/7/94	0:30	372	641	356	5.48	1.00	4.93	0.55	0.24	0.96	13.16	80	714	316	86	626
GR-LNB 150F	9/7/94	0:30	369	641	352	5.31	1.00	4.94	0.55	0.24	0.96	13.00	80	710	320	90	630
RR GR-LNB 150E	9/7/94	0:30	370	642	351	5.31	1.00	4.94	0.55	0.24	0.97	13.00	80	711	321	91	632
GR-LNB R.1	9/7/94	0:21	369	642	351	5.37	1.04	4.69	0.57	0.24	0.97	12.88	80	712	321	92	631
LNB	9/8/94	0:53	372	640	358	5.30	1.11	4.27	0.61	0.24	0.97	12.50	80	710	315	78	630
GR-LNB 150I	9/8/94	0:30	372	641	356	5.25	0.93	5.36	0.51	0.24	0.97	13.26	80	713	322	89	635
.5gas,OFAcooling	9/8/94	2:04	364	637	345	5.15	1.11	4.33	0.61	0.24	0.98	12.41	80	701	321	93	628
LNB(OFAcooling)	9/8/94	0:28	365	642	344	5.41	1.11	4.29	0.61	0.25	0.98	12.65	80	711	325	95	634

Cheorkee Unit #3, Average Test Data

Post Modification

Test No.	Date	Dur.	RH In Press PSIG	RH In Temp Deg F	Hot RH Out Prs PSIG	DryGas HtLss %	Moist HtLss %	CombH2O HtLss %	Refuse HtLss %	Radiat HtLss %	Unmeas HtLss %	Total Htlss %	Comb Air Temp	Econ Gas Out Temp	AH Gas Out Temp	AH Air In Temp	AH Air Out Temp
LNB	9/9/94	0:45	371	637	357	5.23	1.11	4.28	0.61	0.24	0.96	12.43	80	706	319	85	630
GR-LNB.R6%	9/9/94	0:22	368	632	351	5.35	1.04	4.70	0.57	0.24	0.95	12.84	80	708	317	89	626
GR-LNB.R8%	9/9/94	0:11	368	634	350	5.40	1.02	4.84	0.56	0.24	0.96	13.00	80	710	319	91	628
GR-LNB.R10%	9/9/94	0:18	367	635	349	5.34	1.00	4.96	0.55	0.24	0.96	13.04	80	709	320	92	629
GR-LNB.B12%	9/9/94	0:17	366	638	347	5.33	0.98	5.09	0.53	0.24	0.96	13.14	80	710	322	94	631
LNB-OFAcooling	9/9/94	0:14	365	641	345	5.37	1.11	4.29	0.61	0.24	0.97	12.60	80	710	324	96	633
LNB	9/21/94	0:55	315	590	302	4.88	1.10	4.24	0.61	0.31	1.16	12.30	80	678	294	70	607
LNB	9/21/94	2:05	372	629	356	4.93	1.10	4.25	0.61	0.24	0.98	12.12	80	702	302	72	619
LNB	9/21/94	1:45	374	621	359	4.67	1.10	4.24	0.61	0.24	0.96	11.82	80	694	298	66	613
LNB	9/21/94	2:51	381	618	373	4.17	1.10	4.23	0.61	0.24	0.96	11.31	80	684	289	55	607
LNB 150	10/3/94	4:13	428	548	412	4.88	1.10	4.25	0.61	0.17	0.76	11.79	80	698	301	67	608
LNB 150	10/3/94	3:54	410	548	396	4.84	1.10	4.25	0.61	0.20	0.83	11.83	80	700	301	67	613
LNB	10/3/94	1:48	379	548	365	4.83	1.10	4.25	0.61	0.23	0.93	11.95	80	690	298	66	609
LNB(on dispatch)	10/4/94	4:10	295	548	285	4.80	1.10	4.23	0.61	0.32	1.21	12.28	80	660	291	67	597
LNB(on dispatch)	10/4/94	6:15	406	562	392	4.95	1.11	4.26	0.61	0.21	0.87	12.00	80	713	306	67	624
LNB 150	10/4/94	2:22	423	622	406	4.75	1.11	4.26	0.61	0.18	0.78	11.67	80	697	304	68	612
LNB-OFA	10/4/94	0:10	425	620	407	4.86	1.10	4.25	0.61	0.17	0.77	11.76	80	696	300	70	604
LNB-OFA	10/4/94	0:45	426	612	407	4.97	1.10	4.25	0.61	0.17	0.76	11.86	80	700	299	70	603
GR-LNB (6%)	10/4/94	0:20	424	634	405	4.70	1.03	4.65	0.57	0.18	0.78	11.91	80	702	299	70	608
GR-LNB (8%)	10/4/94	0:26	424	643	405	4.68	1.02	4.76	0.56	0.18	0.78	11.98	80	705	301	70	612
GR-LNB (10%)	10/4/94	0:15	425	649	406	4.66	1.00	4.87	0.55	0.18	0.79	12.05	80	707	302	70	615
GR-LNB (15%)	10/4/94	0:17	426	655	407	4.63	0.94	5.20	0.52	0.18	0.80	12.28	80	711	304	70	620
LNB	10/5/94	2:36	412	643	390	5.00	1.11	4.27	0.61	0.19	0.81	11.99	80	705	313	83	621
LNB	10/5/94	0:43	415	648	391	5.38	1.11	4.28	0.61	0.19	0.81	12.38	80	716	319	85	627
LNB(pre-test)	10/14/94	3:35	405	631	385	4.73	1.11	4.25	0.61	0.20	0.84	11.74	80	697	304	73	612
LNB	10/14/94	0:24	416	636	394	4.92	1.11	4.26	0.61	0.18	0.80	11.88	80	709	309	76	618
GR-LNB 3 Mill	10/14/94	0:20	377	630	356	4.53	0.99	4.91	0.55	0.23	0.93	12.14	80	700	295	76	609
LNB 4 Mill	10/18/94	0:34	406	609	383	4.88	1.11	4.26	0.61	0.18	0.79	11.82	80	702	306	69	616
GR-LNB 3 Mill	10/18/94	0:53	344	620	321	4.51	0.97	4.95	0.54	0.26	1.03	12.27	80	691	287	68	602
GR-LNB 3 Mill	10/18/94	0:24	356	625	333	4.41	0.91	5.32	0.50	0.25	1.00	12.39	80	695	289	68	608
LNB(pre-test)	10/20/94	2:29	425	653	408	4.64	1.10	4.25	0.61	0.18	0.79	11.58	80	714	301	58	623
LNB a	10/20/94	1:04	429	652	413	4.86	1.11	4.26	0.61	0.18	0.79	11.80	80	717	306	65	625
LNB b	10/20/94	0:19	428	652	412	4.93	1.11	4.26	0.61	0.18	0.79	11.87	80	718	307	67	626
LNB c	10/20/94	0:32	428	652	411	4.96	1.11	4.26	0.61	0.18	0.79	11.90	80	718	308	68	626

Cheorkee Unit #3, Average Test Data

Post Modification

Test No.	Date	Dur.	RH In Press PSIG	RH In Temp Deg F	Hot RH Out Prs PSIG	DryGas HtLss %	Moist HtLss %	CombH2O HtLss %	Refuse HtLss %	Radiat HtLss %	Unmeas HtLss %	Total Htlss %	Comb Air Temp	Econ Gas Out Temp	AH Gas Out Temp	AH Air In Temp	AH Air Out Temp
LNB d	10/20/94	2:42	415	643	397	4.90	1.11	4.26	0.61	0.19	0.82	11.89	80	711	307	71	622
GR-LNB a	10/20/94	0:26	408	648	388	4.74	1.00	4.89	0.55	0.20	0.85	12.22	80	717	305	73	623
GR-LNB b	10/20/94	0:20	409	656	390	4.64	1.00	4.89	0.55	0.20	0.86	12.13	80	717	307	73	627
LNB	10/21/94	2:58	409	643	390	4.69	1.10	4.24	0.61	0.19	0.83	11.67	80	702	297	65	613
LNB-OFA	10/21/94	0:28	409	628	389	5.00	1.10	4.25	0.61	0.19	0.82	11.97	80	706	300	73	610
GR-LNB #1	10/21/94	0:28	409	643	387	4.66	1.00	4.87	0.55	0.19	0.83	12.10	80	706	304	74	617
GR-LNB #2	10/21/94	0:10	409	647	387	4.64	1.00	4.87	0.55	0.20	0.83	12.09	80	707	305	73	618
GR-LNB #3	10/21/94	0:10	409	648	387	4.63	1.00	4.87	0.55	0.19	0.82	12.07	80	706	305	73	619
GR-LNB #4	10/21/94	0:14	409	651	387	4.58	1.00	4.87	0.55	0.20	0.84	12.04	80	709	304	73	620
GR-LNB #5	10/21/94	0:13	410	655	388	4.59	1.00	4.87	0.55	0.20	0.84	12.05	80	711	304	73	622
LNB	10/24/94	5:10	327	621	314	4.56	1.10	4.22	0.61	0.29	1.12	11.90	80	682	285	60	605
LNB	10/25/94	2:54	338	627	320	4.57	1.10	4.22	0.61	0.28	1.08	11.86	80	679	285	62	599
GR-LNB (50k)	10/25/94	0:19	349	634	333	4.57	0.98	4.93	0.54	0.27	1.06	12.35	80	693	287	68	604
GR-LNB (60k)	10/25/94	0:12	349	631	333	4.65	0.98	4.93	0.54	0.27	1.06	12.43	80	694	288	69	605
LNB	10/25/94	0:11	342	629	326	4.74	1.10	4.23	0.61	0.27	1.07	12.02	80	687	289	69	603
LNB	11/2/94	4:00	397	648	380	7.14	1.10	4.22	0.61	0.23	0.92	14.21	80	720	284	57	617
GR-LNB	11/2/94	1:08	396	648	375	6.88	1.03	4.61	0.57	0.22	0.90	14.22	80	723	282	55	614
GR-LNB	11/2/94	0:14	397	647	376	6.83	1.03	4.61	0.57	0.22	0.89	14.15	80	722	281	54	612
GR-LNB	11/2/94	0:24	397	649	376	6.87	1.03	4.61	0.57	0.21	0.89	14.18	80	721	280	55	610
LNB	11/3/94	1:19	312	607	302	6.22	1.09	4.18	0.61	0.31	1.18	13.58	80	672	258	45	589
LNB-OFA(14k)	11/3/94	0:18	315	579	303	5.59	1.08	4.17	0.61	0.30	1.14	12.89	80	662	250	44	582
LNB-OFA(60k)	11/3/94	0:12	312	563	300	5.64	1.08	4.16	0.61	0.30	1.14	12.93	80	659	247	43	577
GR-LNB 1	11/3/94	0:14	314	556	303	5.38	1.02	4.52	0.57	0.29	1.13	12.92	80	658	249	44	577
GR-LNB 2	11/3/94	0:12	313	559	303	5.62	1.02	4.52	0.57	0.30	1.14	13.17	80	662	249	43	576
GR-LNB 3	11/3/94	1:11	312	573	301	5.71	0.97	4.81	0.55	0.30	1.15	13.49	80	666	251	45	579
GR-LNB 4	11/3/94	0:24	310	583	299	5.68	0.91	5.14	0.51	0.30	1.16	13.71	80	669	252	45	581
GR-LNB 5	11/3/94	0:14	311	590	300	5.53	0.88	5.35	0.49	0.31	1.16	13.73	80	670	253	45	583
LNB	11/4/94	1:17	397	642	383	6.63	1.10	4.21	0.61	0.23	0.93	13.70	80	716	280	41	620
LNB-OFA	11/4/94	0:17	394	646	380	6.43	1.09	4.21	0.61	0.22	0.92	13.48	80	710	274	42	612
GR-LNB 1	11/4/94	0:23	401	646	387	6.23	1.04	4.50	0.58	0.22	0.89	13.46	80	711	274	42	612
GR-LNB 2	11/4/94	0:12	403	646	390	6.16	1.01	4.70	0.56	0.21	0.88	13.52	80	711	275	42	613
GR-LNB 3	11/4/94	0:20	395	646	382	6.34	1.04	4.50	0.58	0.22	0.91	13.59	80	708	274	44	610
GR-LNB 4	11/4/94	0:14	400	644	386	6.21	1.00	4.72	0.56	0.21	0.89	13.60	80	709	275	45	611
GR-LNB 5	11/4/94	1:39	394	647	380	6.13	0.93	5.18	0.52	0.22	0.91	13.88	80	709	276	46	611

Cheorkee Unit #3, Average Test Data

Post Modification

Test No.	Date	Dur.	RH In Press PSIG	RH In Temp Deg F	Hot RH Out Prs PSIG	DryGas HtLss %	Moist HtLss %	CombH2O HtLss %	Refuse HtLss %	Radiat HtLss %	Unmeas HtLss %	Total Htlss %	Comb Air Temp	Econ Gas Out Temp	AH Gas Out Temp	AH Air In Temp	AH Air Out Temp
LNB	11/7/94	1:43	299	611	279	6.22	1.09	4.19	0.61	0.31	1.19	13.62	80	667	268	67	591
GR-LNB	11/7/94	0:24	293	583	269	6.11	1.03	4.56	0.57	0.31	1.17	13.76	80	659	267	80	581
GR-LNB	11/7/94	1:35	298	588	273	6.10	0.98	4.83	0.55	0.30	1.16	13.92	80	663	270	80	583
LNB (D out)	11/7/94	0:15	293	606	268	6.48	1.08	4.24	0.61	0.32	1.20	13.92	80	667	270	79	585
GR-LNB	11/7/94	0:16	304	602	279	6.98	1.03	4.55	0.58	0.30	1.14	14.58	80	679	274	76	590
GR-LNB	11/7/94	0:12	303	604	278	6.60	0.99	4.80	0.55	0.30	1.15	14.40	80	674	275	76	591
LNB	11/8/94	1:03	310	615	295	6.01	1.09	4.19	0.61	0.31	1.19	13.40	80	686	263	49	604
GR-LNB(varied OFA)	11/8/94	0:33	312	611	299	5.70	1.01	4.63	0.57	0.31	1.17	13.38	80	685	258	48	597
GR-LNB(OFA op)	11/8/94	2:55	312	606	299	5.68	1.01	4.62	0.57	0.30	1.16	13.34	80	682	255	45	594
GR-LNB(D@80%)	11/8/94	0:40	310	605	296	5.61	1.00	4.63	0.56	0.31	1.17	13.29	80	681	253	42	593
LNB 1	11/9/94	0:18	307	614	294	5.83	1.08	4.18	0.61	0.32	1.19	13.21	80	684	257	41	600
GR-LNB 1	11/9/94	3:29	313	572	300	5.55	0.98	4.75	0.55	0.30	1.13	13.26	80	655	249	46	571
GR-LNB 2	11/9/94	0:39	314	578	300	5.53	0.99	4.72	0.56	0.30	1.13	13.22	80	654	252	52	570
GR-LNB 3	11/9/94	0:32	361	620	344	5.78	0.99	4.72	0.56	0.25	0.99	13.30	80	677	258	52	579
GR-LNB 4	11/9/94	5:31	398	649	379	6.12	1.00	4.71	0.56	0.21	0.88	13.49	80	700	267	49	594
GR-LNB 5	11/9/94	0:31	332	616	315	6.17	0.99	4.75	0.55	0.28	1.08	13.81	80	678	258	45	587
LNB 2	11/9/94	0:45	237	522	226	5.40	1.06	4.22	0.60	0.38	1.39	13.04	80	623	233	45	557
GR-LNB 6	11/9/94	0:15	242	490	232	5.05	1.00	4.57	0.57	0.37	1.35	12.90	80	616	229	45	548
GR-LNB 7	11/9/94	0:11	244	493	234	4.79	0.95	4.84	0.54	0.37	1.35	12.84	80	617	228	44	548
GR-LNB 8	11/9/94	0:16	241	491	231	5.11	0.98	4.66	0.56	0.37	1.36	13.03	80	617	228	44	548
LNB(120)	11/10/94	1:15	313	617	301	6.44	1.09	4.18	0.61	0.31	1.18	13.81	80	686	261	46	597
LNB(150)	11/10/94	0:27	395	641	380	6.44	1.09	4.20	0.61	0.23	0.94	13.52	80	716	274	47	614
GR-LNB(43k)	11/10/94	0:48	396	642	379	6.30	1.00	4.73	0.56	0.22	0.91	13.73	80	719	276	48	614
GR-LNB(46k)	11/10/94	1:42	395	646	377	6.47	1.00	4.74	0.56	0.22	0.91	13.90	80	719	280	54	616
GR-LNB(53k)	11/10/94	1:29	390	648	369	6.54	1.00	4.75	0.56	0.22	0.92	13.99	80	716	280	55	614
GR-LNB(61k)	11/10/94	9:45	390	648	371	6.48	1.00	4.74	0.56	0.22	0.91	13.91	80	714	276	50	609
GR-LNB	11/11/94	9:12	392	648	375	6.50	1.00	4.74	0.56	0.22	0.91	13.93	80	713	275	48	609
100% Gas Testing 11/2/94-11/11/94 (SR's c																	
LNB(coal/gas)	12/1/94	2:41	420	626	399	5.66	1.11	4.26	0.61	0.17	0.76	12.57	80	716	307	76	624
Test 21	1/19/95	1:00	325	619	311	4.48	0.96	5.01	0.53	0.27	1.04	12.30	80	704	286	53	616
Test 22	1/19/95	1:02	325	618	312	4.51	1.01	4.74	0.56	0.27	1.04	12.12	80	705	285	53	616
Test 24	1/19/95	0:33	234	579	225	4.67	1.09	4.21	0.61	0.37	1.37	12.32	80	677	274	48	608
Test 25	1/19/95	0:30	237	578	229	4.76	1.09	4.20	0.61	0.37	1.35	12.39	80	680	274	47	610
Test 27	1/19/95	0:25	236	570	227	4.59	1.09	4.20	0.61	0.37	1.35	12.21	80	680	272	45	610

Cheorkee Unit #3, Average Test Data

Post Modification

Test No.	Date	Dur.	RH In Press PSIG	RH In Temp Deg F	Hot RH Out Prs PSIG	DryGas HtLss %	Moist HtLss %	CombH2O HtLss %	Refuse HtLss %	Radiat HtLss %	Unmeas HtLss %	Total Htlss %	Comb Air Temp	Econ Gas Out Temp	AH Gas Out Temp	AH Air In Temp	AH Air Out Temp
Test 30	1/20/95	1:01	226	547	210	4.65	1.00	4.71	0.56	0.37	1.35	12.63	80	657	269	50	592
Test 31	1/20/95	1:00	224	564	207	4.71	0.92	5.22	0.51	0.37	1.36	13.08	80	665	275	52	601
Test 32	1/20/95	1:05	223	571	206	4.81	0.96	4.96	0.54	0.37	1.36	13.00	80	669	277	52	604
Test 33	1/20/95	0:40	223	568	205	4.79	1.01	4.71	0.56	0.37	1.36	12.80	80	670	277	54	604
Test 1(R)	1/24/95	1:00	407	646	381	4.91	1.10	4.24	0.61	0.22	0.92	12.00	80	721	293	51	621
Test 16	1/25/95	0:20	406	635	384	4.34	0.97	4.98	0.54	0.22	0.90	11.94	80	688	284	46	601
Test 17	1/25/95	0:40	406	631	385	4.40	1.01	4.73	0.56	0.22	0.90	11.82	80	689	284	46	601
Test 40 3 Mill	1/25/95	1:00	360	576	334	4.29	1.01	4.71	0.56	0.25	1.00	11.82	80	662	280	64	584
Test 41 3 Mill	1/25/95	1:00	359	600	332	4.50	0.92	5.23	0.51	0.25	1.01	12.43	80	675	283	66	591
Test 42 3 Mill	1/25/95	1:00	359	606	331	4.47	0.96	4.98	0.54	0.26	1.01	12.22	80	678	281	65	592
Test 43 3 Mill	1/25/95	0:45	362	594	335	4.49	1.01	4.72	0.56	0.25	1.00	12.03	80	676	278	62	589
Test 2(R2)	1/25/95	0:39	413	645	387	4.90	1.10	4.23	0.61	0.21	0.87	11.92	80	701	289	54	603
Test 2(R)	1/25/95	0:30	414	639	389	5.14	1.10	4.23	0.61	0.21	0.87	12.16	80	705	291	55	603
Test 14(R)	1/25/95	0:20	412	649	387	4.35	1.01	4.74	0.56	0.21	0.88	11.75	80	696	286	51	604
Test 15(R)	1/25/95	0:50	414	657	389	4.33	0.94	5.14	0.52	0.21	0.88	12.02	80	698	288	50	609
Test 16(R)	1/26/95	0:24	412	639	388	4.50	0.97	4.98	0.54	0.21	0.87	12.06	80	691	289	51	603
Test 44	1/26/95	0:25	409	650	382	4.49	1.03	4.68	0.57	0.21	0.88	11.86	80	698	295	59	607
Test 45	1/26/95	0:30	410	656	382	4.49	1.01	4.76	0.56	0.21	0.89	11.92	80	700	294	57	610
Test 46	1/26/95	0:48	411	661	385	4.41	0.95	5.11	0.53	0.22	0.89	12.11	80	702	294	55	613
Test 47	1/26/95	0:30	412	661	386	4.45	0.98	4.95	0.54	0.22	0.89	12.03	80	703	294	54	614
LNB 3 Mill	1/27/95	0:45	357	641	335	4.23	1.09	4.19	0.61	0.33	1.25	11.70	80	661	268	50	577
Test 50	1/27/95	0:42	358	643	337	4.25	1.01	4.69	0.56	0.33	1.25	12.09	80	659	273	56	579
Test 51	1/27/95	0:31	358	643	338	4.18	0.91	5.25	0.51	0.34	1.25	12.44	80	657	272	55	579
Test 52	1/27/95	0:30	358	643	338	4.16	0.96	4.97	0.54	0.34	1.26	12.21	80	658	272	56	579

Cheorkee Unit #3, Average Test Data

Post Modification

Test No.	Date	Dur.	Calc Coal Flow lbs/hr	Msd Coal Flow lbs/hr	Calc TAir Flow scfm	Msd TAir Flow scfm	Heat Rate Gross	Heat Rate Net	OFA Inner Fl scfm	OFA Outer Fl scfm	Inner OFA Flow % of Tot	OFA % of Tot Air	Carbon In Ash %
LNB OFA Cooling	8/17/94	3:08	113427		273493		9410	10791					
GR-LNB	8/17/94	1:15	105744		278326		8801	10850					
Test A (LNB)	8/17/94	0:33	113539		267875		8428	10802					
Test B (GR-LNB)	8/17/94	0:40	104933		283276		8499	10881					
C (LNB)	8/18/94	0:24	113527		266830		8286	10801					
D (GR-LNB rear fired)	8/18/94	0:31	104654		280215		8367	10875					
E (GR-LNB front fired	8/18/94	0:36	104776		279520		8777	10865					
F (GR-LNB)	8/18/94	0:36	104790		271152		8149	10862					
GR-LNB (50k)	8/29/94	0:22	116311	152531	308184	206870	9304	10061	15874	43010	26	19.11	
GR-LNB (<3k)	8/29/94	0:21	115678	152289	291728	214513	9224	9946	2670	531	87	1.10	
GR-LNB (RW)	8/30/94	0:19	120129	155038	317426	208067	9365	10123	16088	43169	26.95	18.67	
GR-LNB (BW)	8/30/94	0:23	110898	142454	312564	204697	9343	10089	15972	43283	26.38	18.96	
LNB-OFA 100A	8/31/94	1:00	128750	157650	302403	220707	9310	10023	2062	0	100.00	0.68	
LNB-OFA 100D	8/31/94	0:25	129214	160086	314706	214397	9376	10131	11509	26092	30.15	11.95	
LNB-OFA 100E	8/31/94	0:34	129393	155090	317066	209364	9357	10111	14632	38048	27.00	16.61	
LNB-OFA 110A	8/31/94	0:38	128735	154923	303296	208712	9332	10070	8645	17008	33.21	8.46	
LNB-OFA 110B	8/31/94	0:28	128402	157425	300094	207282	9289	10026	10581	15525	40.03	8.70	
LNB	9/1/94	1:39	124423	147446	288320	209802	9288	10016	2566	0	100.00	0.89	
GR-LNB 140A	9/1/94	0:30	115440	141268	302918	196179	9337	10086	15917	43320	26.13	19.56	
GR-LNB 140C	9/1/94	0:30	115141	140037	306565	193262	9314	10066	17131	52000	23.00	22.55	
GR-LNB 140D	9/1/94	0:30	114824	139688	306357	190478	9315	10070	17132	52000	21.00	22.57	
LNB (0.5% Gas)	9/1/94	2:18	125263	156065	276362	202513	9233	9951	625	0	100.00	0.23	
Baseline (LNB)	9/2/94	0:30	125958	149537	284456	208861	9209	9912	2056	0	100.00	0.72	
GR-LNB 150C	9/2/94	0:30	119357	144091	302450	199505	9256	9999	15159	42559	26.00	19.08	
GR-LNB 150D	9/2/94	0:37	119504	141632	303679	195903	9274	10017	15210	44670	25.00	19.72	
LNB	9/7/94	1:56	126621	146206	297794	207057	9428	10169	1874	0	100.00	0.63	
GR-LNB 150E	9/7/94	0:30	114968	133687	318510	197605	9408	10180	17335	52000	24.00	21.77	4.12
GR-LNB 150F	9/7/94	0:30	114681	129903	305931	181168	9420	10180	16580	52000	22.00	22.42	1.16
RR GR-LNB 150E	9/7/94	0:30	114508	129861	303832	180486	9389	10146	16491	52000	22.00	22.54	3.56
GR-LNB R.1	9/7/94	0:21	119425	134921	306665	182526	9373	10134	16472	52000	22.05	22.33	
LNB	9/8/94	0:53	126047	145801	301011	217212	9310	10037	1891	0	100.00	0.63	5.11
GR-LNB 150I	9/8/94	0:30	105990	125020	299429	183179	9354	10099	15073	47033	23.94	20.74	5.03
.5gas,OFAcooling	9/8/94	2:04	124006	145959	289283	201192	9347	10085	527	8006	5.70	2.95	
LNB(OFAcooling)	9/8/94	0:28	125401	148069	299943	211844	9296	10021	1598	7596	16.86	3.07	

Cheorkee Unit #3, Average Test Data

Post Modification

Test No.	Date	Dur.	Calc Coal Flow lbs/hr	Msd Coal Flow lbs/hr	Calc TAir Flow scfm	Msd TAir Flow scfm	Heat Rate Gross	Heat Rate Net	OFA Inner Fl scfm	OFA Outer Fl scfm	Inner OFA Flow % of Tot	OFA % of Tot Air	Carbon In Ash %
LNB	9/9/94	0:45	126478	143063	294212	206763	9373	10096	1804	0	100.00	0.61	
GR-LNB.R6%	9/9/94	0:22	118723	134174	305964	183982	9463	10240	17074	51950	22.91	22.56	
GR-LNB.R8%	9/9/94	0:11	116001	130098	307513	180236	9440	10212	17098	52000	20.75	22.47	
GR-LNB.R10%	9/9/94	0:18	114229	126396	304822	174788	9488	10263	16920	52000	20.00	22.61	
GR-LNB.B12%	9/9/94	0:17	111395	124652	302478	174196	9448	10217	16739	52000	20.00	22.73	
LNB-OFAcooling	9/9/94	0:14	126003	142224	299381	209451	9347	10076	2152	9190	18.40	3.79	
LNB	9/21/94	0:55	105554	130810	254057	183089	9313	10143	328	0	100	0.13	
LNB	9/21/94	2:05	123744	155908	292234	214675	9246	9960	360	0	100	0.12	
LNB	9/21/94	1:45	123926	158548	282965	207342	9271	9996	393	0	100	0.14	
LNB	9/21/94	2:51	122678	160665	261862	191978	9204	9907	390	0	100	0.15	
LNB 150	10/3/94	4:13	143436	173553	327470	237496	9698	10498	4177	0	100	1.28	
LNB 150	10/3/94	3:54	137895	164111	314857	227760	9651	10458	4110	0	100	1.31	
LNB	10/3/94	1:48	127252	151168	293184	209101	9589	10443	4159	0	100	1.42	
LNB(on dispatch)	10/4/94	4:10	99627	121382	234936	164867	9443	10464	4167	0	100	1.77	
LNB(on dispatch)	10/4/94	6:15	136524	158901	314524	228378	9552	10350	4137	0	100	1.32	
LNB 150	10/4/94	2:22	137516	161788	307908	226319	9383	10147	4133	0	100	1.34	
LNB-OFA	10/4/94	0:10	138301	174939	322073	225592	9397	10190	17982	4735	79	7.05	
LNB-OFA	10/4/94	0:45	138698	173750	331031	221408	9440	10256	17726	40951	31	17.73	
GR-LNB (6%)	10/4/94	0:20	130415	163403	315849	205631	9381	10168	17974	48685	27	21.10	
GR-LNB (8%)	10/4/94	0:26	128485	161191	314308	201907	9346	10122	18000	51571	26	22.13	
GR-LNB (10%)	10/4/94	0:15	126407	157096	311880	198476	9321	10063	18000	51953	24	22.43	
GR-LNB (15%)	10/4/94	0:17	119331	148693	308969	194541	9282	10040	18000	52000	23	22.66	
LNB	10/5/94	2:36	136998	167252	309347	225778	9357	10136	1918	18	99	0.63	
LNB	10/5/94	0:43	138464	169055	327460	240935	9350	10133	1944	3722	38	1.73	
LNB(pre-test)	10/14/94	3:35	133807	165386	301299	222914	9328	10089	1995	0	100	0.66	
LNB	10/14/94	0:24	137536	171784	314042	235299	9357	10116	3989	0	100	1.27	
GR-LNB 3 Mill	10/14/94	0:20	113675	143012	284221	182971	9336	10144	18000	52000	24	24.63	
LNB 4 Mill	10/18/94	0:34	135389	163089	310544	227831	9444	10229	2022	0	100	0.65	
GR-LNB 3 Mill	10/18/94	0:53	104044	130455	271971	171915	9262	10110	17845	50920	25	25.28	
GR-LNB 3 Mill	10/18/94	0:24	100564	123822	274186	171102	9275	10096	18000	52000	24	25.53	
LNB(pre-test)	10/20/94	2:29	138932	162305	307899	231179	9208	9939	2094	0	100	0.68	
LNB a	10/20/94	1:04	139463	160037	315814	235979	9234	9966	2059	0	100	0.65	
LNB b	10/20/94	0:19	139659	160970	318930	237873	9241	9974	2026	0	100	0.64	
LNB c	10/20/94	0:32	139731	162056	319703	238339	9249	9983	2085	0	100	0.65	

Cheorkee Unit #3, Average Test Data

Post Modification

Test No.	Date	Dur.	Calc Coal Flow lbs/hr	Msd Coal Flow lbs/hr	Calc TAir Flow scfm	Msd TAir Flow scfm	Heat Rate Gross	Heat Rate Net	OFA Inner Fl scfm	OFA Outer Fl scfm	Inner OFA Flow % of Tot	OFA % of Tot Air	Carbon In Ash %
LNB d	10/20/94	2:42	136352	157741	310186	229319	9275	10027	2028	0	100	0.65	
GR-LNB a	10/20/94	0:26	121720	142169	301807	191371	9259	10039	18000	52000	25	23.19	
GR-LNB b	10/20/94	0:20	121704	142861	294057	186590	9185	9945	17740	52000	24	23.72	
LNB	10/21/94	2:58	135203	152974	306087	226534	9257	10020	1922	0	100	0.63	
LNB-OFA	10/21/94	0:28	135251	160782	321588	204548	9340	10148	17867	52000	24	21.73	
GR-LNB #1	10/21/94	0:28	123055	145254	300810	186096	9325	10102	17188	52000	24	23.00	
GR-LNB #2	10/21/94	0:10	123114	146491	299036	186106	9303	10076	17016	52000	24	23.08	
GR-LNB #3	10/21/94	0:10	123830	144806	299300	183471	9350	10127	16939	51977	24	23.03	
GR-LNB #4	10/21/94	0:14	122821	148619	295649	187367	9253	10020	16890	51990	24	23.30	
GR-LNB #5	10/21/94	0:13	122754	149473	295137	187196	9198	9953	16835	51995	24	23.32	
LNB	10/24/94	5:10	109849	133649	255505	187081	9175	9933	2260	0	100	0.88	
LNB	10/25/94	2:54	114028	135504	266180	194705	9163	9902	2343	0	100	0.88	
GR-LNB (50k)	10/25/94	0:19	104257	120496	272340	172606	9209	9969	17737	46370	27	23.54	
GR-LNB (60k)	10/25/94	0:12	104355	119494	275604	170699	9229	9993	17566	50599	24	24.73	
LNB	10/25/94	0:11	115976	131978	275332	198071	9304	10055	2001	0	100	0.73	
LNB	11/2/94	4:00	129627	0	298347	244550	8970	9595	2442	0	100	0.82	
GR-LNB	11/2/94	1:08	123281	0	301494	234519	9030	9676	17981	3996	82	7.29	
GR-LNB	11/2/94	0:14	123507	0	301648	228330	9031	9682	18000	22753	46	13.51	
GR-LNB	11/2/94	0:24	124041	0	305088	222340	9070	9728	18000	39246	32	18.76	
LNB	11/3/94	1:19	104334	0	238156	188684	9046	9702	4652	0	100	1.95	
LNB-OFA(14k)	11/3/94	0:18	105262	0	225604	164796	9142	9830	17969	303	98	8.10	
LNB-OFA(60k)	11/3/94	0:12	103897	0	228758	147078	9185	9906	18000	49820	28	29.65	
GR-LNB 1	11/3/94	0:14	99044	0	223795	162124	9252	9962	16578	10633	69	12.16	
GR-LNB 2	11/3/94	0:12	98919	0	234144	164817	9249	9969	18000	25523	42	18.59	
GR-LNB 3	11/3/94	1:11	94480	0	238421	157334	9242	9965	18000	45302	30	26.55	
GR-LNB 4	11/3/94	0:24	89078	0	239895	154021	9247	9971	18000	52000	25	29.18	
GR-LNB 5	11/3/94	0:14	85610	0	236414	153658	9188	9902	18000	52000	25	29.61	
LNB	11/4/94	1:17	128506	0	275614	225234	8903	9514	4538	0	100	1.65	
LNB-OFA	11/4/94	0:17	128567	0	276875	194490	9006	9654	18000	42308	32	21.78	
GR-LNB 1	11/4/94	0:23	124981	0	277473	199660	9030	9668	16467	29117	38	16.43	
GR-LNB 2	11/4/94	0:12	121999	0	279476	195579	9058	9696	17969	40325	31	20.86	
GR-LNB 3	11/4/94	0:20	123566	0	279096	196321	9045	9696	17583	36850	33	19.50	
GR-LNB 4	11/4/94	0:14	120727	0	280561	193206	9074	9725	18000	43875	29	22.05	
GR-LNB 5	11/4/94	1:39	110410	0	281403	190638	9116	9775	18000	50094	26	24.20	

Cheorkee Unit #3, Average Test Data

Post Modification

Test No.	Date	Dur.	Calc Coal Flow lbs/hr	Msd Coal Flow lbs/hr	Calc TAir Flow scfm	Msd TAir Flow scfm	Heat Rate Gross	Heat Rate Net	OFA Inner Fl scfm	OFA Outer Fl scfm	Inner OFA Flow % of Tot	OFA % of Tot Air	Carbon In Ash %
LNB	11/7/94	1:43	104166	0	226620	179555	9057	9720	4412	0	100	1.95	
GR-LNB	11/7/94	0:24	97534	0	228785	154152	9289	10027	18000	37469	33	24.25	
GR-LNB	11/7/94	1:35	95103	6	234855	156641	9303	10029	17414	36536	32	22.97	
LNB (D out)	11/7/94	0:15	103039	0	234376	192922	9151	9850	818	2617	24	1.47	
GR-LNB	11/7/94	0:16	102784	0	263748	174548	9316	10036	18000	38190	32	21.30	
GR-LNB	11/7/94	0:12	97990	0	251490	165910	9294	9999	18000	37180	33	21.94	
LNB	11/8/94	1:03	104171	0	222210	181106	8927	9572	2928	0	100	1.32	
GR-LNB(varied OFA)	11/8/94	0:33	97972	0	225477	157570	9051	9734	15436	25757	37	18.27	
GR-LNB(OFA op)	11/8/94	2:55	98297	0	228459	157795	9091	9784	15464	25509	37	17.93	
GR-LNB(D@80%)	11/8/94	0:40	97387	0	227764	158059	9078	9772	15686	25925	37	18.27	
LNB 1	11/9/94	0:18	103402	0	221694	180225	8961	9618	4465	0	100	2.01	
GR-LNB 1	11/9/94	3:29	95928	0	233095	156626	9271	9998	17318	28290	38	19.57	
GR-LNB 2	11/9/94	0:39	97106	0	230237	157098	9248	9959	16761	28075	37	19.47	
GR-LNB 3	11/9/94	0:32	110324	0	263474	191383	9153	9821	17493	30546	36	18.23	
GR-LNB 4	11/9/94	5:31	121306	4	289358	208246	9086	9741	17875	33377	34	17.71	
GR-LNB 5	11/9/94	0:31	103057	0	257695	168945	9223	9951	17060	29331	36	18.00	
LNB 2	11/9/94	0:45	80558	0	187468	145192	9238	10131	2218	0	100	1.18	
GR-LNB 6	11/9/94	0:15	77144	0	187638	120876	9424	10362	16139	28192	36	23.63	
GR-LNB 7	11/9/94	0:11	73962	0	182679	117573	9405	10338	17208	33600	34	27.81	
GR-LNB 8	11/9/94	0:16	75500	0	190446	121405	9448	10393	15310	26882	36	22.15	
LNB(120)	11/10/94	1:15	105327	0	243751	187741	8977	9724	9058	0	100	3.72	
LNB(150)	11/10/94	0:27	127960	0	278429	232371	8884	9509	1709	0	100	0.61	
GR-LNB(43k)	11/10/94	0:48	119440	0	282498	205471	9025	9676	16522	33585	32	17.74	
GR-LNB(46k)	11/10/94	1:42	119922	6	284056	202503	9043	9690	17041	32384	34	17.40	
GR-LNB(53k)	11/10/94	1:29	119100	0	285541	199579	9059	9716	17927	32144	35	17.54	
GR-LNB(61k)	11/10/94	9:45	119633	2	290387	197545	9115	9780	18000	31529	36	17.06	
GR-LNB	11/11/94	9:12	119106	7	291347	197979	9070	9732	18000	31599	36	17.02	
100% Gas Testing 11/2/94-11/11/94 (SR's c													
LNB(coal/gas)	12/1/94	2:41	140338	115680	316227	238196	9373	10096	4162	0	100	1.32	
Test 21	1/19/95	1:00	105086	120385	272558	169881	9683	10660	17486	52000		25.49	
Test 22	1/19/95	1:02	110163	125496	273892	171290	9657	10634	17469	52000		25.36	
Test 24	1/19/95	0:33	89094	102883	219841	153165	9622	10871	9940	0		4.52	
Test 25	1/19/95	0:30	90321	104154	226947	145884	9647	10902	17688	6401		10.61	
Test 27	1/19/95	0:25	89995	102816	221107	131427	9666	10949	17609	29388		21.26	

Cheorkee Unit #3, Average Test Data

Post Modification

Test No.	Date	Dur.	Calc Coal Flow lbs/hr	Msd Coal Flow lbs/hr	Calc TAir Flow scfm	Msd TAir Flow scfm	Heat Rate Gross	Heat Rate Net	OFA Inner Fl scfm	OFA Outer Fl scfm	Inner OFA Flow % of Tot	OFA % of Tot Air	Carbon in Ash %
Test 30	1/20/95	1:01	82063	95660	221154	124710	9910	11250	17361	37041	26	24.60	
Test 31	1/20/95	1:00	75428	88124	218886	121190	9889	11214	17501	40412	24	26.46	
Test 32	1/20/95	1:05	79161	92484	221228	123472	9819	11132	17452	40424	24	26.16	
Test 33	1/20/95	0:40	82664	96988	220575	124136	9819	11131	17453	40425	24	26.24	
Test 1(R)	1/24/95	1:00	131893	157780	313392	240133	9242	10064	1679	0	100.0	0.54	7.87
Test 16	1/25/95	0:20	116109	134058	291006	176451	9391	10237	18000	43468	29.2	21.12	
Test 17	1/25/95	0:40	121061	140617	293926	178597	9410	10259	18000	43454	29.2	20.91	
Test 40 3 Mill	1/25/95	1:00	109660	132074	266472	164640	9615	10556	17385	29889	36.08	17.74	
Test 41 3 Mill	1/25/95	1:00	101488	119843	277703	165890	9598	10527	18000	46046	28.03	23.06	
Test 42 3 Mill	1/25/95	1:00	106197	125473	278347	169244	9568	10484	18000	46194	28.02	23.06	
Test 43 3 Mill	1/25/95	0:45	110748	129346	281475	169884	9550	10474	18000	45635	28.41	22.61	
Test 2(R2)	1/25/95	0:39	135349	159913	325870	248560	9422	10256	1545	0	100.0	0.47	
Test 2(R)	1/25/95	0:30	135449	158981	334512	246770	9449	10304	9647	0	100.0	2.88	
Test 14(R)	1/25/95	0:20	123748	146504	293668	183697	9400	10226	18000	43935	29.0	21.09	
Test 15(R)	1/25/95	0:50	115931	135319	291035	179149	9360	10170	18000	43557	29.1	21.15	7.01
Test 16(R)	1/26/95	0:24	118542	138834	297704	181397	9450	10290	18000	43672	29.0	20.72	
Test 44	1/26/95	0:25	125572	154134	294304	184063	9484	10332	18000	44567	29.0	21.26	
Test 45	1/26/95	0:30	123877	150080	294975	183731	9424	10257	18000	44113	29.0	21.06	
Test 46	1/26/95	0:48	116754	141053	290926	180276	9400	10219	18000	43858	29.0	21.26	9.98
Test 47	1/26/95	0:30	119887	143674	293337	183309	9386	10207	18000	44165	29.0	21.19	
LNB 3 Mill	1/27/95	0:45	111133	141006	256621	200303	9134	10049	3256	0	100.0	1.27	
Test 50	1/27/95	0:42	102860	132139	252815	165722	9143	10064	17749	29199	37.2	18.57	
Test 51	1/27/95	0:31	93204	118033	252213	156884	9144	10068	18000	42769	30.0	24.09	
Test 52	1/27/95	0:30	97741	122686	250319	155392	9113	10037	18000	42870	30.0	24.32	