RESPONSE TO ALACHUA COUNTY COMMISSION REQUEST TO EVALUATE ADDITIONAL AIR EMISSION CONTROL ALTERNATIVES

STAFF REPORT TO THE
REGIONAL UTILITIES COMMISSION
OF THE
GAINESVILLE CITY COMMISSION
FEBRUARY 7, 2002

PURPOSE AND SCOPE

The purpose of this report is to summarize the results from analyzing the additional alternatives for Deerhaven 2 air emission control as requested by the Alachua County Commission. This request was received in correspondence dated August 23, 2001 (see Attachment 1). Discussions with the Regional Utilities Committee at meetings on August 29, 2001, October 18, 2001, and September 19, 2001, as well as at the 2001 joint meeting of the City Commission with the Alachua County Commission were also taken into account.

Technical details of the cost and feasibility of the retrofit options for Deerhaven 2 were taken from the report entitled Evaluation of Air Pollution Control Alternatives for Deerhaven 2, dated February 8, 2002 by the Burns & McDonnell Engineering Company. The report was originally prepared July 2000 and has been expanded for the purposes described here. Emission performance benchmark data were taken from EPA published sources, with supplemental information from Gainesville Regional Utilities' ("GRU's") operating reports. The modeling of the effects on ambient air quality from reducing Deerhaven 2 emissions are summarized from the report provided to the Regional Utilities Committee on July 11, 2000 (and subsequently presented at several other local forums).

ADDITIONAL ANALYSES PERFORMED

The following analyses were performed to fully address the issues identified in the forums described above and are summarized in this report:

- Comparison of Deerhaven's emission performance to other power plants.
- Review of electrostatic precipitator (ESP) performance.
- Evaluation of the cost-effectiveness of additional emission control technologies as identified by the Alachua County Environmental

Protection Department ("ACEPD") in their August 14, 2001 report to the Alachua County Commission. These included:

a. Selective non-catalytic reduction ("SNCR") of NOx by injecting ammonia or urea at the top of the firebox;

b. Utilization of magnesium enhanced lime (MEL) instead of limestone in a wet flue gas desulfurization scrubber;

c. Enhancing the particulate matter ("PM") capture potential of the existing electrostatic precipitator ("ESP");

d. Mercury ("Hg") removal with sorbent injection and removal (carbon injection with compact hybrid particulate collection ("COHPAC") integrated with the existing ESP was evaluated);

e. CO2 reduction through carbon sequestration; and

f. Synergistic and Integrated Technologies.

- Inclusion of the fiscal benefits from the effects of reduced emissions on community health, the environment, and economic development.

- Joining the Cities for Climate Protection campaign.

DEERHAVEN AIR EMISSION CONTROL

Deerhaven 2 is a coal fired 218 MW generating unit equipped with electrostatic precipitators. Its firebox is specifically designed for relatively low levels of NOx production and to burn low sulfur coal of specific ash and physical characteristics. The figure of merit commonly used to compare performance for SOx and NOx emission is in terms of pound emitted per million British thermal units ("lbs./mmBtu"). Deerhaven 2 has had a good environmental compliance history since first entering commercial operation in 1981 (over 20 years of operation). Deerhaven was also able to choose early election of the lower EPA NOx limits that went into effect January 1, 1997 under the EPA Acid Rain Program. Following is a review of benchmark and performance indicators.

SOx Figures 1 and 2 compare Deerhaven 2 SOx emission rates to all coal plants nationally (1998 EPA statistics) and to all coal plants in Florida (2000 EPA statistics). Not only does Deerhaven 2 compare well nationally, but also it is the cleanest non-scrubbed unit in Florida.

NOx Figures 3 and 4 compare Deerhaven 2 NOx emission rates to all coal plants nationally (1998 EPA statistics) and to all coal plants in Florida (2000 EPA statistics). Deerhaven compares well nationally as well as with plants in Florida.

Particulate Matter/Opacity Particulate matter ("PM") is routinely measured on an annual basis using EPA stack testing methodologies under a variety of operating scenarios. Deerhaven 2 particulate emissions have historically been well below its permit limitation. Opacity, on the other hand, is continuously monitored to determine compliance with the opacity limit and to serve as an indicator of ESP performance. EPA does not publish statistics useful for comparative benchmarking of PM and opacity. Figure 5 summarizes the trends in opacity from Deerhaven 2 on an annual average basis. It should be noted that since 1997 there has been a steady improvement in ESP performance as evidenced by the reduction in the average annual opacity. This has occurred as the result of improvements in ESP controls, equipment, and process management, as documented in Attachment 2.

One of the issues raised has been brief increases in opacity during the infrequent start up and shut down of Deerhaven 2 (averaging less than once per month). During start-up, the ESP does not reach peak efficiency until the entire system has reached operating temperatures and conditions. In the event the unit is taken off line, the ESP has to be shut down as soon as possible to avoid the accidental combustion of incompletely combusted gases in the ESP. The potential corrective measure of installing a baghouse was addressed as an alternative technology in the studies summarized here.

Mercury (Hg) Although EPA recently has decided to regulate Hg, it is not a regulated parameter at this time and there are no regulatory emission limits for Deerhaven 2, nor are there ambient air standards for Hg. GRU participated in EPA's 1999 study of Hg concentrations in coal. The results of that National study for the forth quarter of 1999 are summarized in Figure 6. In that study, Deerhaven's low sulfur coal had the sixteenth (16^{th}) lowest concentration of Hg from the 449 plants across the nation that participated in the study. GRU has begun periodically testing Hg concentrations in its coal, with the results to date summarized in Figure 7.

Total VOCs As part of its commitment to ongoing ambient air quality research, GRU undertook the first and only study of ambient Volatile Organic Compounds ("VOCs") in the Gainesville urban area. Figure 8 contains a map of the six monitoring sites selected, chosen to characterize areas near GRU's power plants, industrial parks, core residential areas, and background conditions. Four simultaneous sets of 24-hour, composite samples were taken, to assure that data for each site represented the same atmospheric conditions. Samples were also taken during the middle of the workweek to assure that worst conditions were captured. Total VOCs as well as many of EPA's hazardous air pollutants ("HAPS") were analyzed. Figure 9 contains the results. There are no ambient air quality standards for total VOCs or EPA HAPS, but the highest value obtained for any compound was at most 10,000 times less than chronic levels permitted in the workplace by OSHA. As expected, power stations were not associated with the highest VOC levels found.

Findings on Overall and ESP Performance and Management There is no need for ESP modifications at this time, and best operating practices are being employed at Deerhaven 2 for emission control. The potential for improvement to Deerhaven's ESP was anticipated years ago and substantial improvements have been made to the controls, equipment, and operations, and will continue to be made, as needed. Especially noteworthy is the remote, real time monitoring of the ESP performance by an independent contractor. Other items of GRU's commitment to best operating practices and performance of all the emission control systems include:

- The real time display of continuous emission monitoring data in the control room;
- The prompt reaction to and thorough evaluation of any permit excursions to determine their nature and cause, to ensure proper corrective action has been taken and to improve, as needed, control systems and practices.
- A commitment to take the unit off-line in the event a more detailed evaluation of operating/control systems and practices related to air emissions is warranted.
- The observation that Deerhaven 2 has had a good compliance history in the over twenty years of unit operation.

The commitment to cease operations can cost up to $250,000 per day in excess energy costs during summer peak days, and $135,000 per day during winter peak days. Deerhaven 2 was taken off line last week as the result of opacity excursions, the nature and cause of which are currently under investigation.

EVALUATION OF ADDITIONAL TECHNOLOGIES

The Burns and McDonnell Engineering Company ("BM") was commissioned to evaluate the additional emission control technologies identified by the ACEPD. Table 1 updates the technology performance criterion and assumptions used in the study. These were applied to develop planning level cost estimates of construction and operating costs for the SNCR, MEL wet FGD, and Hg removal systems. The pros and cons of various features of implementing these technologies are discussed fully in the BM report. Only the "best of breed" for each family of technologies are summarized in this report, based on their cost per ton (or pound) of pollutant removed.

As shown in Table 1, the SNCR alternative would not reach the removal efficiency standards adopted for the previous study. The MEL alternative has substantial externalities in terms of the CO2 driven off from CaCO3 as required to produce the magnesium enhanced lime. The application of sorbent injection with COHPAC removal, while common on relatively small scale waste incinerators has yet to be commercially scaled up to coal plants and is not considered a viable BACT for coal fired power plants by EPA at this time. Carbon sequestration from power plants is theoretically possible, and data from an MIT study projecting cost was found and is presented here. Alternatives identified by ACEPD related to baghouse configurations and synergistic/integrated control strategies were not amendable to economic analysis for the following reasons.

- Baghouse Configurations Baghouse control technologies evaluated in the previous study included the assumption that they were to be integrated into the existing hot side ESP. Functionally, this configuration has been shown to be as effective in collecting PM 2.5 as the additional configurations suggested by ACEPD.

- Synergistic and Integrated Controls. ACDEP had suggested that the cost of additional emission control could be reduced through integration and synergies between various individual strategies. Optimizing the various permutations and combinations of retrofit technologies when the target of concern had not yet been identified is not warranted. However, there are two major new technologies emerging in the power industry that very significantly, and synergistically, control a wide range of target emissions, including Hg. Therefore, pursuant to the ACEPD request, the following technologies were reviewed by GRU staff:

    a. Integrated Coal Gasification with Combined Cycle Generation ("IGCC")
    b. Circulating Fluidized Bed Steam Cycle Generation ("CFB")

  A full evaluation of these two technologies requires an extensive Integrated Resource Plan, which is beyond the scope of this report. Both of these technologies are expected to have substantial fuel price benefits over even the most efficient gas units, and are extremely effective in reducing undesirable emissions. The scale of these units may require consideration of not only local, but also regional emission reductions. Staff hopes to identify an option with these (or other) technologies for Deerhaven that will have net positive benefits while reducing emissions, as was accomplished by the Kelly repowering.

Economic Analysis Results. Table 2 contains the results of the additional economic evaluations, together with the alternatives previously evaluated. Also given is the fuel switching scenario, using Pet Coke as a less expensive fuel. This alternative was updated to incorporate the lower cost of MEL as opposed to Wet FGD as used before for this alternative.

Effects on Ambient Air Quality Table 3 compares Alachua County's ambient air quality to EPA's ambient air quality standards. Ambient air quality in Alachua County is well below (cleaner than) thresholds for health and environmental harm. Also shown in Table 3 are the concentrations in ambient air which local emissions would cause under worst case conditions (including point sources, non-point sources, and vehicle emissions). Local ambient air quality is due more to regional, than local, factors. As shown in Table 4, the reduction in atmospheric loading from additional emission control at Deerhaven 2 does not materially improve ambient conditions.

Findings on Additional Technologies for NOx and SOx SNCR and MEL Wet FGD technologies suggested by ACEPD were found to potentially reduce the costs for reduction of SOx and NOx, but will not significantly improve ambient air quality.

Findings on Hg Emission Control Sorbent injection with COHPAC has substantial capital and operational expense and complexity. The plan for an Hg deposition rate sensitivity analysis, developed jointly by staff and the Gainesville Energy Advisory Committee, will provide guidance on whether the investment is warranted, or if the Hg advisory for fish from the Santa Fe River is due to background conditions.

Findings on Synergistic/Integrated Technologies The potential cost-effectiveness from the retrofit technologies evaluated in this study are very likely to be eclipsed by rapidly emerging IGCC and CFB technologies designed to accommodate a wide range of solid fuels.

Findings on Fiscal Impacts on Community Health Ambient conditions are already well below those recognized to have measurable increases in risk to human health and environmental quality.

Findings on Carbon Sequestration Strategies It is important to differentiate between fuel switching to reduce carbon emissions (i.e. from coal to natural gas), direct carbon sequestration (i.e. removal from the flue gas), and indirect carbon sequestration (i.e. renewable energy, energy conservation, and vegetative management). Conversion to natural gas has already been found not to be economically feasible at Deerhaven 2 (see Table 2). Direct sequestration is not economically feasible. GRU has already accomplished much in the areas of: greenhouse gas reduction; energy conservation; solar energy use; beneficial reuse of water, biosolids, and mineral waste streams; and has nearly 10,000 acres involved in biological carbon fixation. GRU actively seeks all forms of fiscal benefit to be gained from these activities, including grants, federal incentive payments, and watches environmental credit exchange markets carefully. The full range and magnitude of these programs is beyond the scope of this report and will be addressed elsewhere.

CITIES FOR CLIMATE PROTECTION

The Cities for Climate Protection ("CCP") was established by a United Nations summit of municipal leaders in 1993 to provide a planning framework for greenhouse gas reduction and strategic energy management, and is sponsored by the International Council for Local Environmental Initiatives and by the United States Environmental Protection Agency. In order to join, a local government has to adopt a resolution that commits to undertake five planning steps in the subsequent three (3) years. The local government can choose to address just its own operations or to include the community as a whole for each of the five steps. The five steps are to:

1. Establish an inventory and forecast for key sources of greenhouse gases;
2. Set a greenhouse gas emissions goal;
3. Develop and adopt a local greenhouse gas action plan to achieve those reductions;
4. Begin implementation of the plan;
5. Monitor and report on greenhouse gas reductions.

The CCP Campaign is very narrowly focused on greenhouse gases and energy resources, as carbon sources. The City of Gainesville with its electric, water, wastewater, and natural gas utilities, is vitally involved in a much wider range of social, economic, environmental and resource conservation issues. As such, the City is in a good position to evaluate the relative cost-effectiveness and the trade-off between various environmental alternatives. Furthermore, the City can use much of the greenhouse gas emissions inventory already completed by Alachua County. Joining the CCP is likely to be very beneficial to the CCP campaign as well as providing an opportunity to the City for additional networking of ideas and concepts. Since the City of Gainesville historically provided substantial leadership, information, and incentives to assist citizens and customers to reduce resource consumption, joining CCP and including the community in its resolution seems appropriate.

RECOMMENDATIONS

Based on the preceding analysis and discussion, staff recommends that no action be taken to retrofit Deerhaven 2 with additional emission control equipment at this time and that the Regional Utilities Committee recommend to the full City Commission that it:

1. Instruct staff to continue to monitor and evaluate advances in emission control and generation technology.

2. Instruct staff to continue to pursue, in a timely and cost effective manner, planning studies related to the:

   A. Assembly of ambient air quality data and development of improved models of local impacts on ambient air quality.

   B. Sensitivity analysis of the relative loading of Hg emissions from Deerhaven compared to background in the Santa Fe river watershed.

3. Adopt a resolution in the form necessary to join the Cities for Climate Protection Campaign,

4. Transmit to the Alachua County Commission this report documenting the additional analyses performed at their request and the resulting findings and recommendations.

5. Remove from the Regional Utilities Committee agenda referral items related to the August 23, 2001 Alachua County Commission request and the November 6, 2001 Joint Commission meeting.

TABLE 1

PERFORMANCE CRITERIA FOR TECHNOLOGY EVALUATIONS

TARGET	BASELINE EMISSIONS		CONTROL	%	TARGET EMISSIONS		BACT
EMISSION	lb/mmBtu	tons/yr	TECHNOLOGY	RED.	lb/mmBtu	tons/yr	lb/mmBtu
NOX	0.483	3576	GAS REBURN	50%	0.242	1788	0.15
			SCR	85%	0.072	536	
			SNCR	*40%*	*0.290*	*2146*	
SOX	0.939	6952	WET FGD	90%	0.094	695	0.098
			SEMI-DRY FGD	90%	0.094	695	
			WET FGD (MEL)	*90%*	*0.094*	*695*	
PM	0.021	155	BAGHOUSE	29%	0.015	111	0.015
Hg	*1.74E-06*	*1.28E-02*	*SORBENT INJ./COHPAC*	*90%*	*1.74E-07*	*1.28E-03*	*N/A*
CO2	*200*	*1.49E+06*	*Sequestration*	*86%*	*28.14*	*2.08E+05*	*N/A*

1. *Italics indicate additional evaluations pursuant to August 23, 2001 correspondance from Alachua County Board of County Commissioners.*
2. *Includes corrections made February 8, 2002 by Burns and McDonnell in their final report.*

ANALYSIS OF DEERHAVEN 2 EMMISSION REDUCTION ALTERNATIVES

TABLE 2

TARGET EMMISSION	CONTROL TECHNOLOGY	ESTIMATED CAPITAL COST	ESTIMATED O&M COST PER YEAR	PRESENT VALUE	ESTIMATED $/TON REMOVED
ADD-ON ALTERNATIVES					
NOx	GAS REBURN	$20,330,000	$4,815,000	$75,702,500	$ 3,973
NOx	SCR	$15,500,000	$1,192,000	$29,208,000	$ 966
NOx	*SNCR*	*$2,091,000*	*$527,000*	*$7,767,010*	*$ 532*
SOx	WET LIMESTONE FGD	$58,957,000	$5,523,000	$122,471,500	$ 1,944
SOx	SEMI-DRY LIME FGD	$53,308,000	$5,098,000	$111,935,000	$ 1,774
SOx	*WET FGD (MEL)*	*$45,779,000*	*$2,821,000*	*$69,599,728*	*$ 1,275*
PM	BAGHOUSE	$13,736,000	$883,000	$23,890,500	$ 55,200
Hg	*SORBANT INJ./COHPAC*	*$11,924,000*	*$2,998,000*	*$44,208,263*	*$ 3.74E+08*
CO2	*SEQUESTRATION*	*$221,840,000*	*$30,696,000*	*$533,465,178*	*$ 54*
FUEL CHANGE ALTERNATIVES					
SO2&PM	GAS CONVERSION	> $12,000,000	> $31,500,000	> $383,000,000	N/A
SOx	WET FGD-15% PET COKE	> $53,308,000	> $2,599,000	> $82,308,000	N/A
SOx	*MEL FGD-15% PET COKE*	*> $45,779,000*	*> $321,000*	*> $40,599,728*	*N/A*
SYNERGISTIC/INTEGRATED ALTERNATIVES (CAPACITY INCREASE)					
ALL	IGCC	N/A	N/A	N/A	N/A
ALL	CFB	N/A	N/A	N/A	N/A

1. *Italics indicate additional evaluations pursuant to August 23, 2001 correspondance from Alachua County Board of County Commissioners.*
2. *Includes corrections made February 8, 2002 by Burns and McDonnell in their final report.*
3. *Economic analysis assumptions: 20 yrs., 3% annual escalation assumed for non-fuel O&M, 8.75% discount rate, fuel benefits from IRP models.*
4. *Cost per ton removed based on annualized capital cost plus first year's O&M divided by reduction from base case emissions.*

OVERVIEW OF AIR QUALITY
IN
ALACHUA COUNTY
(ug/m^3)

PARAMETER	SO_2 (Annual Avg)	NO_X (Annual Avg)	PM1O (Annual Avg)	OZONE (8-Hr Avg)
EPA STANDARDS	60	100	50	157
AMBIENT LEVELS	3	16	20	151
% OF STANDARD	5%	16%	40%	96%

NOTES: SO_2 and NO_X taken from Deerhaven 2 air quality monitoring, 11/72 - 12/86. PM1O and Ozone taken from Alachua County Air Quality Commission, Findings and Recommendations, January 2000.

SOURCES INSIDE ALACHUA COUNTY DO NOT EXPLAIN AMBIENT AIR QUALITY
(ug/m^3)

PARAMETER	$S0_2$	NOx	PM10	NOTE
AMBIENT LEVELS	3	16	20	1
PREDICTED FROM LOCAL SOURCES	1	2	1.7	2
% ACCOUNTED FOR	33%	13%	12%	

Notes:

1. SO_2 and NO_x taken from Deerhaven 2 air quality monitoring, 11/79-12/86. PM10 taken from Alachua County Air Quality Commission, Findings and Recommendations, January 2000.
2. Mass Balance Model, 4 day turnover, 1000 m mixing cell, using loadings developed by Alachua County Air Quality Commission, Findings and Recommendations, January 2000.

W:\U0070\CEMS\DH RPT AMBIENT COND.doc

TABLE 3

TABLE 4

EFFECTS OF DEERHAVEN EMISSION CONTROL ON AMBIENT AIR QUALITY (ESTIMATED PERCENT OF ANNUAL AVERAGE EPA STANDARDS)

PARAMETER	AMBIENT AIR QUALITY	AFTER ADDTL[1] DH2 EMISSION REDUCTION
SO_2	5%	4%
NO_3	16%	15%
PM10	40%	40%

NOTES: Assumes the following reductions from DH2

SO_2	90%
NO_2	85%
PM10	29%

W:U0070/CEMS/Airana_Air quality

Average SO_2 Emission Rates

412 Coal-fired Power Plants: Source EPA
(Calendar Year 1998)

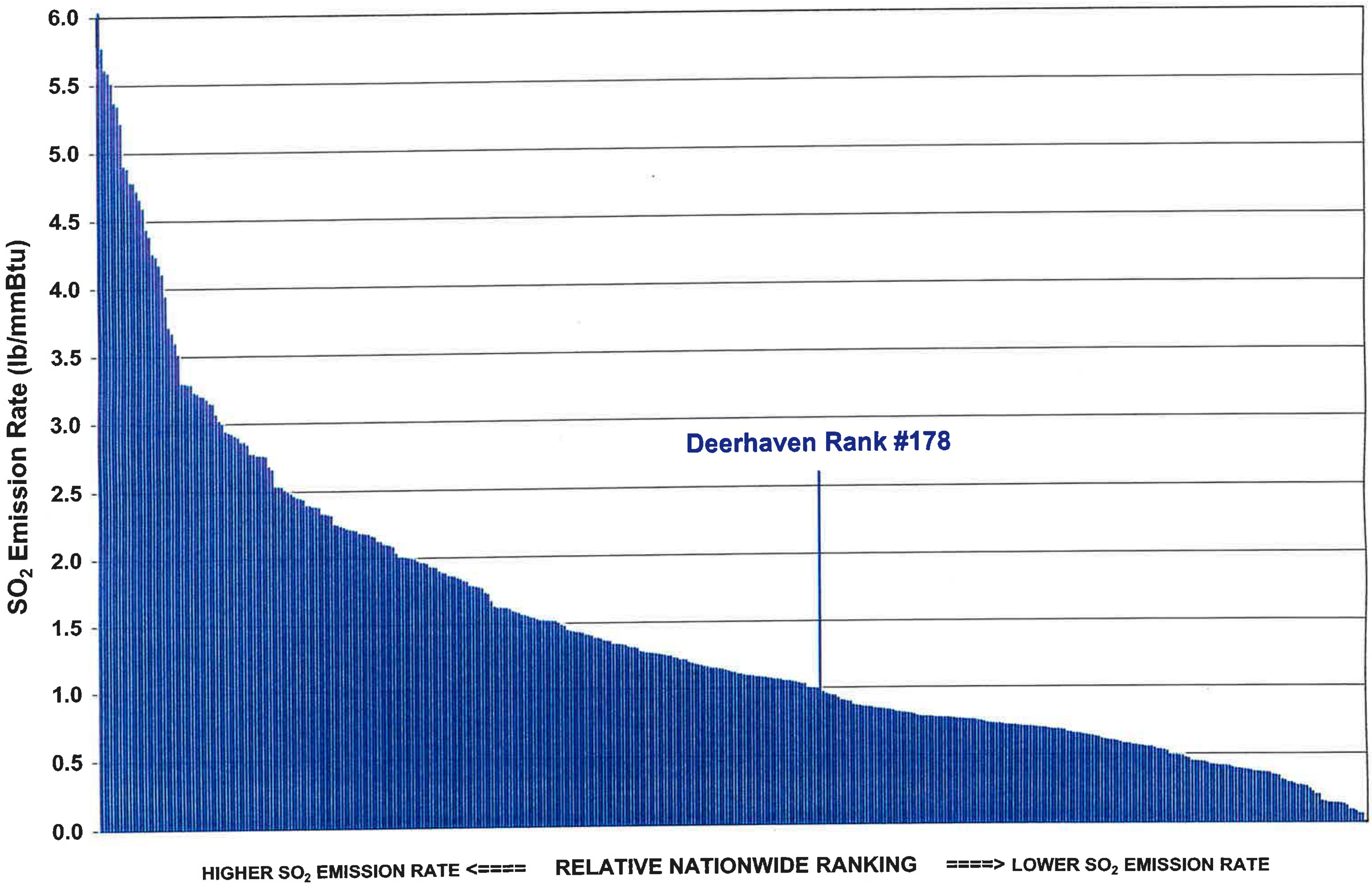


FIGURE 1

Chart SO2 Sort - qry - Summary by plant.xls

RWK - 02/05/2002

2000 EPA SO_2 Emissons Data for Florida Power Plants

Coal Units Only

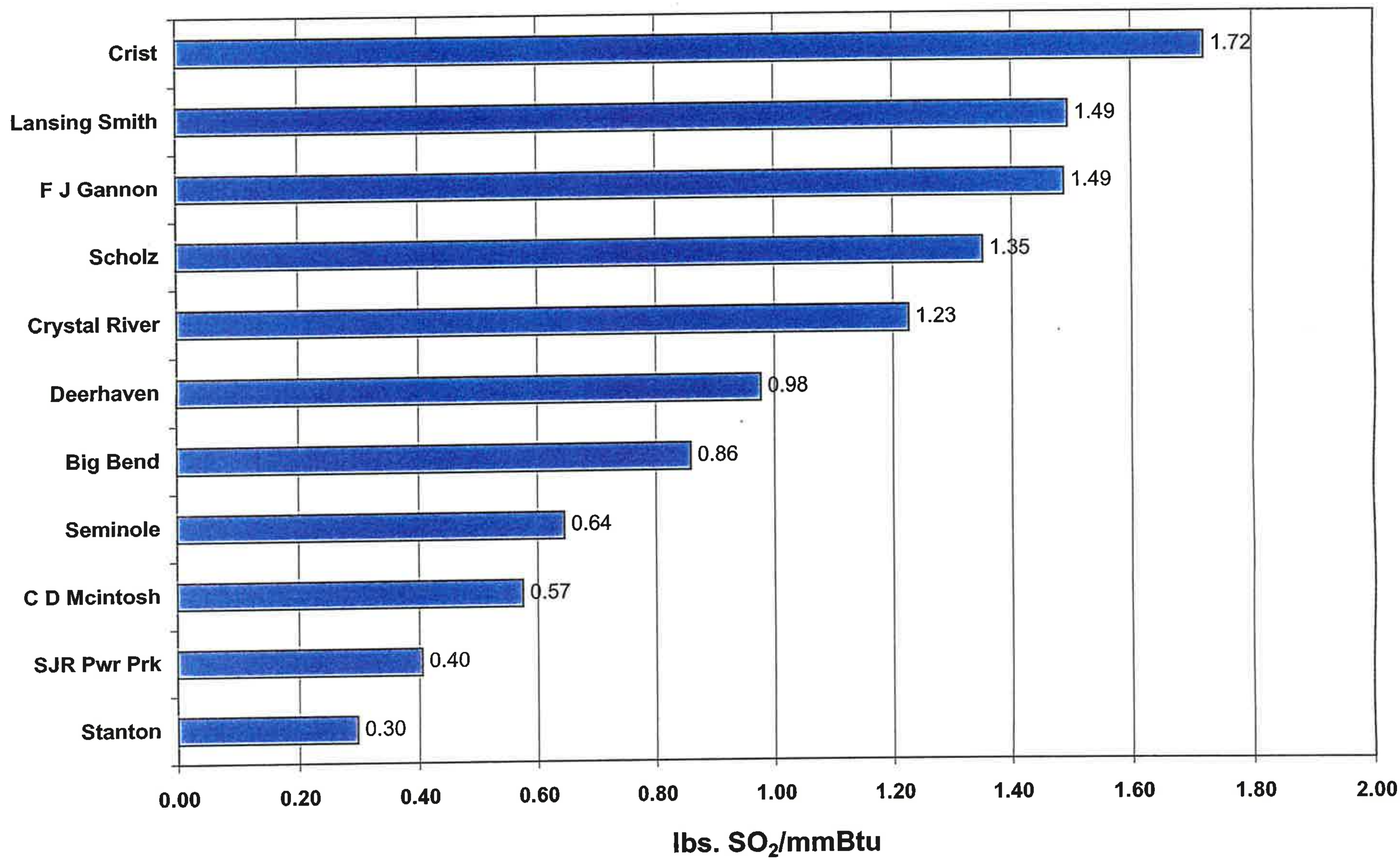


FIGURE 2

Average NO_x Emission Rates

412 Coal-fired Power Plants: Source EPA

(Calendar Year 1998)

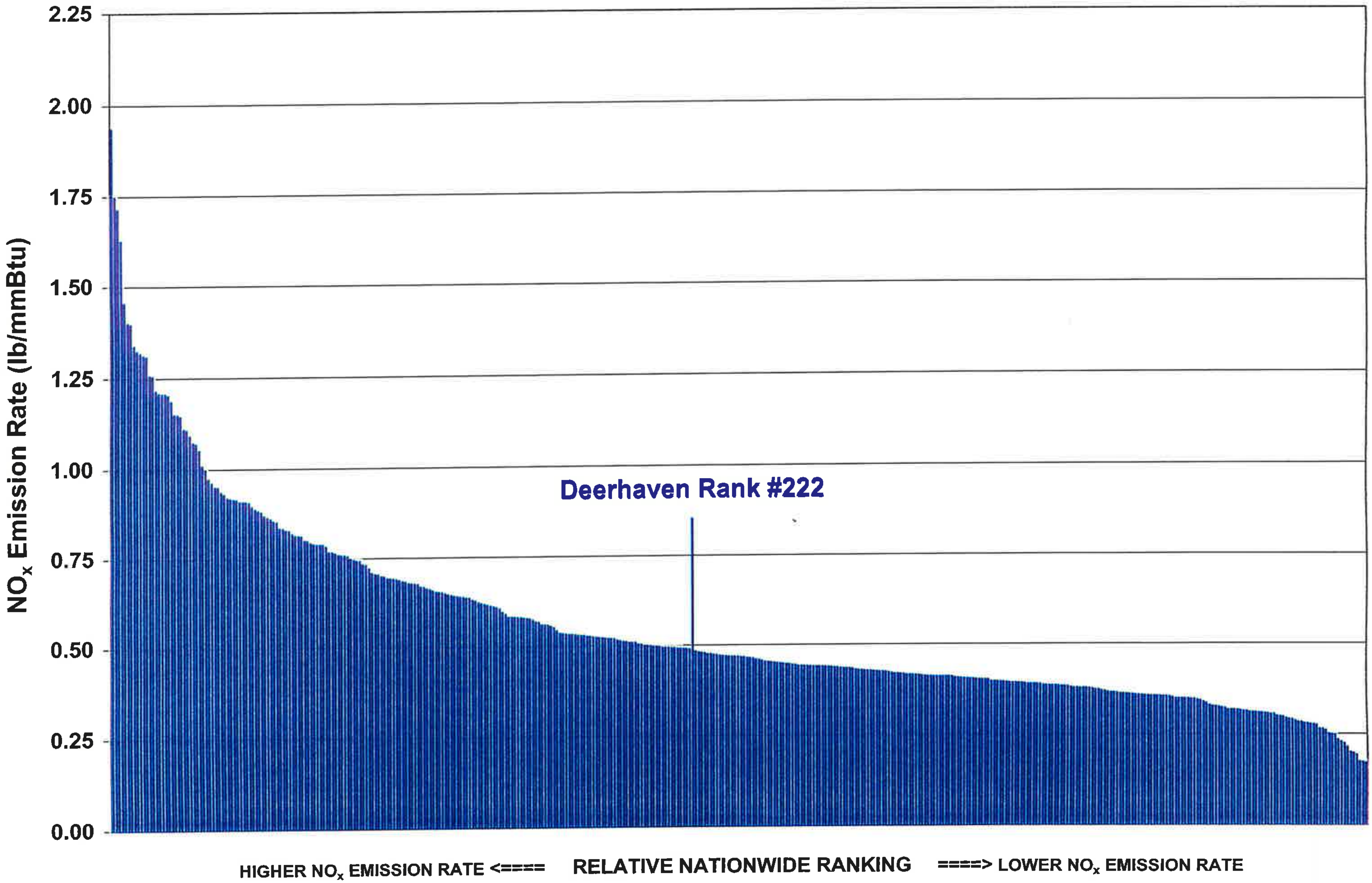
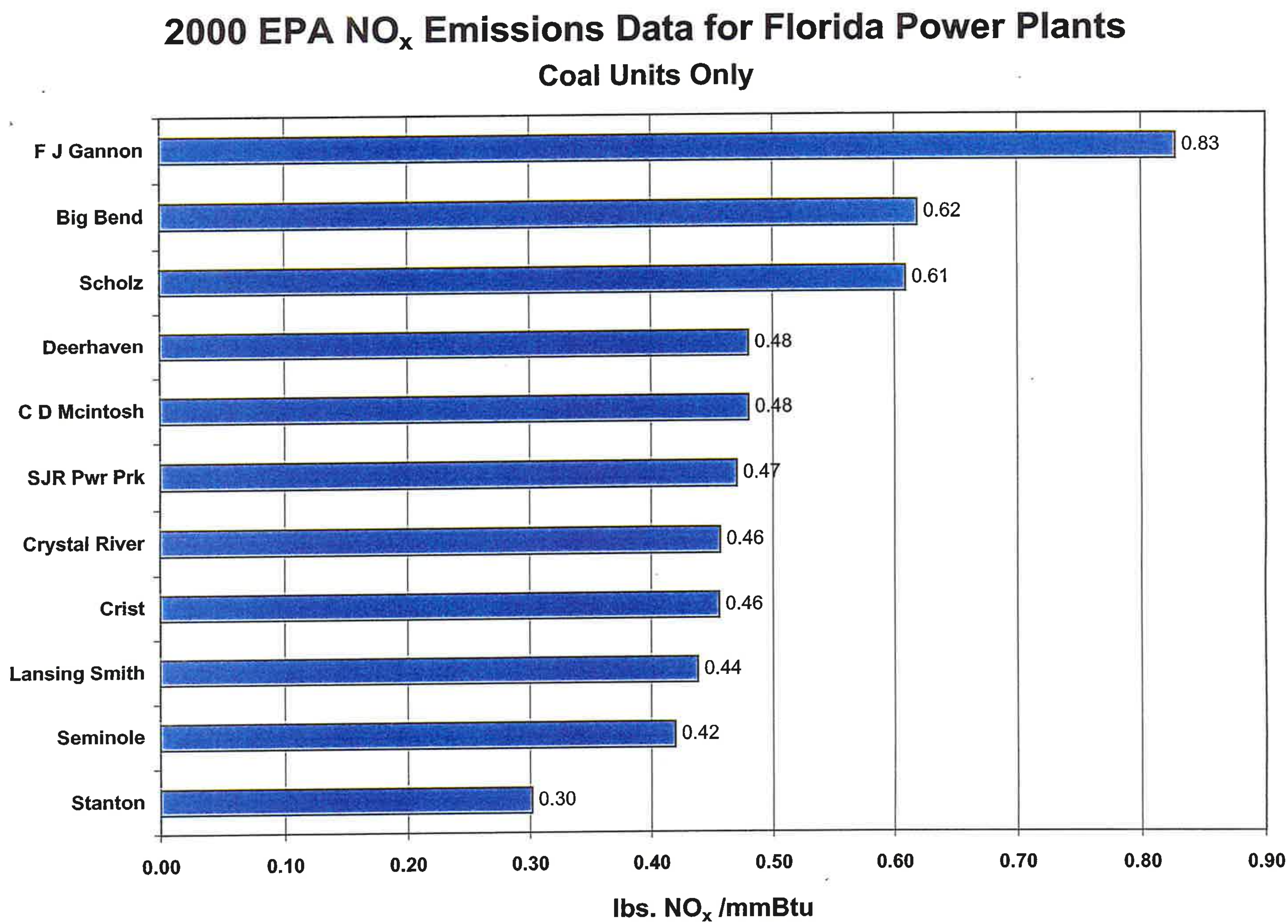


FIGURE 3

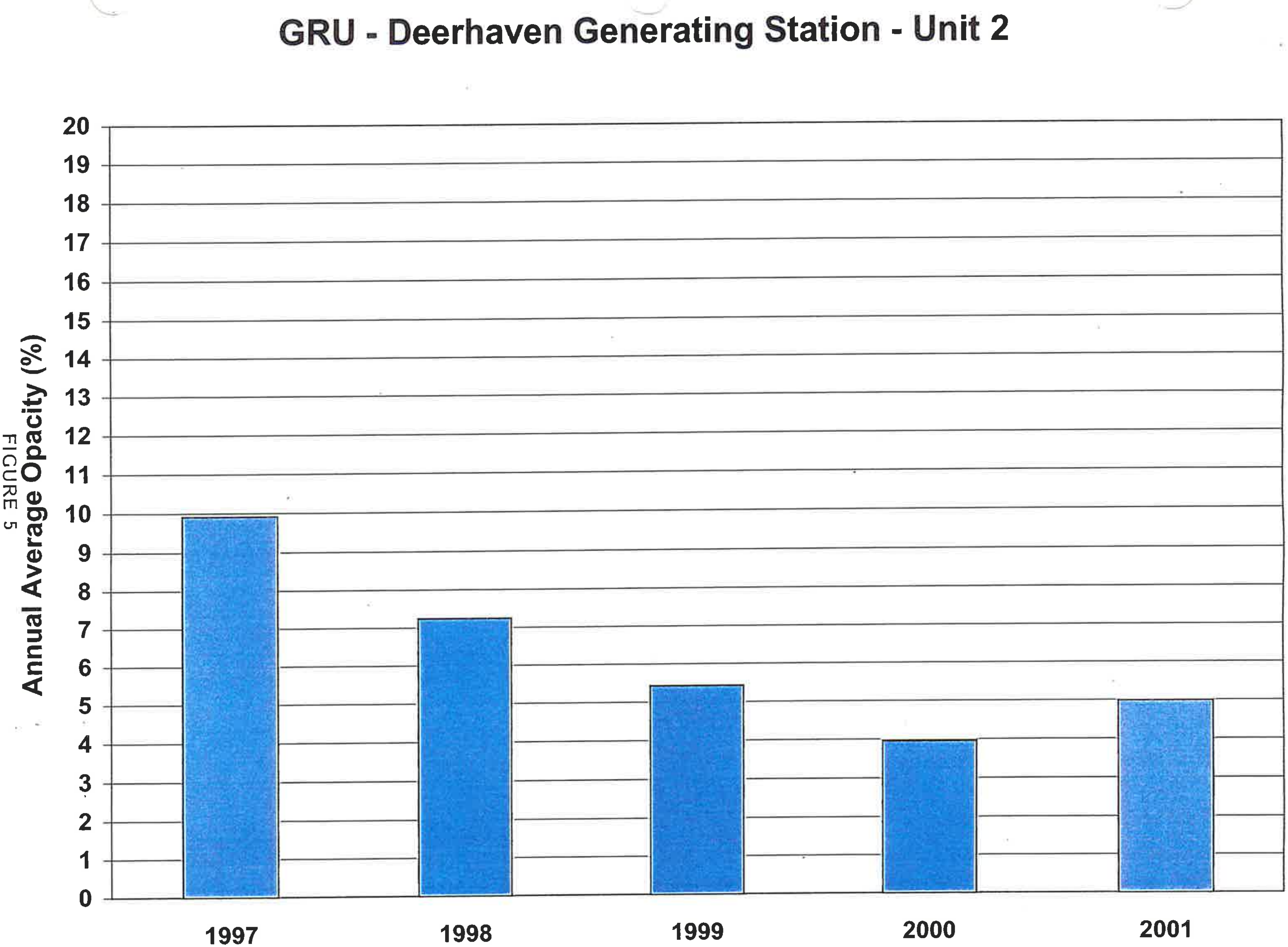
Chart NOx Sort - qry - Summary by plant.xls

RWK - 02/05/2002



2000 EPA NO_x Emissions Data for Florida Power Plants
Coal Units Only
F J Gannon
Big Bend
Scholz
Deerhaven
C D Mcintosh
SJR Pwr Prk
Crystal River
Crist
Lansing Smith
Seminole
Stanton
0.83
0.62
0.61
0.48
0.48
0.47
0.46
0.46
0.44
0.42
0.30
0.00
0.10
0.20
0.30
0.40
0.50
0.60
0.70
0.80
0.90
lbs. NO_x /mmBtu

FIGURE 4



GRU - Deerhaven Generating Station - Unit 2
Annual Average Opacity (%)
20
19
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
1997
1998
1999
2000
2001

FIGURE 5

Deerhaven Coal Contains Less Mercury than 96% of U. S. Coal-fired Plants

(449 Coal-fired Power Plants, Data Source: EPA, Quarter 4, 1999)

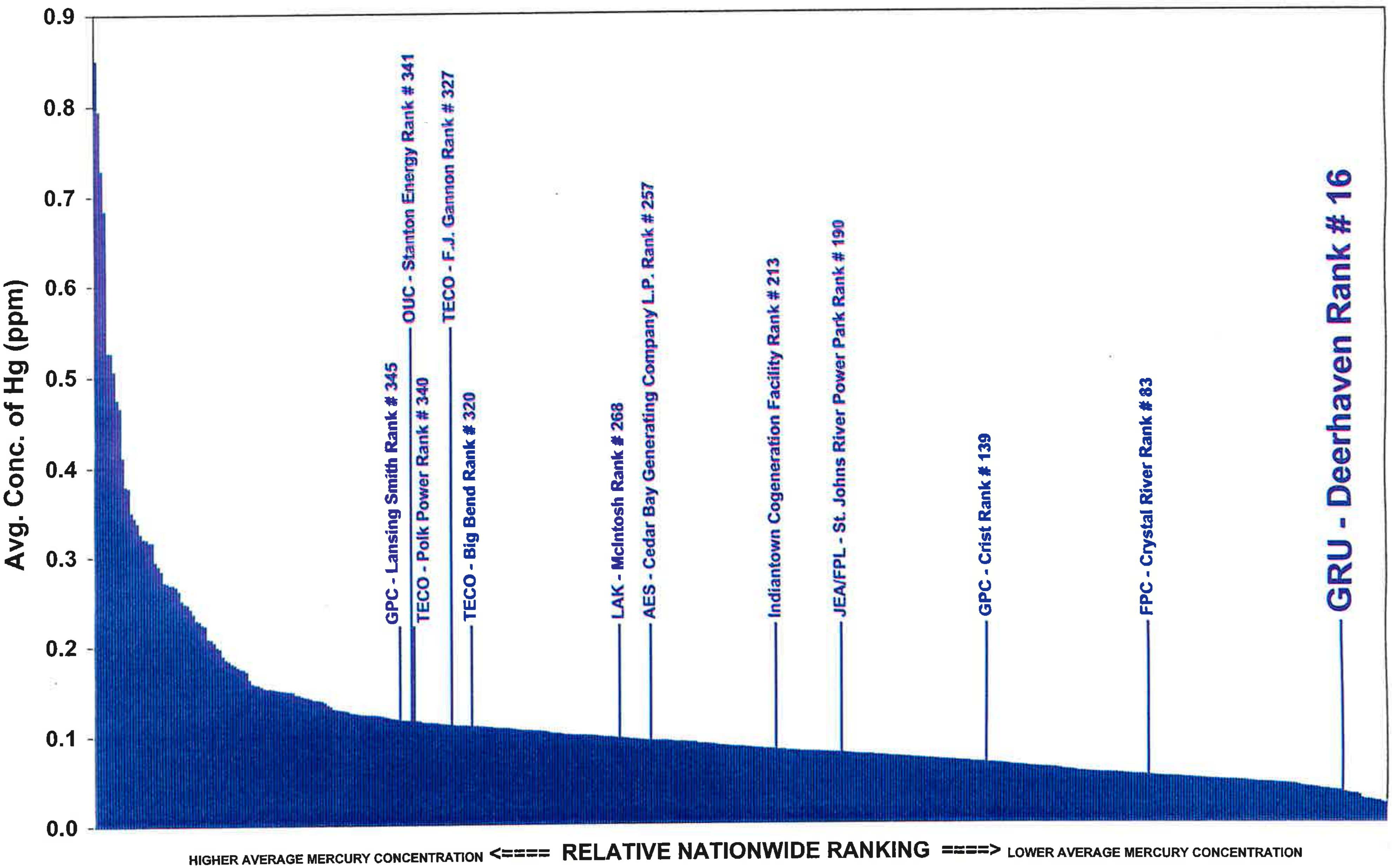
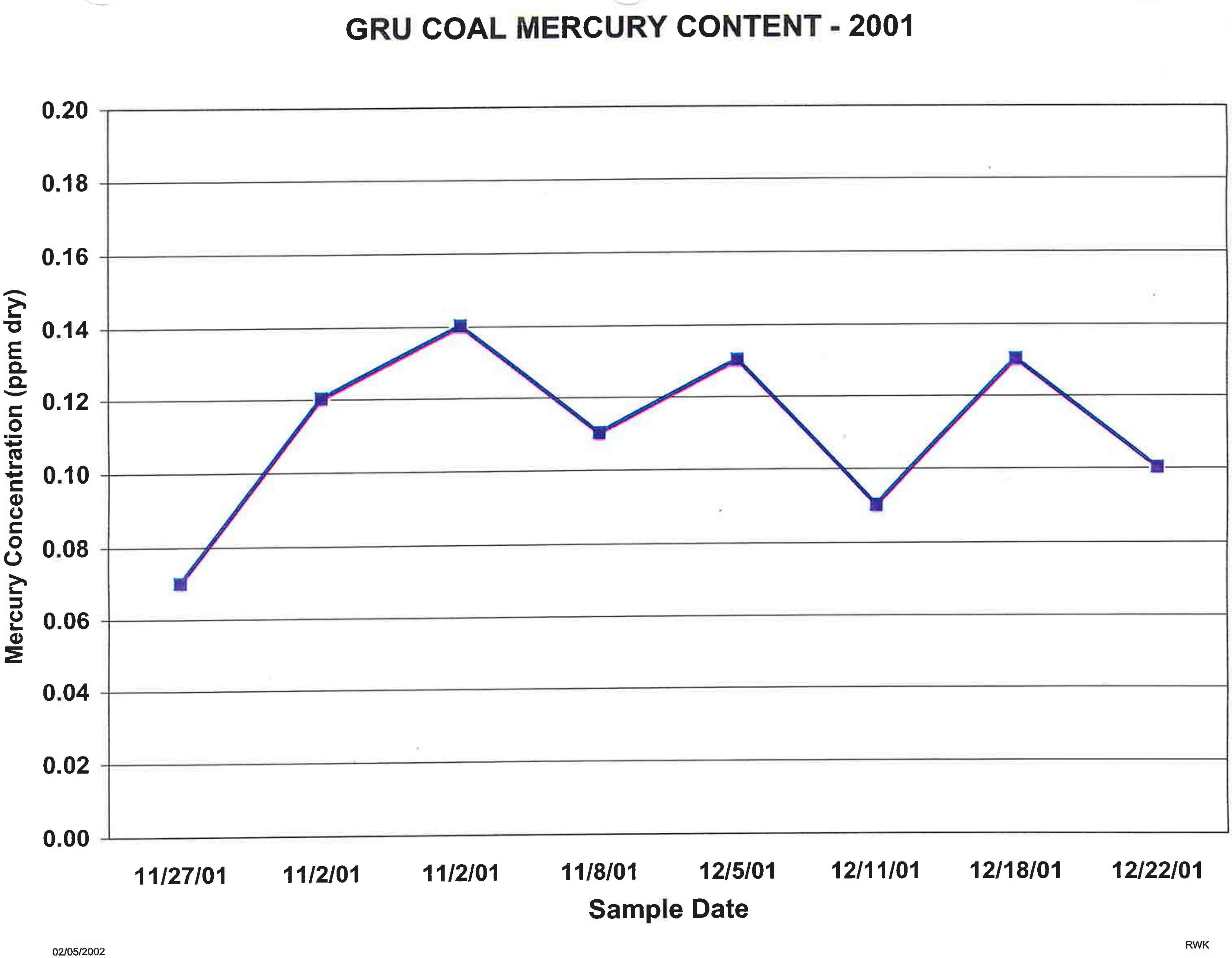


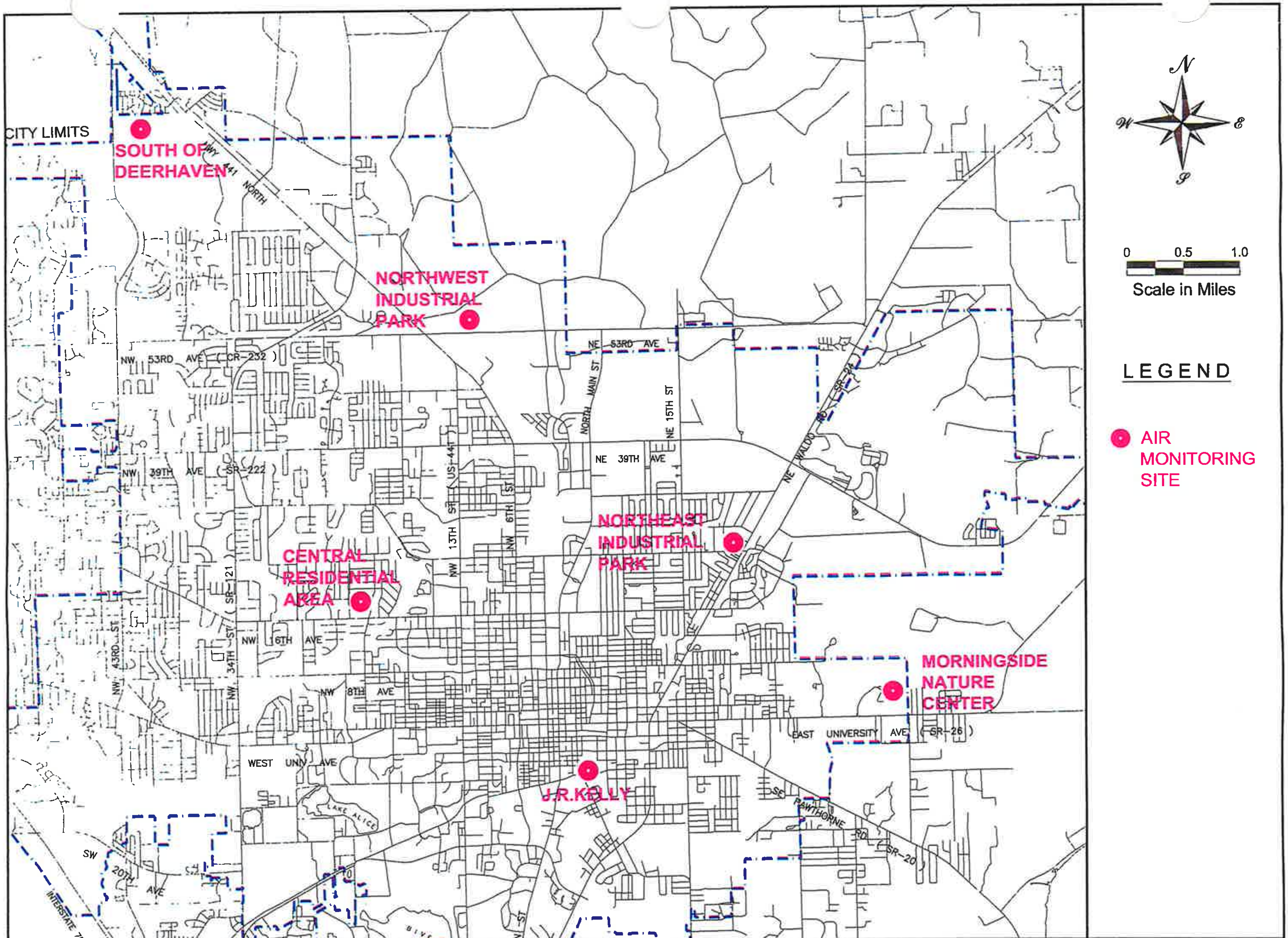
FIGURE 6

02/04/2002



GRU COAL MERCURY CONTENT - 2001
Mercury Concentration (ppm dry)
0.20
0.18
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
11/27/01
11/2/01
11/2/01
11/8/01
12/5/01
12/11/01
12/18/01
12/22/01
Sample Date
02/05/2002
RWK

FIGURE 7



SCALE : 1" = 6,000'

AUTOCAD FILE \KLEMANS\AIR_MONITORS.DWG
PLOT DATE 02/04/02 C.A.O.

LOCATIONS FOR AMBIENT AIR MONITORING OF V.O.C.'s

GRU

FIGURE 8

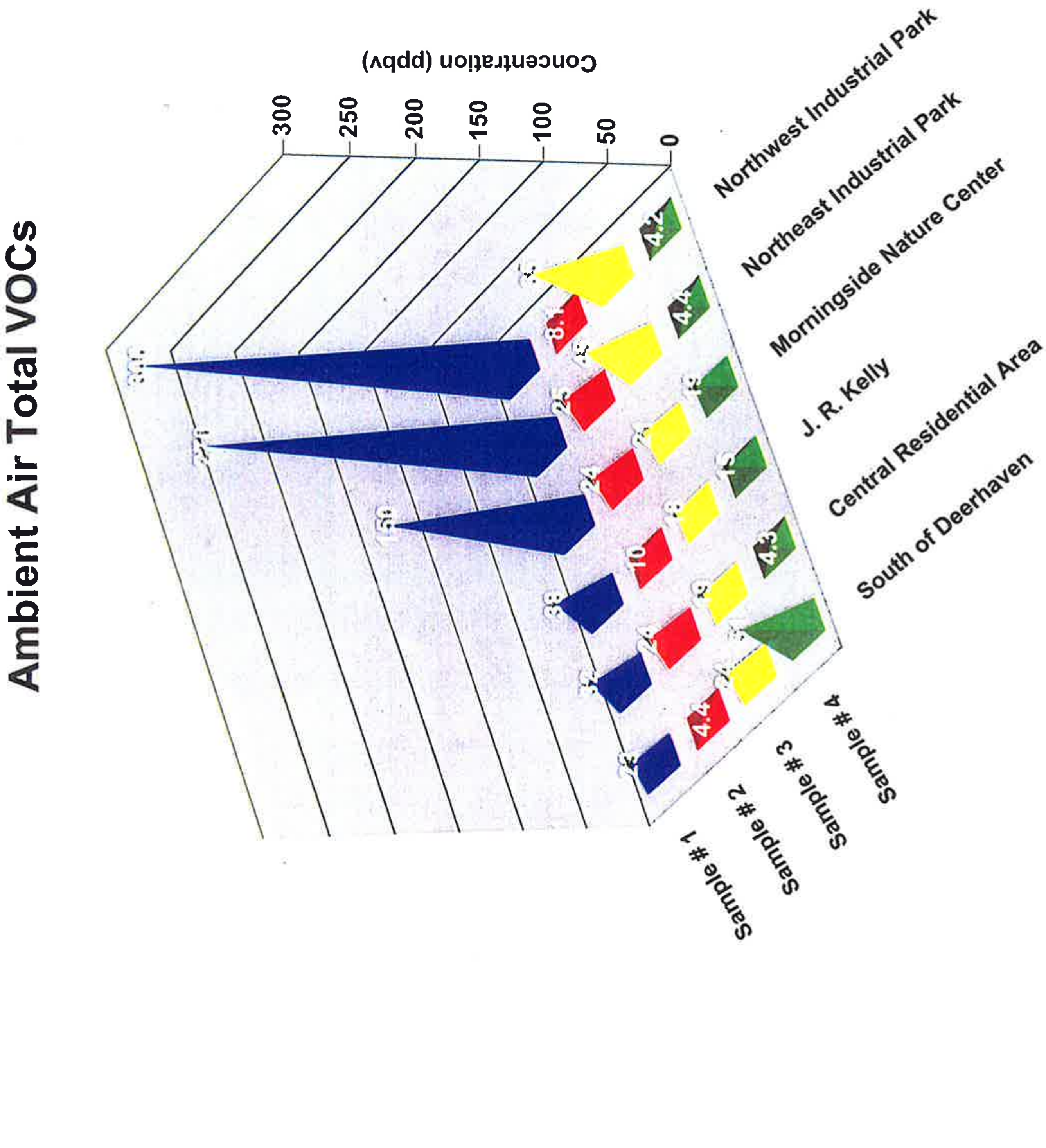

Ambient Air Total VOCs
Concentration (ppbv)
0
50
100
150
200
250
300
Northwest Industrial Park
Northeast Industrial Park
Morningside Nature Center
J. R. Kelly
Central Residential Area
South of Deerhaven
Sample # 1
Sample # 2
Sample # 3
Sample # 4
8.1
10
4.4
4.3
38

FIGURE 9

ALACHUA COUNTY
BOARD OF COUNTY COMMISSIONERS

P.O. Box 2877 • Gainesville, Florida 32602-2877
Tel. (352) 374-5210 • Fax (352) 338-7363
1-800-491-4496 (toll free) • Suncom 651-5210
Commissioners' E-Mail: bocc@co.alachua.fl.us
Home Page: www.co.alachua.fl.us

ALACHUA COUNTY
Board of County Commissioners

Commission

Dave Newport
Chair

Robert Hutchinson
Vice Chair

Mike Byerly

Rodney J. Long

Penelope Wheat

Administration

Randall H. Reid
County Manager

August 23, 2001

AUG 24

Mayor Tom Bussing
City of Gainesville
PO Box 490-19
Gainesville, FL 32602-490

Dear Mayor:

On August 14, 2001, the Alachua County Board of County Commissioners (BoCC) heard a presentation by the County's Environmental Protection staff regarding opportunities for reducing air emissions at the Deerhaven power plant. Staff's presentation included a review of the Deerhaven plant pollution control alternatives report prepared by GRU contractor Burns & McDonnell, Inc. The presentation was followed by staff recommendations and comments from GRU staff and concerned citizens.

Subsequently, the BoCC approved transmittal of the following recommended actions for consideration by the City Commission and GRU:

1. GRU should evaluate and implement performance improvements in the electrostatic precipitator (ESP) particulate control device at Deerhaven to reduce excess emissions during start-up and shut down operations;

2. GRU should further evaluate alternate control technologies for reduction of NOx, Mercury, SO2 and particulate emissions from the Deerhaven plant, considering not only capital investment and operational costs but also the costs of emissions in terms of their fiscal impacts on community health, the environment, and economic development impacts such as impacts on nature-based tourism and job recruiting;

3. The City of Gainesville should join Alachua County as a member of the Cities for Climate Protection, a local government initiative involving over one hundred cities and counties in the U.S. which have made voluntary commitments to reduce greenhouse gases (see website at http://www.iclei.org/us/US_ccp.html). The County is committing to a 20 percent reduction it its emission of greenhouse (GHG) gases by 2010. We hope that the City could commit to a similar goal;

4. GRU should evaluate carbon sequestration mitigation strategies to reduce carbon dioxide (CO2) emissions as part of an overall City GHG reduction goal.

It is indisputable that every member of the City Commission is dedicated to improving the air quality and overall environment of Gainesviille and Alachua County. We applaud your efforts. These measures are being suggested, after consultation with our professional staff, in an effort to assist the City's already exemplary environmental protection efforts. On behalf of the Board of County Commissioners, I look forward to continuing to work with the City of Gainesville and GRU to reduce emissions from the Deerhaven plant.

Sincerely,

Dave Newport

Dave Newport,
Chair

DN/cb
chr01.089

cc. Board of County Commissioners
Randall H. Reid, County Manager
Chris Bird, Director, Department of Environmental Protection
Mike Kurtz, General Manager, GRU
Laura Merker, Commission Services Coordinator

I. Automatic Voltage Controls for Precipitator Transformer - Rectifier Sets, installed 1996

Upon the unexpected early failure of the automatic voltage controls for the transformer - rectifier sets in Fall 1996, new BHA Preciptech SQ300 controllers were installed on the Unit 2 precipitator.

Explanation:

In 1996, with the assistance of BHA Preciptech service personnel who had previously provided Deerhaven with excellent maintenance service and technical assistance, it was determined that some of the old AVC's were not functioning properly even though their controls indicated normal operation. A few AVC's had failed completely and were beyond repairable. The AVC's were analog systems and parts were expensive and largely unavailable. As it was necessary to act immediately, Deerhaven plant staff and Power Engineering decided to replace the controls with modern microprocessor-controlled AVC's on an emergency purchasing basis.

BHA Preciptech was selected as the vendor. The SQ-300 AVC product was selected, and 24 of these were quickly ordered in November, 1996. Several AVC's were delivered within a few days and installed by plant electricians under the technical direction of a BHA Preciptech field service technician. Over a two-month period in Nov – Dec 1996, 24 SQ-300 AVC's were installed one at a time on the Unit 2 precipitator, while the unit was on-line. These AVC's have provided reliable service since they were installed, and recorded opacity measurements have confirmed this.

II. Controller for Precipitator Rappers and Vibrators, installed 1997

Following the installation of new AVC's in Fall 1996, a new BHA Preciptech PRC-100 controller for precipitator rappers and vibrators was purchased and installed 1997.

Explanation:

With the failure of the AVC's, the Rapper and Vibrator control sequencers were also becoming maintenance intensive. The existing Research-Cottrell rapper and vibrator controls featured relays and timers with a rolling drum logic sequencer. Like the existing AVC's, this electromechanical system had suffered several failures and was becoming unreliable.

Plant staff and Power Engineering decided to purchase new rapper/vibrator controls and install them during the planned Spring Outage in March, 1997. BHA Preciptech offered a PRC-100 controller for the rapper and vibrator systems, which was capable of coordinating with the new voltage controls.

In the existing precipitator rapper controls, there were five separate and uncoordinated controllers in discrete cabinets for the 212 rappers, in four groups of 48 and one group of 20. In the existing precipitator vibrator controls there were four separate controllers in discrete cabinets for the 96 rappers, in groups of 24 each.

The PRC-100 system implemented control for all rappers and vibrators in one two-bay cabinet with a microprocessor-based system. It provided for coordinated rapping and vibrating for the entire precipitator. In addition, programming the timing and sequencing is much easier, allowing plant staff to tune rapping and vibrating for optimum performance quickly and reliably.

The new PRC-100 system was installed in March 1997, and put in service at unit startup in early April 1997. The system has functioned successfully and with good reliability since its installation.

III. New Precipitator Control Supervisory Computer, installed 2000

A new supervisory Windows NT computer implemented with BHA WinDAC and WinRAP software was installed in January 2000.

Explanation:

The two systems of controllers, SQ-300 and PRC-100, were each delivered in 1996-97 with DOS-based computers that provided for operator interface control functions and system programming functions. These were 80486 PC's that were rather simple by today's standards, and although they were effective, they had now windows operating system and no multitasking capability now expected from computer workstations. They were also nearing the end of their expected service life in Fall 1999.

Power Engineering and Deerhaven plant staff purchased the new WinDAC and WinRAP software packages offered by BHA for the control systems. These were implemented on an industrial Pentium class PC that had been purchased the previous year and had a new (1999) motherboard for Y2K compliance. One NT workstation PC replaced the two DOS PC's and provided faster and better precipitator information for plant operators and maintenance personnel.

The WinDAC software provided additional functionality to better coordinate the 24 SQ-300 controls for T-R Sets from a graphical user interface (GUI). It provided the capability of remote access via computer network or dialup for additional technical support from off-site locations. It provided the capability for energy management, which was implemented with the first priority to minimize particulate emissions while improving precipitator reliability and improving overall unit energy efficiency.

WinDAC uses the CEMS opacity measurement to determine the optimum level of power for precipitator operation. The T-R Sets are capable of operating at full design efficiency for particulate removal at approximately 50% T-R Set power during normal boiler operation. During periods when the boiler is not operating at steady state, such as load change, system upsets and transitions, opacity is monitored and additional power is applied up to 100% as necessary to control emissions to the lowest level possible within the maximum capability of the precipitator for the boiler operating conditions. Operating the TR-Sets at reduced power reduces stress on power electronics and electrical equipment, and improves reliability while extending service life.

IV. Remote Monitoring and Diagnostics Service by BHA, implemented 2001

In July, 2001, Deerhaven purchased a Remote Monitoring and Diagnostics Service which provides advanced technical support from BHA by remote data link and operational analysis of precipitator operation.

Explanation:

With the installation of the Precipitator computer with the NT operating system and WinDAC and WinRAP software, it became possible to implement a remote data link with BHA's service center in Newport News, VA, for technical support for maintenance and operational analysis using controls data. This service was requested when new engineering personnel added to plant staff in Summer 2001 were able to implement and support it at the plant.

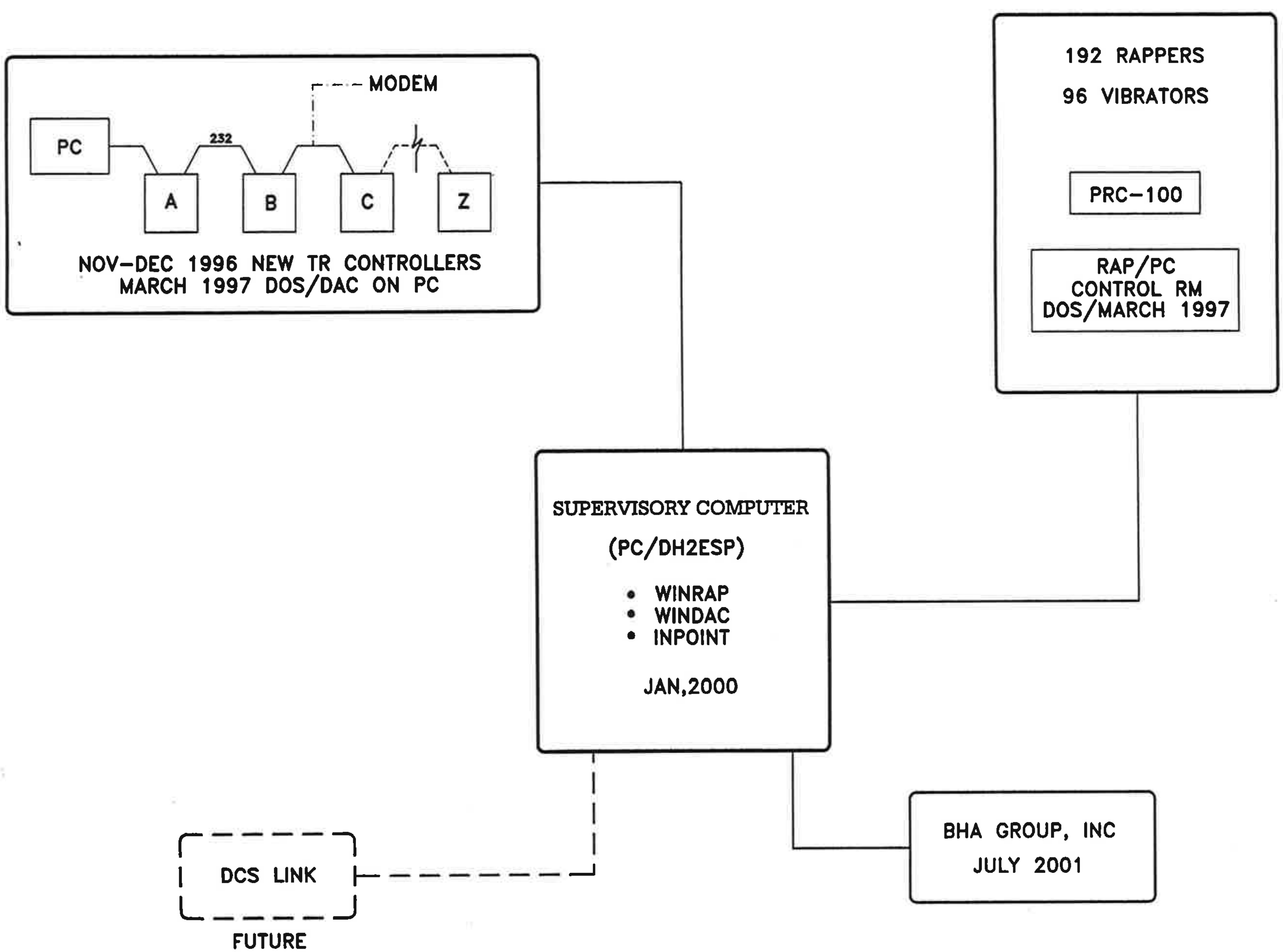
The technical support will be available on a 24-hour basis via voice telephone assistance to plant personnel and via dial-up modem from Newport News into the Deerhaven Precipitator Computer by BHA technicians who are experts. This assistance will guide plant staff as they troubleshoot problems and help them find solutions quickly. The technical advice by telephone has always been available from BHA in the past, but not the data link service is new and vastly enhances BHA's capability to provide analysis as they have access to real-time data. This contract formalizes the support relationship and provides for BHA to commit resources to our problems and within a prearranged agreement for them to be compensated. Plant personnel can immediately begin solving problems without pausing to get purchase order authorization.

ATTACHMENT 2

The monthly operational analysis report of the precipitator will provide a synopsis of operation and analysis of alarms and trends in operation. As many aspects of precipitator operation are slow responding systems, a monthly analysis by technical experts is expected to be more than adequate to anticipate problems and help plant staff avert failures and become proactive. This analysis will help identify problems before equipment fails and operation suffers.

DEERHAVEN UNIT 2 ELECTROSTATIC PRECIPITATOR

IMPROVEMENTS TO CONTROL SYSTEMS



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