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BUREAU OF AIR REGULATION

February 10, 2003

Mr. Greg DeAngelo
Florida Department of Environmental Protection
Bureau of Air Regulation, New Source Review Section
2600 Blair Stone Road, MS 5505
Tallahassee, Florida 32399-2400

Re: **Hines Energy Complex - Power Block 3**
Additional Information Related to
Project No. 1050234-006-AC/Air Permit No. PSD-FL-330 and
Supplemental Site Certification Application to PA 92-33

Dear Mr. DeAngelo:

Please find enclosed additional information relating to the air quality impacts of, and the nature and extent of, all general, residential, commercial, industrial and other growth which has occurred since August 7, 1977 in the area of this proposed project. This information is provided to supplement the information provided in the above referenced application and to fully satisfy the requirements of 62-212.400(3)(h)(5), F.A.C.

Should you have any questions regarding this information, please contact me at (813) 826-4363.

Sincerely,

Jamie Hunter
Lead Environmental Specialist
Environmental Services

jjh/JJH055

Enclosure

c/enc: Hamilton Oven – FDEP Siting Office
Doug Roberts – HG&S

P.O. Box 14042
St. Petersburg, FL 33733

HINES ENERGY COMPLEX, POWER BLOCK 3
GENERAL, RESIDENTIAL, COMMERCIAL, INDUSTRIAL GROWTH

In support of Progress Energy's response to Florida Department of Environmental Protection (FDEP) sufficiency questions, December 18, 2002, Progress Energy submits the following information to satisfy the requirements of 62-212.400(3)(h)(5), Florida Administrative Code (F.A.C.), which states that an application must include information relating to the air quality impacts of, and the nature and extent of, all general, residential, commercial, industrial and other growth which has occurred since August 7, 1977, in the area the facility or modification would affect. This information is consistent with the EPA Guidance related to this requirement in the Draft New Source Review Workshop Manual (1990).

In general, there has been minimal residential, commercial, and industrial growth within a 5-mile radius of the Hines Energy Complex site since 1977. The site is located in Polk County in central Florida and is the fourth largest county in Florida consisting of 1,823 square miles. The site lies in a region of the state dominated by phosphate mining operations including mines, settling ponds, sand tailings piles, gypsum stacks, and chemical and beneficiation plants. The site itself consists of approximately 8,000 acres that is wholly owned by Progress Energy. The adjacent land uses consist almost entirely of active phosphate mining, or mined and reclaimed lands. See Figure 2.2.3-2 of the Supplemental Site Certification Application (SSCA). From the standpoint of land use compatibility, the availability of transportation facilities, the lack of noise and visual impacts during construction and operation activities, the Siting Board has already determined the site location to be suitable for power plant facilities. A discussion of land use in the area of the Hines Energy Complex site is presented in Section 2.2 of the SSCA.

The following discussion presents general trends in residential, commercial, industrial, and other growth that has occurred since August 7, 1977, in Polk County. As such, the information presents information available from a variety of sources (e.g., Florida Statistical Abstract, FDEP) that characterizes Polk County as a whole.

RESIDENTIAL GROWTH

POPULATION AND HOUSEHOLD TRENDS

As an indicator of residential growth, the trend in the population and number of single- and multi-family household units in Polk County since 1977 are shown in Figure 1.

Over 3 million people live within a 50-mile radius and 6 million within a 100-mile radius of the Polk County. The county experienced a 73 percent increase in population for the years 1977 through 2000. During this period, there was an increase in population of about 204,000 with about 123,000 due to births and the rest from people moving into the county.

Similarly, the number of households in the county increased by about 68,000 or about 58 percent since 1977.

GROWTH ASSOCIATED WITH THE OPERATION OF THE PROJECT

The nearest community to the project is the unincorporated community of Homeland that is approximately 1 mile northeast of the site boundary. There are very few residences near the plant site. Because of the limited number of workers needed to operate the project, residential growth due to the project is expected to be minimal.

COMMERCIAL GROWTH

RETAIL TRADE AND WHOLESALE TRADE

As an indicator of commercial growth in Polk County, the trends in the number of commercial facilities and employees involved in retail and wholesale trade are presented in Figure 2. The retail trade sector comprises establishments engaged in retailing merchandise. The retailing process is the final step in the distribution of merchandise. Retailers are, therefore, organized to sell merchandise in small quantities to the general public. The wholesale trade sector comprises establishments engaged in wholesaling merchandise. This sector includes merchant wholesalers who buy and own the goods they sell; manufacturers' sales branches and offices who sell products manufactured domestically by their own company; and agents and brokers who collect a commission or fee for arranging the sale of merchandise owned by others.

Since 1977 retail trade has increased by 524 establishments and 21,000 employees or 38 and 108 percent, respectively. For the same period, wholesale trade has increased by 413 establishments and 4,600 employees or 107 and 98 percent, respectively.

LABOR FORCE

The trend in the labor force in Polk County since 1977 is shown in Figure 3. The county is designated as a labor surplus area by the U.S Department of Labor. The unskilled labor supply consistently exceeds local demand. The estimated unemployment rate for 2000 was 4.7 percent.

Between 1977 and 1999, approximately 88,600 persons were added to the available work force for an increase of 85 percent.

TOURISM

Another indicator of commercial growth in Polk County is the tourism industry. As an indicator of tourism growth in the county, the trend in the number of hotels and motels and the number of units at the hotels and motels are presented in Figure 4.

This industry comprises establishments primarily engaged in marketing and promoting communities and facilities to businesses and leisure travelers through a range of activities, such as assisting organizations in locating meeting and convention sites; providing travel information on area attractions, lodging accommodations, restaurants; providing maps; and organizing group tours of local historical, recreational, and cultural attractions.

Between 1978 and 2000, there was a decrease of about 25 percent in the number of hotels and motels in the county; however there was a slight increase of 7 percent in the number of units at those facilities.

TRANSPORTATION

As an indicator of transportation growth, the trend in the number of vehicle miles traveled (VMT) by motor vehicles on major roadways in Polk County is presented in Figure 5. The county is the center of Florida's industrial belt and is within 500 miles of 40 major metropolitan areas.

The county straddles Interstate I-4, the main conduit for the central Florida growth corridor. Interstate I-4 connects with Interstate I-75 between Lakeland and Tampa (16 miles west of Lakeland to the interchange). Interstate I-4 extends from Orlando in the east, connecting with the Florida Turnpike, and continues to Daytona where it connects with Interstate I-95. Other major highways in the county include U.S Highways 27, 60, 92, and 98.

Between 1977 and 2001, there was an increase of about 5,100,000 VMT or 62 percent in the amount of travel by motor vehicles on major roadways in the county.

GROWTH ASSOCIATED WITH THE OPERATION OF THE PROJECT

The existing commercial and transportation infrastructure should be adequate to provide any support services that might be required during construction and operation of the project. The workforce needed to operate the proposed project is expected to be about 12 workers that represent a small fraction of the labor force present in the immediate and surrounding areas.

INDUSTRIAL GROWTH

UTILITIES

Existing power plants in Polk County include the following:

- Ridge Generating Station;
- TECO Polk Power Station;
- Lakeland Electric McIntosh Plant;
- Lakeland Electric Larsen Plant;
- Calpine Auburndale Plant;
- Orange Cogen Plant;
- Mulberry Cogen Plant;
- Progress Energy, Hines Energy Complex, Power Block 1; and
- Progress Energy Tiger Bay Plant.

Together, these power plants have an electrical generating capacity of over 2,300 megawatts (MW).

Proposed sources that have received air permits or sources under construction include the following:

- CPV Pierce;
- Calpine Osprey Plant;
- Lakeland Electric Winston Peaking Station;
- Decker Peace River Plant;
- Calpine Auburndale Unit 2;
- TECO Polk Modification; and
- Progress Energy, Hines Energy Complex, Power Block 2.

Together, these power plants have a proposed electrical generating capacity of over 2,200 megawatts (MW).

As an indicator of electrical utility growth, the electrical generation capacity in Polk County since 1977 is shown in Figure 6.

MINING, MANUFACTURING, AND CITRUS INDUSTRIES

As an indicator of industrial growth, the trend in the number of employees in the mining and manufacturing industries in Polk County since 1977 are shown in Figure 7. As shown, the mining industry has experienced a decrease of 36 percent in the number of employees since 1977. Meanwhile, the manufacturing industry has experienced a slight increase of 5 percent in the number of employees.

As another indicator of industrial growth, the trend in the number of boxes of citrus produced in Polk County since 1977 is also shown in Figure 7. The citrus industry has experienced increases in the 1980s and early 1990s but, since 1977, has decreased by 22 percent.

GROWTH ASSOCIATED WITH THE OPERATION OF THE PROJECT

Since the baseline date of August 7, 1977, there have been only a few major facilities built within a 10-mile radius of the plant site including but not limited to: Orange Cogen Plant, TECO Polk Power Station, Progress Energy Tiger Bay Plant, and Mulberry Cogen Plant. These facilities consist of combustion turbines primarily operating in combined cycle mode and firing natural gas. Based on their locations in different areas around the Hines Energy Complex, it is not expected that there will be concentrated industrial/commercial growth due to the operation of the project.

AIR QUALITY DISCUSSION

AIR EMISSIONS AND SPATIAL DISTRIBUTION OF MAJOR FACILITIES

The spatial distribution of major air pollutant facilities in Polk County is shown in Figure 8. Based on actual emissions reported in 1999, total emissions of stationary sources from the county are as follows:

- SO_2: 31,900 TPY;
- Particulate matter with diameter of 10 microns or less (PM_{10}): 1,100 TPY;
- Nitrogen oxides (NO_x): 10,200 TPY;
- Carbon monoxide (CO): 1,050 TPY; and
- Volatile organic compounds (VOC): 320 TPY.

AIR EMISSIONS FROM MOBILE SOURCES

The trends in the air emissions of CO, VOC, and NO_x from mobile sources are presented in Figure 9. Between 1977 and 2002, there were significant decreases in these emissions. The decrease in CO, VOC, NO emissions were about 81, 7, and 4 tons per day, respectively, which represent decreases of 80, 80, and 56 percent, respectively, from 1977 emission estimates.

AIR MONITORING DATA

Since 1977, Polk County has been classified as attainment for all criteria pollutants. There are currently four air quality monitors that are operated by the FDEP in Polk County. These monitors measure sulfur dioxide (SO_2) concentrations (Mulberry and Nichols), PM_{10} concentrations (Mulberry and Nichols), and ozone (two sites in Lakeland). Data collected from these stations are considered to be representative of air quality in Polk County. A summary of the maximum pollutant concentrations measured in Polk County from 1998 through 2001 is presented in Table 2.3.7-7 of the SSCA application.

These data indicate that the maximum air quality concentrations measured in the region comply with and are well below the applicable ambient air quality standards. These monitoring stations are generally located in areas where the highest concentrations of a measured pollutant is expected due to the combined effect of emissions from stationary and mobile sources as well as meteorology. Therefore, the ambient concentrations in areas not monitored should have pollutant concentrations less than those monitored concentrations.

In addition, since 1977, SO_2 and PM in the form of PM_{10} or total suspended particulates (TSP) have been collected in the county at numerous monitoring stations. Ozone data have been collected at several monitoring stations in the county since 1992.

SO_2 Concentrations

The trends in the annual, 24-hour, and 3-hour average SO_2 concentrations measured in Polk County since 1977 are presented in Figures 10 through 12, respectively. SO_2 concentrations have been measured at more than 15 stations for various time periods throughout these years. The information presented in these figures is for those stations which operated for more than one year from 1977 through 2002.

As shown in these figures, measured SO_2 concentrations have been and continue to be well below the AAQS.

PM_{10}/TSP Concentrations

The trends in the annual and 24-hour average PM_{10} and total suspended particulate (TSP) concentrations measured in Polk County since 1977 are presented in Figures 13 and 14, respectively. TSP concentrations are presented through 1988 since the AAQS was based on TSP concentrations through that year. In 1988, the TSP AAQS was revoked and the PM standard was revised to PM_{10}. TSP, and PM_{10} concentrations have been measured at more than 20 stations for various time periods throughout these years. Similar to the SO_2 concentrations, the information presented in these figures is for those stations which operated for more than one year from 1977 through 2002.

As shown in these figures, measured TSP concentrations were generally below the TSP AAQS although, at several monitors, the TSP concentrations approached and exceeded the AAQS. Since 1988 when PM_{10} concentrations have been measured, the PM_{10} concentrations have been and continue to be below the AAQS.

Ozone Concentrations

The trends in the 1-hour and 8-hour average ozone concentrations measured in Polk County since 1991 are presented in Figures 15 and 16, respectively. Ozone concentrations were not measured in Polk County prior to 1991. Ozone concentrations have been measured at four stations since 1991.

As shown in these figures, measured ozone concentrations have approached but have not exceeded the AAQS. This trend is similar to measured ozone concentrations in surrounding counties that exhibit similar trends as those for Polk County. Ozone is a regional pollutant that is produced due to the interaction of regional VOC and NO_x emissions with sunlight. These emissions originate not only in Polk County but from adjacent counties to produce ozone concentrations across the region.

AIR MODELING ANALYSES FOR THE PROJECT

Additionally, results of air modeling analyses demonstrate that the Project will comply with all applicable AAQS and PSD Class II and I increments. In fact, the project's maximum impacts are predicted to be below the significant impact levels in PSD Class II and I areas.

CONCLUSIONS

Because of the minimal number of operational workers required for the project, the limited amount of current and expected commercial and industrial development around the existing plant site, and the low predicted impacts of the project in an area that currently complies and is anticipated to comply with ambient air quality standards, the air quality associated with the general, residential, commercial, and industrial growth in the county which has occurred since August 7, 1977 is expected to remain below ambient standards once the project is constructed and operated.

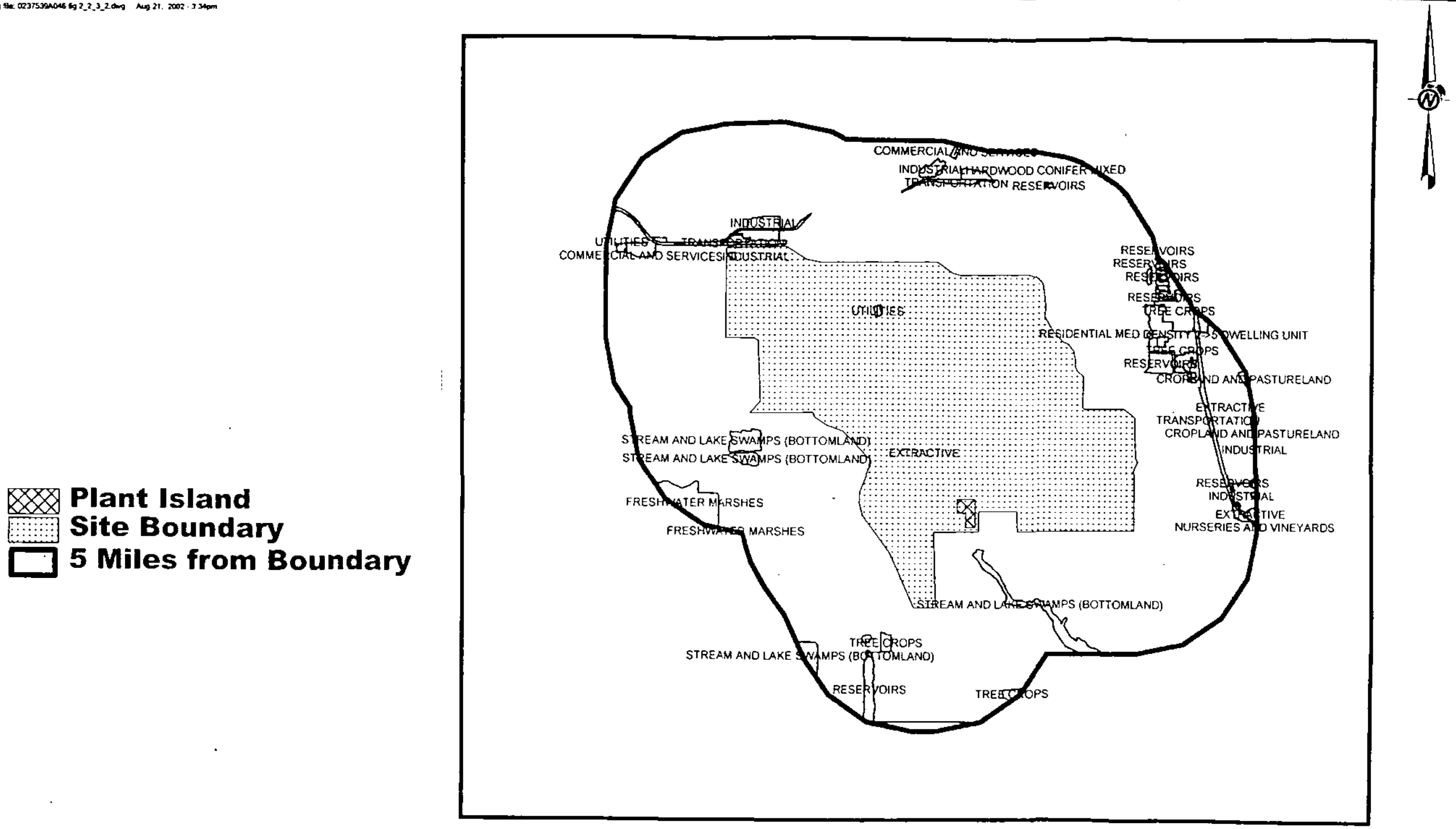
Table 2.3.7-7. Summary of Maximum Measured SO_2, PM_{10}, O_3, and NO_2 Concentrations Representative of the Hines Energy Complex, 1998 to 2001

AIRS/ Saroad Site No.	Operator	Location	Measurement Period Year	Months	1-Hour Highest	1-Hour 2nd Highest	3-Hour Highest	3-Hour 2nd Highest	8-Hour 3-year Average 4th Highest	24-Hour Highest	24-Hour 2nd Highest	Annual Average
Sulfur dioxide		**Florida AAQS**			**NA**	**NA**	**NA**	**0.5 ppm**	**NA**	**NA**	**0.1 ppm**	**0.02 ppm**
2860006F02	Polk County	Mulberry	1998	Jan-Dec	NA	NA	0.078	0.069	NA	0.029	0.027	0.006
			1999	Jan-Dec	NA	NA	0.070	0.052	NA	0.019	0.019	0.006
			2000	Jan-Dec	NA	NA	0.074	0.062	NA	0.022	0.018	0.005
			2001	Jan-Dec	NA	NA	0.059	0.048	NA	0.018	0.017	0.005
PM_{10} [a]		**Florida AAQS**			**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**150 μg/m³**	**50 μg/m³**
121052006-1	Polk County	Mulberry	1998	Jan-Dec	NA	NA	NA	NA	NA	108	91	22.2
			1999	Jan-Dec	NA	NA	NA	NA	NA	50	50	20.8
			2000	Jan-Dec	NA	NA	NA	NA	NA	46	45	25.4
			2001	Jan-Dec	NA	NA	NA	NA	NA	74	59	22.6
Ozone [a]		**Florida AAQS**			**NA**	**0.12 ppm**	**NA**	**NA**	**0.08 ppm**	**NA**	**NA**	**NA**
121056006-1	Polk County	Lakeland	1998	Jan-Dec	0.119	0.106	NA	NA	NA	NA	NA	NA
			1999	Jan-Dec	0.103	0.101	NA	NA	NA	NA	NA	NA
			2000	Jan-Dec	0.106	0.102	NA	NA	NA	NA	NA	NA
			2001	Jan-Dec	0.113	0.106	NA	NA	NA	NA	NA	NA
Nitrogen dioxide		**Florida AAQS**			**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**0.053 ppm**
120570081-1	Hillsborough	Tampa	1998	Jan-Dec	NA	NA	NA	NA	NA	NA	NA	0.006
			1999	Jan-Dec	NA	NA	NA	NA	NA	NA	NA	0.007
			2000	Jan-Dec	NA	NA	NA	NA	NA	NA	NA	0.008
			2001	Jan-Dec	NA	NA	NA	NA	NA	NA	NA	0.007

Note: NA = not applicable.
AAQS = ambient air quality standard.

[a] On July 18, 1997, EPA promulgated revised AAQS for particulate matter and ozone. For particulate matter, $PM_{2.5}$ standards were introduced with a 24-hour average standard of 65 μg/m³ (based on the 3-year averages of the 98th percentile values) and an annual standard of 15 μg/m³ (3-year averages at community monitors). The form of the 24-hour PM_{10} standard was changed; compliance is based on 3-year average of 99th percentile concentrations that is 150 μg/m³ or less. The O_3 standard was modified to be 0.08 ppm for the 8-hour average; achieved when the 3-year average of 99th percentile values is 0.08 ppm or less. The courts have stayed these standards. Florida DEP has not yet adopted the revised standards.

Drawing file: 0237539A046 fig 2_2_3_2.dwg Aug 21, 2002 - 3:34pm



SOURCE: SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT 1999 LAND USE

Florida Power
Hines Energy Complex

FIGURE 2.2.3-2
EXISTING LAND USE WITHIN
5 MILES OF THE PLANT

Figure 1. Population and Household Unit Trends in Polk County

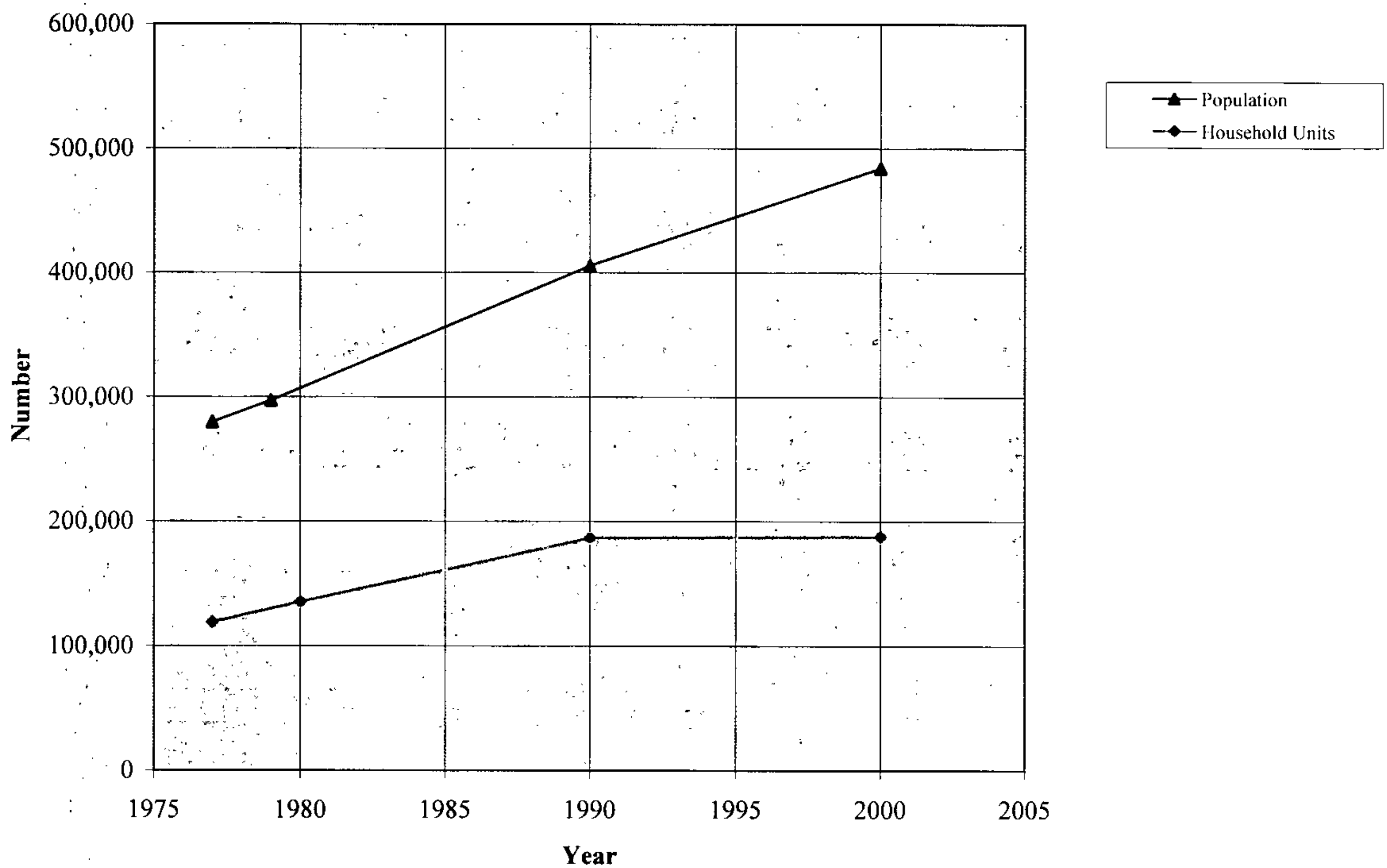


Figure 2. Retail and Wholesale Trade Trends in Polk County

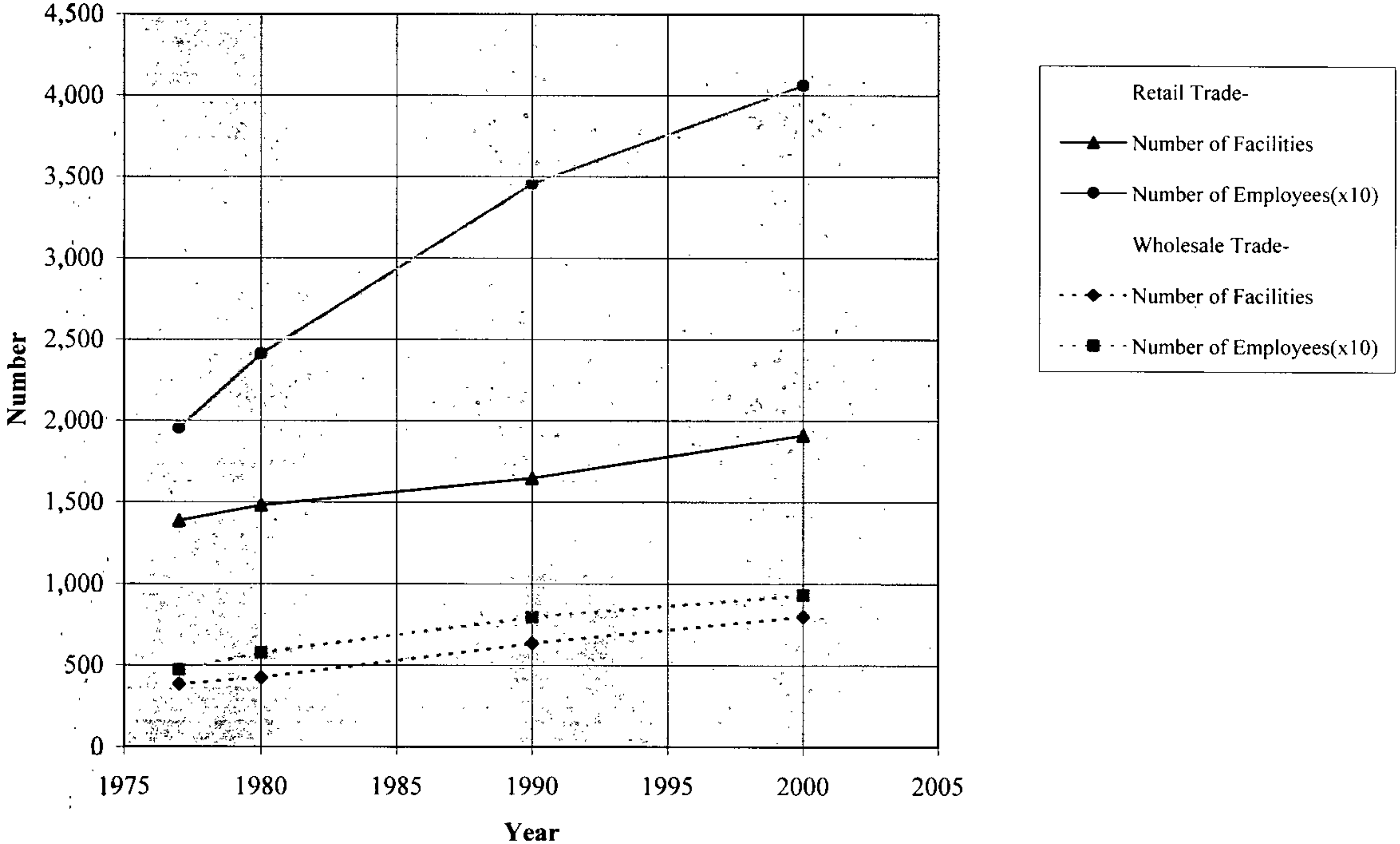


Figure 3. Labor Force Trend in Polk County

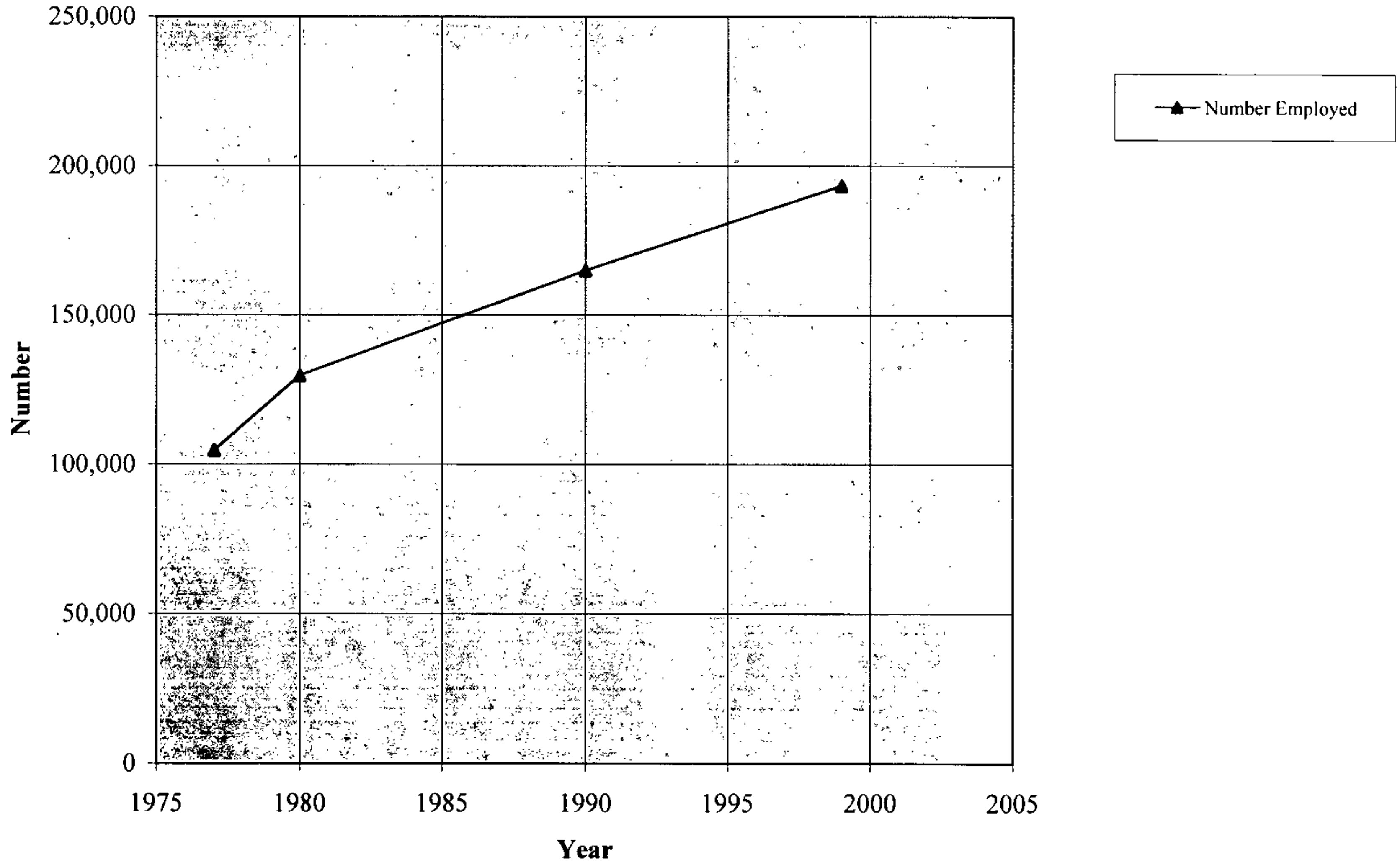


Figure 4. Hotel and Motel Trend in Polk County

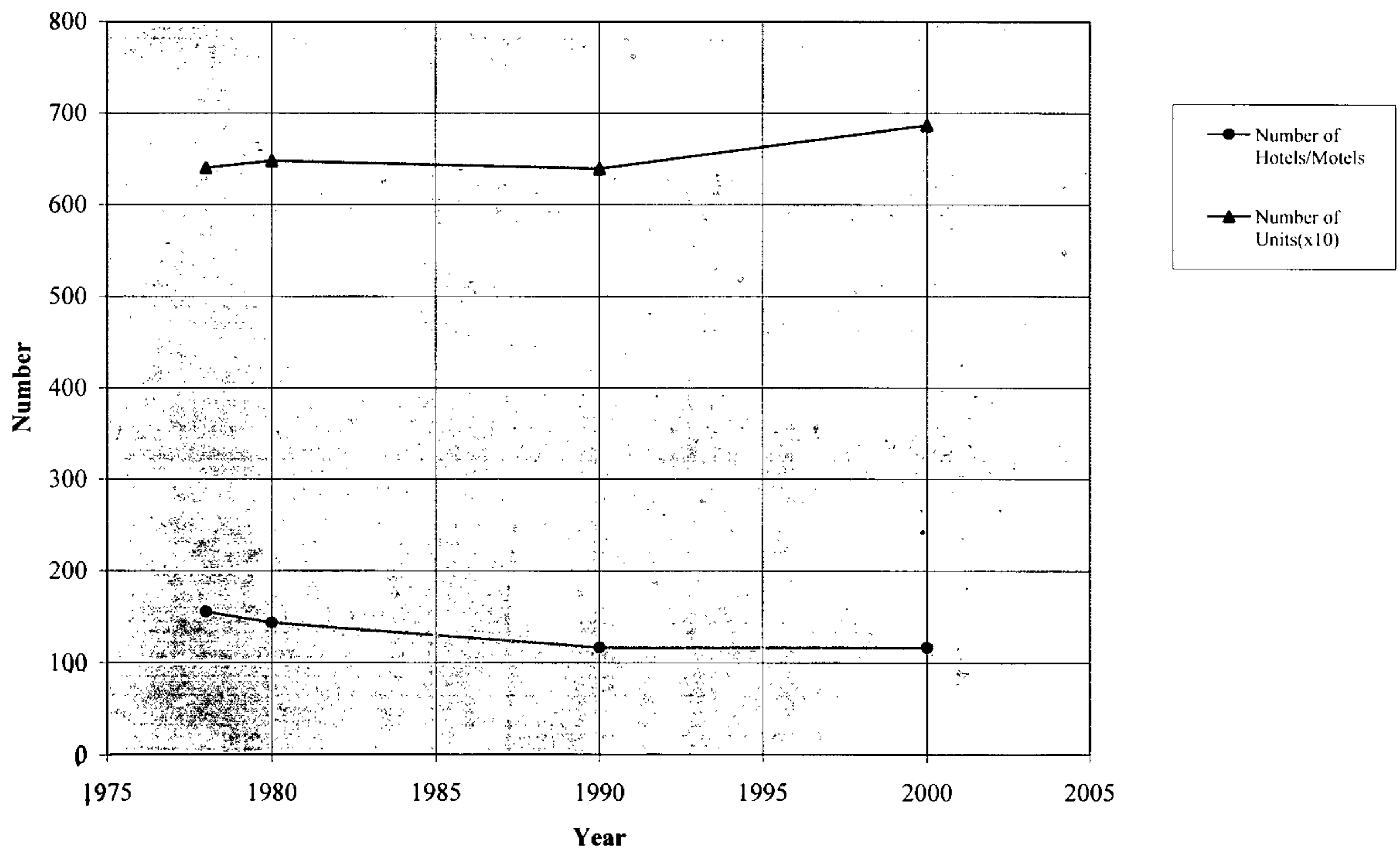


Figure 5. Vehicle Miles Traveled (VMT) Estimates for Motor Vehicles for Polk County

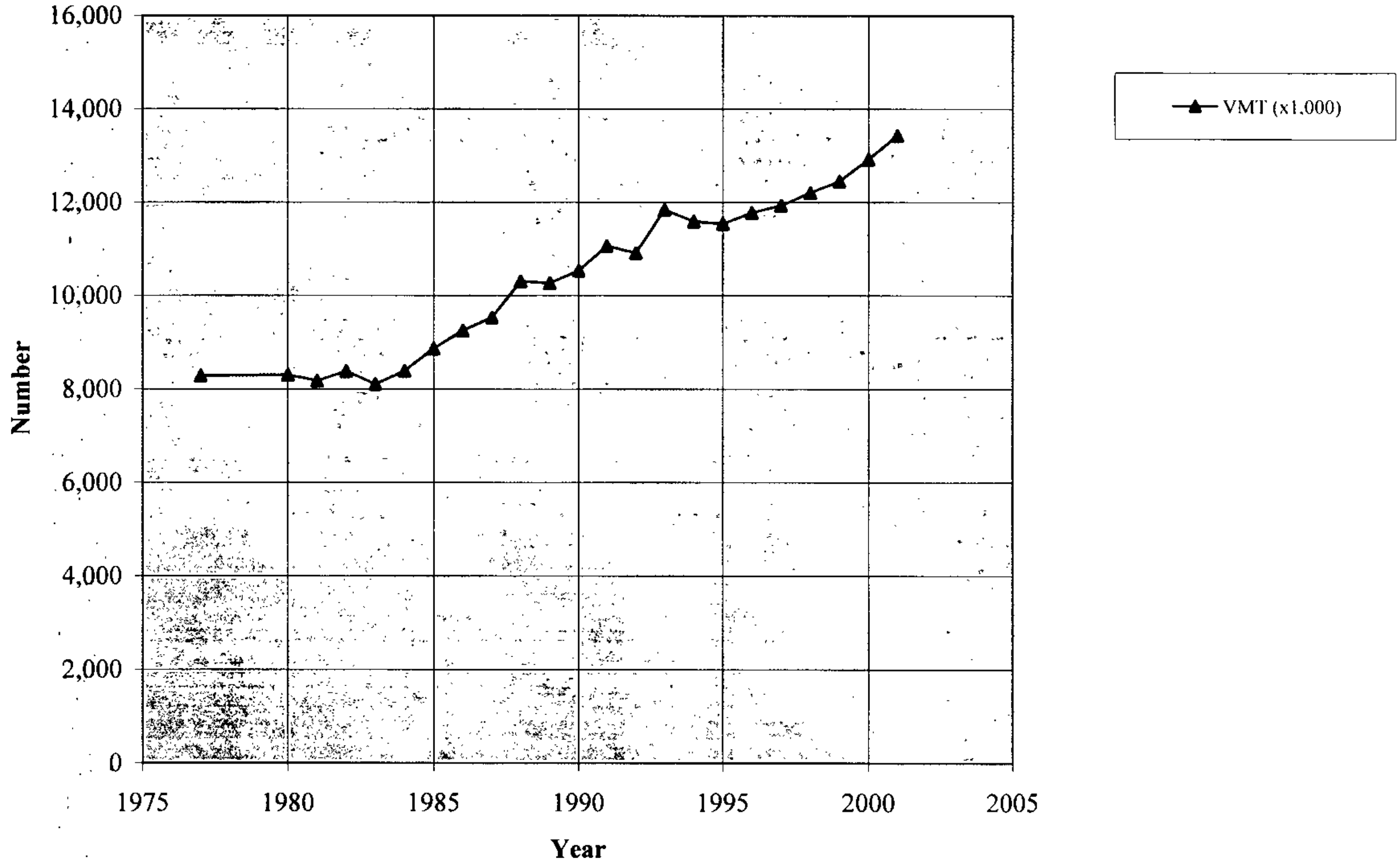
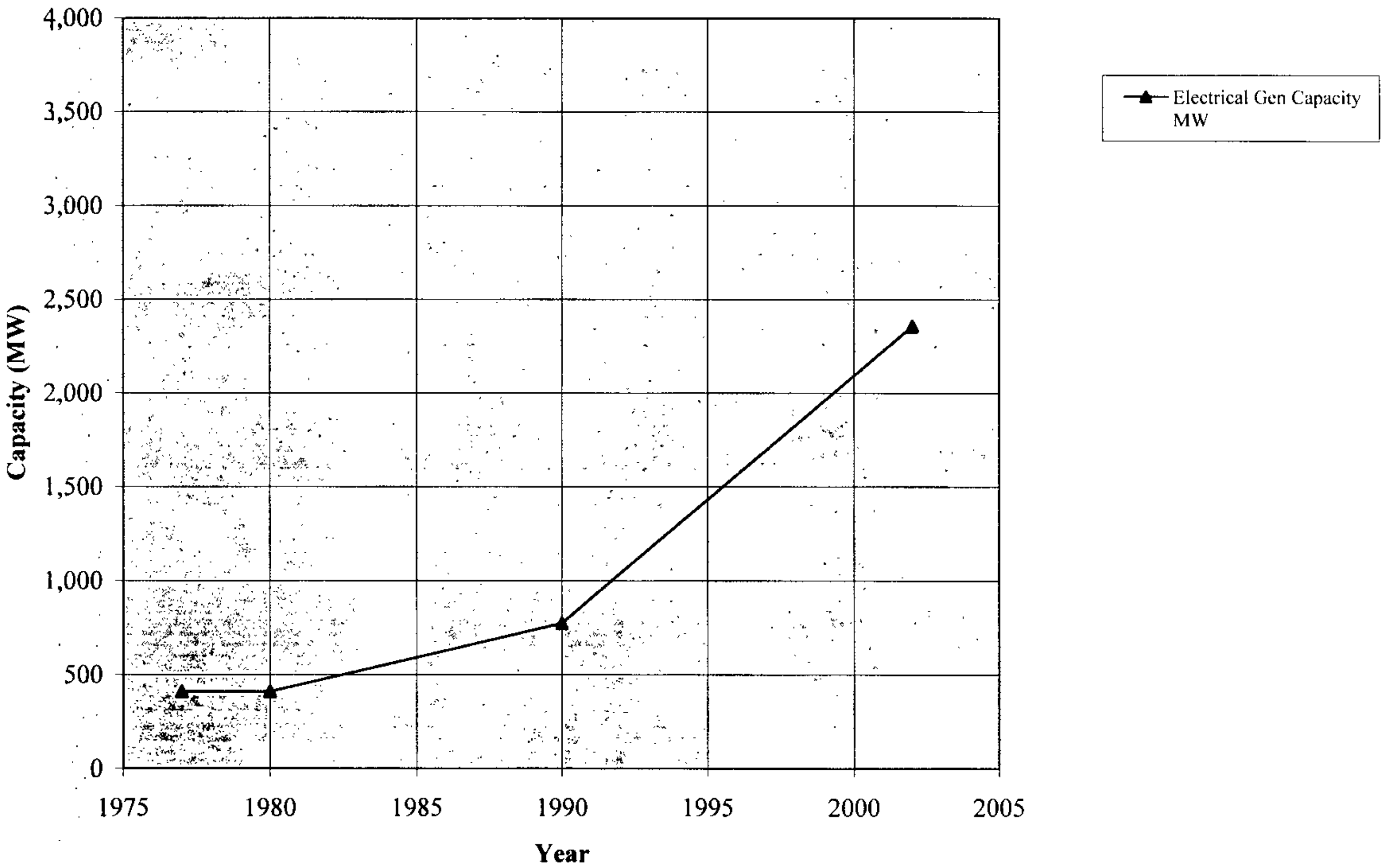


Figure 6. Electrical Power Generation Capacity in Polk County



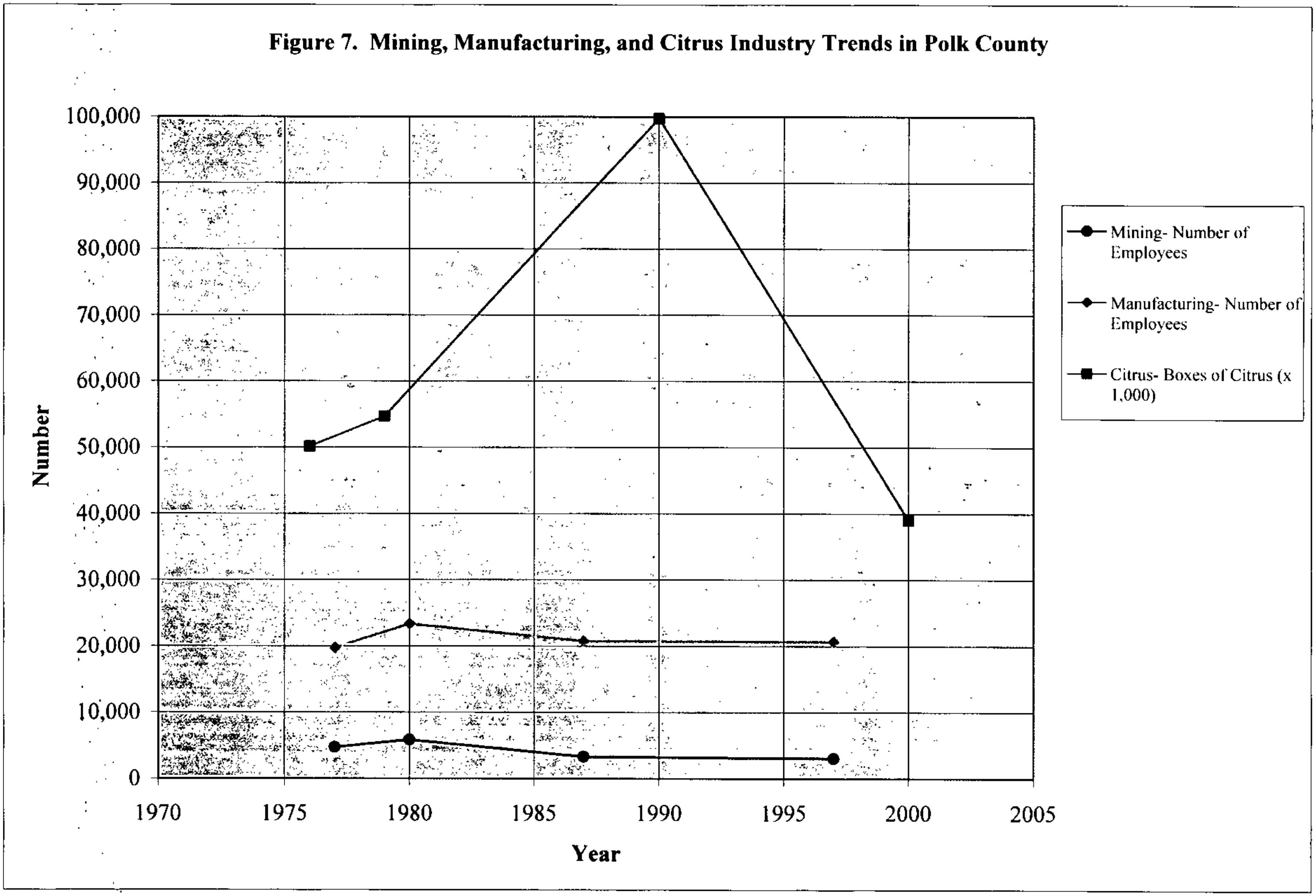


Figure 7. Mining, Manufacturing, and Citrus Industry Trends in Polk County
100,000
90,000
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
Number
1970
1975
1980
1985
1990
1995
2000
2005
Year
Mining- Number of Employees
Manufacturing- Number of Employees
Citrus- Boxes of Citrus (x 1,000)

Figure 8. Major Sources of Air Emissions in Polk County

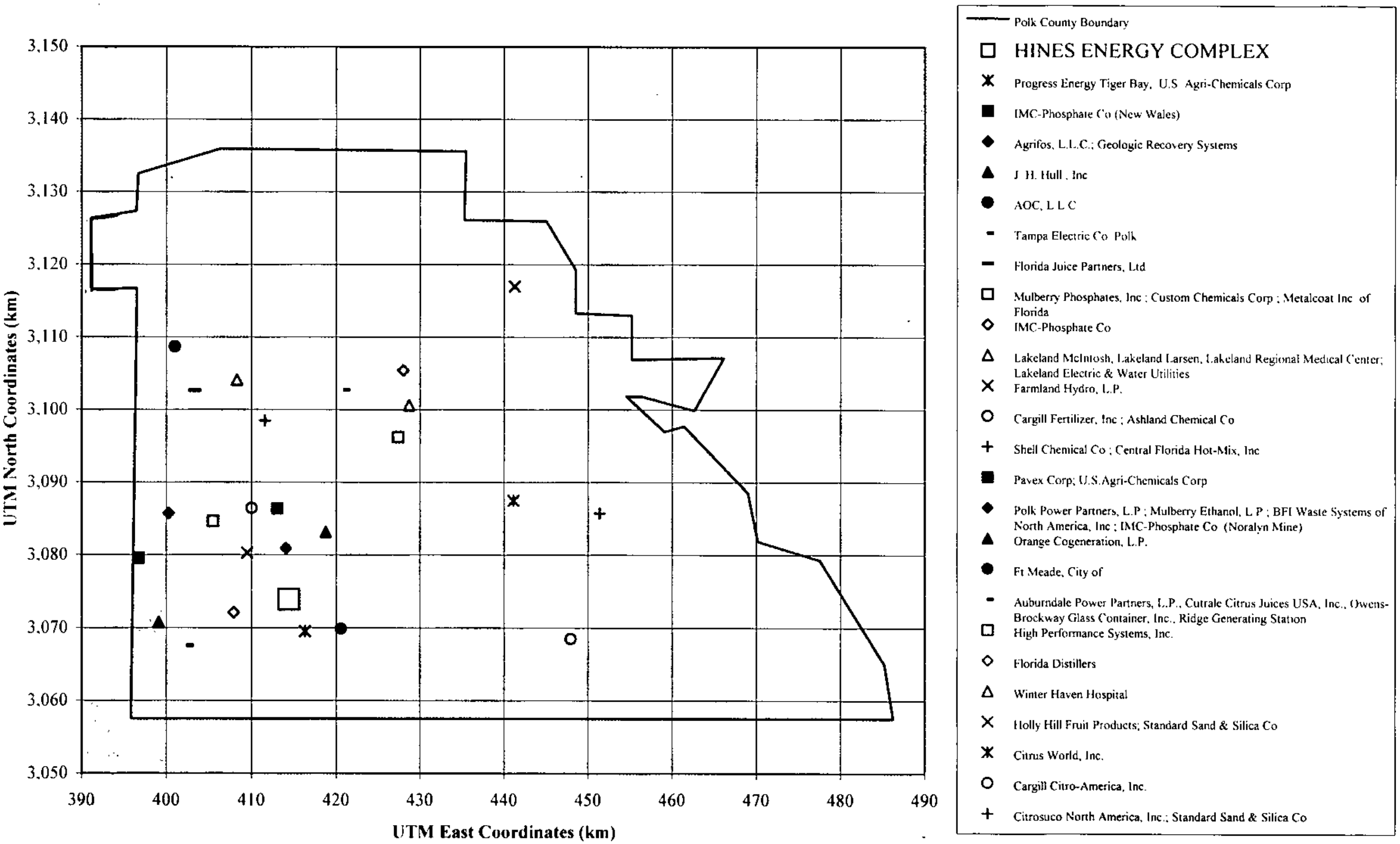


Figure 9. Mobile Source Emissions (Tons per Day) of CO, VOC, and NOx in Polk County

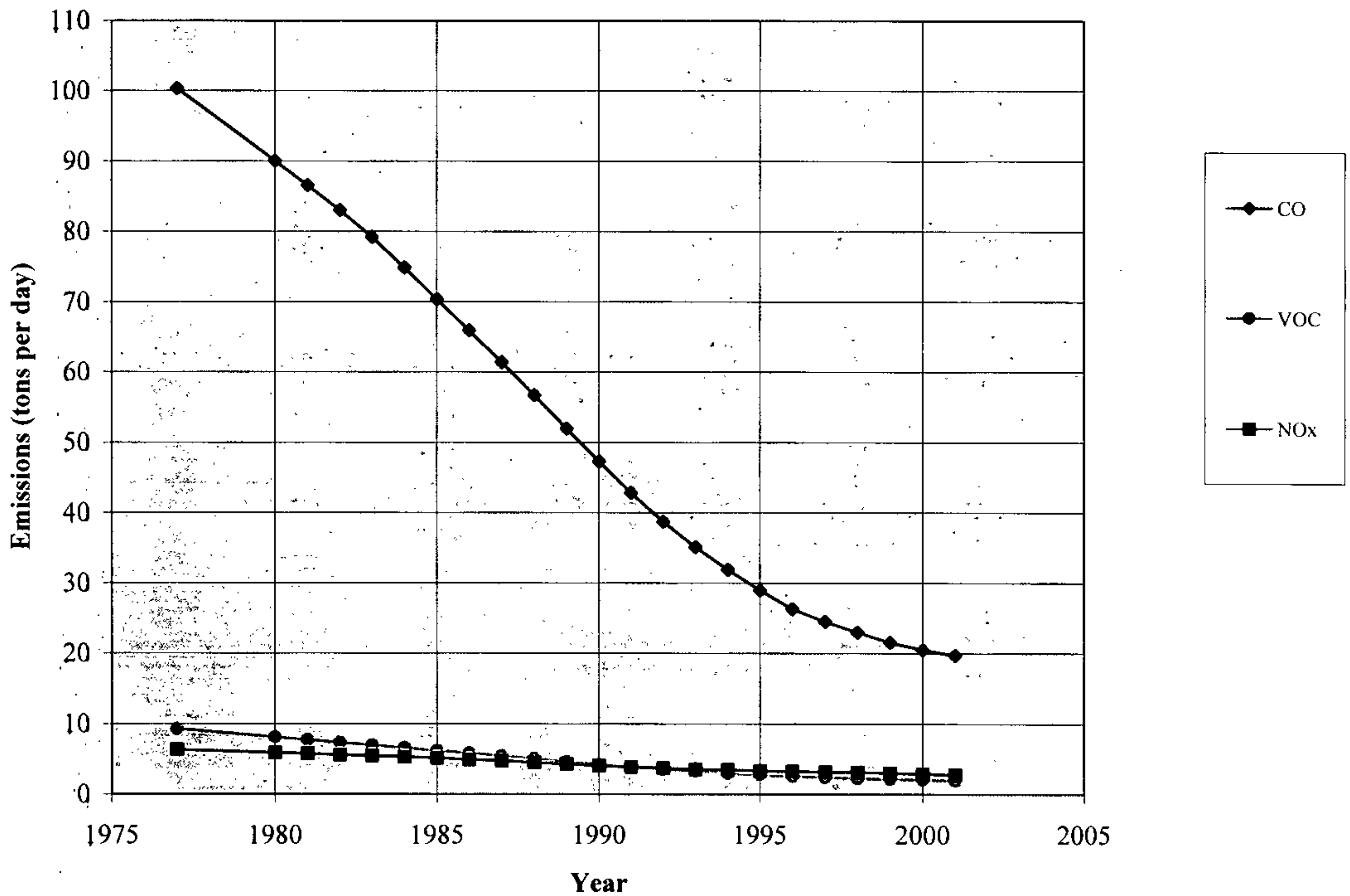
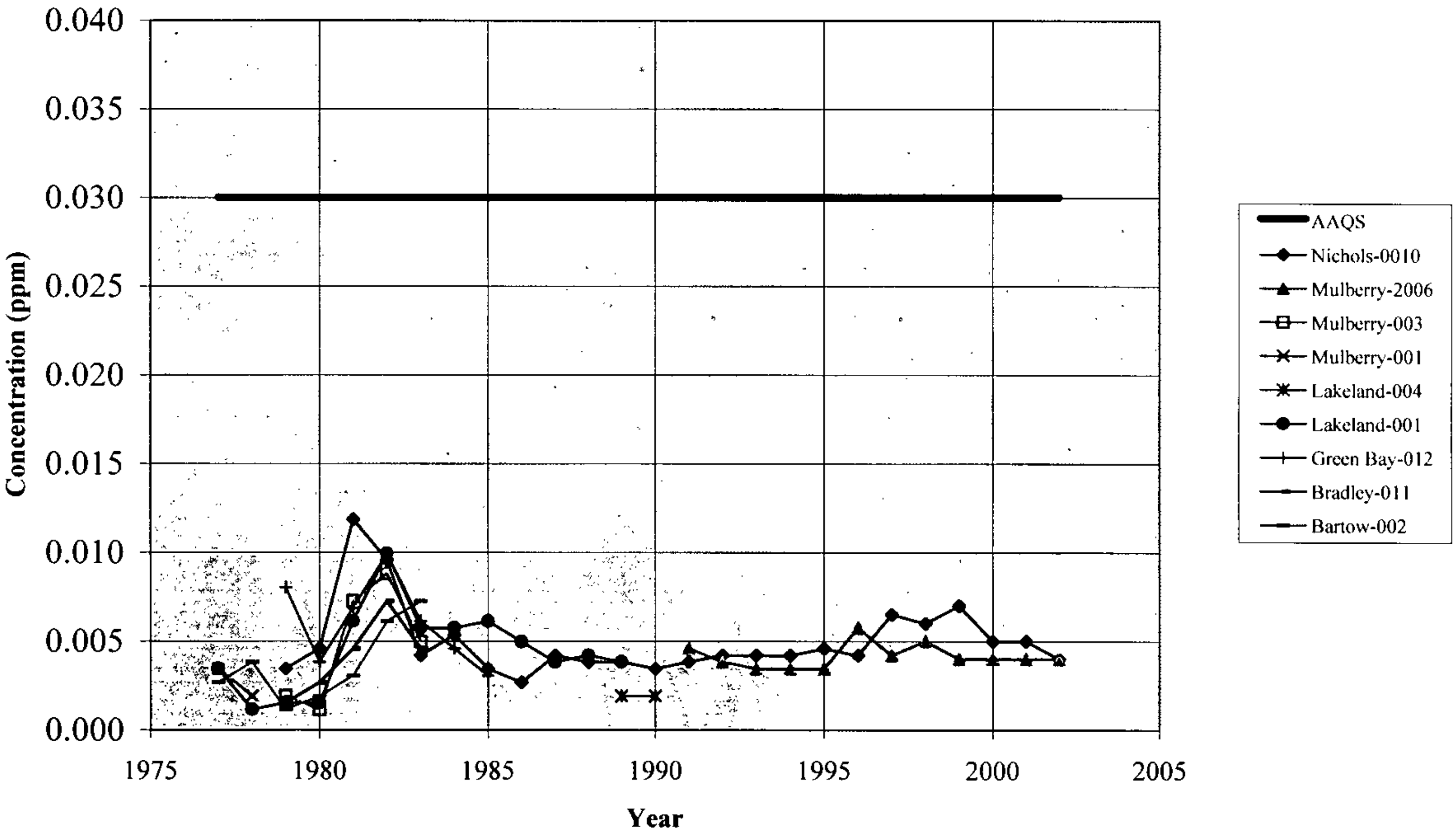


Figure 10. Measured Annual Average Sulfur Dioxide Concentrations from 1977 to 2002- Polk County



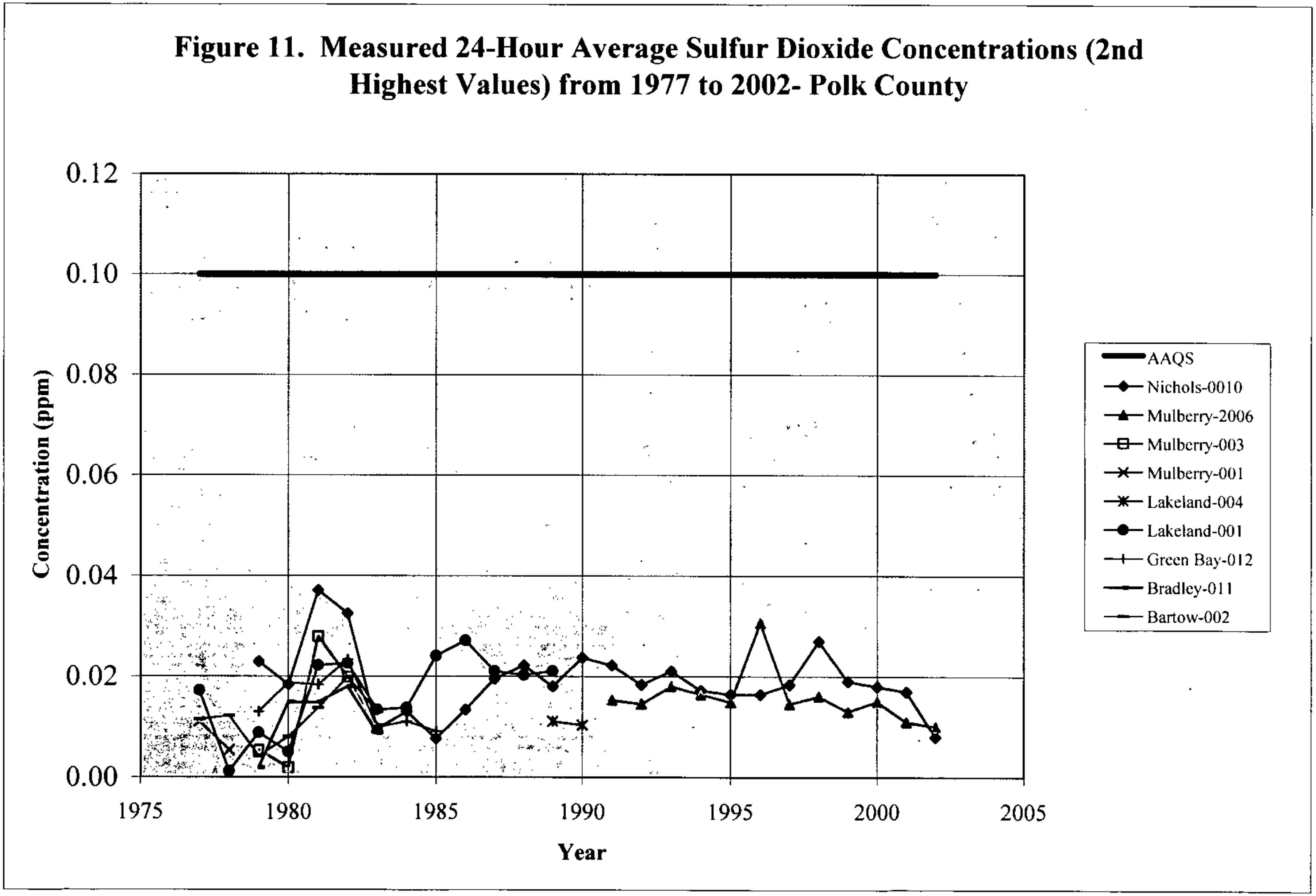


Figure 11. Measured 24-Hour Average Sulfur Dioxide Concentrations (2nd Highest Values) from 1977 to 2002- Polk County
Concentration (ppm)
0.12
0.10
0.08
0.06
0.04
0.02
0.00
1975
1980
1985
1990
1995
2000
2005
Year
AAQS
Nichols-0010
Mulberry-2006
Mulberry-003
Mulberry-001
Lakeland-004
Lakeland-001
Green Bay-012
Bradley-011
Bartow-002

Figure 12. Measured 3-Hour Average Sulfur Dioxide Concentrations (2nd Highest Values) from 1977 to 2002- Polk County

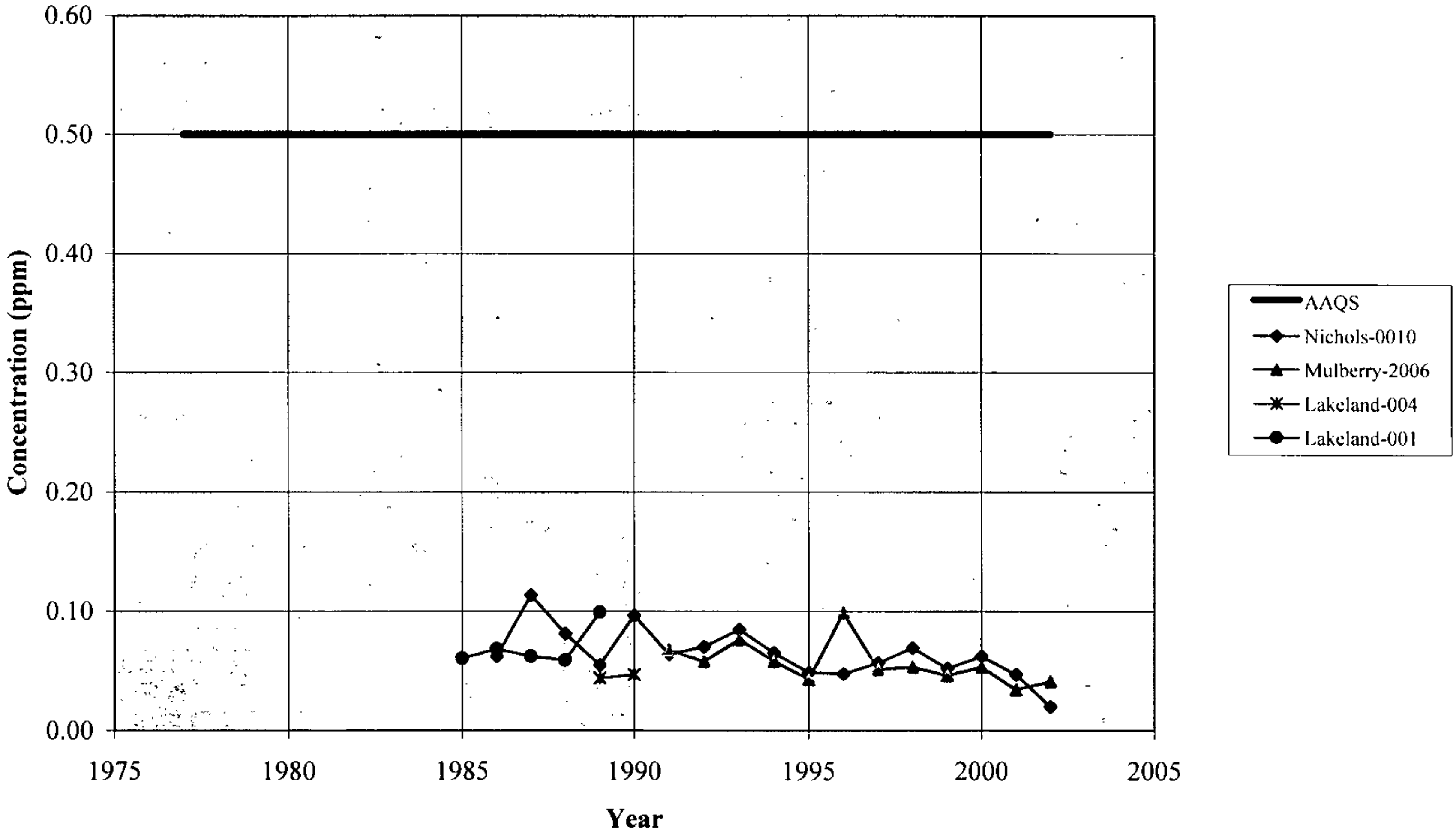


Figure 13. Measured Annual Average PM10 Concentrations (1988 to 2002) and Total Suspended Particulate Concentrations (1977 to 1987) - Polk County

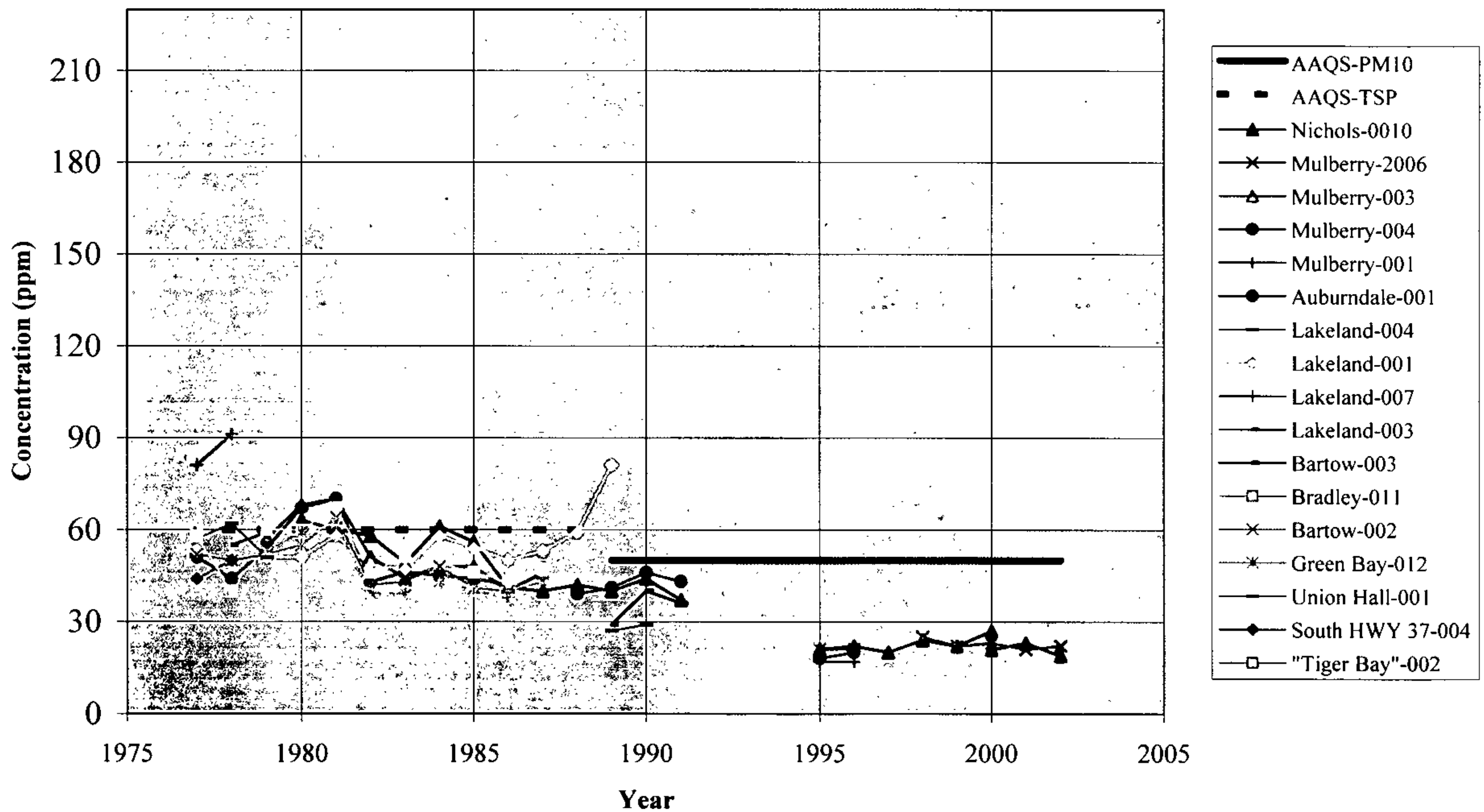


Figure 14. Measured 24-Hour Average PM10 Concentrations (1988 to 2002) and Total Suspended Particulate Concentrations (1977 to 1987) (2nd Highest Values) - Polk County

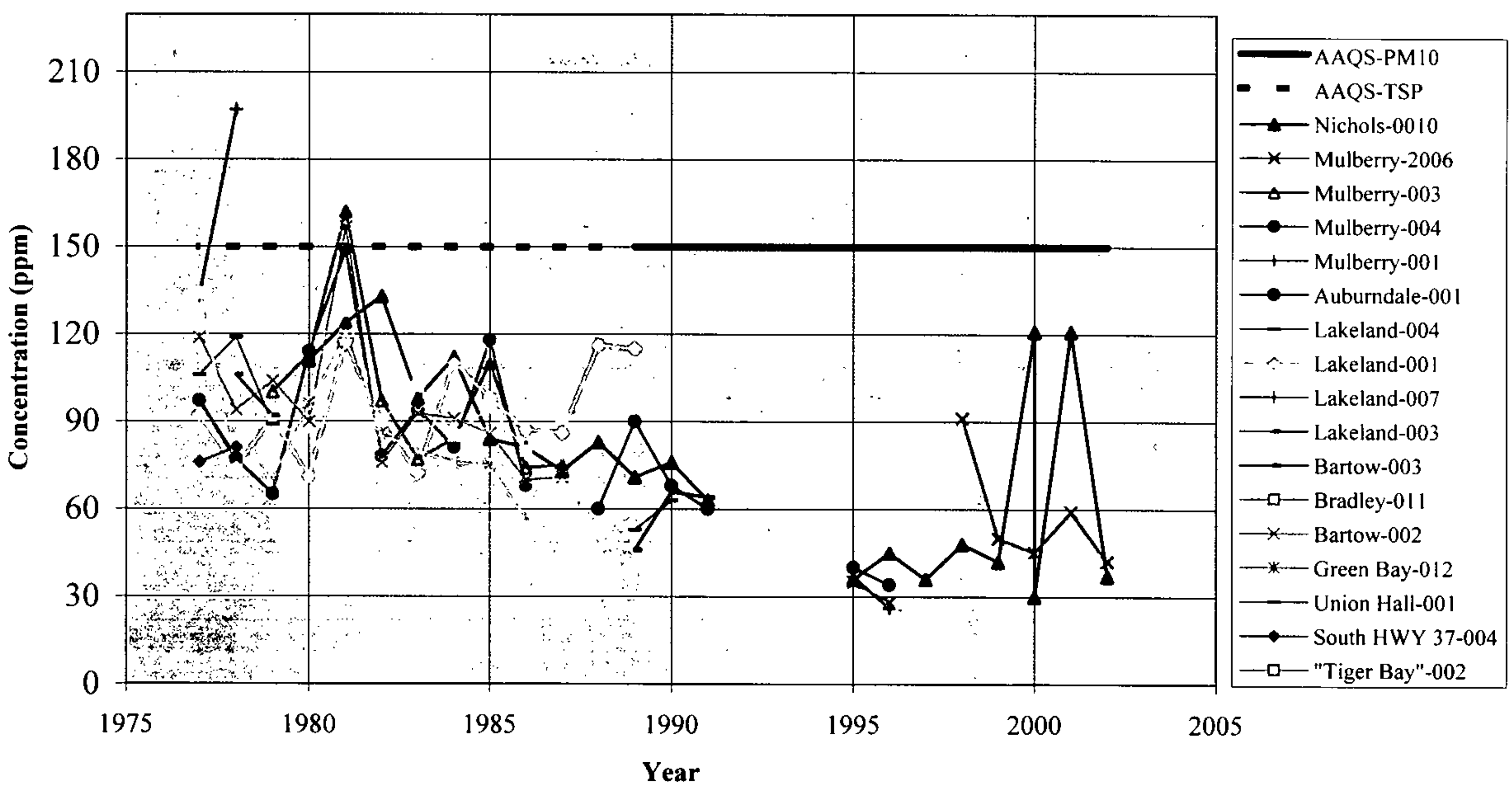


Figure 15. Measured 1-Hour Average Ozone Concentrations (2nd Highest Values) from 1977 to 2002- Polk County

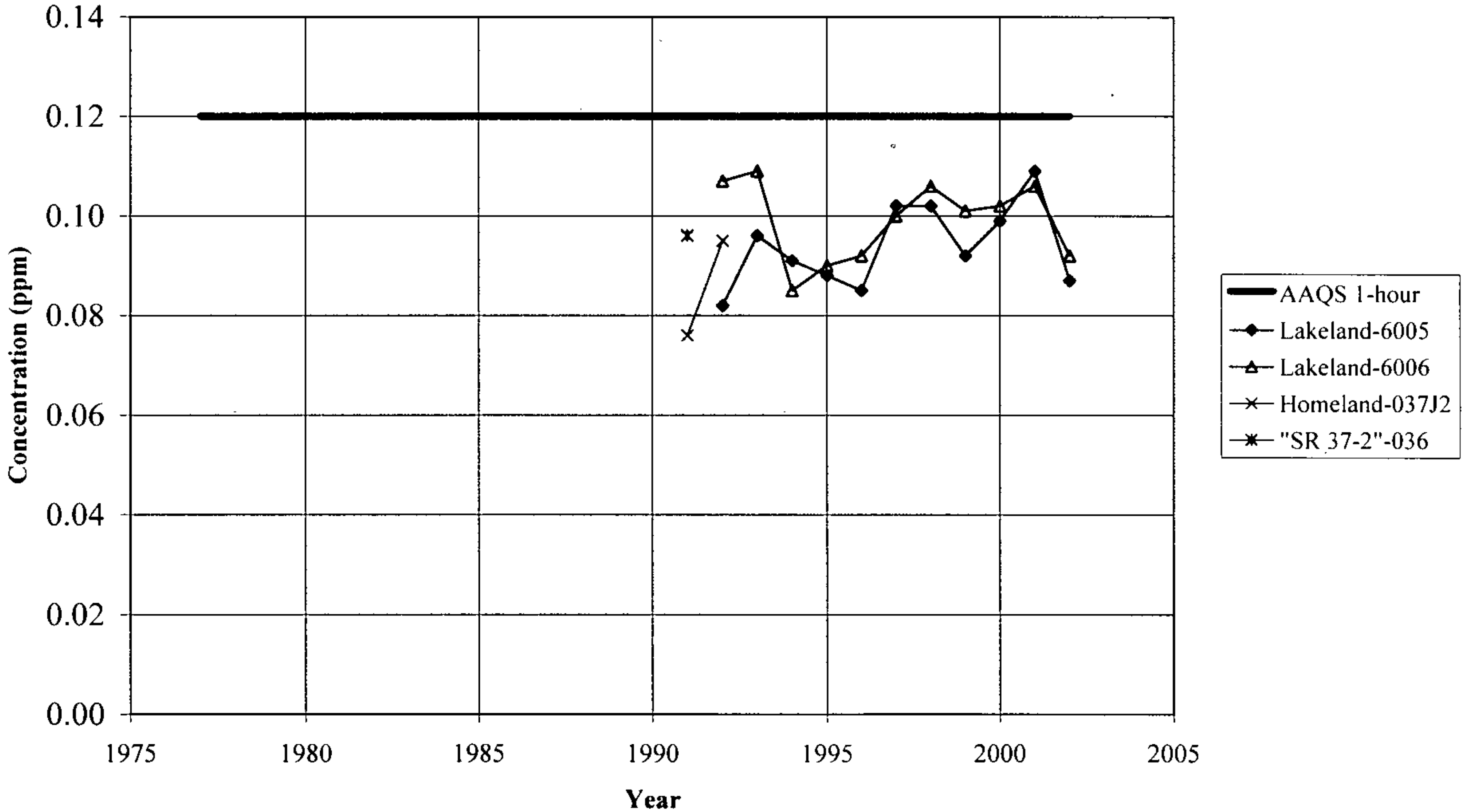
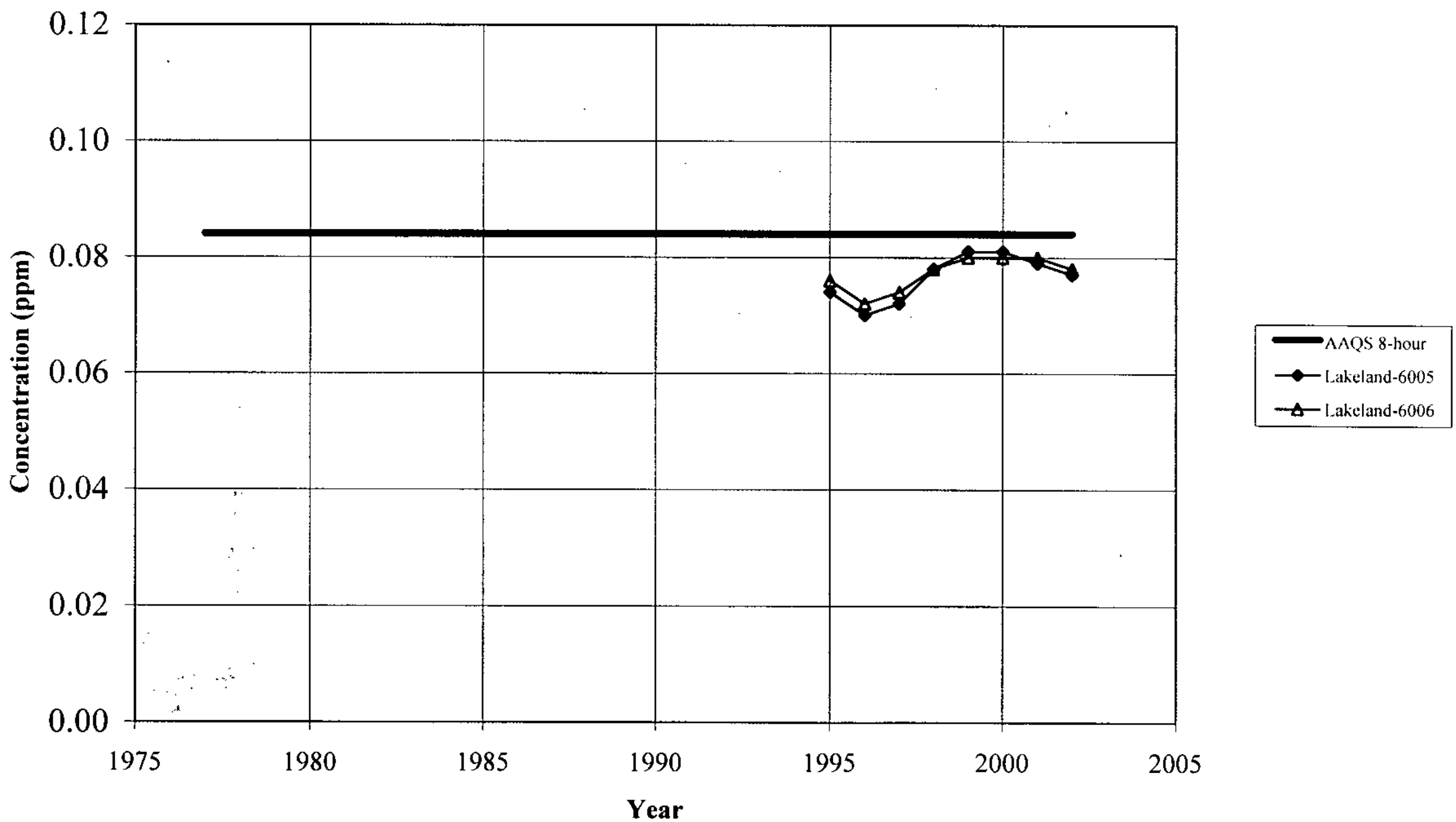


Figure 16. Measured 8-Hour Average Ozone Concentrations (3-Year Average of the 4th Highest Values) from 1995 to 2002- Polk County



TO: Hamilton B. Oven
Power Plant Siting Coordinator

THROUGH: Al Linero
Bureau of Air Regulation

FROM: Greg DeAngelo
Deborah Galbraith
Bureau of Air Regulation

DATE: October 4, 2002

SUBJECT: Florida Power Corporation (FPC) Hines Energy Complex Power Block 3
DEP File 1050234-006-AC (PSD-FL-330)

The following information is needed in order to continue processing this application:

CARBON MONOXIDE

1. BACT for Carbon Monoxide (CO): For CO, the Prevention of Significant Deterioration (PSD) application proposes a Best Available Control Technology (BACT) emission limit of 16 ppmvd corrected to 15-percent oxygen (O_2) when firing natural gas in the Siemens Westinghouse 501 FD combustion turbines. The application forms, however, propose an emission limit of 10 ppmvd corrected to 15-percent O_2. Explain the discrepancy and confirm not only which emission limit is proposed as BACT but also which emission limit was used in the economic analyses.

   The application forms also propose an alternative limit of 50 ppmvd corrected to 15-percent O_2 when the combustion turbine is operating at 60 percent load. The PSD application does not address this alternative emission limit. Provide justification for setting an alternative limit at low load operation. Is the 50 ppmvd limit proposed for operation from 0 to 60 percent load?

   Other states, including New York, Massachusetts, New Jersey, Arizona, Connecticut, Washington, and California have enforced BACT standards by permitting a large number of gas-fired combined and simple cycle power plants with CO limits of 2 to 6 ppmvd at 15 percent O_2, averaged over 3 hours and achieved using an oxidation catalyst. Continuous compliance is demonstrated using CEMS, based on 3-hour averages. Please comment.

2. Startup and Operation at Low Loads: The application presents predicted CO performance at load levels of 60, 80, and 100 percent (65 percent instead of 60 percent for fuel oil firing). Based on manufacturer data, emissions testing at Power Block 2, and data collected during testing and operation of Power Block 1, how does the combustion turbine perform at loads less than 60 percent with respect to CO emissions? How long would a startup period last? Why is a 60 percent load assumed for the low-end of natural gas "normal operation" while 65 percent is used for fuel oil?

3. Continuous Emission Monitoring System (CEMS): Continuous compliance with CO emission limits through the use of a CEMS has been determined to be BACT in recent Department actions for similar projects. Please comment on the feasibility of operating a CO CEMS.

4. CO Catalyst Costs: The application presents direct, indirect, and annualized capital costs for an oxidation catalyst to control CO on a General Electric 7FA combustion turbine operating in combined cycle mode. (Reference is Appendix B, Tables B-8 through B-11.) Explain why these cost calculations are appropriate for the Siemens Westinghouse 501 FD combustion turbine.

On the BACT economic analysis, what is the basis (e.g., vendor's quote, capital recovery data) of the values given for the oxidation catalyst? Provide the names of all manufacturers that were contacted along with their estimates while developing capital and annualized cost estimates for this project. Total proposed annualized cost per unit of $700,340 appears to be higher than annualized cost for recent combined cycle projects reviewed by the Department (Cana at $355,941 and El Paso at $485,927). The cost effectiveness is also lower for those projects (Cana at $2,852/ton and El Paso at $2,475/ton) compared to the proposed cost of $3,773 for this project. Please comment, and recalculate the CO economic analysis as necessary.

5. Carbon Dioxide (CO_2) Emissions Increase or Decrease: What would be the overall CO_2 increase or decrease in emissions for the facility as a result of applying the oxidation catalyst technology in the new units? The application states that "the end result is an additional 2,030 tons/year of [CO_2]." Please submit an explanation of this statement, comparing the decrease (in tons per year) of the operation of the new units with oxidation catalyst versus the increase of the operation of the older units as a result of supplying needed energy. Identify which electrical power generation units are assumed to represent the "older, less efficient technology." How much energy (MW) from these new units will replace energy from the older, less efficient units? (Reference is PSD Application, page 4.3-10.)

NITROGEN OXIDES

6. BACT for Nitrogen Oxides (NO_X): Other states, including New York, Connecticut, Massachusetts, Rhode Island, New Jersey, Arizona, Washington and California have enforced BACT standards by permitting a large number of gas-fired combined cycle power plants with NO_X limits of 1.55 to 2.5 ppmvd corrected to 15 percent O_2, averaged over 1-hour, and achieved using selective catalytic reduction (SCR). Florida has recently issued BACT limits of 2.5 ppmvd corrected to 15 percent O_2 for several General Electric 7FA combined cycle combustion turbines. California has issued a 2.5 ppmvd limit for a Siemens Westinghouse 501 FD unit. Please comment with respect to the proposed NO_X emission limit of 3.5 ppmvd corrected to 15 percent O_2 on a 24-hour block average.

7. Incremental Cost Calculation for SCR: The BACT recommendation is based on the incremental cost of the additional tons removed by an SCR system designed for 2.5 ppmvd versus one designed for 3.5 ppmvd. Explain how a top-down approach to BACT determination would reject SCR at 2.5 ppmvd (at a cost effectiveness of $2770/ton) in favor of the next best technology, SCR at 3.5 ppmvd (at a cost effectiveness of $2741/ton). (Reference is PSD Application, page 4.3-7.)

OTHER POLLUTANTS

8. Volatile Organic Compounds (VOC): Similar to the proposed BACT for CO, the PSD application and the application forms contain different proposed VOC emission limits for the combustion turbines when firing natural gas. The forms propose 1.8 ppmvd corrected to 15 percent O_2, while the application references 2.0 ppmvd. Confirm which limit is proposed as BACT and which limit was the basis for the emissions and control cost calculations.

   Likewise, provide a justification for setting an alternative limit at low load operation. Is the 3.0 ppmvd limit proposed for operation from 0 to 60 percent load?

9. Sulfur Dioxide (SO_2): The PSD application bases SO_2 emissions on the sulfur content of the natural gas. Table 2-4, Typical Natural Gas Analysis, presents a maximum total sulfur number of 1 grain per hundred standard cubic feet (1 grain/100 SCF). The source for this data is Florida Gas Transmission. Is this sulfur content contractually guaranteed from the natural gas supplier? Please explain. (Reference is PSD Application, page 2.2-6.)

OTHER QUESTIONS

10. Minor Sources: The application only lists the combustion turbines, heat recovery steam generators, and the steam turbine. What will be the auxiliary equipment for this project (e.g., cooling tower, fire pump)? Submit emissions estimates for these minor sources, and include these emissions as part of the PSD applicability review.
11. Automated Control System: What type of control system (e.g. Mark V control system) is recommended by the combustion manufacturer?
12. Start Up and Shutdown Emissions: Please submit a Best Operating Practice procedure for minimizing emissions during start up and shutdown (cold, warm, and hot). What is the proposed number of startup/shutdowns per year? Estimate the pollutants emissions during this period. Please provide supporting documentation.
13. Maximum Achievable Control Technology for HAPS: Do the proposed emissions rates for these pollutants include emissions during startup and shutdowns? Please explain.
14. BACT Social Impacts: Expand the BACT analysis to include the social impact of the application of SCR and oxidation catalyst.
15. Maximum Potential Emission Summary: For Table A-25, in Appendix A, identify the four cases labeled A through D, as footnote b appears to be missing.

AIR QUALITY ANALYSIS

16. Air Quality Impacts of Growth: Rule 62-212.400(3)(h)(5), Florida Administrative Code (F.A.C.), states that an application must include information relating to the air quality impacts of, and the nature and extent of, all general, commercial, residential, industrial and other growth which has occurred since August 7, 1977, in the area the facility or modification would affect. Please satisfy this rule requirement as it relates to the Hines Power Block 3 facility or state where in the submitted application it is satisfied.

ADDITIONAL COMMENTS

Comments from EPA and NPS will be forwarded when received.

ADMINISTRATIVE REQUIREMENTS AND CONTACT INFORMATION

Rule 62-4.050(3), F.A.C. requires that all applications for a Department permit must be certified by a professional engineer registered in the State of Florida. This requirement also applies to responses to Department requests for additional information of an engineering nature.

If there are any questions, please contact Greg DeAngelo (review engineer) at (850)921-9506 and e-mail gregory.deangelo@dep.state.fl.us. Matters regarding modeling issues should be directed to Deborah Galbraith (meteorologist) at (850)921-9537 and e-mail deborah.galbraith@dep.state.fl.us.

Department of
Environmental Protection

Jeb Bush
Governor

Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

David B. Struhs
Secretary

September 17, 2002

Mr. Gregg Worley, Chief
Air, Radiation Technology Branch
Preconstruction/HAP Section
U.S. EPA, Region 4
61 Forsyth Street
Atlanta, Georgia 30303

RE: Florida Power Corporation
Hines Energy Complex Power Block 3
DEP File No. 1050234-005-AC, PSD-FL-330

Dear Mr. Worley:

Enclosed for your review and comment is an application submitted by Florida Power Corporation for a PSD project at the above referenced facility in Bartow, Polk County, Florida.

Your comments may be forwarded to my attention at the letterhead address or faxed to the Bureau of Air Regulation at 850/922-6979. If you have any questions, please contact Greg DeAngelo, review engineer, at 850/921-9506.

Sincerely,

Patty Adams for

Al Linero, P.E.
Administrator
New Source Review Section

AAL/pa

Enclosure

Cc: Greg DeAngelo

FLORIDA

Jeb Bush
Governor

Department of Environmental Protection

Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

David B. Struhs
Secretary

September 17, 2002

Mr. John Bunyak, Chief
Policy, Planning & Permit Review Branch
NPS – Air Quality Division
Post Office Box 25287
Denver, Colorado 80225

RE: Florida Power Corporation
Hines Energy Complex Power Block 3
DEP File No. 1050234-005-AC, PSD-FL-330

Dear Mr. Bunyak:

Enclosed for your review and comment is an application submitted by Florida Power Corporation for a PSD project at the above referenced facility in Bartow, Polk County, Florida.

Your comments may be forwarded to my attention at the letterhead address or faxed to the Bureau of Air Regulation at 850/922-6979. If you have any questions, please contact Greg DeAngelo, review engineer, at 850/921-9506.

Sincerely,

Patty Adams

for Al Linero, P.E.
Administrator
New Source Review Section

AAL/pa

Enclosure

Cc: Greg DeAngelo

Florida Department of
Environmental Protection

Memorandum

RECEIVED
SEP 06 2002
BUREAU OF AIR REGULATION

TO: Power Plant Siting Review Committee

FROM: Buck Oven

DATE: September 5, 2002

SUBJECT: Florida Power Corp. Hines Energy Complex - Power Block 3
PA 92-33SB, Module 8043

The Department has received a supplemental application for certification of Power Block 3 at the FPC Hines Energy Complex in Polk County. Copies of the application will be delivered to you shortly. Please review the application for Sufficiency (completeness) and advise me by October 7, 2002. Please keep in mind that this is a supplemental application. Some information in the original application submitted as FPC Polk County Site will still be relevant. Some of the Conditions of Certification (COC) for the units of Power Blocks 1 & 2 and the site as a whole will apply. This will also be an opportunity to review the COC and to update them as may be appropriate.

If you have questions, call me at Suncom 277-2822.

cc: Tim Parker
Geof Mansfield
Joe Bakker
Richard Tedder
Al Linero
Deborah Getzoff

Florida Power
A Progress Energy Company

RECEIVED
DEC 19 2002
BUREAU OF AIR REGULATION

December 18, 2002

Mr. Hamilton Oven, P.E., Administrator
Office of Siting Coordination
Florida Department of Environmental Protection
2600 Blair Stone Road, MS 48
Tallahassee, Florida 32399-2400

Re: **Florida Power - Hines Energy Complex**
Power Block 3
Supplemental Site Certification Application - PA 92-33SA2
Response to Sufficiency Questions

Dear Mr. Oven:

Please find below responses to the sufficiency items outlined in your letter dated November 7, 2002. For clarity, the items noted in the November 7th letter have been repeated, followed by the response.

FDEP Southwest District Questions

WATER FACILITIES PROGRAM

Domestic Wastewater

1. Upon review of Domestic/Sanitary Wastewater Section (Part 3.5.2), the work described in the Supplemental SCA should not change or adversely impact the existing domestic wastewater treatment plant operation.

Response:

Florida Power agrees with this comment. No further response required.

Potable Water

2. Based upon the information submitted in the Supplemental SCA, the facility does not appear to require any permits; however, the following is requested to more accurately characterize the effects on the existing potable system:

P.O. Box 14042
St. Petersburg, FL 33733

a. the number of the existing employees (per day not per shift),
b. the number of proposed employees (per day not per shift), and
c. will lines being run to the proposed facility be dedicated or does the potential exist for additional tie-ins?

Response:

The number of existing employees per day is 29.

An additional 4-6 employees will be added due to Power Block 3.

A single service connection will be installed to serve the minor additional needs for Power Block 3. The extension will provide potable water for safety showers, eyewash stations, sinks and one additional single restroom.

3. Additionally, regulatory authority for potable water in Polk County is delegated to the Polk Co. Department of Health who may have additional permitting requirements.

Response:

Comment noted. No further response required.

Industrial Wastewater

4. Section 3.1 of the Supplemental SCA states that Power Block 3 will not require any expansion of the Cooling Pond. It is also stated that the 722-acre portion of the ultimate 2250-acre Cooling Pond has been constructed and is sufficient to support Power Blocks 1, 2, and 3. Please request that the applicant provide, or identify within the Supplemental SCA, information regarding the expected Cooling Pond water balance impact of supporting an additional Power Block 3. Does the design of the Cooling Pond dams addressed in the 1992 SCA account for water balance impacts of operating an additional Power Block 3? Please request that the applicant, if necessary, provide dam stability and seepage analysis information for any impacts not addressed by the 1992 SCA for the design of the Cooling Pond dams.

Response:

The Cooling Pond water balance information, including impacts due to Power Block 3, can be found in Section 3.5.1 of the Supplemental SCA. Since the increase in water consumption due to Power Block 3 will be equally offset by additional make-up water added to the Cooling Pond, there will be no significant impacts on the overall operation of the pond or issues related to dam stability.

In addition, the annual dam inspections required by the current Conditions of Certification at XVII.H.1, will continue to provide reasonable assurance that the dams are operating as designed.

WASTE MANAGEMENT PROGRAM

Solid Waste

1. The current submittal indicates that there is no on-site disposal of solid waste. Upon review of the Supplemental SCA the Solid Waste Section of the Southwest District does not have any question regarding the submittal.

Response:

Florida Power concurs with this statement. No further response required.

WATERSHED MANAGEMENT PROGRAM

Ground Water

1. Indications in application Volumes 1 and 2 are that no change in the nature of the current on-site discharges are to occur nor does there appear to be any new discharge locations on the footprint due to Power Block 3.

Response:

Florida Power concurs with this statement. No further response required.

2. Departmental records indicate that the ground water monitoring plan (GWMP) for the facility was implemented in January of 1998, and consists of 7 wells designated IMW-1 through 6 (Intermediate aquifer), and FMW-1 (Floridan aquifer). Watershed Management requests a copy of the post construction GWMP well location map.

Response:

A copy of the December 23, 1997 letter and attached map depicting the monitoring well locations is enclosed (Enclosure 1). In addition, the March 16, 1998 cover letter for the well completion reports is enclosed for reference.

Surface Water

3. The applicant is requesting that the Department recognize Supplemental Certification of the operation of an additional 530 MW nominal gas fired combined cycle unit at its existing Hines Energy Complex. The submittal describes the facility as a zero discharger though it states in the application that: "Tiger Bay receives water input from direct precipitation, groundwater seepage through the cooling pond southern dam and minimally from adjacent upland areas."

On October 11, 2001, Jeff Hilton of the DEP Southwest District Industrial Wastewater Compliance and Enforcement conducted an inspection of the facility and in an interoffice memo dated November 14, 2001, described the seepage from the cooling ponds as "The toe areas of the south dams of the cooling pond N-16 and CSA N-16C have approximately 44 sand drains spaced at 200-foot intervals. The drain outlets were in good condition and were clear of vegetation." In order to evaluate the potential surface water quality impacts on Tiger Bay related to the toe drains, Watershed Management recommends submittal of water quality data as described below.

Watershed Management requests the facility provide the Department with water quality data collected at the cooling pond near the sand drains, in Tiger Bay near the sand drains and at a site in Tiger Bay outside of the influence of the sand drains. The facility should provide a plan of study (POS) that includes the location of the sampling sites and a quality assurance project plan (QAPP). The sampling events shall begin upon receiving written approval from the Department. The sampling sites shall be sampled on at least three separate occasions and one sampling event should occur during the wet season. Upon completion of the three sampling events the facility shall submit to the Department a report that discusses the results of the three sampling events and includes the raw data and chain of custody sheets. This data should be requested in both printed and electronic formats and should include a summary and interpretation of the data.

The following *in-situ* parameters should be measured at every site during each separate sampling event: dissolved oxygen, specific conductance, pH, and temperature. Grab samples should be collected at the site and analyzed for the following parameters: nutrients (total nitrogen, total ammonia, total Kjeldahl nitrogen, nitrite-nitrate and orthophosphate), chlorophyll *a* and phaeophyton, fecal and total coliform bacteria, base/neutrals and acid extractables (BNAs), oil and grease, total recoverable petroleum hydrocarbons (TRPH), hydrogen sulfide, sulfate, metals (aluminum, arsenic, boron, cadmium, chromium, copper, iron, lead, magnesium, manganese, mercury, nickel, silver, thallium, vanadium and zinc), volatile organic carbons (VOCs), turbidity, total suspended solids (TSS), and BOD_5. Flows shall be measured at sites near the sand drains and the ambient site during each sampling event.

Response:

The request above appears to be better suited as a proposed Condition of Certification for this project rather than a sufficiency request. The information requested requires a timeframe that exceeds the ability to comply with the Supplemental SCA processing schedule.

Florida Power also questions the validity and purpose of the above requested sampling program. Florida Power's water quality compliance requirements are set forth in the existing Conditions of Section XVIII (Groundwater) of the 1992 Site Certification. These conditions have required Florida Power to install monitoring wells at the southern boundary of the Zone of Discharge of the Cooling Pond and to monitor these wells quarterly. This quarterly monitoring has demonstrated that discharges from the Cooling Pond are in compliance with applicable GII Groundwater (i.e. Primary & Secondary Drinking Water) Standards. Additionally, these conditions require Florida Power to perform a wastestream characterization of the Cooling

Pond within six months after startup of each successive power block for the purpose of determining the adequacy of the applicable groundwater monitoring parameters.

It should be noted that the sand drains along the southern dam of the Cooling Pond were required by the Department and SWFWMD as a hydrologic enhancement to the Tiger Bay watershed. No surfacewater monitoring program was required by the Department as a condition of approval of the Cooling Pond design plans. The conditions of the 1992 Site Certification established Groundwater monitoring as the appropriate method of demonstrating that seepage from the Cooling Pond is in compliance with applicable standards and these conditions were not modified by the Department during the 2001 PB2 Supplemental Certification proceedings. The addition of Power Block 3 at Hines is expected to have no significant impact on the water quality of the Cooling Pond. Therefore, Florida Power intends to perform the wastestream characterizations and groundwater monitoring currently required by the Conditions of Certification.

FDEP Bureau of Air Regulation Questions

The following information is needed in order to continue processing this application:

CARBON MONOXIDE

1. <u>BACT for Carbon Monoxide (CO)</u>: For CO, the Prevention of Significant Deterioration (PSD) application proposes a Best Available Control Technology (BACT) emission limit of 16 ppmvd corrected to 15-percent oxygen (O_2) when firing natural gas in the Siemens Westinghouse 501 FD combustion turbines. The application forms, however, propose an emission limit of 10 ppmvd corrected to 15-percent O_2. Explain the discrepancy and confirm not only which emission limit is proposed as BACT but also which emission limit was used in the economic analyses.

   The application forms also propose an alternative limit of 50 ppmvd corrected to 15-percent O_2 when the combustion turbine is operating at 60 percent load. The PSD application does not address this alternative emission limit. Provide justification for setting an alternative limit at low load operation. Is the 50 ppmvd limit proposed for operation from 0 to 60 percent load?

   Other states, including New York, Massachusetts, New Jersey, Arizona, Connecticut, Washington, and California have enforced BACT standards by permitting a large number of gas-fired combined and simple cycle power plants with CO limits of 2 to 6 ppmvd at 15 percent O_2, averaged over 3 hours and achieved using an oxidation catalyst. Continuous compliance is demonstrated using CEMS, based on 3-hour averages. Please comment.

<u>Response:</u>

The limit for CO when firing natural gas is desired to be the same as that approved by the Department for Power Block 2 (i.e., 16 ppmvd corrected to 15 percent O_2 based on a 24-hour block average). The intent of the limit for Power Block 2 was to cover operation at full load (i.e., 10 ppmvd) and part load (i.e., 50 ppmvd) during the course of a day. The proposed combustion turbines for Power Block 3 are the same as those for Power Block 2 (i.e, Siemens

Westinghouse 501 FD). The BACT evaluation assumed operating conditions that provides conservative emission estimates enveloping conditions that may occur during actual operation. The assumption of 8,760-hours/year of operation at a conservative emission rate (i.e., 59 degree F turbine inlet temperature) provides a conservative basis for the BACT evaluation. To meet an emission limit of 16 ppmvd corrected to 15 percent O_2 on a 24-hour block basis, the units emissions would be 10 ppmvd for 20.5 hours and 50 ppmvd for 3.5 hours. Assuming 8,760 hours per year operation the CO emissions would be about 233 tons/year at the average turbine inlet temperature of 72 degrees F (i.e., 20 hours at 39 lb/hr, 3 hours at 135 lb/hr and 1 hour at 95 lb/hour). The BACT was based on a maximum emission of 216 tons/year (see Table 4-2 in PSD application). Using 233 tons/year and an emission rate with an oxidation catalyst of 30 tons/year the CO reduction would be 203 tons/year. The cost effectiveness using this calculation would be $3,450 per ton of CO removed ($700,340 divided by 203 tons CO reduced/year). The cost effectiveness in the BACT evaluation was $3,773 per ton per year CO removed. Again, both calculations are conservative given the assumption of 8,760 hours/year operation.

As noted above, the 50 ppmvd when operating at 60 percent load was contemplated within a 16 ppmvd 24-hour block average emission limit. A separate limit for low load operation is therefore not required

In regards to other states, New York, Massachusetts, New Jersey, Arizona, Connecticut, Washington, and California, are states that have non-attainment areas for various pollutants. As such, new "major" facilities attempting to locate within ozone non-attainment areas, are potentially subject to New Source Review (NSR) requirements for non-attainment areas. As precursor pollutants to the formation of ozone, NO_x and VOC emissions are potentially subject to NSR requirements, including the installation of Lowest Achievable Emission Rate (LAER) control technology. In ozone non-attainment areas, LAER for VOC emissions from combined-cycle power facilities, which does not consider cost effectiveness, has typically been determined to be oxidation catalyst. An oxidation catalyst would be the same as that which can be implemented for CO control. The installation of an oxidation catalyst as LAER for VOC would also limit CO emissions. However, only BACT would be applicable to CO. Therefore, similar power facilities in New York, Massachusetts, New Jersey, Connecticut, and California have the requirement to install oxidation catalyst based on LAER requirements for VOC and not BACT requirements for CO. The Hines Energy Complex is located in Polk County, which is attainment for all pollutants. Therefore, Power Block 3 is subject to PSD BACT requirements and not LAER for both VOC and CO.

2. Startup and Operation at Low Loads: The application presents predicted CO performance at load levels of 60, 80, and 100 percent (65 percent instead of 60 percent for fuel oil firing). Based on manufacturer data, emissions testing at Power Block 2, and data collected during testing and operation of Power Block 1, how does the combustion turbine perform at loads less than 60 percent with respect to CO emissions? How long would a startup period last? Why is a 60 percent load assumed for the low-end of natural gas "normal operation" while 65 percent is used for fuel oil?

Response:

The information presented in the application is based on available vendor information. No data is currently available for Power Block 2, as this unit is still under construction. The only information available for Power Block 1 consists of full-load compliance testing. These tests show that Power Block 1 meets its compliance limit under these testing conditions. In regards to duration estimates during startup periods, please refer to the response to Comment 12 below. The 60 percent load when firing natural gas and 65 percent load when firing distillate oil are based on data provided by Siemens Westinghouse for the operation of the 501FD combustion turbine.

3. Continuous Emission Monitoring System (CEMS): Continuous compliance with CO emission limits through the use of a CEMS has been determined to be BACT in recent Department actions for similar projects. Please comment on the feasibility of operating a CO CEMS.

Response:

Provided a 24-hour block average emission limit (exclusive of excess emissions due to startup, shutdown and malfunction as authorized by the Department) is established for CO emissions, the use of a CO CEMS would be acceptable as the compliance demonstration method.

4. CO Catalyst Costs: The application presents direct, indirect, and annualized capital costs for an oxidation catalyst to control CO on a General Electric 7FA combustion turbine operating in combined cycle mode. (Reference is Appendix B, Tables B-8 through B-11.) Explain why these cost calculations are appropriate for the Siemens Westinghouse 501 FD combustion turbine.

   On the BACT economic analysis, what is the basis (e.g., vendor's quote, capital recovery data) of the values given for the oxidation catalyst? Provide the names of all manufacturers that were contacted along with their estimates while developing capital and annualized cost estimates for this project. Total proposed annualized cost per unit of $700,340 appears to be higher than annualized cost for recent combined cycle projects reviewed by the Department (Cana at $355,941 and El Paso at $485,927). The cost effectiveness is also lower for those projects (Cana at $2,852/ton and El Paso at $2,475/ton) compared to the proposed cost of $3,773 for this project. Please comment, and recalculate the CO economic analysis as necessary.

Response:

Appendix B, Tables B-8 through B-11, present direct, indirect, and annualized capital costs for an oxidation catalyst to control CO on a Siemens Westinghouse 501F combustion turbine. The reference to GE was inadvertent. These cost estimates are based on a vendor estimate using specific information on this specific combustion turbine.

The CO BACT analysis of oxidation catalyst is based on vendor quotes from Engelhard using procedures from the EPA Cost Control Manual. The cost effectiveness for Power Block 3 was estimated at $3,773 per ton of CO removed. The cost quotes received from Engelhard and used in developing the supporting BACT analysis can be found in Enclosure 2 of this document. The capital costs were estimated using the procedures in the EPA Cost Control Manual. The direct annual and energy costs were developed from vendor and engineering estimates. The result was an annualized cost of $700,340. Cost for other projects may be different based on the scope of each project. With regard to the Cana Project (i.e., CPV Cana Ltd.) the Department did not require an oxidation catalyst at a cost effectiveness of $2,852 per ton removed. In addition, the Department did not propose an oxidation catalyst for the El Paso Projects with a cost effectiveness of $2,475 per ton of CO removed. For projects using the F Class combustion turbines, the Department has not determined that oxidation catalysts are BACT. The conclusions reached by the Department in these permitting reviews, clearly suggest that an oxidation catalyst would not be appropriate for the Hines Power Block 3 project.

5. <u>Carbon Dioxide (CO_2) Emissions Increase or Decrease</u>: What would be the overall CO_2 increase or decrease in emissions for the facility as a result of applying the oxidation catalyst technology in the new units? The application states that "the end result is an additional 2,030 tons/year of [CO_2]." Please submit an explanation of this statement, comparing the decrease (in tons per year) of the operation of the new units with oxidation catalyst versus the increase of the operation of the older units as a result of supplying needed energy. Identify which electrical power generation units are assumed to represent the "older, less efficient technology." How much energy (MW) from these new units will replace energy from the older, less efficient units? (Reference is PSD Application, page 4.3-10.)

<u>Response:</u>

The increases and decreases for installing an oxidation catalyst are presented in Table B-11 of the Air Permit/PSD Application. The CO from each unit was calculated to decrease by 185.6 tons per year (TPY) from the emission rates guaranteed by Siemens Westinghouse. As discussed, in Section 4, page 4.3-11, the actual decrease resulting from the addition of an oxidation catalyst is not expected to be that beneficial given the actual performance of the 501F turbine. As shown in Table B-11, the backpressure on the turbine results in a direct loss of electric power that would otherwise be placed on the electric grid. The amount of power lost as a result of the backpressure is about 3 million KW-hr per year. To replace this power, other less efficient units are operated within the electric system, since electric power is being supplied to meet demand. The demand is independent of the unit operation and any energy lost within the operation of the units cannot be used to meet the demand. To meet demand, the older less efficient power units are operated. This will result in the generation of secondary air pollutants by these units even if the increment of power needed is small. For example, units that cycle would be operated at an incrementally higher load to supply the power lost. To convert the lost energy into thermal energy requirements, a heat rate of 10,300 Btu/kW-hr was used. The energy requirement was 32,062 MMBtu/year (i.e., 3,112,815 kW-hr x 10,300 Btu/kW-hr x MM/10^6 = 32,062 MMBtu/hr). The secondary air pollutants were estimated to be about 4 TPY of criteria pollutants and 2,030 TPY of carbon dioxide. As discussed on page 4.3-10, the amount of CO_2 produced as a direct result of the lost energy is more than 10 times higher than the amount of CO theoretically *reduced (i.e., 185.6 TPY) and converted to CO_2 in the oxidation catalyst. While it is certain that energy lost that is not available to meet demand must be replaced, it is uncertain the exact type of unit that would replace the lost energy. Typically these are cycling units much lower on the dispatch order than Hines Power Block 3. It was assumed that the lost power would be replaced using a natural gas fired unit.*

Power Block 3 is being built to serve the growing energy and capacity needs of Florida Power's customers both old and new. It is not being built for the purpose of displacing energy from existing units. However, under certain scenarios, the operation of the Power Block 3 will have the effect of displacing energy from such units. The actual amount of energy that Power Block 3 will displace from other, existing units will vary from year-to-year based on a number of factors (fuel prices, load growth, weather, maintenance schedules, improvements to other units, etc).

NITROGEN OXIDES

6. BACT for Nitrogen Oxides (NO_X): Other states, including New York, Connecticut, Massachusetts, Rhode Island, New Jersey, Arizona, Washington and California have enforced BACT standards by permitting a large number of gas-fired combined cycle power plants with NO_X limits of 1.55 to 2.5 ppmvd corrected to 15 percent O_2, averaged over 1-hour, and achieved using selective catalytic reduction (SCR). Florida has recently issued BACT limits of 2.5 ppmvd corrected to 15 percent O_2 for several General Electric 7FA combined cycle combustion turbines. California has issued a 2.5 ppmvd limit for a Siemens Westinghouse 501 FD unit. Please comment with respect to the proposed NO_X emission limit of 3.5 ppmvd corrected to 15 percent O_2 on a 24-hour block average.

Response:

As mentioned in the Response to Comment 1, the BACT determinations in many of the states mentioned are also determinations based on LAER. LAER, in addition to other requirements is based on either non-attainment status or designations for interstate NOx transport. While it is recognized that the Department established NO_x emission limits of 2.5 ppmvd corrected to 15 percent O_2 for several projects using the General Electric 7FA, the amount of NO_x reduction and control requirements proposed for Power Block 3 is much greater. For example, the proposed NO_x emission rate of 3.5 ppmvd corrected to 15 percent O_2 for Power Block 3 represents a NO_x reduction of 86 percent (i.e., 25 ppmvd-3.5ppmvd = 21.5 ppmvd; 21.5/25 = 0.86). In contrast, the NO_x reduction for the General Electric 7FA from 9 ppmvd corrected to 15 percent O_2 to 2.5 corrected to 15 percent O_2 is 72.2 percent (i.e., 9 ppmvd-2.5ppmvd = 6.5 ppmvd; 6.5/9 = 0.722). This will result in greater catalyst costs as well as greater backpressure on the turbine. The proposed emission limit of 3.5 ppmvd corrected to 15 percent O_2 represents a turbine specific BACT emission limit.

7. Incremental Cost Calculation for SCR: The BACT recommendation is based on the incremental cost of the additional tons removed by an SCR system designed for 2.5 ppmvd versus one designed for 3.5 ppmvd. Explain how a top-down approach to BACT determination would reject SCR at 2.5 ppmvd (at a cost effectiveness of $2770/ton) in favor of

the next best technology, SCR at 3.5 ppmvd (at a cost effectiveness of $2741/ton). (Reference is PSD Application, page 4.3-7.)

Response:

The cost effectiveness of $2,741 per ton of NO_x removed at an emission rate of 3.5 ppmvd corrected to 15 percent O_2 reflect the total cost effectiveness for the project at that emission limit. The cost effectiveness of $2,770 per ton of NO_x removed at an emission rate of 2.5 ppmvd corrected to 15 percent O_2 also reflect the total cost effectiveness. The incremental cost effectiveness between 3.5 ppmvd and 2.5 ppmvd (corrected to 15 percent O_2) is $3,463 per ton of NO_x removed and also presented on Page 4.3-7 of the PSD Application. The incremental cost effectiveness for an emission limit of 2.5 ppmvd represents a 26 percent incremental increase from an emission limit of 3.5 ppmvd yet only represents a 4 percent greater reduction in NO_x control (i.e., 86 to 90 percent).

OTHER POLLUTANTS

8. Volatile Organic Compounds (VOC): Similar to the proposed BACT for CO, the PSD application and the application forms contain different proposed VOC emission limits for the combustion turbines when firing natural gas. The forms propose 1.8 ppmvd corrected to 15 percent O_2, while the application references 2.0 ppmvd. Confirm which limit is proposed as BACT and which limit was the basis for the emissions and control cost calculations.

   Likewise, provide a justification for setting an alternative limit at low load operation. Is the 3.0 ppmvd limit proposed for operation from 0 to 60 percent load?

Response:

The proposed emission limit is 1.8 ppmvd corrected to 15 percent O_2 (which is approximately 2.2 ppmvd uncorrected). The BACT evaluation included this emission rate as part of the evaluation. As shown on Page 4.3-12 the cost effectiveness exceeds $60,000 per ton of VOC removed at 40 percent removal and nearly $30,000 per ton of VOC removed for 90 percent removal. Low load operation for the units would follow the requirements to meet the proposed CO emission rate as discussed in the Response to Comment 1. The CO and VOC emissions are related through the combustion process and to achieve a CO limit of 16 ppmvd (corrected to 15 percent O_2) the unit would operate 20.5 hours at high load and 3.5 hours at low load. The cost effectiveness calculation, which was based on a VOC emission rate of 27.6 tons per year, which is based on conservative operating conditions (e.g., 8,760 hours per year operation) that would envelop actual emissions during expected operation. For compliance, single stack tests at full load are proposed, along with the CO CEMS if required. Operation at all loads, including from 0 to 60 percent, would be covered by this limit (exclusive of excess emissions due to startup, shutdown and malfunction as authorized by the Department).

9. Sulfur Dioxide (SO_2): The PSD application bases SO_2 emissions on the sulfur content of the natural gas. Table 2-4, Typical Natural Gas Analysis, presents a maximum total sulfur number of 1 grain per hundred standard cubic feet (1 grain/100 SCF). The source for this data

is Florida Gas Transmission. Is this sulfur content contractually guaranteed from the natural gas supplier? Please explain. (Reference is PSD Application, page 2.2-6.)

Response:

No, the 1 grain per hundred standard cubic feet value used to calculate SO2 emissions in the application is not contractually guaranteed. This value was selected based on historical information showing that the average sulfur content of natural gas delivered via pipeline is well below the 1 grain value used in the application to conservatively estimate emissions. The BACT determination related to SO2 emissions from natural gas should be based on the use of "natural gas delivered via pipeline" and not a specific grains of sulfur in the gas, or the term "pipeline natural gas" in order to avoid confusion with the requirements of the Acid Rain Program.

OTHER QUESTIONS

10. Minor Sources: The application only lists the combustion turbines, heat recovery steam generators, and the steam turbine. What will be the auxiliary equipment for this project (e.g., cooling tower, fire pump)? Submit emissions estimates for these minor sources, and include these emissions as part of the PSD applicability review.

Response:

There will be no other auxiliary equipment or minor sources of air pollution associated with the Power Block 3 project. The emission units identified in the Air Permit/PSD Application are the only emission units associated with the project. These are the two combustion turbines.

11. Automated Control System: What type of control system (e.g. Mark V control system) is recommended by the combustion manufacturer?

Response:

The Power Block 3 combustion turbines will have the Siemens TXP control system, the standard for Siemens Westinghouse 501FD2 machines.

12. Start Up and Shutdown Emissions: Please submit a Best Operating Practice procedure for minimizing emissions during start up and shutdown (cold, warm, and hot). What is the proposed number of startup/shutdowns per year? Estimate the pollutants emissions during this period. Please provide supporting documentation.

Response:

The submittal of a Best Operating Practice procedure is somewhat premature since several of the control systems have not yet been selected (e.g., the SCR vendor). While these procedures will be submitted as part of the Title V application, the discussion below presents a discussion of startup and shutdown.

Startup and Shutdown

The startup will vary by the equipment vendors but presented below is a typical description of the process. During all startup conditions, the speed and load of the combustion turbines (CTs) are regulated to provide conditions that would not damage the HRSGs or steam turbine. The typical conditions described below.

1. *Cold Start – Occurs when the combined cycle unit has been shutdown for more than 48 hours. The total time for this startup condition is 6 hours. The first CT is started and held at certain levels of heat input while the exhaust gases from the CT heat up the HRSG and produce steam for the steam turbine. The steam turbine starts load at about 2-hours into the start and load is applied to the CT at about 3 hours into the start. The second CT is started about 3 to 4 hours into the start with load applied at about 4 to 5 hours into the start. At 6 hours into the start, both CTs are at a load that will comply with proposed emission limits.*
2. *Warm Start – Occurs when the combined cycle unit has been shutdown for 48 hours or less. The total time for this startup condition is about 2 hours. Similar to the cold start, the first CT is started and held at levels of heat input while the exhaust gases from the CT heat up the HRSG and produce steam for the steam turbine. The steam turbine starts load at about 1 hour into the start and load is applied to the CT shortly thereafter. The second CT is started about 1 hour into the start with load applied at about 1½ hours into the start. At two hours into the start, the first CT has reach full load with steam applied to the steam turbine. The second turbine is started in similar sequence.*

A maximum number of startups/shutdowns cannot be proposed for the Project. The number of unit startups per year will vary depending on unit dispatching maintenance requirements, forced outages, and other system factors. The units are expected to operate as mid-load to base load units, therefore, startups and shutdowns are expected to be minimal. Typical maintenance requirements would require about one cold startup/shutdown per year.

13. Maximum Achievable Control Technology for HAPS: Do the proposed emissions rates for these pollutants include emissions during startup and shutdowns? Please explain.

Response:

The emission rates for HAPs indirectly accounted for any HAPs during startup and shutdown. Emissions of HAPs were conservatively estimated by using the following assumptions:

- *100 percent load for all operation,*
- *8,760 hour per year operation, and*
- *Conservatively high emission factors.*

The maximum HAPs using these assumptions were estimated to be 7.3 TPY for all HAPs and 2.0 TPY for a single HAP (see Table 2-3 in Air Permit Application). These maximum HAP emissions are considerably less than the major HAP thresholds of 25 TPY for all HAPs and 10 TPY for a single HAP.

As noted in the preceding response, the startup times are relatively short duration and at much lower loads than that at base load. While concentrations of some air pollutants increase, the operation at lower loads produces much less relative mass emission.

14. BACT Social Impacts: Expand the BACT analysis to include the social impact of the application of SCR and oxidation catalyst.

Response:

Although not described as "social impacts," the BACT analyses for SCR and oxidation catalyst include components of social impacts for the technology. These are describe further below:

Social Impacts of SCR: *The social impacts of SCR are incorporated within the economic and energy impacts described in the Section 4 of the Air Permit/PSD Application. From a social perspective, the use of SCR has implications of both costs and benefits. The capital cost of the SCR ($3,470,485 from Table B-3) will generate some direct economic benefits. Since SCR equipment is specialized these benefits would primarily accrue to the manufacturer, which would be located out of Florida. Installation would be at the unit and likely be limited to several weeks of labor effort. The cost for SCR is estimated to be about 0.076 cents per KW-hr, which will be passed to Florida Power's customers. (Calculation: $1,809,118/unit/year x 1 unit/272,610 kW/hr x year/8,760 hrs x 100 cents/$; refer to Table B-4). With SCR, the lost power for each CT/HRSG would be sufficient to supply about 488 residential customers. This is about 0.37 percent of the electric energy that would be supplied by each CT/HRSG. SCR equipment and systems would have to be maintained and would require about 0.6 man-years per CT/HRSG. This will generate economic benefits through payroll, which has been estimated to be about $19,000/year per CT/HRSG. Pollution control equipment, such as SCR, is tax exempted from property taxes. The use of ammonia would be supplied in state (estimated to be about $287,000 per CT/HRSG) and would generate about one trip per week for delivery. A Risk Management Plan (RMP) may be required depending upon the type and quantities of ammonia. SCR would remove about 86 percent of NO_x or a potential of 660 TPY. This benefit is somewhat offset due to the emissions of ammonia, PM and secondary emissions. While the NO_x reduction would not significantly reduce ground-level concentration of NO_2 (as compared to ambient air quality standards), the reduction of NO_x would be beneficial in reducing a precursor to ozone formation.*

Social Impacts of Oxidation Catalyst (OC): *The social impacts of OC are incorporated within the economic and energy impacts described in the Section 4 of the Air Permit/PSD Application. From a social perspective, the use of OC has implications of both costs and benefits. The capital* *cost of the OC ($1,644,300 from Table-B8) will generate some direct economic benefits. Since OC equipment is specialized these benefits would primarily accrue to the manufacturer, which would be located out of Florida. Installation would be at the unit and likely be limited to several weeks of labor effort. The cost for OC is estimated to be about 0.029 cents per KW-hr, which will be passed to FP's customers. (Calculation: $700,340/unit/year x 1 unit/272,610kW/hr x year/8,760 hrs x 100 cents/$; refer to Table B-9). With OC, the lost power for each CT/HRSG would be sufficient to supply about 265 residential customers. OC equipment and systems would have to be maintained and would require about 0.2 man-years per CT/HRSG. This will generate economic benefits through payroll, which has been estimated to be about $6,000/year per CT/HRSG. Pollution control equipment, such as OC, is tax exempted from property taxes. OC would remove 90 percent of CO or a potential of 184 TPY. This benefit is somewhat offset due to the emissions of PM and secondary emissions. The CO reduction would not significantly reduce ground-level concentration of CO (as compared to ambient air quality standards).*

15. Maximum Potential Emission Summary: For Table A-25, in Appendix A, identify the four cases labeled A through D, as footnote b appears to be missing.

Response:

See Enclosure 3.

AIR QUALITY ANALYSIS

16. Air Quality Impacts of Growth: Rule 62-212.400(3)(h)(5), Florida Administrative Code (F.A.C.), states that an application must include information relating to the air quality impacts of, and the nature and extent of, all general, commercial, residential, industrial and other growth which has occurred since August 7, 1977, in the area the facility or modification would affect.. Please satisfy this rule requirement as it relates to the Hines Power Block 3 facility or state where in the submitted application it is satisfied.

Response:

There has been minimal industrial, commercial, and residential growth within a 5-mile radius of the FP Hines Energy Complex site since 1977. The site itself consists of approximately 8,200 acres that is wholly owned by Florida Power. The site lies in a region of the state dominated by phosphate mining operations including mines, settling ponds, sand tailings piles, gypsum stacks, and chemical and beneficiation plants. The adjacent land uses consist almost entirely of active phosphate mining, or mined and reclaimed lands. See SSCA Figure 2.2.3-2. From the standpoint of land use compatibility, the availability of transportation facilities, the lack of noise and visual impacts during construction and operation activities, the Siting Board has already determined the site location to be suitable for power plant facilities. A discussion of land use in the area of the Hines Energy Complex site is presented in Section 2.2 of the Supplemental Site Certification Application.

Since the baseline date of August 7, 1977, there have been only a few major facilities built within a 10-mile radius including: Orange Cogeneration, Polk Power Station, Tiger Bay Cogeneration, *and Mulberry Cogeneration. These facilities are located throughout the area surrounding the Hines Energy Complex. Based on their location with respect to each other, they will not result in impacts due to a concentrated industrial/commercial growth. Also, there is likely to be minimal interaction of air emissions from these plants with those from the Hines Energy Complex.*

There are also very few residences near the plant site. The unincorporated community of Homeland is approximately 1 mile northeast of the site boundary.

The existing commercial and industrial infrastructure should be adequate to provide any support services that the Project might require. Construction of the Project will occur over a 24-month period. The construction workforce is expected to peak at 350 and average 145 employees. It is anticipated that many of these construction personnel will commute to the Site. The workforce needed to operate the proposed Project represents a small fraction of the population present in the immediate area. Population and housing impacts from construction and operation will be minimal because little development into the area is anticipated. Additionally, there are expected to be minimal air quality impacts due to associated industrial/commercial growth given the location at the existing Hines Energy Complex away from the existing industrial and commercial activities.

Since 1977, Polk County has been classified as attainment for all criteria pollutants. The nearest ambient monitors to the Project are located at Mulberry and Lakeland (AIRS Nos. 121052006-1 and 121056006-1). Data collected from these stations are considered to be representative of air quality in Polk County. A summary of the maximum pollutant concentrations measured in Polk County from 1998 through 2001 is presented in Table 2.3.7-7 of the SSCA application. These data indicate that the maximum air quality concentrations measured in the region comply with and are well below the applicable ambient air quality standards.

Additionally, results of air modeling analyses demonstrate that the Project will comply with all applicable AAQS and PSD increments.

ADDITIONAL COMMENTS

Comments from EPA and NPS will be forwarded when received.

Response:

Comment noted. No additional response required.

ADMINISTRATIVE REQUIREMENTS AND CONTACT INFORMATION

Rule 62-4.050(3), F.A.C. requires that all applications for a Department permit must be certified by a professional engineer registered in the State of Florida. This requirement also applies to responses to Department requests for additional information of an engineering nature.
If there are any questions, please contact Greg DeAngelo (review engineer) at (850)921-9506 and e-mail gregory.deangelo@dep.state.fl.us. Matters regarding modeling issues should be directed to Deborah Galbraith (meteorologist) at (850)921-9537 and e-mail deborah.galbraith@dep.state.fl.us.

Response:

Comments noted. Please find enclosed (Enclosure 4) a statement, signed and sealed by a professional engineer, which covers the responses to the "Bureau of Air Regulation Questions" portion of this letter.

Southwest Florida Water Management District Questions

[Note: The following Background section is provided by Florida Power for clarification related to the following sufficiency items provided by the Southwest Florida Water Quality Management District]

Background

Florida Power has a number of applications pending before the Southwest Florida Water Management District (SWFWMD) regarding water use at the Hines Energy Complex, specifically (a) the emergency use of groundwater from Florida Power's Tiger Bay co-generation facility for Power Blocks 1 and 2; (b) groundwater use for Power Block 3; and (c) development of the Aquifer Recharge and Recovery System (ARRP) for Power Blocks 4 – 6. These applications are consistent with the overall water use approved in the Hines Energy Complex ultimate site capacity certification. To clarify the nature of these applications and how they fit into the ultimate site capacity certification, Florida Power is providing the following background information.

In 1994, the Governor and Cabinet (with SWFWMD review and approval) certified the Hines Energy Complex for an ultimate site (power generation) capacity of 3,000 megawatts. This ultimate site certification provides that Florida Power will build the Hines Energy Complex in six "power blocks" or phases of generating capacity. The ultimate site capacity certification constitutes a determination that the Hines Energy Complex site has the environmental resources – including water - necessary to support an ultimate power generation capacity of 3,000 megawatts of combined cycle generating.

At 3,000 MW ultimate site capacity, the Hines Energy Complex will require 32 MGD of water from a combination of sources, including reclaimed water, internal reuse of wastewater, water cropping, offsite non-potable water sources and ground water. Water will be needed for makeup requirements of the cooling pond, personal and sanitary needs of employees and visitors, and various plant processes. With the exception of quantities needed to support potable and sanitary needs, the 1994 ultimate site capacity certification does not allow use of ground water to support Power Blocks 1 and 2, except as approved by SWFWMD under circumstances constituting an emergency. Florida Power is proposing no changes to the groundwater use approved for personal and sanitary needs in the 1994 certification.

The 1994 certification also approved the construction of Power Block 1 - an initial 470 megawatt combined cycle unit. In May 2001, the Governor and Cabinet (with SWFWMD review and approval) certified Power Block 2 - a 530 megawatt combined cycle electrical generating plant. Except in emergency circumstances, Power Blocks 1 and 2 will not use groundwater for cooling water makeup, but instead will use recycled wastewater, reclaimed water from the city of Bartow, *and captured on-site rainwater from the Hines Energy Complex's water cropping system. Florida Power is proposing no changes to the water use for Power Blocks 1 and 2 as part of this Power Block 3 application. By a separate request, Florida Power is proposing to clarify that groundwater may be transferred from its Tiger Bay co-generation facility to Hines in emergency circumstances.*

The 3,000 MW ultimate site capacity certification approved in 1994 provides that, after evaluating the feasibility of water conservation measures and non-potable water supplies, Florida Power may use up to 17.5 MGD of Floridan aquifer groundwater for Power Blocks 3 – 6. At this time, Florida Power believes that all feasible water conservation measures and non-potable water supplies have been employed. Therefore, pursuant to the ultimate site capacity certification, Florida Power is requesting groundwater use for Power Block 3.

This Power Block 3 application involves no changes to the water crop system that was reviewed and approved by SWFWMD in 1994 as part of Power Block 1 and again by SWFWMD in 2001 as part of Power Block 2. This Power Block 3 application also involves no changes to any other water use already approved for Power Blocks 1 and 2.

The 3,000 MW ultimate site capacity certification approved in 1994 also provides that, if SWFWMD adopts rules limiting groundwater use generally within the SWUCA, Florida Power may only use up to 5 MGD of groundwater for Power Blocks 3 – 6. In such case, Florida Power can use groundwater above 5 MGD only if Florida Power can offset that use by other means. Florida Power is proposing the ARRP system as a means of offsetting groundwater use to generate water for Power Blocks 4 – 6. The ARRP system involves no changes to the water use approved for Power Blocks 1 and 2, and no change to the water crop system.

1. Please provide a revised version of Section 3.5 of the current Power Block 3 Supplemental Site Certification submittal. A note in The Table of Contents of Volume I of the submittal indicates that Section 3.5 "...needs further revision." Please note that staff needs an integrated submittal as much as possible, rather than a piece meal submittal that confuses our time frames and renders staffs review less efficient. Also, please note that your submittal of a revised version of Section 3.5 may generate additional questions. Please take into consideration in your revised submittal the following observations. [400-2.091, Florida Administrative Law (F.A.C.), 40D-2.101, F.A.C., 400-2.301, F.A.C., 2.1.1, Basis of Review for Water Use Permit Applications.]

Response:

The referenced phrase is a scrivener's error that was inadvertently included. This comment appears only in the Table of Contents and not in Section 3.5. The information contained in Section 3.5 of the application as submitted, is complete.

2. Please submit a competed Water Use Permit (WUP) Application and a completed Supplemental WUP Form for Industrial Water Use must be properly completed, signed and returned to the District. No portion of the application may be omitted. For example, all the information about the wells (ID No., casing diameter, depth, status, etc., need to be provided/confirmed, and so forth with the other items of information. [400-2.091, F.A.C., 400-2.101, F.A.C., 400-2.301, F.A.C., 2.1.1, Basis of Review for Water Use Permit Applications.]

Response:

Please find enclosed (Enclosure 5) a completed Water Use Permit Application form. Please note that this information is being provided to address the sufficiency requirements of the Supplemental Site Certification Application for this project and not to obtain a separate Water Use Permit, as this is not required for this project. The enclosed form provides information for Hines Energy Complex Power Block 3 project only. Information in the file related to WUP 2010944 provides information from the previous Site Certification activities.

3. In completing the application, as requested in item 2 above, all of the information specified in the application must be provided. For example, information about all surface water withdrawals (e.g. the cooling pond) and groundwater withdrawals should be provided. Also, information about staff gauges and monitoring wells should be provided. [400-2.091, F.A.C., 400-2.101, F.A.C., 400-2.301, F.A.C., 2.1.1, Basis of Review for Water Use Permit Applications.]

Response:

Refer to the response to Item 2 above. In addition, the water balance diagrams mentioned in Item 5 below show the anticipated water uses and sources at Hines Energy Complex for both an average rainfall year and a drought rainfall year.

4. Provide a location map, not necessarily a blue-line aerial map, showing a north arrow, a scale no less than 1" = 800 feet, major land marks such as main roads or highways, referenced to Section, Township and Range, and indicating the following items of information that are associated with your current application:

   a. The boundaries of contiguous property owned — this includes all contiguous property owned regardless of whether or not it constitutes part of the project that constitutes the subject matter of your current application; and

   b. The specific location of all existing (active or inactive) and proposed withdrawal points on the property associated with your current. Label each withdrawal point with an Owner ID No. and indicate the distance in feet between the withdrawal point and the closest east/west and north/south property.
   [400-2.091, F.A.C., 400-2.101, F.A.C., 400-2.301, F.A.C., 2.1.1, Basis of Review for Water Use Permit Applications.]

Response:

An updated map of the Hines Energy Complex is enclosed (Enclosure 6) which shows the proposed well locations. The maps included in WUP 20010944 show well locations and DID 1 through 6 are already listed with latitude and longitude.

5. The permitted groundwater Annual Average Daily (MD) and Peak Month (PMD) are 17.5 million gallons per day (MGD) on a non SWUCA basis. Only 5 MGD are permitted under SWUCA rules. Accordingly, please explain and justify the information provided in the Water Balance Diagrams of the current submittal, wherein groundwater use quantities for PB 3 are indicated as 2.428 MGD in an average year and 5.143 MGD in drought year.

Please explain how are these water balances related to groundwater quantities permitted for PB 3 through 6. FPC should now have data collected since PB#1 came on-line to confirm or adjust the assumptions made in developing the analysis used for quantifying the amounts of water for the project. As FPC develops the remaining three power blocks in the future, they should have even more historical data available to be used in assessing water requirements. Thus it is expected that FPC would collect this data and use it to show justification for the consumptive use quantities requested.

It is not clear how the construction of PB3 will cause some of the changes in the water balances provided. For example, it is not clear how the construction of PB 3 will increase pond seepage from 500,000 gpd to 1,000,000 gpd or why evaporation from the cooling pond will increase from 7,170,000 gpd to 9,300,000 gpd as indicated in these figures. Please explain all variations in the water balance for PBs 1, 2, and 3.

PB 1 has been on-line since 1999. FPC should be able to furnish three years of data indicative of water use at the site. Specifically:

a. Have there been any overflows from the existing cooling pond? If so, when? At what water level elevation and what average rate, maximum rate, duration, monthly quantities, annual quantities?
b. What is the monthly average water elevation in feet and the total dissolved salts (TDS) in milligram per liter (mg/l) in the cooling pond by month. Indicate minimum acceptable elevation and overflow elevation;
c. Provide Monthly average power production (MWH) from PB#1. Indicate any months when the steam turbine generator was not used;
d. Provide monthly average values for cooling water supply temperatures, cooling water return temperatures, ambient air dry bulb temperatures, and ambient wet bulb temperatures at complex;
e. Provide monthly precipitation amounts as measured with on-site rain gauges.
f. Provide monthly quantities (1,000 gallons) and TDS (mg/l) of water withdrawn from on-site wells for potable water system;
g. Provide monthly quantities (1,000 gallons) and TDS (mg/l) of reclaimed water received on-site;
h. Provide monthly quantities of water processed in each on-site treatment system; Provide water budget diagrams showing average and maximum month water budgets that reflect actual experience to date with operation of PB#1. Provide a discussion relating values in water budget diagram to historical data. Use mass and energy balances to reconcile estimates for runoff, evaporation and seepage; and
j. Provide a discussion relating values in figures 3.5.1-2, 3 & 4 to water budget diagram based on historical data.

[400-2.091, F.A.C., 400-2.101, F.A.C., 400-2.301, F.A.C., 2.1.1, Basis of Review for Water Use Permit Applications.]

Response:

The water balance diagrams were prepared for average (Fig. 3.5.1-3) and one-year-in-ten drought (Fig. 3.5.1-4) rainfall conditions. These diagrams are for the combined water use of Power Blocks 1, 2 and 3. Figure 3.5.1-2 shows the water balance diagram and amounts from the previous site certification for combined Power Blocks 1 and 2. The differences between Figure 3.5.1-2 and Figure 3.5.1-3 show the increase water demand caused by Power Block 3. The *groundwater sources of annual average 2.428 mgd and 5.143 mgd for a drought year are those additional needs for Power Block 3. Power Blocks 4, 5 and 6 are not included in these water balances.*

The increase in water seepage from 0.5 to 1.0 mgd for the cooling pond is not attributable to the addition of Power Block 3, but rather to an updated evaluation of embankment seepage, which was recently completed by Ardaman and Associates (Enclosure 7).

The increase in cooling pond evaporation from 7.17 mgd to 9.3 mgd is directly attributable to the increased heat load from Power Block 3. This increase was predicted by Black and Veatch's evaporation models for the original Site Certification approved in 1994.

In regards to Items a. through j. above, the cooling pond is a non-discharge facility with no overflow. The pond is operated between 159 and 163 feet NGVD. See Enclosure 8 for Hines monthly rainfall and pond level.

6. Indicate what specific groundwater withdrawal(s) will be used when Power Block (PB) 3 becomes online. State the Annual Average Daily (MD) and Peak Month Daily (PMD) quantities of groundwater that will be needed from such withdrawal(s) for PB 3. Provide documentation on how these quantities have been computed. Also compare these quantities with water quantities used for PBs 1 and 2, indicate the sources of these quantities and provide documentation on how each component of the these sources has been measured and/or computed. [40D-2.091, F.A.C., 40D-2.101, F.A.C., 40D-2.301, F.A.C., 2.1.1, Basis of Review for Water Use Permit Applications.]

Response:

See Question 5.

7. For each of the water uses that are associated with the project, indicate the AAD and PMD water quantities proposed to be used from all sources for Blocks 1, 2, and 3. Also, indicate the AAD and PMD quantities and the source (the specific withdrawal ID No.) of groundwater that will be used for each of those uses. The uses include but are not limited to, cooling water system, heat recovery boiler make-up water, reduction of oxides of nitrogen NOx emissions, flue-gas desulphurization, etc. Also please relate the actual water use in gallons of water used per MW of electricity produced (GPMW) for each of the water uses that are associated with the project site. [40D-2.091, F.A.C., 40D-2.101, F.A.C., 40D-2.301, F.A.C., 2.1.1, Basis of Review for Water Use Permit Applications.]

Response:

The specific average and peak demands for each water use component at the Hines Energy Complex are shown on Figures 3.5.1-2, 3.5.1-3, and 3.5.1.4. The Floridan Aquifer groundwater will come from production wells 1 and 2 (WUP 20010944 DID 1 and 2).

8. Please provide an account of all water conservation measures taken and/or planned to be taken to reduce water consumption at the project site, through the use of the best available technology. Describe how each process or design aspect of water use at the plant has been selected and compare such process/design to other alternatives, from a water conservation perspective. For example, compare the existing cooling pond system to dry cooling, wet cooling tower, and hybrid (wet/dry) cooling tower. Also compare the effect of using different fuel types on the rate of water consumption. Please note that the comparison required here

should consider factors such as the entire life of the project, the changing value of water in an era of growing water scarcity, the feasibility of using brackish water from the lower Floridan aquifer for cooling, etc. In other words, provide documentation indicating at what price of water would a breakeven point be established between using dry cooling and other cooling processes. Similarly, discuss and compare the method used in reducing the NOx concentrations, vis-a-vis other more water conserving processes, e.g., water injection is less water consumptive than steam injection, and dry low (NOx) systems are less water consumptive than both of these two methods. Additionally, please discuss the feasibility and possible implementation, with time frames, the following:

a. If the anticipated cooling water return temperature is more than 10 degrees F above the average ambient dry bulb temperature, it might be possible to reduce consumptive water use with a sidestream dry cooling tower; and
b. Treatment of RO reject water to recover a portion of this water for reuse.

[40D-2.091, F.A.C., 40D-2.101, F.A.C., 40D-2.301, F.A.C., 2.1.1, Basis of Review for Water Use Permit Applications.] [40D-2.091, F.A.C., 40D-2. 101, F.A.C., 40D-2.301, F.A.C., 2.1.1, Basis of Review for Water Use Permit Applications.]

Response:

Multiple water conservation measures are being employed at Hines currently and as part of Power Block 3. The generation technology being used at Hines, natural gas combined cycle, reduces water consumption by up to two thirds compared to traditional steam generation technology. As stated in previous applications, internal wastewater reuse to provide cooling pond make-up is being done as part of Power Blocks 1 & 2 and will also be part of Power Block 3. The primary reuse water is boiler blowdown. In addition, Power Blocks 1, 2, & 3 are designed with dry low-NOx fuel combustors that eliminate the need for water injection to control nitrogen oxides in the exhaust gas when burning natural gas. Water injection must be used when these units burn fuel oil, however, Florida Power will secure sufficient natural gas supplies that will allow this fuel type to be the primary fuel burned thereby minimizing the need for water injection. Florida Power will also accept limitations on the amount of fuel oil that can be burned by this unit in the facility's FDEP air permit that will further minimize the need for water injection.

Florida Power believes the cooling pond represents the best water conserving cooling technology that is viable in Florida. Cooling towers require greater amounts of make-up water than cooling ponds because cooling towers do not take advantage of direct precipitation and have greater water losses to evaporation. Florida Power does not believe dry cooling is a feasible technology at the Hines Energy Complex. Preliminary estimates for a dry cooling system to serve a 500 MW natural gas fired combined cycle power plant similar to Power Block 3 approaches $28,000,000. Although this is not a detailed cost estimate for Power Block 3 (it is taken from a presentation by Black & Veatch, an engineering consulting firm, made to SWFWMD's Power Plant Task Force), Florida Power believes it is a representative cost estimate. Additional cost would be incurred for replacement power needed to offset the increased internal power requirements for dry cooling. These power requirements are double that of the cooling pond. The existing cooling pond has the capacity to support Power Block 3. The cooling pond was authorized in the original certification and has been approved by the Public Service Commission for Florida Power to recover its investment in the cooling pond from the Company's customers. Florida Power does not believe it is prudent to abandon the existing cooling pond being paid for by our customers and reinvest $28,000,000 (that would also be paid by our customers) to install dry cooling. Since Florida Power has made the investment in the cooling pond, the break even cost necessary to justify dry cooling is zero (there is no cost for the construction of a cooling pond that is associated with the cost of PB3). Therefore, dry cooling is not a cost effective option.

Further consider that during the summer, the peak time of year for power, the net power output of the unit would be reduced by approximately 18 MW if dry cooling were used compared to the cooling pond. This loss in power would need to be produced at another power plant. This would result in use of additional fuel, additional air pollutants, significantly more noise pollution and potentially additional water use for this replacement generation produced at a higher cost to generate. Stated differently, maintaining the approximate 500 MWs of generation using dry cooling results in greater air and noise emissions compared to the same unit using a cooling pond. Florida Power does not believe the cumulative net environmental benefit of dry cooling exceeds that of a cooling pond. The environmental impact resulting from the increased air and noise pollution out weigh any impact from the use of groundwater to provide make-up to the cooling pond. This statement is supported by the existing site certification consumptive use language written by SWFWMD stating that up to 5 MGD of groundwater withdrawal has been determined to meet district rule criteria.

The significantly higher cost and environmental disadvantages of dry cooling make this a non-viable alternative to the existing cooling pond.

9. Revisit the availability of wastewater for reuse from each of the following sites:

   a. The City of Fort Meade;
   b. The City of Lakeland wastewater out-fall into the North Prong of the Alafia River; and
   c. The City of Mulberry.

   Provide documentation of your efforts to date to obtain reuse water from these sources, and the potential of their future availability. [40D-2.091, F.A.C., 40D-2.101, F.A.C., 40D-2.301, F.A.C., 2.1.1, Basis of Review for Water Use Permit Applications.]

Response:

The availability of wastewater from the cities in the vicinity of Hines Energy Complex is limited. Representatives from Florida Power recently met with Ft. Meade's City Manager to discuss the availability and feasibility of receiving Ft. Meade's treated effluent. It was determined from this meeting that this source is not viable because the city is currently under contract with Cargill to provide 100% of the effluent and a new pipeline would need to be constructed through the middle of Ft. Meade to provide conveyance to Hines. Ft. Meade's wastewater treatment plant produces 0.5 MGD AAD and 0.8 MGD PMD flows. The pipeline cost when compared to these flows is not cost effective even if the water were available, which it is not.

Florida Power is currently in the process of setting up meetings with the City of Lakeland and the City of Mulberry. In the case of the City of Lakeland, Florida Power will evaluate the feasibility of reusing the city's effluent. However, as the District is aware, the major component of this effluent would be the industrial wastewater produced by the blowdown from Lakeland Electric's cooling towers. Florida Power will explore the possibility of treating and reusing this industrial wastewater. However, at this time, Florida Power cannot guarantee the feasibility of this source. The feasibility of using the City of Mulberry's treated effluent cannot be discussed at this time due to the uncertainties of quantity, quality and the expense to pipe the water to Hines.

10. Please provide reasonable timeframes for reporting (e.g., every six months) and a framework for periodic reporting to the FOEP and to the District on your water conservation activities and efforts, including efforts made to obtain reuse water from all potential sources. Such efforts also include attempts to discourage ALCOA from dredging the onsite ponds as a means of wastewater disposal via the proposed pipeline to the cooling pond at Hines energy Complex. The reporting framework shall also incorporate every aspect, structure, design or process at

the power plant that has bearing on water conservation. For example, the reporting framework shall include, but it will not be limited to a discussion of all potential sources mentioned above, but it will also address the feasibility of exploiting the Lower Floridan aquifer brackish water, quantities offsetting Upper Floridan aquifer quantities permitted to the permittees, etc.). The reporting framework shall also include, but will not be limited to, discussing water uses at the power plant as listed in Item 7 above, the best available technology and processes for water conservation at the power plant and how the permitee is pursuing up-to-date information on this matter as well as how the permittee plans to incorporate such knowledge in the operation of the existing Power Blocks as well as in the prospective incremental Power Blocks to be built in the future. [40D-2.091, F.A.C., 40D-2.101, F.A.C., 40D-2.301, F.A.C., 2.1.1, Basis of Review for Water Use Permit Applications.]

<u>Response:</u>

This type of information is required to be provided each time that a Supplemental Site Certification Application is submitted for each incremental Power Block. This currently is approximately every two years. This is a sufficient timeframe to provide this type of information. In the event that subsequent Supplemental SCAs are not submitted on this schedule, Florida Power will consider a Condition of Certification that provides for reporting every two years.

11. Please note that the following question was asked in the District's Clarification of Additional Information Letter dated October 14, 2002, regarding the Aquifer Recharge and Recovery Project. It is presented here so that a Condition of Certification (CoC) can be formulated to be added along with other changes of or additions to the CoCs of the Hines' Site Certification. The question relate to water cropping as follows:

    It is imperative that FPC conduct the necessary monitoring and analysis to evaluate the impacts, e.g., decrease of runoff from the project site to the Peace River or its tributaries, due to water cropping, and determine whether or not such cropping would be detrimental to the river's natural system or legal existing users. The fact that the SC does not contain Conditions of Certification (CoC) that require such monitoring/evaluation does not preclude FPC from further evaluation of the impacts of FPC's practices of water cropping on aquifer recharge and Peace River flow. Accordingly, provide a Monitoring and Mitigation Plan, subject to District approval, for the monitoring, evaluation, and mitigation of any adverse impacts in this regard. [40D-2.091, F.A.C., 40D-2.101, F.A.C., 40D-2.301, F.A.C., 2.1.1, Basis of Review for Water Use Permit Applications.]

<u>Response:</u>

The water crop system was developed as a means of reducing Florida Power's dependence on groundwater. The water crop system was approved by SWFWMD as part of the original site certification in 1993-94 and then again as part of Power Block 2 in 2001. According to SWFWMD's August 25, 1993, agency report, SWFWMD reviewed the original site certification for compliance with the permitting criteria in chapters 40D-2, 40D-3, and 40D-4, F.A.C.

According to SWFWMD's August 25, 1993, agency report, the Hines Energy Complex was constructed on a disturbed former mining site. Approximately half of the site was required to be reclaimed in accordance with DEP's mining reclamation rules. The remaining half of the site was mined prior to mandatory mining reclamation requirements. This half of the site is referred to as "non-mandatory areas."

The non-mandatory areas did not contribute to off-site systems as of October 1984 when SWFWMD adopted Chapter 40D-4. Therefore, SWFWMD considers these non-mandatory areas to be existing closed basins from a surface water hydrology analysis standpoint. These areas are evaluated as closed basins because no rule or law requires that these non-mandatory areas to be reclaimed in a manner providing surface water discharge reflecting the pre-mining or pre-1975 condition.

SWFWMD's August 25, 1993, agency report notes that Florida Power would reclaim the mandatory and most of the non-mandatory reclamation areas in a fashion that would allow for water cropping or zero discharge. To offset the reduction in flows to Camp Branch and McCullough Creek, Florida Power will use areas N-11C, N-13, N-9B, N-11A, a portion of the old Estech plant, SA-10 and a portion of SA-12 to contribute flows to these two systems. SWFWMD's August 25, 1993, agency report states that these flows will adequately compensate for the zero discharge nature of the water cropping system and address the potential for adverse environmental impacts off-site. Florida Power developed hydrographs depicting the net effect of these activities on the flows in Camp Branch and McCullough Creek as part of this original review and determination by SWFWMD. These hydrographs are resubmitted in Enclosure 9.

Note also that the Final Order of the Governor and Cabinet approving the ultimate site certification in 1994 adopted the recommended order of the Administrative Law Judge. Paragraph 64 of the Administrative Law Judge's recommended order provides as follows:

> *64. The Polk County Site [now Hines Energy Center] has been designed to function as a "zero discharge" facility. No surface water will be withdrawn from or discharge to any offsite surface water body as a result of plant operations. Certain non-industrial areas within the Polk County Site will be designed, however, to produce offsite drainage to enhance flows to McCullough Creek and Camp Branch. Flow to McCullough Creek will be enhanced by drainage from parcel SA-10, an offsite portion of the Estech Silver City Plant Site, and the southernly portion of parcel SA-12. Drainage from parcels N-11A, N-13, N-9B, Tiger Bay East and Tiger Bay will enhance flows to Camp Branch. Additionally, FPC has agreed to explore the possibility of restoring drainage to Six Mile Creek if on site water cropping produces more water than FPC needs for power plant operations and if such drainage can be accomplished without additional permits. The net effect of the drainage enhancement plans will be to equal or improve flows to McCullough Creek and Camp Branch over the baseline condition for the site. (emphasis added)*

Thus, SWFWMD, DEP, and the Administrative Law Judge reviewed the effects of the water cropping system on offsite areas and concluded that the system, combined with other restoration efforts, would compensate for or be a net improvement over the baseline condition. Florida Power is currently working to implement the watercrop system as previously approved and does not intend to extend the watercrop operation outside of those approved lands. In this Power Block 3 application, Florida Power is not proposing any changes to the water cropping system SWFWMD previously approved.

12. Please provide documentation to demonstrate that rainwater and stormwater capture constitutes a reasonable beneficial use of water. [40D-2.091, F.A.C., 40D-2.101, F.A.C., 40D-2.301, F.A.C., 2.1.1, Basis of Review for Water Use Permit Applications.]

Response:

The Hines Energy Center Condition of Certification XXVI.A.14.c. (PA 92-33) (reviewed and approved by SWFWMD) specifically states that on-site rainwater and stormwater capture and use constitute a reasonable and beneficial use of water. Florida Power is not proposing any changes to the rainwater and stormwater capture system (water crop) SWFWMD previously approved. Please refer to the Question 11 Response for additional detail.

13. As the CoCs are modified or as additional CoC(s) are added, per the current submittal, as well as per the amendment for the water transfer from the Tiger Bay to the Hines, and per the modification for the ARRP, the following items need to be identified/verified, including providing latitude and longitude, when applicable, and located on the location map mentioned in question 4:

    a. The specific Owner ID No., location, and diameter of the delivery point of reuse water from the Bartow Wastewater Treatment Plant;
    b. The specific Owner ID, location, and diameter of the delivery point of water shortage supply from the Tiger Bay to the Hines' cooling pond;
    c. The specific Owner ID No. and location of the staff gauge in cooling pond;
    d. The specific locations, Owner ID Nos., depths (cased and total), diameters, of all injection well(s) and monitoring wells associated with the ARRP as well as associated with monitoring and mitigation plan for water cropping.

    [40D-2.091, F.A.C., 40D-2.101, F.A.C., 40D-2.301, F.A.C., 2.1.1, Basis of Review for Water Use Permit Applications.]

Response:

The following ID Numbers and locations are:

DID 7	*Bartow Effluent Discharge*	*Lat/Lon*	*27 47 30 / 81 50 54*
DID 8	*ALCOA/Tiger Bay Discharge*	*Lat/Lon*	*27 47 30 / 81 51 45*
DID 9	*Cooling Pond Staff Gauge*	*Lat/Lon*	*27 47 30 / 81 51 47*

See Enclosure 10 for Well locations and details.

14. Please provide all the information necessary to comply with the provisions of PA-33SA Conditions of Certification XXVIA.14.b.ii. and iii. for this supplemental application for the construction and operation of a further increment of generating capacity at Hines. [40D-2.091,F.A.C., 40D-2.101, F.A.C., 40D-2.301, F.A.C., 2.1.1, Basis of Review for Water Use Permit Applications.]

Response:

The information related to these provisions can be found in the Supplemental Site Certification Application at Section 3.5.

Florida Department of Transportation Questions

The Florida Department of Transportation has reviewed the transportation related information relative to the subject application for sufficiency. The application bases its transportation impacts on a 1992 traffic study. The Department recommends that new traffic counts be taken and the traffic study be updated based on these more recent counts. Mr. John Czerepak of the Department's District 1 Office in Bartow will be pleased to assist the applicant in the development of acceptable data. Mr. Czerepak can be reached by phone at (941) 519-2343.

In addition, the Department will need to know the height of all new structures associated with the new unit to evaluate any potential aviation impacts.

Response:

As part of the initial site certification proceeding for the Hines Energy Complex in 1992 to 1994, Florida Power, its transportation consultants and reviewers at the Florida Department of Transportation evaluated the traffic impacts of the full build-out of the Hines Energy Complex, up to the planned 3000 MW of generating capacity and potential coal gasification facilities. The traffic impact analyses performed at that time evaluated the impact of traffic expected with each of the six planned units at the site, including the currently-proposed Unit 3. At peak employment at the site, it was found that local roadways would meet local and state level of service standards, with the roadway improvements that were required to be made as part of the initial certification proceeding. Florida Power has undertaken the required roadway improvements needed for full project buildout. Thus, the issue of traffic impact for each unit at the Hines Energy Complex has already been evaluated and mitigation or improvements already required and undertaken. The current conditions of certification originally proposed by the Department of Transportation will also be met with each subsequent unit, including the proposed Unit 3.

Since the impacts have already been addressed for this unit, and given that the addition of Unit 3 will only result in 4-6 additional employees, it is unnecessary to conduct a new traffic impact analysis for Unit 3, using updated traffic counts. The information contained in the Unit 3 site certification application was presented to document that the Unit 3 traffic for construction and operation was within the levels already evaluated and conditioned as part of the initial certification proceeding. It does not represent new traffic, nor require a new traffic impact analysis.

The heights of the two new stacks associated with the project are 125 feet each. This is the same height as the existing stacks at the facility.

[End of Responses]

We look forward to working with you, the Department and other agencies participating in the certification process. Should you, your staff, or any other agency representatives have any questions regarding this response to sufficiency questions, please do not hesitate to contact me at (813) 826-4363.

Sincerely,

Jamie Hunter
Lead Environmental Specialist
Environmental Services

Enclosures

jjh/JJH049

c: (see attached list)

List of Parties Receiving Copies of the Hines 3 SSCA Response to Sufficiency Requests – December 2002

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Al Linero, P.E. **(3 copies)**
Florida Department of Environmental Protection
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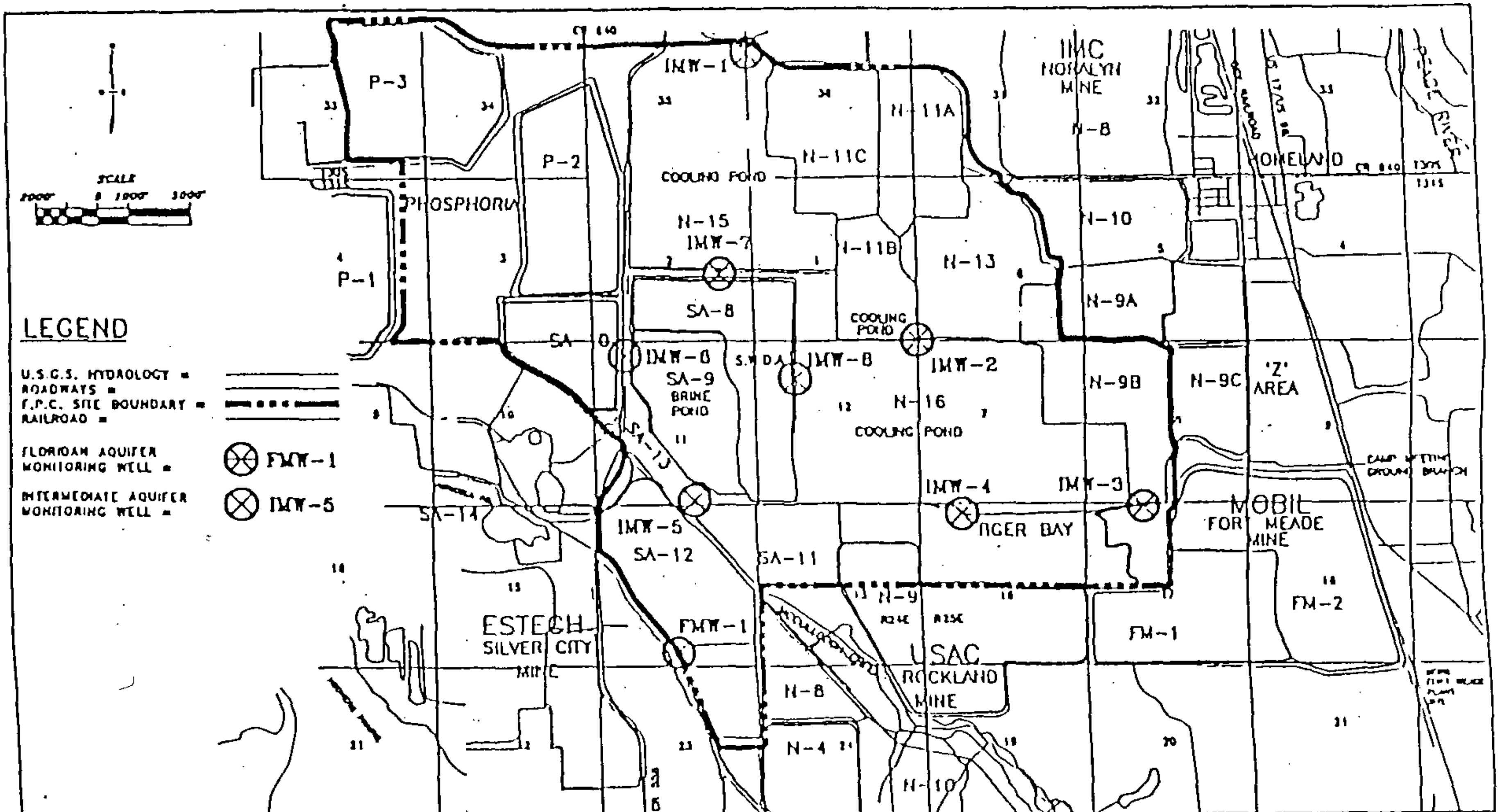
Tallahassee, Florida 32399-2400



Florida Power Corporation

Polk County Site

FIGURE 1

MONITORING WELL LOCATIONS

MWLOC DFC
REV. 10/93

Florida Power
CORPORATION

March 16, 1998

Mr. Michael Hickey
Florida Department of Environmental Protection
Southwest District
3804 Coconut Palm Drive
Tampa, Florida 33619-8318

Dear Mr. Hickey:

Re: Florida Power Corporation - Hines Energy Complex
Site Certification PA 92-33 - Groundwater Monitoring Plan

In accordance with the provisions of Condition XVIII.A.6. of the above certification, attached are the well completion report and logs for the facility.

If you have any questions concerning this submittal, please do not hesitate to contact me at (813) 866-4290.

Sincerely,

B. R. Melton

B. Randall Melton
Environmental Specialist

Attachment

cc: Mr. Hamilton Oven - FDEP Tallahassee
Ms. Dawn Turner - SWFWMD Tampa
Mr. Robert Viertel - SWFWMD Bartow
Permits Data - SWFWMD Brooksville

ENGELHARD

Golder Assoc.
501F - Combined Cycle
CO and SCR Catalyst Systems
Engelhard Budgetary Proposal EPB00664-Rev. 1
March 15, 2000

Performance Data

FUEL	NG	NG	NG	NG	Oil
TURBINE EXHAUST FLOW, lb/hr	3,600,000	3,600,000	3,600,000	3,600,000	3,750,000
TURBINE EXHAUST GAS ANALYSIS, % VOL. N2	74.37	74.37	74.37	74.37	71.87
O2	12.51	12.51	12.51	12.51	11.10
CO2	3.74	3.74	3.74	3.74	5.20
H2O	8.45	8.45	8.45	8.45	10.90
Ar	0.93	0.93	0.93	0.93	0.93
GIVEN: TURBINE CO, ppmvd @ 15% O2	25	25	25	25	30
CALC.: TURBINE CO, lb/hr	99.7	99.7	99.7	99.7	141.8
GIVEN: TURBINE NOx, ppmvd @ 15% O2	25	25	25	25	42
CALC.: TURBINE NOx, lb/hr	163.8	163.8	163.8	163.8	326.2
CALC. GAS MOL. WT.	28.38	28.38	28.38	28.38	28.28
FLUE GAS TEMP. @ CO and SCR CATALYST, F	650	650	650	650	650
DESIGN REQUIREMENTS					
CO CATALYST CO OUT, ppmvd @ 15% O2	2.5	2.5	2.5	2.5	3.0
SCR CATALYST NOx OUT, ppmvd @ 15% O2	3.0	3.0	2.5	2.5	25
NH3 SLIP, ppmvd @ 15% O2	9	5	9	5	12
GUARANTEED PERFORMANCE DATA					
CO CATALYST CO CONVERSION, % - Min.	90.0%	90.0%	90.0%	90.0%	90.0%
CO OUT, lb/hr - Max.	10.0	10.0	10.0	10.0	14.2
CO OUT, ppmvd @ 15% O2 - Max.	2.5	2.5	2.5	2.5	3.0
CO PRESSURE DROP, "WG - Max.	1.3	1.3	1.3	1.3	1.3
SCR CATALYST NOx CONVERSION, % - Min.	88.0%	88.0%	90.0%	90.0%	40.4%
NOx OUT, ppmvd @ 15% O2 - Max.	3	3	2.5	2.5	25
NOx OUT, lb/hr - Max.	19.7	19.7	16.4	16.4	194.3
EXPECTED AQUEOUS NH3 (28% SOL.) FLOW, lb/hr	268.0	233.4	272.4	237.8	297.2
NH3 SLIP, ppmvd @ 15% O2 - Max.	9	5	9	5	12
SCR PRESSURE DROP, "WG - Max.	2.4	2.6	2.6	2.8	
CO SYSTEM	**$773,000**	**$773,000**	**$773,000**	**$773,000**	
REPLACEMENT CO MODULES	**$674,000**	**$674,000**	**$674,000**	**$674,000**	
SCR SYSTEM	**$1,526,000**	**$1,630,000**	**$1,630,000**	**$1,738,000**	
REPLACEMENT SCR MODULES	**$1,042,000**	**$1,144,000**	**$1,144,000**	**$1,250,000**	

Table A-25 Summary of Maximum Potential Annual Emissions for the CT/HRSG

Pollutant	Annual Emissions (tons/year) [a]			Maximum Emissions (tons/year) [b]				PSD Significant Emission Rates
	Natural Gas	Natural Gas	Distillate Oil	Case A	Case B	Case C	Case D	
Load:	100%	60%	100%					
Hours:	8,760	3,000	1,000					
One Combustion Turbine- Combined Cycle								
SO2	22.4	5.4	48.6	22.4	20.1	68.4	66.1	40
PM/PM10	34.4	8.8	29.8	34.4	31.4	60.3	57.3	25/15
NOx	101	24	44	101.2	90.4	133.4	122.6	40
CO	184	219	53	184.0	340.0	216.0	372.0	100
VOC (as methane)	19.1	7.5	10.5	19.1	20.0	27.4	28.4	40
Sulfuric Acid Mist	3.4	0.8	7.4	3.4	3.1	10.5	10.1	7
Lead	0	0.00E+00	1.04E-02	0.0E+00	0.0E+00	1.0E-02	1.0E-02	0.6
Mercury	6.41E-06	1.54E-06	6.05E-04	6.4E-06	5.8E-06	6.1E-04	6.1E-04	0.1
Total HAPs	1.93	0.77	1.80	1.9	2.0	3.5	3.6	25
Two Combustion Turbines- Combined Cycle								
SO2	44.9	10.7	97.1	44.9	40.2	136.9	132.3	40
PM/PM10	69	18	60	69	63	121	115	25/15
NOx	202	48	88	202	181	267	245	40
CO	368	438	106	368	680	432	744	100
VOC (as methane)	38.1	15.0	21.0	38.1	40.1	54.8	56.7	40
Sulfuric Acid Mist	6.9	1.65	14.87	6.87	6.16	20.96	20.25	7
Lead	0.00E+00	0.00E+00	2.09E-02	0.00E+00	0.00E+00	2.09E-02	2.09E-02	0.6
Mercury	1.28E-05	3.07E-06	1.21E-03	1.28E-05	1.15E-05	1.22E-03	1.22E-03	0.1
Total HAPs	3.9	1.55	3.60	3.87	4.09	7.02	7.25	25

a Based on 59 oF compressor inlet air temperature

b Maximim emission cases

Operation	Number of Hours for Operation			
	Case A	Case B	Case C	Case D
100 % Load	8,760	5,760	7,760	4,760
100 % Load -Oil	0	0	1,000	1,000
60% Load-Gas	0	3000	0	3,000
Total hours	8,760	8,760	8,760	8,760

Golder Associates Inc.

6241 NW 23rd Street, Suite 500
Gainesville, FL 32653-1500
Telephone (352) 336-5600
Fax (352) 336-6603

Golder Associates

December 16, 2002

0237539

Trina Vielhauer, Chief
Bureau of Air Regulation
Division of Air Resources Management
Department of Environmental Protection
2600 Blair Stone Road
Tallahassee, FL 23399

RE: FLORIDA POWER – HINES ENERGY COMPLEX POWER BLOCK 3
DEP FILE 1050234-006-AC (PSD-FL-330)
ADDITIONAL INFORMATION REQUEST
PROFESSIONAL ENGINEER CERTIFICATION

Attention: A. A. Linero, P.E., Administrator, New Source Review Section

Dear Al:

This correspondence provides the Professional Engineer Certification for the responses to the sufficiency questions addressing the additional information requested by the Bureau of Air Regulation for the Florida Power Hines Energy Center Power Block 3. The responses for the air construction/PSD permit were prepared by me or under my direction and cover the additional information requested by Greg DeAngelo and Deborah Gailbraith in the October 4, 2002 memorandum to Hamilton Oven.

Please call if there are any questions.

Sincerely,

GOLDER ASSOCIATES INC.

Kennard F. Kosky, P.E.
Principal
Registered Professional Engineer No. 14996
(Golder Associates, Inc. Certificate of Authorization No. 00001670)

Seal

KFK/jkw

cc: Jamie Hunter, Lead Environmental Specialist
Greg DeAngelo, Bureau of Air Regulation
Deborah Gailbraith, Bureau of Air Regulation

P:\Projects\2002\0237539 FPC Hines Energy Complex\4\4.1\L121602 doc

INDIVIDUAL WATER USE PERMIT APPLICATION

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT

2379 BROAD STREET • BROOKSVILLE, FL 34609-6899 • (352) 796-7211 or FLORIDA WATS 1 (800) 423-1476
(SEE LAST PAGE OF THIS FORM FOR YOUR LOCAL PERMITTING OFFICE)

USE FOR QUANTITIES OF 500,000 GALLONS PERDAY OR GREATER

THIS FORM MUST BE COMPLETED FOR ALL APPLICANTS REQUESTING ANNUAL AVERAGE QUANTITIES OF 500,000 GPD OR GREATER. OTHER APPLICANTS MUST COMPLETE THE APPLICATION FORM CORRESPONDING TO THE PROPOSED QUANTITY. THIS INFORMATION IS REQUESTED IN ACCORDANCE WITH RULES 40D-2.101 AND 40D-2.301, FLORIDA ADMINISTRATIVE CODE.

*AN ASTERISK INDENTIFIES ITEMS TO BE INDICATED ON SITE MAP; YOU MAY USE THE MAP REQUESTED IN ITEM IV, SECTION B OF THE WUP APPLICATION.

PLEASE SUBMIT THREE COPIES OF THIS APPLICATION ALONG WITH THREE COPIES OF THE APPROPRIATE SUPPLEMENTAL FORM (IF REQUIRED), DRAWINGS, CALCULATIONS, ETC.

I. GENERAL INFORMATION

1. Type of Application (Check One): ☐ New ☐ Renewal ☒ Modification
2. Water Use Permit Number (If application is for renewal or modification): 20012367 and 20010944

NOTE: "Applicant" is the name under which the permit will be issued (examples: Robert Jones; Baker Groves, Inc., Acme Industries, City of Sundale.) All correspondence will be addressed to the applicant unless an alternate contact is requested in Item 4.

3. APPLICANT

NAME Progress Energy Hines Energy Complex TELEPHONE (863) 519-6100
ADDRESS 7700 CR 555 COUNTY Polk
CITY, STATE, ZIP Bartow, Fl 33830
Applicant is: ☒ Owner ☐ Lessee ☐ Other ________

4. CONTACT OR CONSULTANT: Address all correspondence to the person identified below: ☐ YES ☐ NO

NAME John Hunter COMPANY: Progress Energy
ADDRESS P.O. Box 14042, BB1A TELEPHONE (727) 826-4363
CITY, STATE, ZIP St. Petersburg, Florida 33733

5. OWNER (IF OTHER THAN APPLICANT)

NAME
ADDRESS TELEPHONE ( )
CITY, STATE, ZIP

II. PROPERTY CONTROL

1. Provide a legal description of the property served by this application. ☐ Attached See WUP 2010944
2. This property is: ☒ Owned by the applicant ☐ Leased by the applicant ☐ Applicant has other legal control
3. Leased property: Provide a copy of either (check type of document that is attached):
   ☐ Copy of lease ☐ Letter signed by the property owner describing the lease arrangement and the duration of the lease

NOTE: Permits will not be issued for a duration longer than the lease, unless the lease is renewable. If renewable, the applicant may be required by Permit Condition to provide a copy of the renewed lease at the appropriate time. The property owner and the lessee must sign this application in Section VII.

4. Other Legal Control: If the applicant has legal control over the property other than a lease agreement, please provide a description on an attached sheet. ☐ Attached ☐ N/A

III. CLASSIFICATION

SECTION A - *Quantity*

1. Annual average quantity applied for, in gallons per day (gpd). This quantity should reflect the amount needed six years and ten years hence, or for the remainder of permit duration, if the application is for a modification:

   6 years: 2,428,000 (gpd) 10 years: -- (gpd) Other: 17,500,000 (gpd)

2. Indicate the requested peak monthly pumpage quantity. See Section 3 of the *Basis of Review* for an explanation of this quantity.

   6 years: 5,143,000 (gpd) 10 years: -- (gpd) Other: 17,500,000 (gpd)

SECTION B - *Water Use*

3. Indicate all that apply. Information Supplements must be filled out for all uses. See Section 3 of the *Basis of Review* for explanations of the use classifications.

   - ☐ Public Supply
   - ☐ Recreation or Aesthetic
   - ☐ Agriculture
   - ☒ Industrial or Commercial
   - ☐ Mining or Dewatering

4. Indicate the date on which the use of water was initiated or is proposed for initiation (month/day/year): ____________

5. Indicate the quantity and source of any reuse water used by the applicant:
   Annual Average Quantity 1,770,000 gpd; Peak Month Quantity 2,500,000 gpd; Source: City of Bartow

IV. SITE/WITHDRAWAL INFORMATION

SECTION A - *Acreage*

1. Number of acres Owned: 8226; Leased: ____________; Serviced ____________.

2. Describe the location of the property contained in this application by Section, Township, Range, 1/4 Section:
   Section ____________, Township ____________, Range ____________, 1/4 Section ____________.

   See WUP 2010944

SECTION B - *Location Maps*

3. Provide a recent aerial map showing: (a) a north arrow; (b) a scale designation - all maps should have a minimum scale of 1" = 2,000'; (c) landmarks such as roads and political boundaries; (d) property boundaries - include approximate lengths of boundaries in feet; (e) withdrawal point locations - label withdrawal points, indicate the distance from the withdrawal points to the nearest property boundaries in feet, *(If the withdrawal points are located on non-contiguous parcels, provide separate large-scale maps in addition to a large-scale map which includes all parcels); (f) the area serviced or irrigated, *(If the area serviced or irrigated is a distance from the withdrawal locations, provide separate map(s).

   * May require separate or additional maps. See attached Map

4. Use a Map (not necessarily an aerial) or a sketch of the applicant's property and surrounding area to indicate:
   a. Approximate location of other wells not owned by the applicant including domestic wells, irrigation wells, public water supply wells, etc. within the distance set forth in Item 5, Table 1, below. Supplemental locations at a greater distance may be required. No wells within 2640 feet of Wells P-1 and P-2
   b. Location of monitoring wells, including reference numbers.
   c. Wetlands greater than 0.5 acre in size, covering the area within the distance set forth in Item 5, below. Substantial off-site drawdown impacts may require additional aerial coverage. Mining applicants requirements differ, and are provided on the Mining and Dewatering Supplemental Form, Form No. WUP-6.

SECTION C - *Adjacent Property Owners*

5. Submit a listing of the names and mailing addresses of property owners near the property contained in this application, based on the quantity to be withdrawn and the table provided below. You may choose a distance from either your property boundary or your withdrawal point. The District may require additional potentially affected property owners to be submitted.

Section C, Item 5 continued on Page 3

Section C, Item 5 continued from Page 2

TABLE 1 - FOR WELL OR MINE PIT WITHDRAWALS OF:

Average GPD on an Annual Basis	***OR*** Maximum GPD During Any Single Day	Provide Information on the Following:
500,000 gpd but less than 1,000,000 gpd	More than 5,000,000 but not more than 10,000,000 gpd	All property owners within 1,320' of the well, or within 200' of your property boundary
1,000,000 gpd or greater	More than 10,000,000	All property owners within 2,640' of the well, or within 400' of your property boundary

TABLE 2 - FOR SURFACE WATER WITHDRAWALS:

If your withdrawal is from a lake with a surface area of 80 acres or less, list below all riparian owners on the lake or impoundment.

If your withdrawal is from a lake larger than 80 acres, list below all riparian owners in either direction 660' from point where applicant's property intersects the shoreline.

If your withdrawal is from a stream and if the maximum daily average pumpage is less than 5,000,000 gpd, list below all riparian owners 660' upstream and 1,320' downstream from your property boundaries at the shoreline.

If your withdrawal is from a stream and if the maximum daily average pumpage is greater than or equal to 5,000,000 gpd, list below all riparian owners 1,320' upstream and 2,640' downstream from your property boundaries at the shoreline.

Name	Mailing Address
None	

SECTION D - *Withdrawal Points*

6. **Groundwater Withdrawals.** Include all wells on property greater than 2 inches in diameter, whether active or inactive, and whether existing or proposed, in the table on the following page:

TABLE LEGEND:

SWFWMD I.D. No. - the withdrawal number assigned by the District, if existing.
Owner I.D. No. - the owner's I.D. number.
Construction Date - the approximate date that the withdrawal point became operable.
Average Withdrawal Rate - the total quantity of water to be withdrawn in one year divided by 365, in gpd.
Peak Monthly Withdrawal Rate - the maximum quantity to be withdrawn in a single month, in gpd.
Maximum Daily Withdrawal Rate - the maximum quantity to be withdrawn in any single day.
Standby - refers to status of wells that would not be used unless another well becomes inoperable.
Cap - the well is capped.
Meter - refers to whether a flow meter is installed: if several withdrawals are connected to the same meter. (ganged), indicate by placing a letter character (a,,b, etc.) instead of a check mark, linking those interconnected withdrawals by like characters. If an indirect flow measuring device (e.g. an elapsed time meter, etc.) is used, place an I (indirect) in the space provided.
Monitor - refers to water level or water quality monitors. Indicate the type of monitor by placing an L (Level), Q (Quality), or both in the space provided. The absence of checkmarks or letters indicates active status.
Mainline Diameter - refers to the outside diameter of the main discharge pipe.
Proposed - check if the withdrawal point is proposed rather than existing.

Section D, continued on Page 4

Section D, continued from Page 3

See WUP 2010944

I.D. No. SWFWMD	I.D. No. Owner	Casing Diameter	Depth Cased	Total Depth	Constr. Date	Pump Capacity (gpm)	Withdrawal Rate Average Annual	Withdrawal Rate Peak Month	Proposed	Status (check): Mon.	Stdby.	Cap.	Meter	Mainline Diameter
1	P-1	20	360	880	2006	2500	2428000	3600000	x					16
2	P-2	20	360	880	2006	2500	2428000	3600000	x					16
6	P-6	8	300	500	1998	100	19000	36000						2

7. Indicate the future use of any capped source: ____

8. Indicate the parameters sampled for any monitor wells listed above: See Groundwater Monitor. Plan

9. **Surface Water Withdrawals** - See the Groundwater withdrawal section above for explanation of most terms. Source name is the name of a lake, stream or other waterbody.

See Attached Table A.

I.D. No. SWFWMD	I.D. No. Owner	Source Name	Lake Acreage	Intake Diameter	Pump Capacity (gpm)	Withdrawal Rate Average Annual	Withdrawal Rate Peak Month	Proposed	Status (check): Active	Stdby.	Metered	Mainline Diameter

10. **Other Sources.** Describe any other sources of water, such as from utilities, treated waste water effluent, etc. List annual average and peak month quantities for each additional source:

City of Bartow, ALCOA, Tiger Bay Cogen. Plant

V. IMPACTS

Are you aware of any adverse impacts that your withdrawals have or may have on other water users, off-site land uses, the water resources, or environmental features? If so, provide a detailed explanation of the impact and your plans to deal with it.

None Anticipated ☒ Explanation Attached ☐

VI. HYDROGEOLOGY

Provide any information available on regional and site-specific hydrogeology, including aquifer characteristics, for all aquifers existing in the area of your withdrawals. Provide documentation and references in support of this information. If you do not have such information, hydrogeologic testing may be required either as additional information in support of your application, as a condition of the permit, or both. The District may use appropriate regional data in lieu of or in addition to submitted information to assess the impacts of your withdrawals. New hydrogeologic testing should follow the guidelines of Part C, *Permit Information Manual.*

See Site Certification Application

VII. APPLICANT CERTIFICATION

I hereby certify that the information contained herein is true and accurate and that I have legal authority to undertake the activities described herein and execute this application.

[signature]	12/18/02
Applicant Signature	Date

I hereby certify that the applicant has sufficient legal control of the property described in this application.

Property Owner (if other than applicant)	Date

APPLICANT CHECK LIST:

Attachments requested in support of this application:

		Attached	***N/A***
1.	(Section II-1) Copy of Legal Description	☐	☒
2.	(Section II-2) Copy of Current Lease	☐	☒
3.	(Section II-3) Description of Other Legal Property Control	☐	☒
4.	(Section IV-3) Aerial Map	☒	☐
5.	(Section IV-4) Site Map	☒	☐
6.	(Section IV-5) Adjacent Property Owners	☐	☒
7.	(Section VI) Hydrologic Information	☐	☒
8.	Appropriate Supplemental Form	☒	☐

TABLE A. WITHDRAWAL INFORMATION FROM COOLING AND WATERCROP AREAS AT HINES ENERGY COMPLEX

Water Source	Water Acres	Pipe Diam.	Pump Capacity	Remarks
Cooling Pond	722	72"	60,000 gpm	Each Power Block has 2 pumps
Plant Island Ditch	5	18"	5,000 gpm	Two pumps
East Side Water Crop	20	18"	5,000 gpm	Temporary pump
N-11B	5	18"	5,000 gpm	Temporary pump
SA-8	20	12"	5,000 gpm	Temporary pump
Triangle Lakes	60	18"	3,200 gpm	Currently being installed

WATER USE PERMIT APPLICATION SUPPLEMENTAL FORM

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT

2379 BROAD STREET • BROOKSVILLE, FL 34609-6899 • (352) 796-7211 or FLORIDA WATS 1 (800) 423-1476

INDUSTRIAL OR COMMERCIAL

ANSWER ALL QUESTIONS. IF A QUESTION IS NOT APPLICABLE, ENTER N/A. IF MORE SPACE IS NEEDED, ATTACH ADDITIONAL SHEETS AND REFER TO THE APPLICATION QUESTION NUMBER. PROVIDE DOCUMENTATION AND REFERENCES WHERE APPROPRIATE. IF THERE ARE OTHER USES, COMPLETE THE APPROPRIATE SUPPLEMENTAL FORM (S). THIS INFORMATION IS REQUESTED IN ACCORDANCE WITH RULES 40D-2.101 AND 40D-2.301, FLORIDA ADMINISTRATIVE CODE.

NOTE: IF PROCESSING OF MATERIALS IS ASSOCIATED WITH MINING OR DEWATERING, USE THE **MINING AND DEWATERING SUPPLEMENTAL FORM, WUP FORM NO 6,** AND INCLUDE THE INDUSTRIAL/COMMERCIAL USES ON THAT FORM.

*AN ASTERISK IDENTIFIES ITEMS TO BE INDICATED ON SITE MAP; YOU MAY USE THE MAP REQUESTED IN ITEM IV, SECTION B OF THE APPLICATION FORM.

PLEASE SUBMIT *THREE COPIES* OF THIS SUPPLEMENTAL FORM ALONG WITH YOUR APPLICATION, DRAWINGS, CALCULATIONS, ETC.

I. GENERAL INFORMATION

APPLICANT: Progress Energy Hines Energy Complex WUP No. (If Existing): 2012367 and 2010944

(Same as shown on WUP application)

II. SITE INFORMATION

SECTION A - *Fire Flow*

1. Describe fire flow and standby capacity (identify withdrawal points and when they would be used).

______

SECTION B - *Existing Wellfields*

Describe the existing wellfield operation schedule, if applicable. Include in the description those wells that are primary, secondary, stand-by, and the well rotation schedule, if any. Description Attached ☐ N/A ☒

SECTION C - *Surface Water Management System*

Is a surface water management system proposed? Yes ☐ No ☒ Existing? exempt Yes ☐ Permit No.______ No ☐

If so, an evaluation of the impact of the proposed withdrawal on the surface water management system, and conversely, the impact of the surface water management system on the withdrawal and water availability at the project site must be submitted.

SECTION D - *Discharge/Recirculation*

Identify the following items on a map or maps: 1. Discharge points; 2. Recirculation or settling ponds.

Number the ponds, and list the acreage of each pond: See Table A.

Pond No.	Acreage

III. WATER USE

SECTION A - ***Annual Average Quantities in gallons per day (gpd)***

		Present	Projected 6-Year	Projected 10-Year
1.	Potable and sanitary needs	19,000	19,000	19,000
2.	Lawn and landscape irrigation	0	0	0
3.	Outside use (washing, maintenance)	0	0	0
4.	Fire protection (testing, maintenance)	0	0	0

5. Provide a Water Balance diagram, indicating all water sources (ground water from wells, ground water from water table dewatering or drainage, surface water, rainfall, recycled water, etc.), the amount of water entering and leaving each step in the process, all water losses (e.g. evaporation, product moisture, steam losses, waste-material entrainment, off-site discharge, recycle, etc.), and the final disposition of water. These diagrams should be based on the annual average daily quantity and the peak monthly quantity. All flows must be in units of gallons per day, and the total of all sources must equal the total of all losses. See Fig. 3.5.1-3 and Fig. 3.5.1-4

		Present	6-Year	10-Year
6.	**Total Water Demand** (Total Items 1-5)	19000	2428000	17500000
7.	Provide the percentage of unaccounted water (total system throughout minus all accounted and in-plant uses):	0	0	0
8.	Population served (works/visitors):	30	40	50

SECTION B - ***Lawn and Landscape Irrigation***

If any of the projected water use will be for irrigation of lawns, landscaping of recreational areas, respond to items 1 through 5 below; if not, please check N/A. N/A ☒

If these quantities are greater than 100,000 gpd annual average, you must fill out the Recreational Supplemental Information Form, WUP 8.

1. Acres to be irrigated ______
2. Type(s) of vegetation to be irrigated ______
3. Irrigation method ______
4. Approximate peak monthly water use ______
5. Approximate annual average water use ______
6. Show irrigated area(s) on map.*

SECTION C - ***Peak Month Quantity***

Provide the peak month quantity needed at present, in 6 years, and in 10 years. Provide calculations supporting these quantities.

		Present	6 year	10 year
9.	**Total peak month quantity (gpd)**	35000	5143000	17500000

IV. DISPOSAL

SECTION A - ***Methods of Disposal***

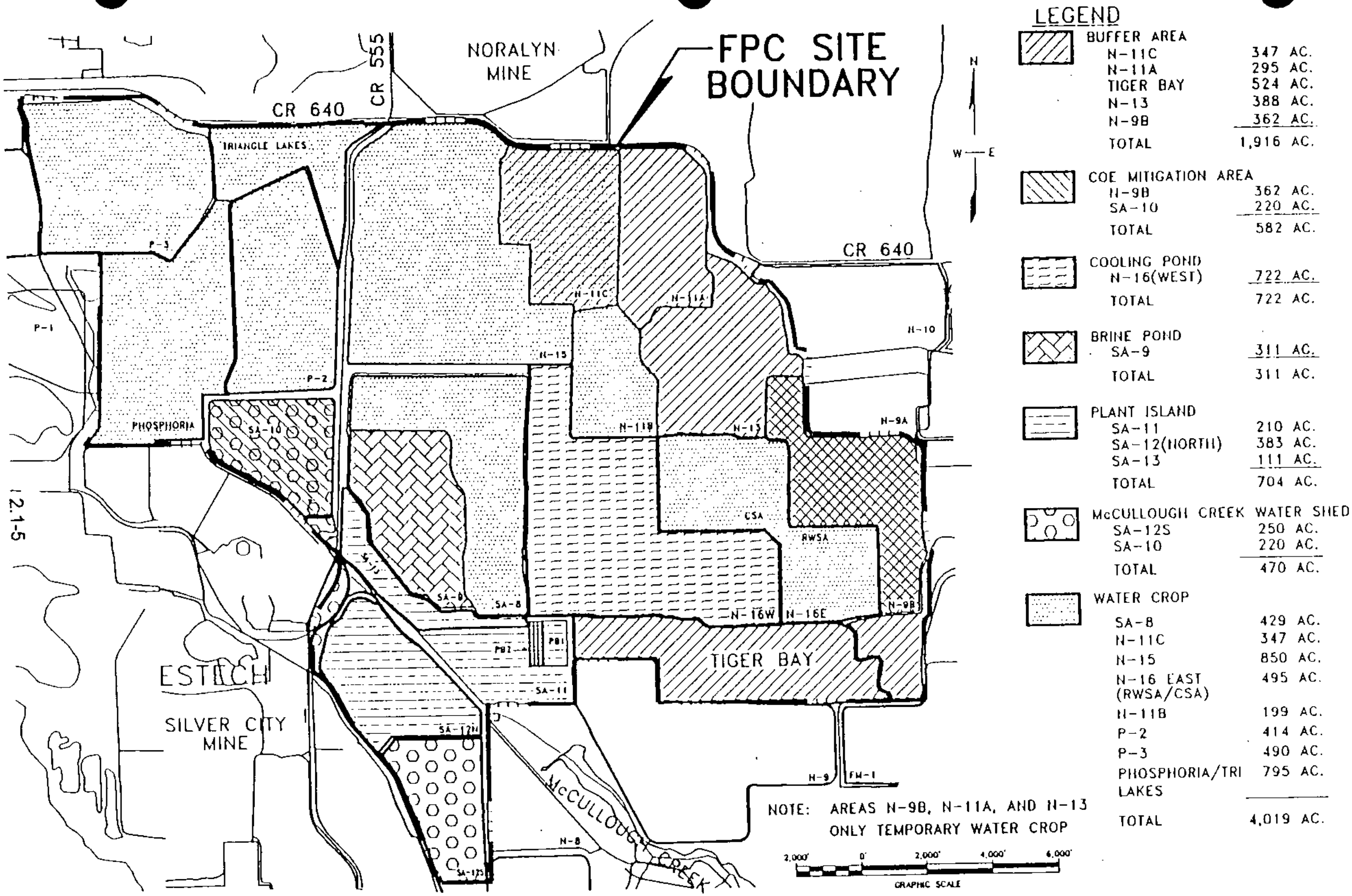
SPECIFY THE PERCENTAGE FOR EACH, TO TOTAL 100%:

1. Individual septic tank ______ %
2. Percolation pond ______ %
3. Offsite discharge ______ %
4. Spray irrigation ______ %
5. Other 100 % Specify Onsite Treatment Plant
6. Discharge to other location ______ % Name ______ NPDES, DER Discharge Permit Nos. ______
7. Discharge to other location ______ % Name ______ NPDES, DER Discharge Permit Nos. ______

TOTAL 100 %

V. WATER CONSERVATION

1. Attach a description of water conservation practices currently employed or planned. If planned, include an estimated time frame for implementation. ☐ Attached
2. Include plans to recycle waste water, and provide present and future quantities. ☐ Attached



2.1-5

Florida Power CORPORATION

Hines Energy Complex

FIGURE 2.1.2-1
HINES ENERGY COMPLEX 1000 MW SITE PLAN

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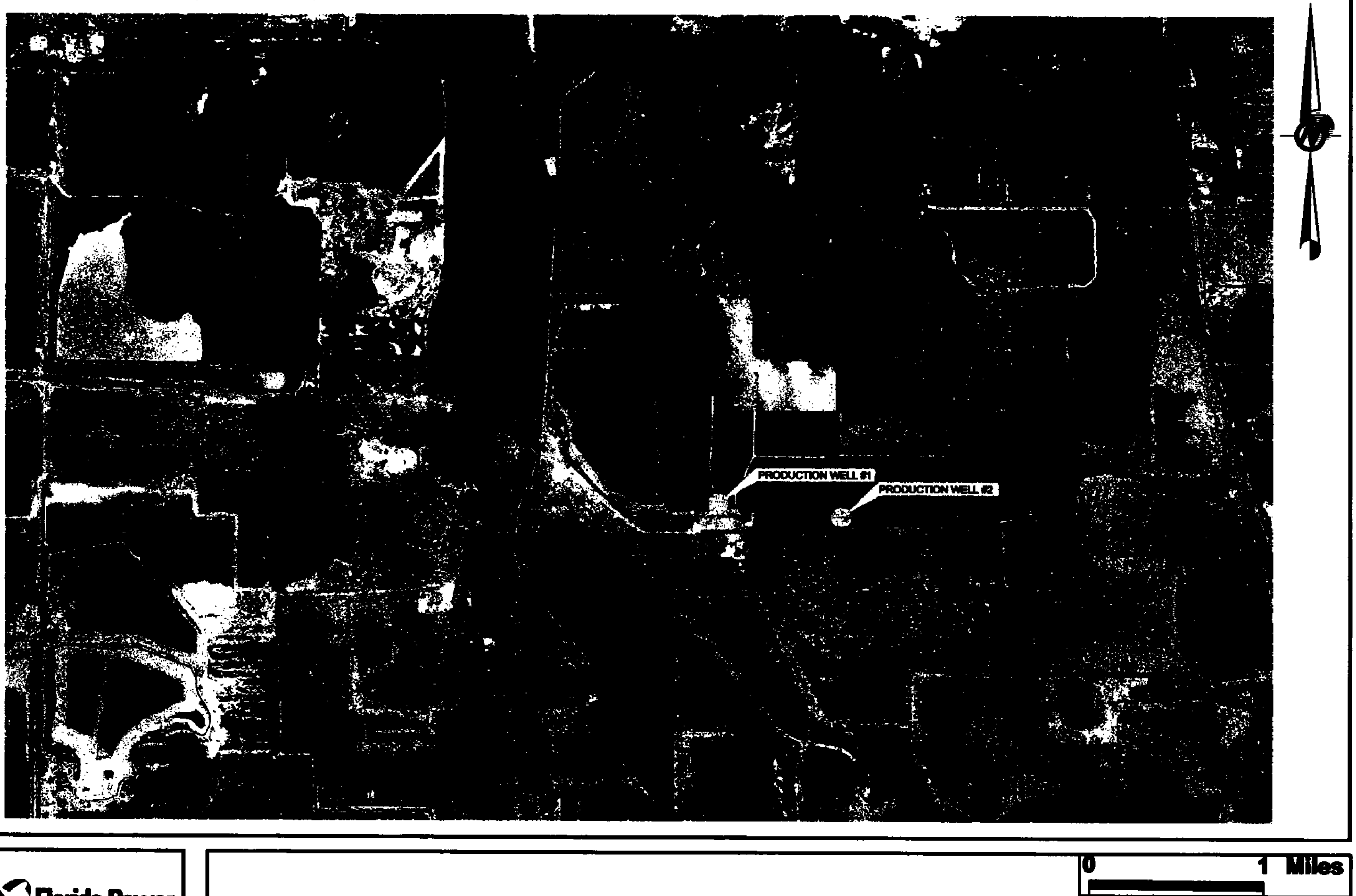

Florida Power

Hines Energy Complex

GROUNDWATER WELL LOCATIONS

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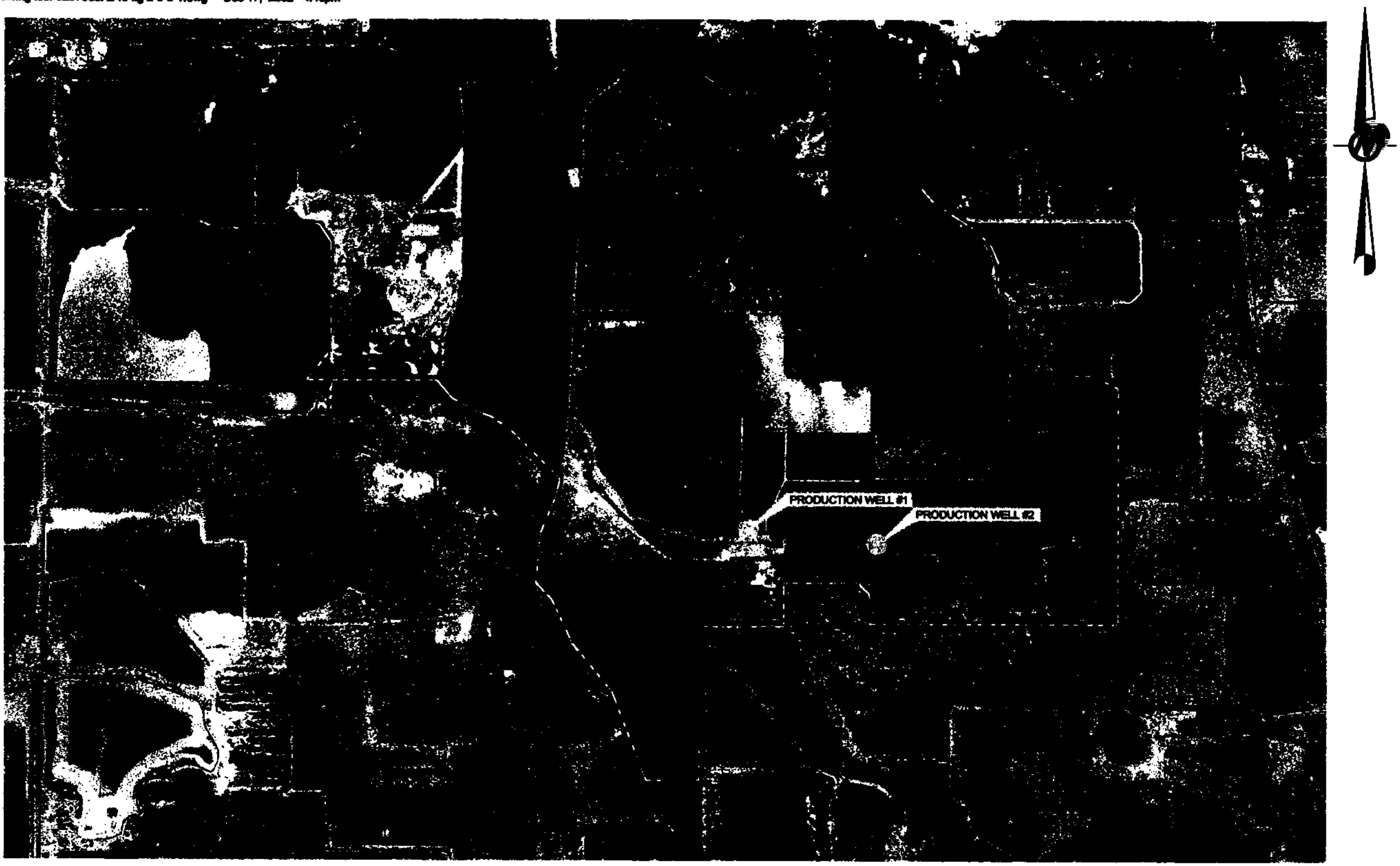

Florida Power

Hines Energy Complex

GROUNDWATER WELL LOCATIONS

Ardaman & Associates, Inc.

Geotechnical, Environmental and
Materials Consultants

September 9, 2002
File No.: 02-55-9638

Mr. Randy Melton
Florida Power Corporation
7700 CR 555
Bartow, Florida 33830

Subject: Evaluation of Seepage Losses from N-16, Cooling Pond
Hines Energy Center, Polk County, Florida

Dear Mr. Melton:

As authorized on August 26, 2002, Ardaman & Associates, Inc. has completed seepage and water loss analyses for the N-16 cooling pond and ESA at the Hines Energy Center. This report presents the data used and the results of our analyses.

Background

As we understand it, expansion plans at the Hines Energy Center make it necessary to improve the estimate of water losses due to seepage from the cooling pond system at the plant. Because Ardaman & Associates, Inc. has been tracking piezometer data for Florida Power since August of 1996 as well as conducting annual inspections of the dams forming the cooling pond and other reservoirs, we have the background information required for such analyses.

The cooling pond was constructed within an area mined for phosphate matrix. It is typical for the mining operations to trench into the base limestone and bed clay materials for drainage. If this was done in N-16, it can caused increased base seepage due to the interconnection of the mined area with the limestone aquifer systems. Also, N-16 was used for deposition of clay washed out of the phosphate matrix during beneficiation. This clay can act to seal the bottom of the area. For example, N-15 to the northwest of N-16 was used a s a clay storage area, so base seepage from this area would be minimal.

Design Information

Cooling Pond N-16 consists of a series of dams that separate it from other cells on site. Each of these sections has been grouped based on the section geometry and is identified with a letter. The following table presents the section number, its relative location and pertinent information regarding each section.

Section ID	Location	Remarks
J-1	Southwest corner of N-16	Location of plant outflow
J-2	South boundary of N-16	Separates N-16 from Tiger Bay
J-3	South portion of ESA	Separates ESA from Tiger Bay
K	Northeast corner of N-16	Separates N-16 from N-11B
L	North boundary of N-16	Separates N-16 from N-15
M	Northwest corner of N-16	Separates N-16 from Recirculation Ditch
N	Western boundary of N-16	Separates N-16 from SA-8
Q	Northeastern boundary of N-16	Separates N-16 from ESA
R	Northern boundary of N-16	Separates N-16 from ESA
S	Eastern Boundary of N-16	Separates N-16 from ESA

The attached Figure 1 shows the layout of the N-16 cooling pond and the ESA (Effluent Storage Area).

A portion of the data for our analyses was obtained from a series of reports prepared by Dames & Moore. This data includes information on section geometry, soil types used in the sections, and design soil properties. A series of piezometers were also installed in the N-16 dams. After installation, sensitivity tests were run in each piezometer. These tests provided permeability values for use in our analyses.

Also, as stated earlier, we have been monitoring the water levels in the piezometers since 1996. This data was used to estimate the phreatic surface through the dams.

Data from 4 wells installed into the Hawthorn formation near N-16 (FMW-1, IMW-2, IMW-3, and IMW-4) were provided by Gus Schaeffer of Florida Power Corporation. These wells provided information regarding water levels in the underlying bed clay and limestone under the dams.

Analyses

Based on our review of the cooling pond configuration, it was determined that not all sections result in seepage out of the pond. The water levels in SA-8 is about +163 feet. This is slightly above the water level in N-16 (currently about +161 feet). The water level in N-15 (about +165) is also above the level in N-16. Therefore, the seepage out of N-16 from sections L, M, and N is negligible. Also, the water level in Tiger Bay (+148 feet) is at or above the level in the ESA (145 feet), resulting in minimal seepage loss from the ESA into Tiger Bay. At section J-1, the downstream ground surface is at the same elevation as the top of the dam and this section is relatively short. Therefore, seepage losses from this section were assumed to be minimal.

Section K

Figure 2 presents the generalized geometry, soil types, and water levels used for the analyses of section K. Also included on the figure are the data obtained from the Hawthorne well. The line near the bottom of the figure is the potentiometric surface of the Upper Floridan Aquifer. This is the expected water level for the limestone formation. It should be noted that the water level seen on the deep well corresponds to the water levels seen in the shallow well. This indicates base seepage and a direct connection between the screen interval of the well and the seepage through the dam.

Using the construction data from Dames & Moore, the water levels in the piezometers, the dam length, and the permeability test results, an estimated seepage quantity was calculated. Using an average pond elevation of +160.85 feet, a seepage quantity of 105 thousand gallons per day was calculated. At maximum pond level (+165 feet), this value raises to 132 thousand gallons per day.

Section J-2

Figure 3 presents the generalized geometry, soil types, and water levels used for the analyses of section J-2. Also included on the figure are the data obtained from the Hawthorne well. The line near the bottom of the figure is the potentiometric surface of the Upper Floridan Aquifer. This is the expected water level for the limestone formation. It should be noted that the water level seen on the deep well corresponds to the water levels seen in the shallow wells. This indicates base seepage and a direct connection between the screen interval of the well and the seepage through the dam.

Using the construction data from Dames & Moore, the water levels in the piezometers, the dam length, and the permeability test results, an estimated seepage quantity was calculated. Using an average pond elevation of +160.85 feet, a seepage quantity of 136 thousand gallons per day was calculated. At maximum pond level (+165 feet), this value raises to 180 thousand gallons per day.

Sections Q, R, and S

Figure 4 presents the generalized geometry, soil types, and water levels used for the analyses of sections Q, R, and S.

Using the construction data from Dames & Moore, the water levels in the piezometers, the dam length, and the permeability test results, an estimated seepage quantity was calculated. Using an average pond elevation of +160.85 feet, a seepage quantity of 166 thousand gallons per day was calculated. At maximum pond level (+165 feet), this value raises to 211 thousand gallons per day.

Combining the lateral seepage from the three areas results in a total of about 406 to 523 thousand gallons per day. This estimate does not include any losses from the ESA to the north or east.

Base Seepage

As mentioned above, the deep piezometers in the Hawthorne show water levels at the same levels as the shallow piezometers in the dams. This confirms that base seepage is occurring. The very deep well, FMW-1, is about 220 feet deep. Data from this well has not been plotted on the attached figures since it is away from N-16. However, based on the well completion report, the post development water level was at elevation +163.06 feet, only 3 feet below the ground surface. This water level generally corresponds to the water level in N-16. This further shows that seepage is occurring from N-16 into the intermediate aquifer.

In order to estimate base seepage, we utilized a vertical permeability of 1×10^{-7} cm/sec for the upper bed clays. A head difference between the pond levels and the total head of the Upper Floridan Aquifer was also used in the calculations. Assuming an area of 732 acres for N-16, the base seepage quantity is estimated at 351 thousand gallons per day. For the 442 acre ESA, about 181 thousand gallons per day was estimated. Therefore, the total base seepage for N-16 and the ESA is 532 thousand gallons per day.

Evaporation/Transpiration

Data on rainfall is included with each set of piezometer monitor data. Our review of the rainfall data indicates that the average rainfall between May 2, 1998 and August 24, 2002 was 46.67 inches. This value is site specific since on-site rain gauges are used to measure accumulated rainfall between each set of piezometer readings.. Typical evaporation losses are 50 inches per year. However, the loss from N-16 may be greater due to the heat energy from the plant present in the cooling water. Using the two averages, there is a net loss of 3.24 inches per year. This translates to 0.009 inches per day. The total combined open water area of N-16 was estimated at 732 acres while the ESA has about 210 acres. Using the open water area, the total evaporation loss is estimated at 230 thousand gallons per day.

Conclusions

Combining the losses from lateral seepage and base seepage results in a range of total seepage loss from 938 to 1,055 thousand gallons per day. The amount of water loss from evaporation has not been included in this total due to the amount of variability resulting from temperature and composition factors beyond the scope of these analyses.

We appreciate the opportunity to provide our services on this important project. If you have any questions on the data or analyses, please contact the undersigned at your convenience.

Very truly yours,

Ardaman & Associates, Inc.

Philip J. Erbland, P.E.
Project Engineer
Florida License No. 52621

Ross T. McGillivray, PE
Chief Engineer, Tampa Branch
Florida License No. 17920

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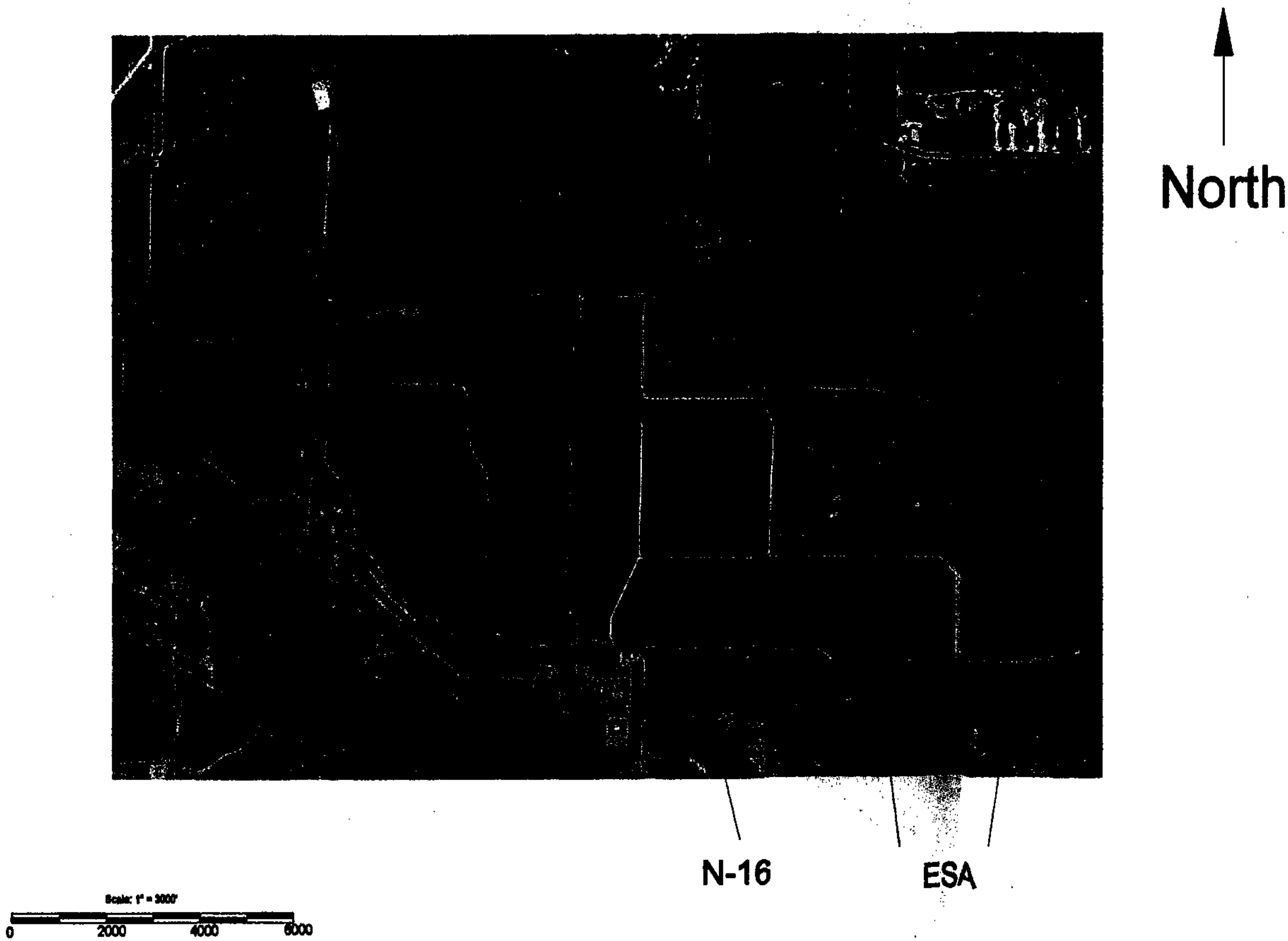
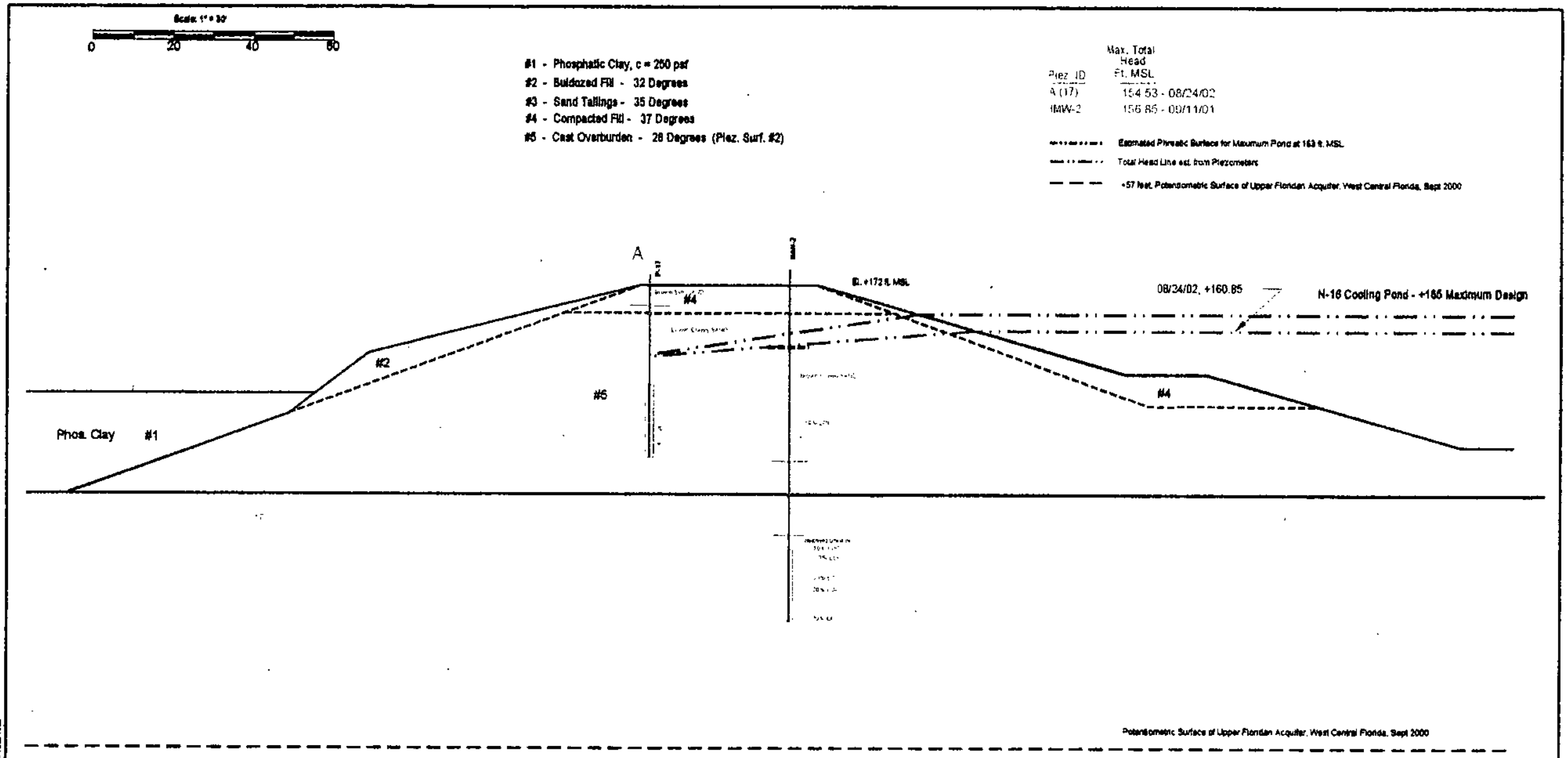


DRAWN BY: PJE	CHECKED BY:	DATE: 04-08-02	N-16 Cooling Pond	Ardaman & Associates, Inc. Consulting Engineers in Soils, Hydrogeology, Foundations, and Materials Testing	FIGURE NO.
FILE NO. 02-6638	APPROVED BY: Ross T. McGillivray, PE		Florida Power Corporation Hines Energy Complex - Polk Co., FL		1



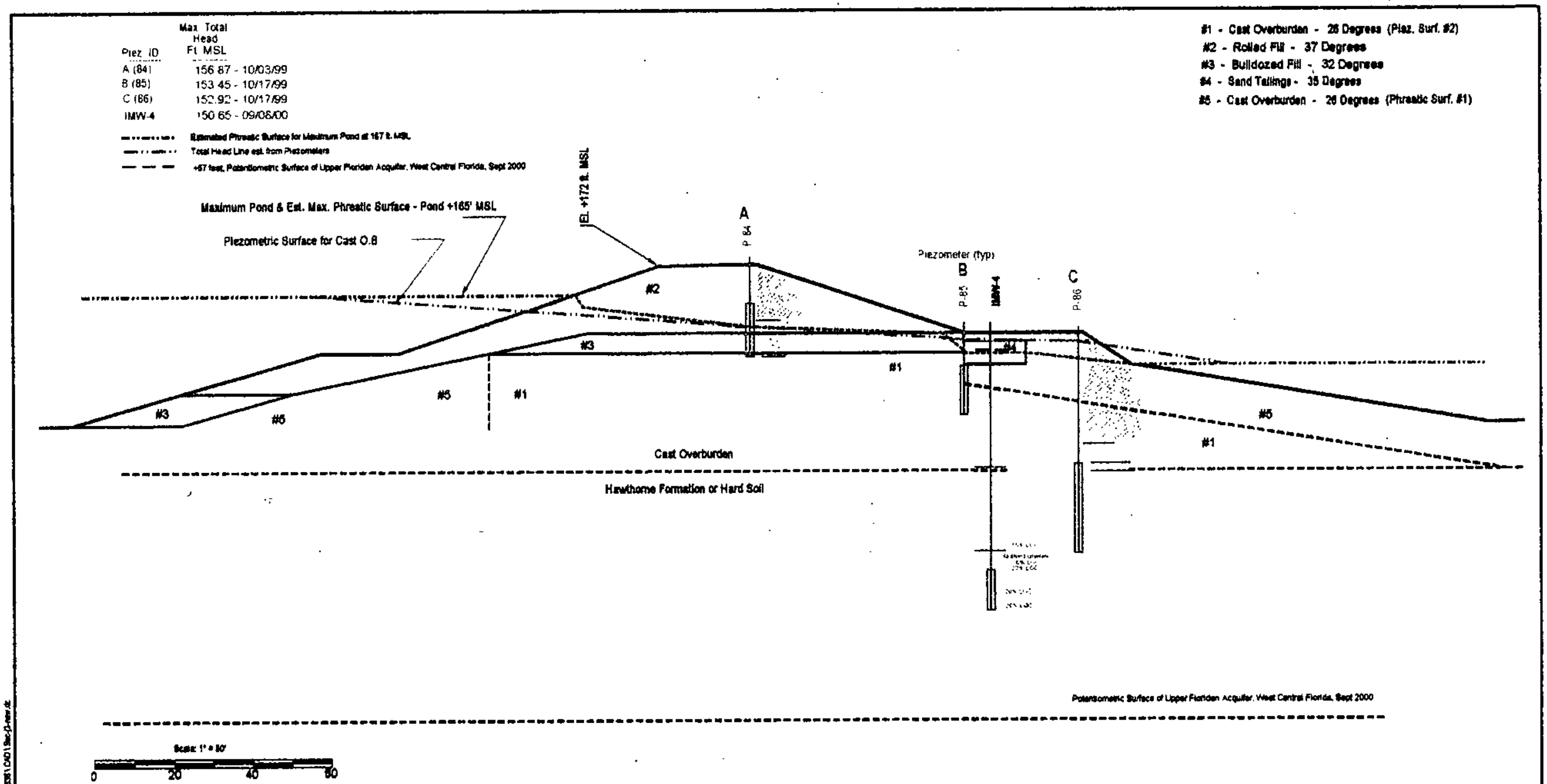
DRAWN BY: RJE	CHECKED BY:	DATE: 08-26-2002
FILE NO. 02-58-9638	APPROVED BY: Ross T. McGillivray, PE	

Section "K" - N-16 Cooling Pond

Floirda Power Corporation Hines Energy Complex - Polk Co., FL

Ardaman & Associates, Inc.
Consulting Engineers in Soils, Hydrogeology, Foundations, and Materials Testing

FIGURE NO. 2



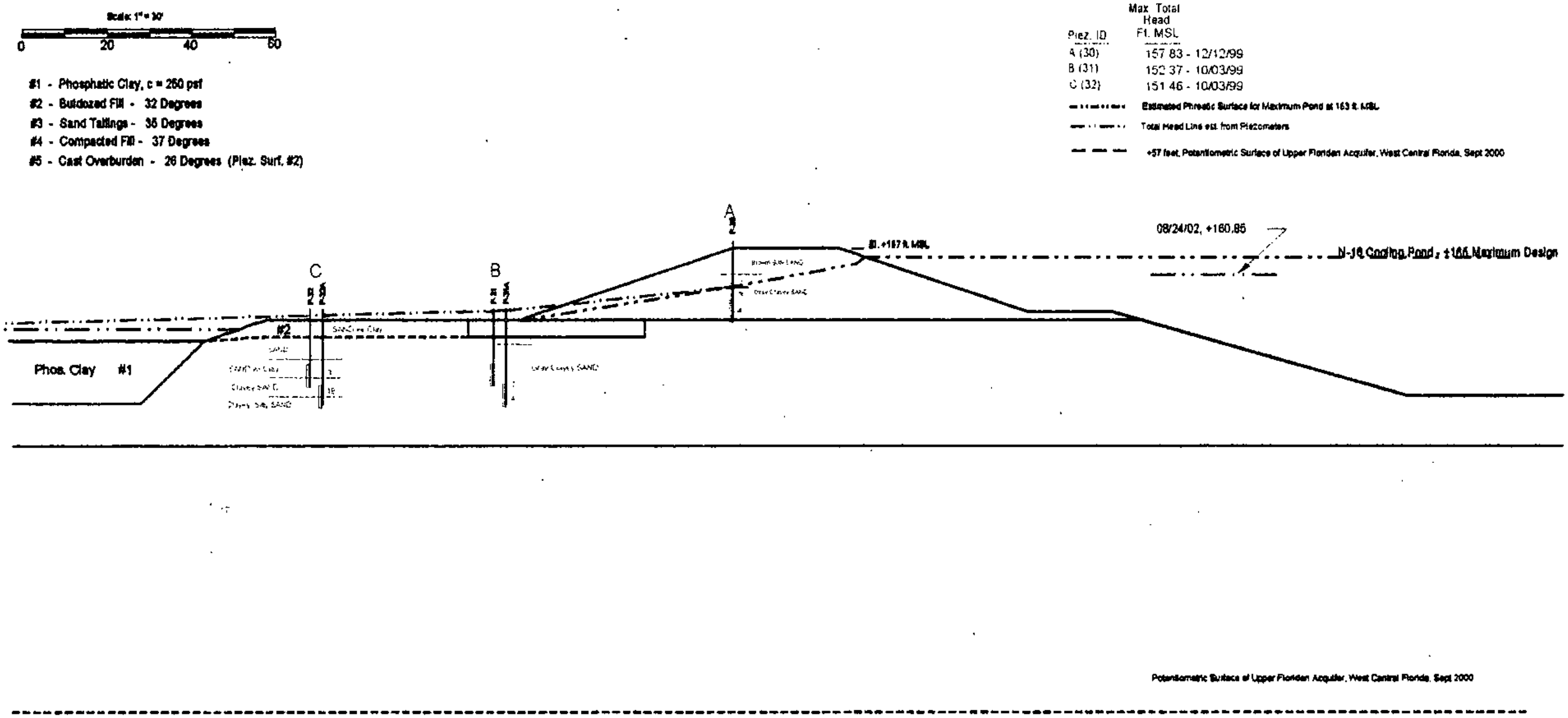
DRAWN BY: RTM/PJE	CHECKED BY:	DATE: 08/27/02
FILE NO 02-9836	APPROVED BY: Ross T. McGillivray, PE	

Section "J-2" - N-16 Cooling Pond Dam Cross Section

Florida Power Hines Energy Complex - CR 555, Polk County, Florida

Ardaman & Associates, Inc.
Consulting Engineers in Soils, Hydrogeology, Foundations, and Materials Testing

FIGURE NO 3



DRAWN BY: RTM/PJE	CHECKED BY:	DATE: 08/27/02
FILE NO. 02-8638	APPROVED BY: Ross T. McGillivray, PE	

Sections "Q", "R", and "S" - N-16 Cooling Pond

Florida Power Corporation Hines Energy Complex - Polk Co., FL

Ardaman & Associates, Inc.
Consulting Engineers in Soils, Hydrogeology, Foundations, and Materials Testing

FIGURE NO. 4

HINES COOLING POND DATA

Month	BARTOW avg MGD	Rainfall inches	POND Level ft	Water Crop AF	POND TEMP oF
Jan-98		4.49			
Feb-98	2.33	10.67			
Mar-98	2.33	10.74	157.20		
Apr-98	1.92	0.78	157.20	0	
May-98	1.95	1.42	157.50	0	
Jun-98	1.76	3.76	157.40	0	
Jul-98	1.94	11.01	158.68	0	
Aug-98	1.92	6.35	158.93	0	
Sep-98	1.95	19.93	160.48	0	
Oct-98	1.77	1.06	160.77	0	
Nov-98	1.57	3.29	161.00	0	
Dec-98	1.53	2.63	160.94	0	66
Jan-99	1.61	2.19	161.00	0	65
Feb-99	1.78	0.65	161.00	0	64
Mar-99	1.7	0.53	160.78	0	68
Apr-99	1.63	2.32	160.63	0	76
May-99	1.48	4.98	160.60	0	81
Jun-99	1.5	11.2	161.15	0	82
Jul-99	1.69	4.05	161.05	0	86
Aug-99	2.22	7.19	161.07	0	86
Sep-99	2.24	9.33	161.22	0	80
Oct-99	2.33	2.42	161.30	0	72
Nov-99	2.13	2.68	161.10	0	58
Dec-99	1.95	2.05	161.02	0	60
Jan-00	1.88	0.88	161.00	0	60
Feb-00	1.82	0.3	160.90	0	67
Mar-00	1.8	0.82	160.80	0	75
Apr-00	1.62	1.12	160.70	0	75
May-00	1.54	1.08	160.28	0	80
Jun-00	1.45	6.91	160.73	0	80
Jul-00	1.51	4.7	160.85	135	83
Aug-00	1.58	5.03	160.90	0	84
Sep-00	1.66	5.23	160.48	0	81
Oct-00	1.6	0.31	160.06	441	73
Nov-00	1.7	0.63	160.00	249	63
Dec-00	1.75	0.47	159.85	192	58
Jan-01	1.65	0.62	159.90	0	56
Feb-01	1.71	0	159.80	0	67
Mar-01	1.64	6.23	159.70	0	68
Apr-01	1.61	0.2	159.75	0	70
May-01	1.61	2.72	159.20	0	80
Jun-01	1.61	10.76	159.75	200	82
Jul-01	1.63	7.98	160.15	500	83
Aug-01	1.65	5.55	160.30	300	86
Sep-01	1.71	13.28	160.60	0	79

Oct-01	1.73	0.83	160.40	0	70
Nov-01	1.76	0.32	160.00	0	68
Dec-01	1.72	0.85	159.98	0	65
Jan-02	1.75	1.58	160.00	0	71
Feb-02	1.76	6.19	159.70	0	62
Mar-02	1.78	0.29	159.60	0	74
Apr-02	1.79	2.65	159.20	0	76
May-02	1.8	4.34	159.50	460	79

McCULLOUGH CREEK

25 YEAR STORM EVENT POINT A

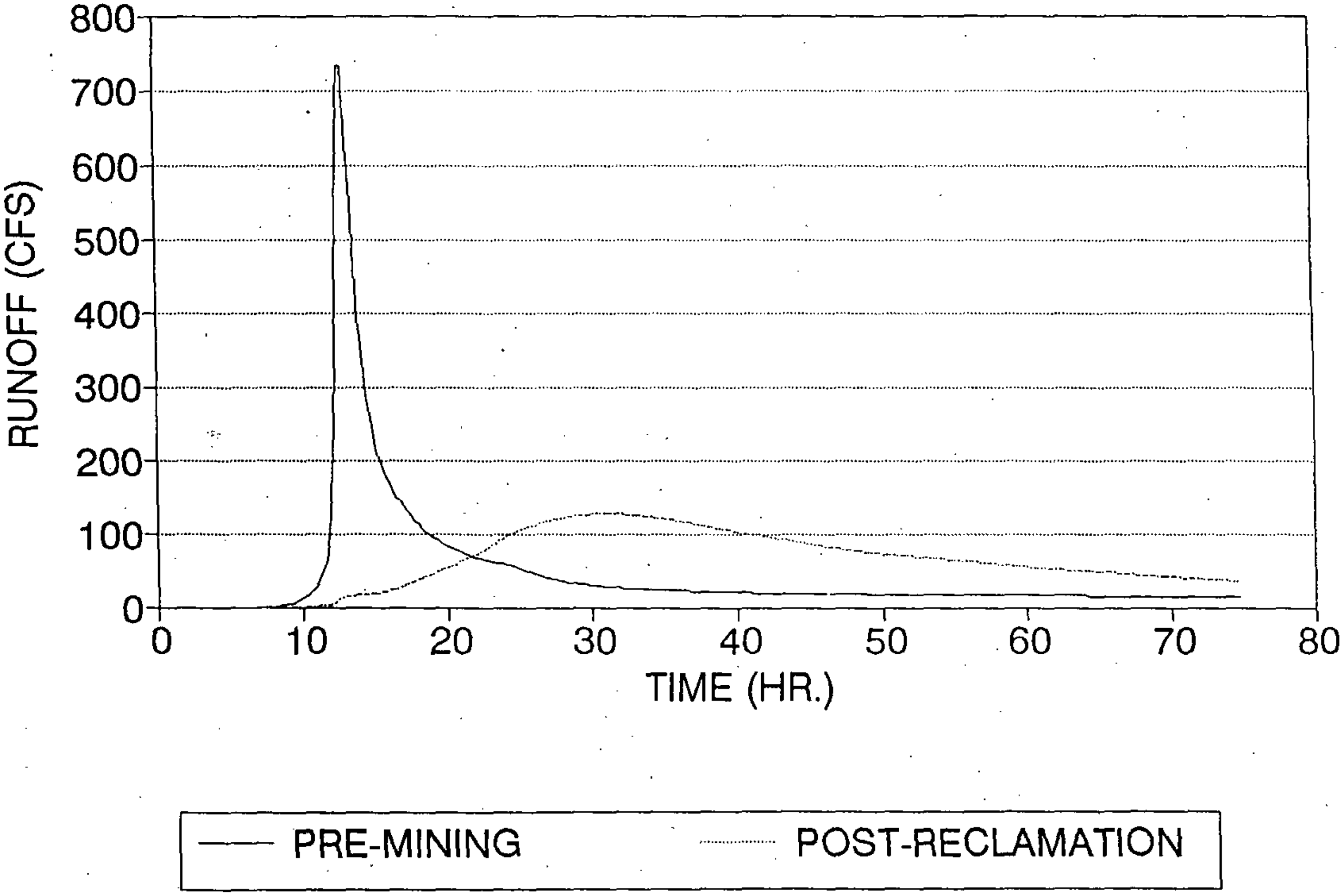


EXHIBIT WMD-33B

FPC Polk County Site

11/92

McCULLOUGH CREEK
MEAN ANNUAL STORM POINT A

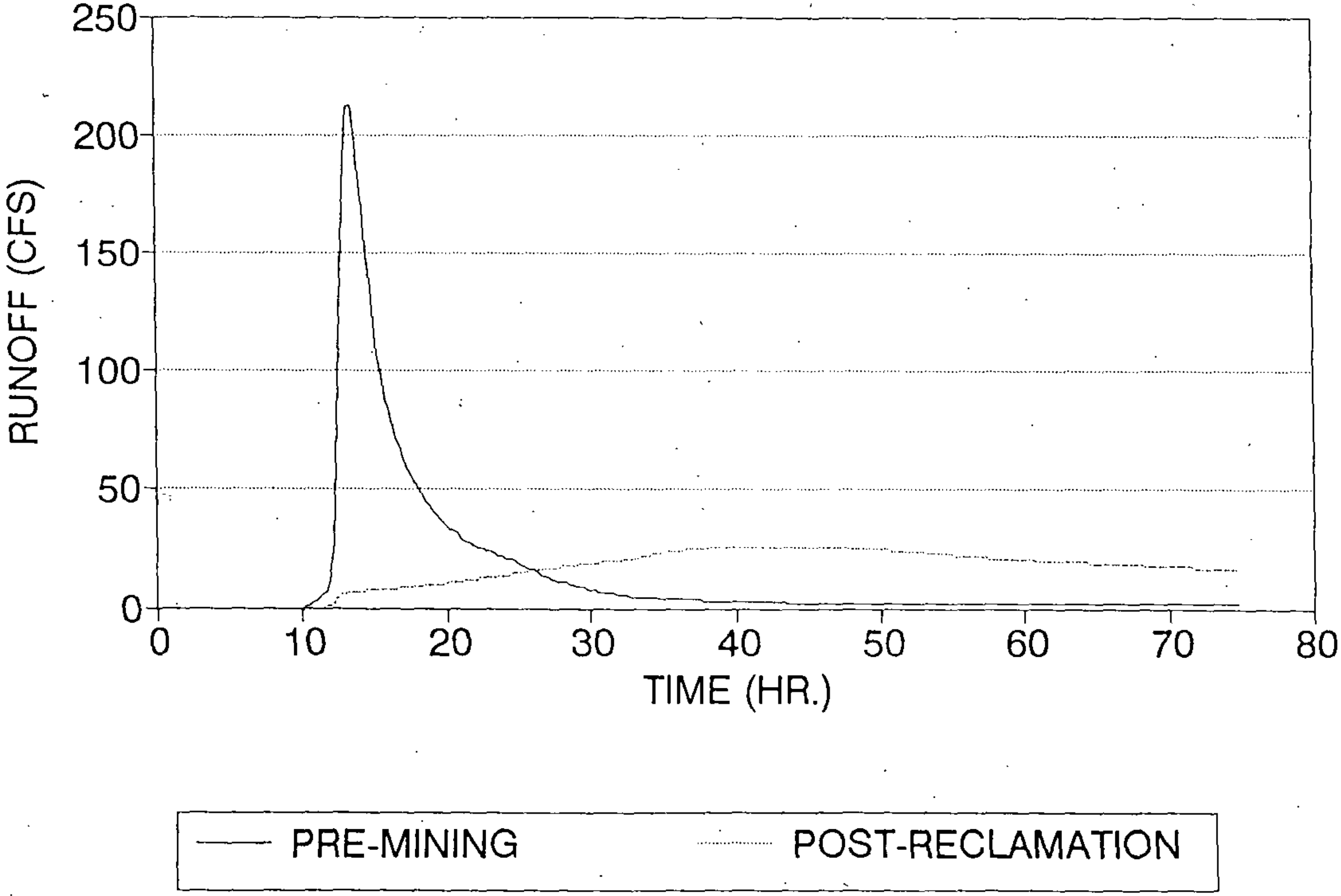
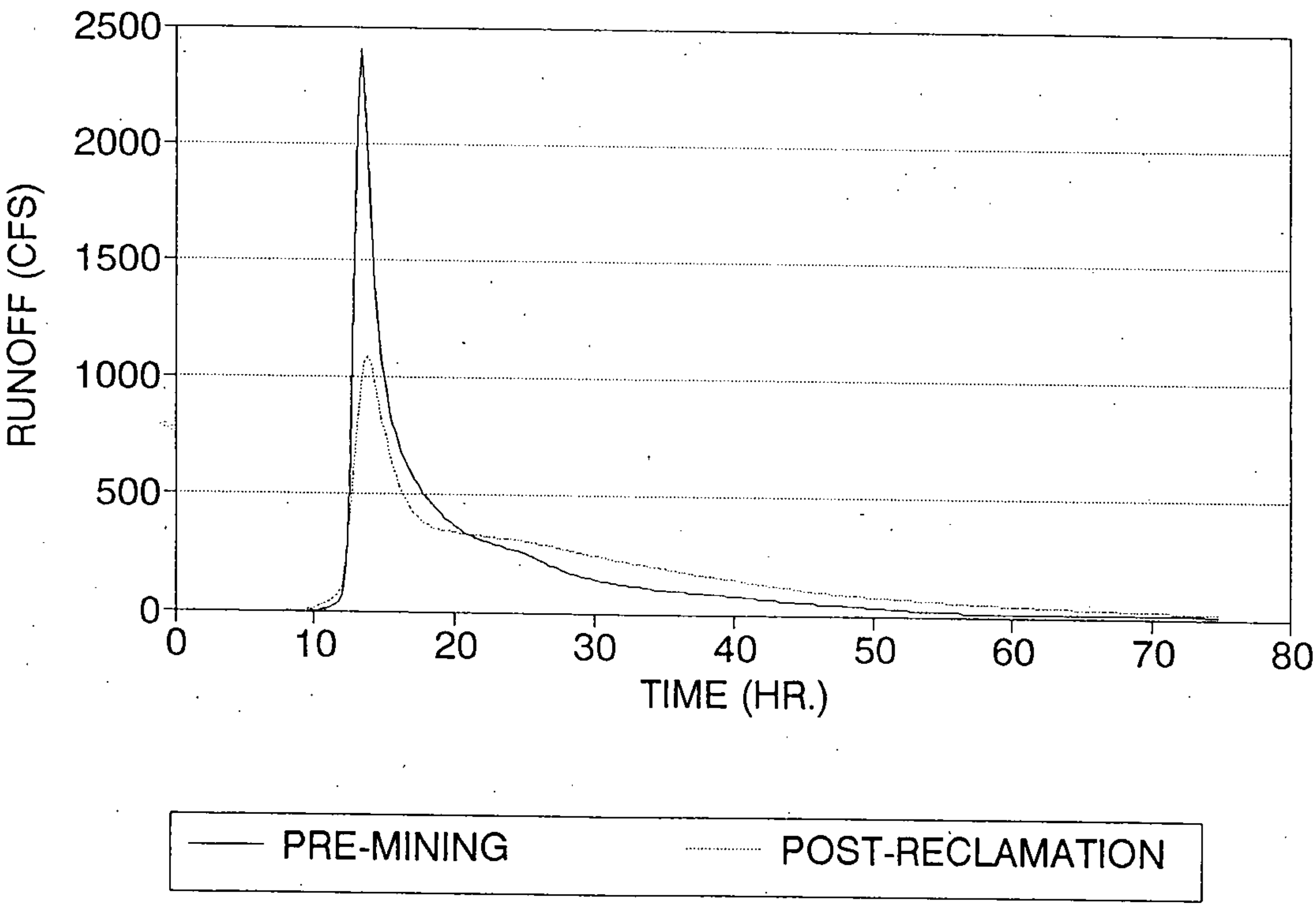


EXHIBIT WMD-33C

FPC Polk County Site

CAMP BRANCH
25 YEAR STORM EVENT



FPC Polk County Site
EXHIBIT WMD-33D

11/92

CAMP BRANCH
MEAN ANNUAL STORM EVENT

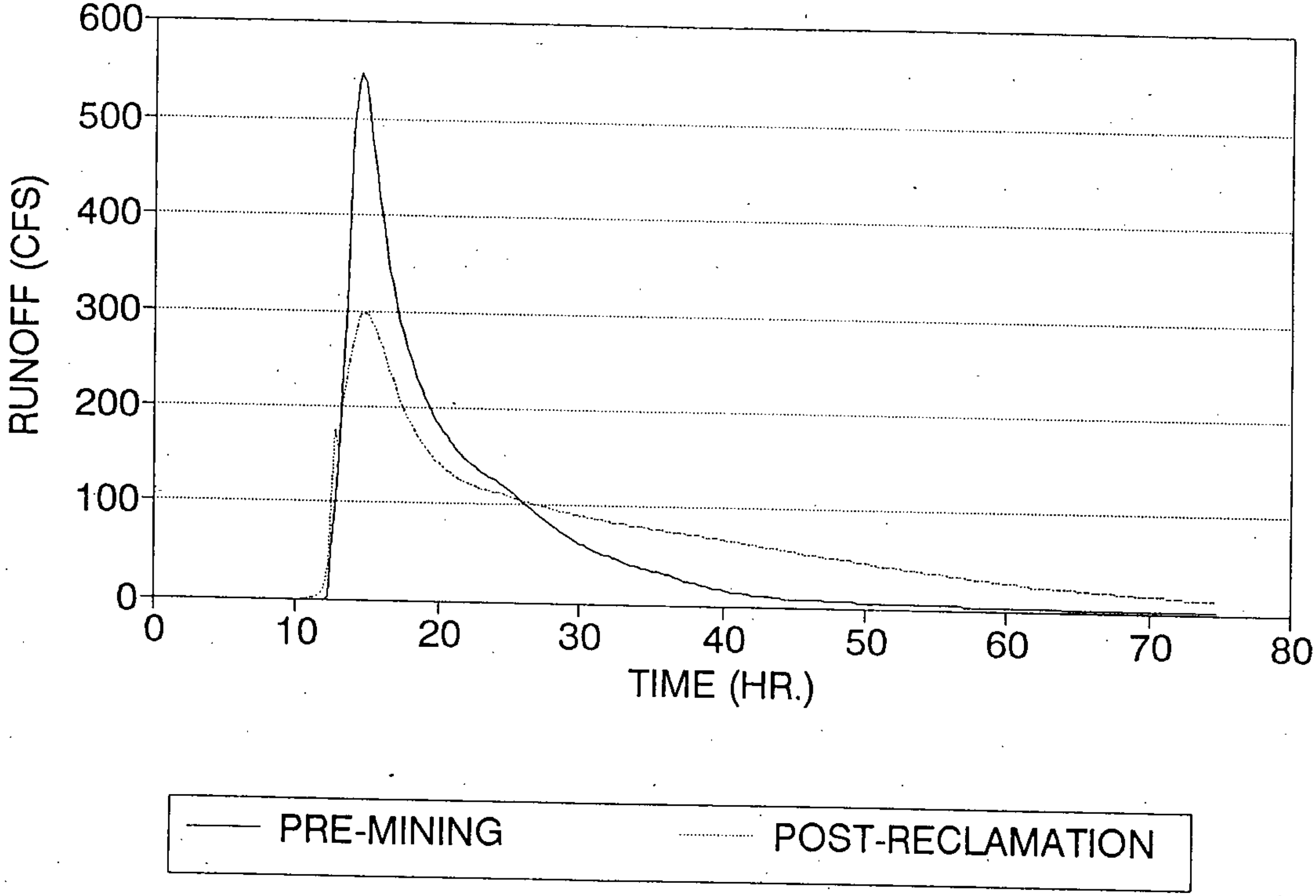


EXHIBIT WMD-33E

FPC Polk County Site

WELL SUMMARY

Production Wells (See WUP No. 2011944)

ID	Diam.(in.)	Tot.Depth(ft)	Cased Depth(ft)	Use
P-1	20	880	360	Industrial
P-2	20	880	360	Industrial
P-3	20	880	360	Industrial
P-4	20	880	360	Industrial
P-5	20	880	360	Industrial
P-6	8	500	360	Potable

Recharge Wells (Proposed wells for ARRP)

ID	Diam.(in.)	Tot.Depth(ft)	Cased Depth(ft)	Use
AR-1	24	900	360	Recharge
AR-2	24	900	360	Recharge
AR-3	24	900	360	Recharge
AR-4	24	900	360	Recharge
AR-5	24	900	360	Recharge
AR-6	24	900	360	Recharge

Monitor Wells (Proposed ARRP Monitor)

ID	Diam.(in.)	Tot.Depth(ft)	Cased Depth(ft)	Use
ARM-1	8	600	360	Monitor
ARM-2	8	600	360	Monitor
ARM-3	8	600	360	Monitor

New Well Locations

Owner ID.	Lat.	Long.	Sect.	Twn.	Rng.
AR-1	27 48 39	81 52 17	1	31S	24E
AR-2	27 48 39	81 52 30	1	31S	24E
AR-3	27 48 39	81 52 42	2	31S	24E
AR-4	27 48 39	81 52 54	2	31S	24E
AR-5	27 48 39	81 53 06	2	31S	24E
AR-6	27 48 39	81 53 18	2	31S	24E
ARM-1	27 48 51	81 52 16	1	31S	24E
ARM-2	27 48 39	81 52 30	1	31S	24E
ARM-3	27 48 21	81 52 17	1	31S	24E