Technical Evaluation

and

Preliminary Determination

Kissimmee Utilities

Osceola County

49.9 MW Combined Cycle Gas Turbine

Permit Numbers:

State AC 49-74856

Federal PSD-FL-087

Florida Department of Environmental Regulation

Bureau of Air Quality Management

Central Air Permitting

January 4, 1984

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PUBLIC NOTICE

A modification to an existing air pollution source is being proposed by Kissimmee Utilities located in the City of Kissimmee, Osceola County, Florida. The proposed modification is the construction of a 49.9 MW combined cycle gas turbine. The modification will increase emissions of air pollutants, in tons per year, by the following amounts:

PM	SO_2	NO_x	CO	VOC
96	1702	1029	349	83

The proposed modification has been reviewed by the Florida Department of Environmental Regulation (FDER) under Chapter 403, Florida Statutes, and Federal regulation 40 CFR 52.21, Prevention of Significant Deterioration (PSD). The Department has made a preliminary determination that the construction can be approved provided certain conditions are met. A summary of the basis for the determination and the application for State and Federal permits submitted by Kissimmee Utilities are available for public review at the following offices:

Bureau of Air Quality Management
Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, Florida 32301

St. Johns River District
Department of Environmental Regulation
3319 Maguire Blvd., Suite 232
Orlando, Florida 32803

Kissimmee Public Library
305 E. Broadway
Kissimmee, Florida 32741

The maximum percentages of allowable PSD increments consumed by the proposed modification will be as follows:

	Annual	24-Hour	3-Hour
PM	Negligible	Negligible	NA
SO_2	5	11	9

Any person may submit written comments to FDER regarding the proposed modification. All comments, postmarked not later than 30 days from the date of notice, will be considered by FDER in making a final determination regarding approval for construction of this source. Those comments will be made available for public review on request. Furthermore, a public hearing can be requested by any person. Such request should be submitted within

14 days of the date of this notice. Letters should be addressed to:

Mr. C. H. Fancy, P.E.
Deputy Chief
Bureau of Air Quality Management
Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, Florida 32301

INTRODUCTION

Kissimmee Utilities has reapplied (September 6, 1983) for a permit to construct a combined cycle unit. An original application for the same unit was submitted to the department in August 1981. A state and federal permit were issued on November 25, 1981 and February 19, 1982 respectively. The state permit expired on January 30, 1983.

A revised preliminary determination has been performed for the new permit application. This revised preliminary determination covers changes which have been made to the permit specific conditions and to the BACT emission limits. All sections have been revised to reflect the modifications requested in the new permit application.

The organization pattern of the original determination has not varied.

I. SYNOPSIS OF APPLICATION

A. Name and Address of Applicant

Kissimmee Utilities
P. O. Box 1608
Kissimmee, Florida 32741

B. Source Location

The proposed source is located at 112 Ruby Street in the City of Kissimmee, in Osceola County, Florida. The UTM coordinates are: Zone 17-460.1 Km East and 3,129.3 Km North.

C. Project Description

The applicant proposes to install and operate a combined cycle combustion gas turbine, with a total net generating capacity of 46.5 megawatts (MW) and a gross generating capacity of 49.9 MW. The turbine will be fired with natural gas. No. 2 fuel oil, having a maximum sulfur content of 0.5 percent, will be used as a standby fuel. The maximum heat input will be 441.7 MMBTU/hr (LHV).

Kissimmee Utilities (KU) currently operates 12 diesel generating units with a total output rated at 26.8 MW at this site.

II. RULE APPLICABILITY

A. Federal Regulations

The proposed project is subject to preconstruction review under federal Prevention of Significant Deterioration (PSD) regulation, Section 52.21 of Title 40 of the Code of Federal Regulations as amended in the Federal Register of August 7, 1980 (45 CFR 52.21). Specifically, Kissimmee Utilities' combined cycle combustion gas turbine is a major stationary source (40 CFR 52.21(b)(1)) located in an area currently designated as attainment in accordance with 40 CFR 81.310 for all criteria pollutants regulated under the Clean Air Act (CAA).

The proposed source will be a major modification (40 CFR 52.21(b)(2) for particulate matter (PM), sulfur dioxide (SO_2), nitrogen oxides (NO_x), volatile organic compounds (VOC), and carbon monoxide (CO). Emissions of PM, SO_2, NO_x, VOC and CO will increase above the significant criteria set in the PSD regulations. Therefore, the proposed project is subject to PSD review for these pollutants.

This review consists of a determination of Best Available Control Technology (BACT) and unless otherwise exempted, an analysis of the air quality impact of the increased emissions. No air quality impact analysis is required for ozone, even though there will be a significant increase in VOC emissions, because this increase is less than 100 tons per year. The review also includes an analysis of the project's impacts on soils, vegetation and visibility along with air quality impacts resulting from associated commercial, residential and industrial growth.

The proposed project is also subject to the provisions of the federal New Source Performance Standard (NSPS) for gas turbines, 40 CFR 60, Subpart GG.

B. State Regulations

The proposed project is subject to preconstruction review under the provisions of Chapter 403, Florida Statutes, and Chapter 17-2, Florida Administrative Code. Specifically, the proposed source is a major emitting facility for NO_x and SO_2 as defined in Chapter 17-2 because the potential emissions of each pollutant exceed 250 tons per year.

This project shall comply with provisions of Rule 17-2.500, Prevention of Significant Deterioration (PSD), 17-2.660, New Source Performance Standards (NSPS) for gas turbines 40 CFR, Subpart GG and 17-2.700 Stationary Point Source Emissions Test Procedures.

The proposed source is exempt from provisions of Rule 17-2.510, New Source Review for Nonattainment Areas.

III. SOURCE IMPACT ANALYSIS

A. Emissions Limitations

The operation of the proposed combined cycle gas turbine, will produce emissions of particulate matter (PM), sulfur dioxide (SO_2), nitrogen oxides (NO_x), beryllium (Be), Mercury (Hg), carbon monoxide (CO) and volatile organic compounds (VOC) to the atmosphere.

Table 1 summarizes potential to emit of all pollutants regulated under the Act which are affected by the proposed source.

Best Available Control Technology (BACT) has been determined for NO_x, SO_2, PM, VOC, and CO. The emission limiting standards selected as BACT and made a condition of the permit are listed in Table 2. Justification for the standards selected is included in Technical Appendix A.

The permitted emissions, including those determined as BACT, are in compliance with New Source Performance Standard (NSPS) requirements of 40 CFR 60, Subpart GG.

B. Air Quality Impacts

An air quality impacts analysis has been performed to evaluate the impact of the proposed project on ambient concentrations of NO_x, SO_2, PM, and CO. Dispersion modeling was used to evaluate the impacts.

Results of the analysis provide reasonable assurance that the project, as described in this permit and subject to the conditions herein, will not lead to any violation of National Ambient Air Quality Standards or PSD increments. Details of the analysis are discussed in the Technical Appendix B.

TABLE 1
SUMMARY OF EMISSIONS
(Tons Per Year)*

Pollutant	Gas-Fired			Fuel-Oil Fired			PSD
	Turbine	Supplemental Firing	Total	Turbine	Supplemental Firing	Total	Significant Emission Rate[e]
Potential NOx[a]	1877	28	1905	1927	27	1954	--
Actual NOx[b]	976	28	1004	1002	27	1029	40
Hydrocarbons (as CH_4)	82	1	83	73	1	73	40
Carbon Monoxide	224	7	231	342	7	349	100
Particulate	27	1	28	93	3	96	25
Sulfur Dioxide[c]	19	2	21	1,542	160	1,702	40
Mercury[d]	0.02	--	0.02	0.002	--	0.002	0.1
Beryllium[d]	--	--	--	0.0006	--	0.0006	0.0004

(a) Potential emissions in accordance with state and federal definitions as estimated by the applicant. A 48 percent emission reduction is expected with the proposed water injection technique.

(b) Based upon turbine gas flow rate and 129 ppm Nox according to the following equation: (DSCFM)(NOx ppm)(2000 ug/m3-ppm)(0.0283 m3/ft3)(10^{-6} g/ug)(60 min/hr)(8760 hr/yr)(1 lb/454g)(1 ton/2000 lb).

(c) Assumed natural gas has 0.01 percent sulfur content. Fuel oil calculations based on total conversion of 0.8 percent sulfur in fuel oil to sulfur dioxide, as requested by the applicant.

(d) Emissions calculated based on emissions factors from Stationary Conventional Combuation Processes, EPA, (450/2-80-074).

(e) 40 CFR 52.21(b)(23).

* Calculations are based on 8760 hours per year operating time.

TABLE 2
ALLOWABLE EMISSION LIMITS
49.9 MW Combined Cycle Combustion Turbine

Pollutant	Standard	Gas Turbine[a]	Boiler	Basis
NO_x[a]	$0.0075 \frac{(14.4)}{Y} + F$	79 PPM (gas) and 129 (oil) at 15 percent oxygen on a dry basis		NSPS, BACT
SO_2	0.8 percent S by weight 0.015 percent by volume at 15 percent oxygen on a dry basis	0.5 percent S by weight and 388 lb/hr	0.5 percent S by weight	NSPS, BACT
PM[b]	20% opacity	20% opacity or 22 lb/hr	20% opacity	BACT
VOC	--	19 lb/hr		BACT
CO	--	80 lb/hr		BACT
Mercury (Hg)	--	0.0004 lb/hr		Estimated by Applicant
Beryllium (Be)	--	0.00004 lb/hr		EPA 600/57-81-003b

(a) The allowable NO_x emission rate for the gas turbine was determined by the following formula:
STD = $0.0075 \frac{(14.4)}{Y} + F$ where:

STD = allowable NO_x emissions (percent by volume at 15 percent oxygen and on a dry basis).

Y = manufacturer's rated heat rate at manufacturer's rated load (kilojoules per watt hour) or, actual measured heat rate based on lower heating value of fuel as measured at actual peak load for the facility. The value of Y shall not exceed 14.4 kilojoules per watt hour. The efficiency factor must be based on the gas turbine efficiency itself, not the overall efficiency of the gas turbine combined with other equipment.

NO_x = 79 PPM when burning natural gas

NO_x = 129 PPM when burning fuel oil No. 2

F = NO_x emission allowance for fuel-bound nitrogen as follows:

Fuel-bound nitrogen (Percent by weight)	F (NO_x percent by volume)
$N \leq 0.015$	0
$0.015 < N \leq 0.1$	$0.04(N)$
$0.1 < N \leq 0.25$	$0.04+0.0067(N-0.1)$
$N > 0.25$	0.005

where: N = the nitrogen content of the fuel (percent by weight)

N>0.25 is proposed by the applicant

(b) Visible emissions: Not to exceed 20% opacity; 40% opacity is permitted for not more than two-minutes in any one hour.

C. Additional Impact Analysis

An additional impacts analysis has been performed to assess (1) the impact of the proposed project on soils, vegetation, and visibility and (2) any air quality impacts resulting from associated commercial, residential, or industrial growth. No adverse impacts are expected; details of the analysis are discussed in Technical Appendix C.

IV. CONCLUSIONS

Base on review of the data submitted by Kissimmee Utilities for the installation and operation of a 49.9 MW combined cycle gas turbine, the FDER concludes that compliance with all applicable federal and state air quality regulations will be achieved provided certain specific conditions are met. The NSPS emission limits for NO_x, SO_2, and the permitted emissions limits of 0.0004 lb/hr for Hg, 0.00004 lb/hr, for Be, 22 lb/hr for PM, 19 lb/hr for VOC and 80 lb/hr for CO have been determined to be Best Available Control Technology (BACT) for this source. The impact of the emissions from the 49.9 MW combined cycle gas turbine will not cause or contribute to a violation of any ambient air quality standard or PSD increment. Appendix D includes the proposed general and specific conditions in the draft state permit (AC 49-74856) and federal permit (PSD-FL-087).

TECHNICAL APPENDIX A

FEDERAL BACT ANALYSIS

The applicant is required, under the provisions of 40 CFR 52.21, as revised August 7, 1980 (45 FR 52676), to apply BACT to all criteria and noncriteria pollutants emitted in significant levels. BACT is determined for each pollutant on a case-by-case review taking into account energy, environmental and economic impacts.

The applicant has proposed BACT for each applicable pollutant and has presented justification for the standards selected. The Department of Environmental Regulation (DER) has reviewed and accepted the technology and emission limits proposed as BACT. The federal PSD permit shall include these limits or any more stringent emission standards that are imposed by the State of Florida. These limits are summarized in Table 2. A discussion of the BACT for each pollutant follows:

PM Control

The BACT limitation proposed for particulate matter (PM), 22 lb/hr, is based upon emission for Stationary Gas Turbines AP-42.

Particulate emissions from stationary gas turbines depend on the ash content of the fuel which is minimal for the proposed fuels. The applicant has reported an ash percentage of less than 0.1 in the fuel oil analysis. Therefore, FDER feels that the applicant proposed 0.0498 lb/MMBTU (22 lb/hr) emission limit for PM is reasonable as BACT.

Carbon Monoxide and Hydrocarbon Control

The applicant proposes emissions levels for carbon monoxide (CO) and volatile organic compounds (VOC) based on emission estimates from Stationary Gas Turbines AP-42.

CO and HC emissions are function of combustion efficiency. The higher the percentage of peak load at which a turbine operates, the more efficient the combustion of the fuel.

HC and CO emissions from stationary gas turbines operating at peak load are relatively low. Gas turbines normally operate at 80 to 100 percent of peak load with HC emission averaging less than 50 ppm and CO emission averaging less than 500 ppm concentration at 15 percent oxygen.

Based on the above facts, FDER agrees that emission limits of 0.1811 lb/MMBTU (80 lb/hr) for CO and 0.043 lb/MMBTU (19 lb/hr) for VOC constitute BACT for the proposed source.

SO_2 Control

The applicant proposes an emission limit of 388 lb SO_2/hr and 0.8 percent sulfur content in the fuel oil. The basis of this proposed emission limit is found in the AP-42 emission factors for Stationary Gas Turbines and NSPS for Gas Turbines.

SO_2 emissions from stationary gas turbines depend on the sulfur content of the fuel since nearly 100 percent of the sulfur is converted to SO_2 during the combustion process. Due to the high volumes of exhaust gases, the cost of flue gas desulfurization (FGD) is considered unreasonable. Therefore, FDER determines that the selection of low sulfur oil (0.5), and an emission limit of 388 lb SO_2/hr is BACT for the proposed source.

NO_x Control

The applicant proposes to control NO_x with a wet control technique (water injection) and limiting the maximum fuel-bound nitrogen content to 0.25 percent.

Total NO_x emissions from any combustion source, including stationary gas turbines, are a function of both thermal NO_x and organic NO_x formation. Thermal NO_x is formed by a high temperature reaction between nitrogen and oxygen from the combustion air. Organic NO_x, however, is formed by the oxidation of fuel-bound nitrogen during combustion.

NO_x formation within a turbine generally increases exponentially with increased pressure and temperature. High efficiency turbines, therefore, generally discharge gases with higher NO_x concentrations than low efficiency turbines. Since the

relative fuel consumption of gas turbines varies linearly with efficiency, an adjustment factor was selected (NSPS) that permitted increased NO_x emissions for the efficient turbines.

Gas turbines with waste heat recovery (combined cycle gas turbine) have a higher overall efficiency than the gas turbine alone. The application of the efficiency adjustment factor to the entire system would permit greater NO_x emission. The efficiency adjustment factor in the selected NSPS must be based on the gas turbine efficiency itself, not the overall efficiency of a gas turbine combined with other equipment. This consideration is discussed at length in the preamble to the selected NSPS for stationary gas turbines.

Based on the above facts, the KU gas turbine would actually be allowed an emission rate of 79 PPM (gas) and 129 PPM (oil) due to the efficiency adjustment factor, which is an increase of the nominal 75 PPM NO_x emission by 5.64%. An additional 50 PPM would be the allowance for fuel-bound nitrogen when burning fuel oil No. 2. Therefore, FDER determines that the selected NSPS emission limit of 79 PPM (gas) and 129 PPM (oil), or $0.0075 \frac{(14.4)}{Y} + F$ (when applicable) at 15% oxygen on a dry basis (see formula, Table 2) is BACT for this source.

Beryllium Control

The applicant proposes an emission limit of 1.2 pounds per year (0.0014 NG/J) for beryllium based on the emission factor from Stationary Combustion Processes - EPA 450/2-80-074. This emission factor was based on characterization of fuel samples. A later publication, EPA 600/57/81-003b, presented an emission factor of 0.00004 NG/J based on uncontrolled emissions in the exhaust gases from a distillate oil-fired boiler.

Using the lowest emission factor of 0.35 pounds per year (0.00004 NG/J), the annual amount of beryllium emitted would be less than the significant increase - 0.8 pounds per year - for this pollutant.

BEST AVAILABLE CONTROL TECHNOLOGY (BACT) DETERMINATION
Kissimmee Utilities
Osceola County

Kissimmee Utilities, Kissimmee, Florida, plans to increase their existing electric generating capability by an additional 49.9 gross megawatts. The proposed supplementary-fired combined cycle gas turbine system is composed of one 400 million Btu/hr heat input gas turbine (30.9 megawatt gross output) from which the exhaust gases discharge into a waste heat boiler. The steam produced will operate two steam turbines each producing 9.5 megawatt gross output. The boiler has a 41.7 million Btu per hour supplemental heat source to generate additional steam.

The system will fire natural gas with No. 2 oil as stand-by fuel. Hourly fuel consumption at maximum firing will be 0.491 million cubic feet of gas or 78 barrels of oil. The system is scheduled to operate 8,760 hours per year.

BACT Determination Requested by the Applicant:

Pollutant	Emission Limit
NO_x	129 PPM when firing oil
SO_2	0.8% maximum fuel sulfur content

Date of Receipt of a BACT Application:

September 9, 1983

Date of Publication in the Florida Administrative Weekly:

September 4, 1981

Review Group Members:

Comments were obtained from the New Source Review Section, the Air Modeling Section, and the St. Johns River District Office.

BACT Determination by DER:

Turbine Emissions	Limit
NO_x (gas)	79 PPM (water injection)
NO_x (oil)	129 PPM (water injection)
SO_2	No. 2 distillate oil with sulfur content not to exceed 0.5 percent or natural gas as fuel
Visible Emissions	Maximum 20% opacity

Boiler Emissions	Limit
SO_2 & Particulates	Natural gas as fuel or No. 2 distillate oil with sulfur content not to exceed 0.5 percent
Visible Emissions	Not to exceed 20% opacity. 40% opacity is permitted for not more than two minutes in any one hour.

Turbine NO_x emission limits calculated using the NSPS formula in Subpart GG, subsection 40 CFR 60.332.

$$NO_x = 0.0075 \frac{(14.4)}{Y} + F$$

Y = Manufacturer's rated heat rate at manufacturers rated load. Applicant indicates this parameter is 13.66 kJ/watt-hr.

F = NO_x emission allowance for fuel-bound nitrogen. Applicant indicates this parameter is 0.005.

Compliance with the turbine NO_x emission limit shall be in accordance with 40 CFR 60, Appendix A; Method 20 as set forth in the NSPS subsection 40 CFR 60.335. The sampling site shall be located between the gas turbine and the boiler.

The excess emission reports required under subsection 40 CFR 60.7(c) are to be sent to the Department of Environmental Regulation, Bureau of Air Quality Management, 2600 Blair Stone Road, Tallahassee, Florida, 32301. The information to be submitted to the department is outlined in Subpart GG, subsection 40 CFR 60.334(c).

Compliance with the opacity limits shall be in accordance with DER Method 9 (Rule 17-2.700(6)(a)9.).

BACT Determination Rationale:

Nitric oxides produced by the combustion of fuel in the gas turbine are formed by the combination of nitrogen and oxygen in the combustion air. NO_x is also formed from the reaction of the nitrogen in the fuel with the oxygen in the combustion air. Formation of the latter NO_x will be minimized by the applicant's use of natural gas or distillate oil as fuel, both of which have low nitrogen content.

NO_x formation is extremely sensitive to flame temperature, therefore injecting water or steam into the gas turbine reaction zone will reduce production of NO_x. The use of the wet control technique to reduce NO_x emissions to or below the NSPS limits is determined to be BACT.

The SO_2 emissions from the gas turbine are strictly a function of the fuel sulfur content. Flue gas desulfurization systems are economically unattractive compared to the cost of low sulfur fuels. The firing of natural gas or No. 2 oil containing a maximum of 0.5% sulfur is determined as BACT for the control of SO_2 emissions.

The reduction of NO_x emissions results in an increase in CO emissions. CO emissions are considered to be a local problem since CO readily reacts to form CO_2. NO_x emissions, however, are linked to the formation of photochemical oxidants and are subject to long range transport. As a result of this trade-off, no emission limit for CO is specified in this determination.

The proposed stationary gas turbine is subject to the requirements of Subpart GG, New Source Performance Standards (NSPS) and Florida Administrative Code Rule 17-2.660. The Department has been delegated the authority to implement and enforce the NSPS program, therefore, the quarterly excess emission reports required by 40 CFR 60(c) are to be sent to the Department of Environmental Regulation.

The supplemental heat source to the waste heat recovery boiler is 41.7 million Btu per hour. The major air pollutant from this source would be SO_2 when firing No. 2 distillate oil. The emission rate of SO_2 will be 0.5 $lb/10^6$ Btu, which is less than the current NSPS standard for fossil-fuel-fired steam generators, therefore, the installation of a FGD system is not justified. The waste heat recovery boiler will not operate when the gas turbine is down.

The monitoring provisions of the NSPS for the gas turbine requires that the sulfur content and nitrogen content of the fuel

fired is determined as set forth in subsection 40 CFR 60.334. The same fuel source will be used to fire the boiler supplemental heaters, therefore, the Department has determined that only an opacity emission limit for the waste heat boiler is necessary to insure compliance.

The applicant indicated that beryllium emissions would be 1.2 pounds per year based upon an emission factor from the guideline publication EPA-450/2-80-074. The beryllium emission factor for distillate oil was based on characterization of fuel samples. A later publication, EPA-600/57-81-003b, presented a summary of uncontrolled emissions in the exhaust gas from a distillate oil-fired boiler. The emission factor for beryllium was 0.00004 Ng/J as compared to the applicants emission factor of .00014 Ng/J. Using the most recent emission factor the annual amount of beryllium emitted would be 0.35 pounds which is less than the significant emission rate of 0.8 pounds per year (Table 500-2).

Details of the Analysis May be Obtained by Contacting:

Edward Palagyi, BACT Coordinator
Department of Environmental Regulation
Bureau of Air Quality Management
2600 Blair Stone Road
Tallahassee, Florida 32301

Recommended By:

_____

C. H. Fancy, Deputy Bureau Chief, BAQM

Date:

_____

Approved:

_____

Victoria J. Tschinkel, Secretary

Date:

_____

APPENDIX B

AIR QUALITY IMPACT ANALYSIS

A. Summary

The State PSD review for PM and SO_2 requires an air quality impact analysis which includes a PSD increment analysis and a Florida Ambient Air Quality Standards (FAAQS) analysis. The State PSD increment and FAAQS analyses depend on air quality modeling carried out in accordance with FDER-approved methods.

The air quality impact analysis required under federal PSD review for PM, SO_2, CO, and NO_x includes:

- An analysis of existing air quality;
- A PSD increment analysis (for PM and SO_2 only);
- A National Ambient Air Quality Standards (NAAQS) analysis; and,
- An analysis of impact on soils, vegetation and visibility and growth-related air quality impacts.

The analysis of existing air quality may require preconstruction monitoring; the PSD and NAAQS analyses depend on air quality modeling carried out in accordance with EPA-approved methods. Federal PSD review also requires a good engineering practice (GEP) stack height evaluation.

Based on these required State and federal air quality impact analyses, FDER has reasonable assurance that the KU modification, as described in this permit and subject to the conditions of approval proposed herein, will not cause or contribute to a violation of any State or federal PSD increment or ambient air quality standard. A discussion of the required analyses follows.

B. Discussion

1. Modeling Methodology

Two FDER and EPA-approved dispersion models were used in the State and federal air quality impact analyses. These were the Single-Source (CRSTER) and Industrial Source Complex (ISC) models.

These models were used to determine the maximum predicted annual concentrations and to identify the absolute worst-case short-term meteorological conditions which would affect emissions from KU after the proposed modification is completed. They were also used to identify days on which meteorological conditions produced worst-case short-term KU impacts in the vicinity of the facility with interacting sources located directly upwind.

The maximum short-term impacts due to emissions from KU and all major interacting sources were analyzed using a refined grid spacing of 0.1 to 0.2 kilometers between receptors and only the days on which worst-case meteorological conditions occurred.

Since worst-case impacts for each pollutant subject to analysis occur under different fuel burning conditions, modeling and analysis for each of these pollutants was performed using the worst-case fuel.

The surface meteorological data used in the models were National Weather Service data collected at Orlando, Florida during the period 1974-78. Upper air meteorological data used in the models were collected during the same time period at Tampa, Florida.

Final stack parameters and emission rates used in evaluating the proposed KU modification are contained in Tables B-1 and B-2.

Table B-1

Stack Parameters for Kissimmee Utilities - Baseline Case

Emissions Unit	Stack Height (m)	Stack Diameter (m)	Exit Velocity (m/s)	Exit Temperature (K)	Emission Rate (g/sec) SO_2	PM
Unit #7	13.11	.61	16.30	466.50	.87	.52
Units #8,#9	16.15	.85	17.60	477.60	3.36	2.01
Units #10,#11	7.01	.76	9.60	466.50	2.28	1.36
Units #14-#18	13.41	.80	8.70	505.40	5.37	3.21
Units #19,#20	8.69	.90	17.20	505.40	2.89	1.73

TABLE B-2

Stack Parameters for Kissimmee Utilities - Projected Case

Emissions Unit	Stack Height (m)	Stack Diameter (m)	Exit Velocity (m/s)	Exit Temperature (K)	Emission Rate (g/sec) SO_2	PM	NO_x	CO
Unit #7	13.11	.61	16.30	466.50	.87	.52	4.46	.79
Units #8, #9	16.15	.85	17.60	477.60	3.36	2.01	17.10	3.16
Units #10, #11	7.01	.76	9.60	466.50	2.28	1.36	10.58	2.12
Units #14-#18	13.41	.80	8.70	505.40	5.37	3.21	11.34	5.45
Units #19,#20	8.69	.90	17.20	505.40	2.89	1.73	14.66	2.64
Combustion Turbine	18.29	3.66	38.03	422.00	48.9	2.77	30.70	10.08

2. Analysis of Existing Air Quality

In order to evaluate exisitng air quality in the area of a proposed project, FDER may require a period of continuous preconstruction monitoring for any pollutant subject to PSD review. An exemption from this requirement may be obtained if the net emissions increase of the pollutant from the modification would cause an air quality impact less than a certain de minimus level as defined in 40 CFR 52.21(i)(8). Based on the modeling results shown in the following table, this exemption is applicable to the proposed modification for all of the pollutants subject to PSD review. Therefore, no preconstruction monitoring has been required.

Projected Air Quality Impacts From Combustion Turbine

Pollutant	Averaging Time	Projected Impact (ug/m^3)	De Minimus Level (ug/m^3)
SO_2	24-hour	10	13
TSP	24-hour	<1	10
NO_x	24-hour	6	14
CO	8-hour	<10	575

There are no FDER or EPA-approved TSP, SO_2, NO_x, or CO monitors within 25 kilometers of the KU facility. Since the KU facility is located in a remote area with respect to nonspecified sources, FDER has assumed the following pollutant background values: 0 ug/m^3 for CO, 20 ug/m^3 for SO_2 and NO_x, 40 ug/m^3 for TSP. These background values are used for all

averaging times and are consistent with EPA monitoring guidelines.

3. PSD Increment Analysis

Both the State and federal PSD increment analyses pertain to PM and SO_2 for which maximum allowable increases (increments) are defined. The proposed KU modification will be located in an area where the Class II increments apply. The nearest Class I area is more than 100 kilometers away from the proposed site.

The predicted maximum TSP and SO_2 increment consumption is the same in both the State and federal PSD increment analyses. Increment consumption at KU is affected by the construction of the combustion turbine alone.

As shown in the following table, modeling results predict that the maximum TSP and SO_2 increment consumption will not exceed allowable increments. The highest, second-highest short-term predicted concentrations are given in the table since five years of meteorological data were used in the modeling.

Maximum Increment Consumption

(ug/m^3)

State and Federal

	Averaging Time		
Pollutant	3-hour	24-hour	Annual
SO_2: Maximum KU Impact	44	10	< 1
SO_2: Allowable Class II Increment	512	91	20
PM: Maximum KU Impact	NA	< 1	< 1
PM: Allowable Class II Increment	NA	37	19

There are other increment consuming sources within the vicinity of KU. Even though these sources consume increment in the area around KU, this consumption is very small. The combined impacts of these sources and KU in the interacting directions are less than the maximum increment consumed by KU only.

The nearest Class I area is Chassahowitza National Wilderness Area which is 125 kilometers away from KU. At this distance, it can be assumed that no Class I increment will be consumed as a result of emissions from KU.

4. Ambient Air Quality Standards Analysis

Both State and federal PSD regulations require the permit applicant to demonstrate that, given existing air quality in an area, a proposed emissions increase subject to PSD review will not cause or contribute to any violation of ambient air quality standards. For the proposed project at KU, an ambient air quality standards analysis is required for PM, SO_2, CO and NO_x.

As shown in the following table, modeling results predict that maximum ground-level concentrations for each of these pollutants will be below both the FAAQS and NAAQS. The highest, second-highest short-term predicted values are given in this table since five years of meteorological data were used in the modeling.

Pollutant	Averaging Time	Projected Air Quality* (ug/m^3)	NAAQS (ug/m^3)	FAAQS (ug/m^3)
SO_2	annual	40	80	60
	24-hour	155	365	260
	3-hour	392	1300	1300
TSP	annual	52	75	60
	24-hour	121	150	150
NO_2	annual	89	100	100
CO	8-hour	<500	10,000	10,000
	1-hour	<1000	40,000	40,000

*Includes background concentrations of 40 ug/m^3 for annual and 24-hour TSP, 20 ug/m^3 for SO_2 for all averaging times, and 20 ug/m^3 for NO_2.

** Air quality impact calculated for the proposed modification only.

Modeling was also performed to evaluate the impacts of interactions of emissions from other sources with those from KU. Maximum contributions from surrounding sources are very small compared to maximum ground-level concentrations from KU and they occur in non-critical directions. Therefore, no violations are predicted to occur due to interacting sources.

5. Good Engineering Practice Stack Height Evaluation

The stack height proposed for the KU combustion turbine is less than the Good Engineering Practice (GEP) stack height of 65 meters for stacks uninfluenced by structures or terrain. A building downwash analysis was not performed since the new stack will not be within the area of influence of any structure with the potential to cause downwash conditions.

APPENDIX C

ANALYSIS OF IMPACT ON SOILS, VEGETATION AND VISIBILITY AND GROWTH-RELATED AIR QUALITY IMPACTS

The maximum impact of the proposed modification, as demonstrated through the air quality analysis, will be below the national secondary air quality standards for PM and SO_2. These standards were established to protect public welfare related values. Also, the maximum impact of the proposed modification on NO_2, and CO concentrations will be insignificant. Therefore, no adverse effects on soils, vegetation and visibility is expected.

There will be no increase in the number of employees at this site due to the project. Therefore no secondary residential, commercial or industrial growth which will adversely affect air quality in the area is expected.

APPENDIX D

SPECIFIC CONDITIONS

FDER proposes a preliminary determination of approval with conditions for the project (construction of a 49.9 MW combined cycle gas turbine) requested by Kissimmee Utilities in the permit applications submitted on September 6, 1983.

Special conditions listed in the draft State permit AC 49-74856, are adopted as special conditions for the draft federal permit, PSD-FL-087, for this source.

The attached General Conditions (federal) are also made a part of the proposed federal permit PSD-FL-087.

GENERAL CONDITIONS

1. The permittee shall notify the permitting authority in writing of the beginning of construction of the permitted source within 30 days of such action and the estimated date of start-up of operation.

2. The permittee shall notify the permitting authority in writing of the actual start-up of the permitted source within 30 days of such action and the estimated date of demonstration of compliance as required in the specific conditions.

3. Each emission point for which an emission test method is established in this permit shall be tested in order to determine compliance with the emission limitations contained herein within sixty (60) days of achieving the maximum production rate, but in no event later than 180 days after initial start-up of the permitted source. The permittee shall notify the permitting authority of the scheduled date of compliance testing at least thirty (30) days in advance of such test. Compliance test results shall be submitted to the permitting authority within forty-five (45) days after the complete testing. The permittee shall provide (1) sampling ports adequate for test methods applicable to such facility, (2) safe sampling platforms, (3) safe access to sampling platforms, and (4) utilities for sampling and testing equipment.

4. The permittee shall retain records of all information resulting from monitoring activities and information indicating operating parameters as specified in the specific conditions of this permit for a minimum of two (2) years from the date of recording.

5. If, for any reason, the permittee does not comply with or will not be able to comply with the emission limitations specified in this permit, the permittee shall immediately notify the State District Manager by telephone and provide the District Office and the permitting authority with the following information in writing within four (4) days of such conditions:

   (a) description for noncomplying emission(s),

   (b) cause of noncompliance,

   (c) anticipated time the noncompliance is expected to continue or, if corrected, the duration of the period of noncompliance,

(d) steps taken by the permittee to reduce and eliminate the noncomplying emission,

and

(e) steps taken by the permittee to prevent recurrence of the noncomplying emission.

Failure to provide the above information when appropriate shall constitute a violation of the terms and conditions of this permit. Submittal of this report does not constitute a waiver of the emission limitations contained within this permit.

6. Any change in the information submitted in the application regarding facility emissions or changes in the quantity or quality of materials processed that will result in new or increased emissions must be reported to the permitting authority. If appropriate, modifications to the permit may then be made by the permitting authority to reflect any necessary changes in the permit conditions. In no case are any new or increased emissions allowed that will cause violation of the emission limitations specified herein.

7. In the event of any change in control or ownership of the source described in the permit, the permittee shall notify the succeeding owner of the existence of this permit by letter and forward a copy of such letter to the permitting authority.

8. The permittee shall allow representatives of the State environmental control agency or representatives of the Environmental Protection Agency, upon the presentation of credentials:

(a) to enter upon the permittee's premises, or other premises under the control of the permittee, where an air pollutant source is located or in which any records are required to be kept under the terms and conditions of the permit;

(b) to have access to any copy at reasonable times any records required to be kept under the terms and conditions of this permit, or the Act;

(c) to inspect at reasonable times any monitoring equipment or monitoring method required in this permit;

(d) to sample at reasonable times any emission of pollutants;

and

(e) to perform at reasonable times an operation and maintenance inspection of the permitted source.

9. All correspondence required to be submitted to this permit to the permitting agency shall be mailed to:

Mr. James T. Wilburn
Chief, Air Management Branch
Air & Waste Management Division
U.S. EPA, Region IV
345 Courtland Street, NE
Atlanta, GA 30365

10. The conditions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

The emission of any pollutant more frequently or at a level in excess of that authorized by this permit.shall constitute a violation of the terms and conditions of this permit.

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301-8241

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

PERMITTEE:

Kissimmee Utilities
P. O. Box 1608
Kissimmee, Florida
32741

Permit Number: AC 49-74856
Date of Issue:
Expiration Date:
County: Brevard
Latitude/Longitude: 28° 17' 20" N
81° 24' 20" W
Project: 49.9 MW Combined Cycle Gas Turbine

This permit is issued under the provisions of Chapter(s) 403, Florida Statutes, and Florida Administrative Code Rule(s) 17-2 and 17-4. The above named permittee is hereby authorized to perform the work or operate the facility shown on the application and approved drawing(s), plans, and other documents attached hereto or on file with the department and made a part hereof and specifically described as follows:

For the construction of a 49.9 MW combined cycle combustion gas turbine to be located at Kissimmee Utilities Power plant on 112 Ruby Street, City of Kissimmee, Osceola County, Florida. The UTM coordinates of the proposed plant are 460.1 Km East and 3129.3 Km North.

Construction shall be in accordance with the attached permit application, plans, documents and drawings except as otherwise noted on page 5 through 8, Specific Conditions.

Attachments are as follows:

1. Application to Construct Air Pollution Sources, DER Form 17-1.122(16) received on September 9, 1983.

2. Clair Fancy's letter of October 6, 1983.

3. Response to Clair Fancy's letter received on November 7, 1983.

PERMITTEE: Kissimmee Utilities **I. D. Number:**
Permit Number: AC 49-74856
Date of Issue:
Expiration Date:

GENERAL CONDITIONS:

1. The terms, conditions, requirements, limitations, and restrictions set forth herein are "Permit Conditions" and as such are binding upon the permittee and enforceable pursuant to the authority of Sections 403.161, 403.727, or 403.859 through 403.861, Florida Statutes. The permittee is hereby placed on notice that the department will review this permit periodically and may initiate enforcement action for any violation of the "Permit Conditions" by the permittee, its agents, employees, servants or representatives.

2. This permit is valid only for the specific processes and operations applied for and indicated in the approved drawings or exhibits. Any unauthorized deviation from the approved drawings, exhibits, specifications, or conditions of this permit may constitute grounds for revocation and enforcement action by the department.

3. As provided in Subsections 403.087(6) and 403.722(5), Florida Statutes, the issuance of this permit does not convey any vested rights or any exclusive privileges. Nor does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations. This permit does not constitute a waiver of or approval of any other department permit that may be required for other aspects of the total project which are not addressed in the permit.

4. This permit conveys no title to land or water, does not constitute state recognition or acknowledgement of title, and does not constitute authority for the use of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the state. Only the Trustees of the Internal Improvement Trust Fund may express state opinion as to title.

5. This permit does not relieve the permittee from liability for harm or injury to human health or welfare, animal, plant or aquatic life or property and penalties therefor caused by the construction or operation of this permitted source, nor does it allow the permittee to cause pollution in contravention of Florida Statutes and department rules, unless specifically authorized by an order from the department.

GENERAL CONDITIONS:

6. The permittee shall at all times properly operate and maintain the facility and systems of treatment and control (and related appurtenances) that are installed or used by the permittee to achieve compliance with the conditions of this permit, as required by department rules. This provision includes the operation of backup or auxiliary facilities or similar systems when necessary to achieve compliance with the conditions of the permit and when required by department rules.

7. The permittee, by accepting this permit, specifically agrees to allow authorized department personnel, upon presentation of credentials or other documents as may be required by law, access to the premises, at reasonable times, where the permitted activity is located or conducted for the purpose of:

a. Having access to and copying any records that must be kept under the conditions of the permit;

b. Inspecting the facility, equipment, practices, or operations regulated or required under this permit; and

c. Sampling or monitoring any substances or parameters at any location reasonably necessary to assure compliance with this permit or department rules.

Reasonable time may depend on the nature of the concern being investigated.

8. If, for any reason, the permittee does not comply with or will be unable to comply with any condition or limitation specified in this permit, the permittee shall immediately notify and provide the department with the following information:

a. a description of and cause of non-compliance; and

b. the period of noncompliance, including exact dates and times; or, if not corrected, the anticipated time the noncompliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the noncompliance.

GENERAL CONDITIONS:

The permittee shall be responsible for any and all damages which may result and may be subject to enforcement action by the department for penalties or revocation of this permit.

9. In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data and other information relating to the construction or operation of this permitted source, which are submitted to the department, may be used by the department as evidence in any enforcement case arising under the Florida Statutes or department rules, except where such use is proscribed by Sections 403.73 and 403.111, Florida Statutes.

10. The permittee agrees to comply with changes in department rules and Florida Statutes after a reasonable time for compliance, provided however, the permittee does not waive any other rights granted by Florida Statutes or department rules.

11. This permit is transferable only upon department approval in accordance with Florida Administrative Code Rules 17-4.12 and 17-30.30, as applicable. The permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the department.

12. This permit is required to be kept at the work site of the permitted activity during the entire period of construction or operation.

13. This permit also constitutes:

(X) Determination of Best Available Control Technology (BACT)
(X) Determination of Prevention of Significant Deterioration (PSD)
(X) Compliance with New Source Performance Standards.

14. The permittee shall comply with the following monitoring and record keeping requirements:

a. Upon request, the permittee shall furnish all records and plans required under department rules. The retention period for all records will be extended automatically, unless otherwise stipulated by the department, during the course of any unresolved enforcement action.

GENERAL CONDITIONS:

b. The permittee shall retain at the facility or other location designated by this permit records of all monitoring information (including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation), copies of all reports required by this permit, and records of all data used to complete the application for this permit. The time period of retention shall be at least three years from the date of the sample, measurement, report or application unless otherwise specified by department rule.

c. Records of monitoring information shall include:

- the date, exact place, and time of sampling or measurements;
- the person responsible for performing the sampling or measurements;
- the date(s) analyses were performed;
- the person responsible for performing the analyses;
- the analytical techniques or methods used; and
- the results of such analyses.

15. When requested by the department, the permittee shall within a reasonable time furnish any information required by law which is needed to determine compliance with the permit. If the permittee becomes aware that relevant facts were not submitted or were incorrect in the permit application or in any report to the department, such facts or information shall be submitted or corrected promptly.

SPECIFIC CONDITIONS:

1. The new source shall be constructed in accordance with the capacities and specifications stated in the application.

2. The maximum emission rates for the 49.9 MW combined cycle gas turbine shall not exceed the emission limits listed in Table 2 of the preliminary determination.

3. The plant shall be allowed to operate continuously (8760 hours per year).

SPECIFIC CONDITIONS:

4. The source shall be allowed to use either natural gas of No. 2 fuel oil.

5. Maximum sulfur (S) content in the oil shall not exceed 0.5 percent S by weight.

6. Before this construction permit expires, the 49.9 MW combined cycle gas turbine will be tested for particulate matter, sulfur dioxide, visible emissions (VE), carbon monoxide and nitrogen oxides. Except as provided under 40 CFR 60.8(b), the performance tests shall be in accordance with the provisions of the following reference methods in Appendix A of 40 CFR 60.

   a. Method 1. Sample and Velocity Traverses

   b. Method 2. Volumetric Flow Rate.

   c. Method 3. Gas Analysis

   d. Reference Method 5 must be used to determine the initial compliance status of the unit with respect to the PM standard. Thereafter visible emissions may be used unless 10% opacity is exceeded. In that case, compliance must be demonstrated by Method 5. Compliance with the opacity limitation will be determined by reference Method 9.

   e. Compliance with the sulfur dioxide emission limits will be determined by reference Method 20 or by calculations based on fuel analysis (ASTM D2880-77 and 010720-70) for sulfur content.

   f. Compliance with carbon monoxide emission limits will be determined by reference Method 10.

   g. Compliance with volatile organic compound emission limits will be assumed provided the CO allowable emission rate is achieved; specific VOC compliance testing is not required.

h. Compliance with the allowable emission limits for nitrogen oxides shall be conducted using EPA reference Method 20 Subpart GG Section 60.335. The sampling site shall be located between the gas turbine and the boiler.

During performance tests to determine compliance with the proposed standard, measured NO_x emission at 15 percent oxygen will be adjusted to ISO ambient atmospheric conditions by the following correction factor:

$$NO_x = (NO_{x_{OBS}}) \left(\frac{Pref.}{P_{OBS}}\right)^{0.5} e^{19(H_{OBS} - 0.00633)} \left(\frac{288^oK}{Tamb}\right)^{1.53}$$

where:

NO_x = Emissions of NO_x at 15 percent oxygen and ISO standard ambient conditions.

$NO_{x_{obs}}$ = Measured NO_x emission at 15 percent oxygen, ppmv.

P_{ref} = Reference combustor inlet absolute pressure at 101.3 kilopascals (1 atmosphere) ambient pressure.

P_{obs} = Measured combustor inlet absolute pressure at test ambient pressure.

H_{obs} = Specific humidity of ambient air at test.

e = Transcendental constant (2.718).

T_{AMB} = Temperature of ambient air at test.

Test results will be the average of 3 valid runs. The Department will be notified 30 days in advance of the compliance test. The test will be conducted at permitted capacity +10%.

7. A continuous monitoring system shall be installed to monitor and record the fuel consumption and the ratio of water to fuel being fired in the turbine.

8. Sulfur and nitrogen content of the fuel being fired in the gas turbine shall be determined and recorded as specified in the NSPS for Gas Turbines 40 CFR 60, Subpart GG, Section 60.334.

The records of fuel oil usage will be kept by the company, available for regulatory agency's inspection, for a two year period.

10. The applicant shall comply with all requirements of 40 CFR 60, Subpart GG, Standards of Performance for stationary gas turbines.

11. Reasonable precautions to prevent fugitive particulate emissions during construction such as coating or spraying roads and construction sites used by contractors will be taken by the applicant.

12. The applicant shall report any delays in construction and completion of this unit to the Department's St. Johns River District office.

13. The applicant will demonstrate compliance with the conditions of the construction permit, and submit a complete application for an operating permit to the Department's St. Johns River District office prior to 90 days of the expiration date of the construction permit. The applicant may continue to operate in compliance with all terms of the construction permit until its expiration date or issuance of an operating permit.

14. Upon obtaining an operating permit, the applicant will be required to submit periodic test reports on the actual operation and emissions of the facility. These reports will give the data specified in 40 CFR 60.334.

15. The source shall comply with the provisions and requirements of the attached general conditions.

16. Stack sampling facilities will include the eyebolt and angle described in Chapter 17-2.700, Florida Administrative Code.

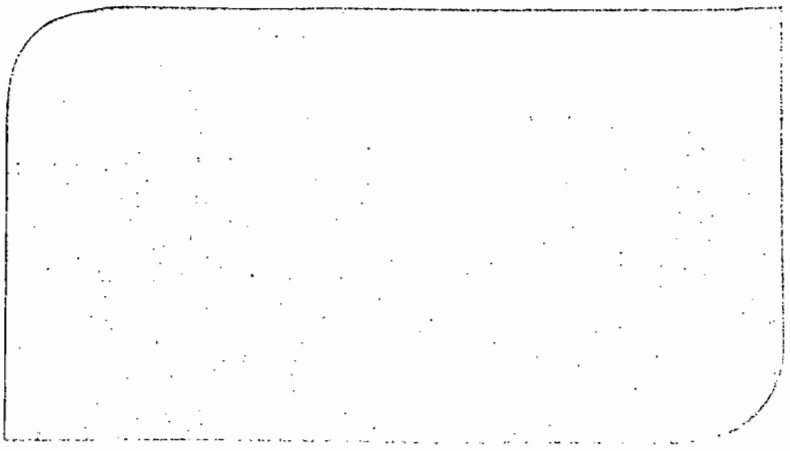
Issued this____day of_____,1984.

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

_____
Victoria J. Tschinkel, Secretary

_____Pages Attached.

ATTACHMENT 1



DER

SEP 9 1983

BAQM

ESE ENVIRONMENTAL SCIENCE AND ENGINEERING, INC.

AIR CONSTRUCTION PERMIT APPLICATION AND PSD REPORT KISSIMMEE UTILITIES 49.9 MW COMBINED CYCLE UNIT

Prepared for:

KISSIMMEE UTILITIES
Kissimmee, Florida

Prepared by:

ENVIRONMENTAL SCIENCE AND ENGINEERING, INC.
Gainesville, Florida 32602

ESE No. 81-613-200

August 1983

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SECTION I AIR CONSTRUCTION PERMIT APPLICATION

SECTION II PSD REPORT

LIST OF TABLES IN PSD REPORT

Addendum to Air Construction Permit Application and PSD Report

Kissimmee Utilities Combined Cycle Unit

This addendum explains changes which have been made in the permit application since the original application was submitted to DER in August 1981. Additional information provided with this application is also discussed. The purpose of this addendum is to enhance understanding of the new revised application, and therefore facilitate the review process. Changes/additions are discussed in order as they appear in the document.

1. In Section III.C. of the application, pollutant emission rates for particulate matter (PM), nitrogen oxides (NOx), and carbon monoxide (CO) have changed. These changes are documented in Attachment B of the application. In the case of CO and PM when firing oil in the gas turbine, manufacturers emission data were used since those estimates were greater than AP42 emission factors. In addition, revised AP42 factors for Volatile Organic Compound (VOC) emissions when burning natural gas and fuel oil in the Heat Recovery Steam Generator (HRSG), for CO emissions when burning natural gas in the HRSG, and for PM emissions when burning natural gas in the HRSG, have been incorporated into the calculations. For NOx, emissions are based upon the NSPS limit of 129 ppm NOx in the turbine exhaust gas stream. This results in a substantial decrease in NOx emissions compared to the previous application. For PM and CO, the revised emission factors result in an increase in maximum hourly emissions for these pollutants.

2. In Section III.H., stack parameters are shown for both the main stack and the turbine bypass stack. The bypass stack would be used only when the HRSG units are not in operation. Under these conditions, the exhaust gases are at a much higher temperature (about 1000°F), and at a much larger flow rate. It is also noted that the stack height of the main stack is increased from 30 feet to 60 feet and the stack diameter has increased from 8 feet to 12 feet. Since the model results shown in Attachment D of the application where based upon a 30 foot stack height, those results are conservative. Maximum air quality impacts are not expected when using the bypass stack, because the much larger flow rate and exhaust gas temperature under these conditions will result in much greater plume rise.

3. In Attachment A of the application, a plot plan for the new combined cycle unit is shown.

4. In Attachment B, the estimated exhaust gas flow of the turbine only at 15 percent oxygen is shown in DSCFM. These flows for gas firing and oil firing were used with the 129 ppm NSPS emission rate in order to calculate NOx emission due to turbine operation only. The table of annual emissions in Attachment D has been expanded to show the contributions of the gas turbine and the HRSG supplemental firing to the total estimated emissions.

5. In Attachment C, Control Technolgy, a description of the water injection system for the gas turbine has been included.

6. The PSD report has not been revised although emissions of CO and PM have increased compared to the previous application. As shown in Table 2 of the PSD report, PM and CO impacts were minimal from the proposed combined cycle unit. These impacts are not expected to increase significantly based upon the revised emission rates and increased stack height. NOx impacts would decrease since emissions have decreased and stack height has been increased compared to the previous application. Similarly, sulfur dioxide (SO_2) emissions have not changed but the increased stack height will result in decreased impacts.

7. The emission inventory presented in the PSD report was reviewed for currentness. From this review, two new increment consuming sources were identified; Southern Fruit and Orlando Utilities Commission - Stanton Energy Center. Southern Fruit is located approximately 24 kilometers from Kissimmee Utilities and OUC-Stanton is located approximately 32 kilometers from Kissimmee Utilities. Based upon the methodology presented in the PSD report, these sources would not have been included in the short term modeling analysis. These sources are primarily sulfur dioxide emitters. As shown in Table 2 of the report, short term SO_2 impacts were predicted to be well below air quality standards, therefore no revision of the report was considered necessary.

In addition to the changes in the permit application, some revisions to the conditions contained in the expired construction permit are requested. Specific Condition 2 of the permit states that maximum emissions shall not exceed those listed in Table 2 of the Preliminary Determination. For NOx, a fixed emission limit for the gas turbine and boiler combined of 250 lbs per hour is specified. In reality, actual mass emissions from the turbine may vary depending on the actual heat rate of the unit and the actual exhaust flow rate for the unit during testing. As a result, it is requested that if testing shows that the fixed mass emission limit cannot be met, that the gas turbine exhaust only be tested as an alternative means of demonstrating compliance. This is in the spirit of the Subpart GG NSPS, which only applies to the gas turbine emissions. The NOx emission limit for the gas turbine only would be variable, depending upon the heat rate of the unit, and compliance would be demonstrated by the NSPS formula.

Specific Condition 3 states that the plant be allowed to operate 8,736 hours per year. It is requested that this be revised to read 8,760 hours per year or 365 days per year operation.

Specific Condition 6 states maximum No. 2 fuel oil consumption to be 78 barrels per hour. It is requested that this condition be deleted so that more quantities of No. 2 fuel oil be allowed to be burned when sulfur content is less than 0.8 percent. The only limiting condition on fuel oil consumption should be the SO_2 emission limit of 388 pounds per hour.

Specific Condition 7.h. is not clear on where testing should be conducted in accordance with Subpart GG of the NSPS. Subpart GG only applies to the gas turbine portion of the combined cycle operation. It is suggested that compliance be determined by measuring total mass emissions at the main stack outlet with the heat recovery steam generator system in operation. However, if compliance with the mass emission limitation cannot be demonstrated at the main stack, then compliance can be demonstrated by measuring only the gas turbine exhaust for NOx concentration with comparison to the standard based on the NSPS formula.

AIR CONSTRUCTION PERMIT APPLICATION

AC 49-74856

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

DER

SEP 9 1983

BAQM

ST. JOHNS RIVER DISTRICT
3319 MAGUIRE BOULEVARD
SUITE 232
ORLANDO, FLORIDA 32803

APPLICATION TO OPERATE/CONSTRUCT AIR POLLUTION SOURCES

SOURCE TYPE: Combustion Turbine [X] New[1] [ ] Existing[1]

APPLICATION TYPE: [X] Construction [ ] Operation [ ] Modification

COMPANY NAME: Kissimmee Utilities COUNTY: Osceola

Identify the specific emission point source(s) addressed in this application (i.e. Lime Kiln No. 4 with Venturi Scrubber; Peaking Unit No. 2, Gas Fired) Combined Cycle Unit #1

SOURCE LOCATION: Street 112 Ruby Street City Kissimmee

UTM: East 17-460.1 North 3129.3

Latitude 28 ° 17 ' 20 "N Longitude 81 ° 24 ' 20 "W

APPLICANT NAME AND TITLE: James C. Welsh, Utilities Director

APPLICANT ADDRESS: Post Office Box 1608, Kissimmee, Florida 32741

SECTION I: STATEMENTS BY APPLICANT AND ENGINEER

A. APPLICANT

I am the undersigned owner or authorized representative* of Kissimmee Utilities

I certify that the statements made in this application for a Construction permit are true, correct and complete to the best of my knowledge and belief. Further, I agree to maintain and operate the pollution control source and pollution control facilities in such a manner as to comply with the provision of Chapter 403, Florida Statutes, and all the rules and regulations of the department and revisions thereof. I also understand that a permit, if granted by the department, will be non-transferable and I will promptly notify the department upon sale or legal transfer of the permitted establishment.

*Attach letter of authorization

Signed: James C. Welsh

James C. Welsh, Utilities Director
Name and Title (Please Type)

Date: 8/26/83 Telephone No. (305) 847-2821

B. PROFESSIONAL ENGINEER REGISTERED IN FLORIDA (where required by Chapter 471, F.S.)

This is to certify that the engineering features of this pollution control project have been designed/examined by me and found to be in conformity with modern engineering principles applicable to the treatment and disposal of pollutants characterized in the permit application. There is reasonable assurance, in my professional judgment, that

[1] See Florida Administrative Code Rule 17-2.100(57) and (104)

the pollution control facilities, when properly maintained and operated, will discharge an effluent that complies with all applicable statutes of the State of Florida and the rules and regulations of the department. It is also agreed that the undersigned will furnish, if authorized by the owner, the applicant a set of instructions for the proper maintenance and operation of the pollution control facilities and, if applicable, pollution sources.

Signed David A. Buff

David A. Buff
Name (Please Type)

ESE, Inc.
Company Name (Please Type)

P.O. Box ESE, Gainesville, Fl 32602
Mailing Address (Please Type)

Florida Registration No. 19011 Date: 8-25-83 Telephone No. (904) 372-3318

SECTION II: GENERAL PROJECT INFORMATION

A. Describe the nature and extent of the project. Refer to pollution control equipment, and expected improvements in source performance as a result of installation. State whether the project will result in full compliance. Attach additional sheet if necessary.

New 30.9 MW combustion turbine fired with natural gas or No. 2 fuel oil. NO_x control by water injection. Waste heat used to produce steam to drive two 9.5 MW steam turbines for total net generation of 46.5 MW and a gross generation capacity of 49.9 MW. Supplemental firing of natural gas or No. 2 oil in waste heat boiler to meet steam requirements. (See Attachment A.)

B. Schedule of project covered in this application (Construction Permit Application Only)

Start of Construction September 1981 Completion of Construction December 1983

C. Costs of pollution control system(s): (Note: Show breakdown of estimated costs only for individual components/units of the project serving pollution control purposes. Information on actual costs shall be furnished with the application for operation permit.)

Additional capital cost of water injection system is $60,000.

D. Indicate any previous DER permits, orders and notices associated with the emission point, including permit issuance and expiration dates.

Not Applicable-- New Source

E. Requested permitted equipment operating time: hrs/day 24 ; days/wk 7 ; wks/yr 52 ;

if power plant, hrs/yr 8,760; if seasonal, describe: _____

F. If this is a new source or major modification, answer the following questions. (Yes or No)

1. Is this source in a non-attainment area for a particular pollutant? No

   a. If yes, has "offset" been applied? _____

   b. If yes, has "Lowest Achievable Emission Rate" been applied? _____

   c. If yes, list non-attainment pollutants. _____

2. Does best available control technology (BACT) apply to this source? If yes, see Section VI. Yes

3. Does the State "Prevention of Significant Deterioriation" (PSD) requirement apply to this source? If yes, see Sections VI and VII. Yes

4. Do "Standards of Performance for New Stationary Sources" (NSPS) apply to this source? Yes

5. Do "National Emission Standards for Hazardous Air Pollutants" (NESHAP) apply to this source? No

Do "Reasonably Available Control Technology" (RACT) requirements apply to this source? No

   a. If yes, for what pollutants? _____

   b. If yes, in addition to the information required in this form, any information requested in Rule 17-2.650 must be submitted.

Attach all supportive information related to any answer of "Yes". Attach any justification for any answer of "No" that might be considered questionable.

SECTION III: AIR POLLUTION SOURCES & CONTROL DEVICES (Other than Incinerators)

A. Raw Materials and Chemicals Used in your Process, if applicable: NA

Description	Contaminants		Utilization Rate - lbs/hr	Relate to Flow Diagram
	Type	% Wt		

B. Process Rate, if applicable: (See Section V, Item 1) NA

1. Total Process Input Rate (lbs/hr): _____

2. Product Weight (lbs/hr): _____

C. Airborne Contaminants Emitted: (Information in this table must be submitted for each emission point, use additional sheets as necessary) See Attachment B

Name of Contaminant	Emission[1]		Allowed[2] Emission Rate per Rule 17-2	Allowable[3] Emission lbs/hr	Potential[4] Emission		Relate to Flow Diagram
	Maximum lbs/hr	Actual T/yr			lbs/hr	T/yr	
SO_2	388	21	NA	NA	388	1,702	Attach. A
PM	22	28	NA	NA	22	96	
NO_x	235	1,004	NA	NA	446	1,954	
HC (as CH_4)	19	83	NA	NA	19	83	
CO	80	231	NA	NA	80	349	

[1] See Section V, Item 2.

[2] Reference applicable emission standards and units (e.g. Rule 17-2.600(5)(b)2. Table II, E. (1) - 0.1 pounds per million BTU heat input)

[3] Calculated from operating rate and applicable standard.

[4] Emission, if source operated without control (See Section V, Item 3).

D. Control Devices: (See Section V, Item 4)

Name and Type (Model & Serial No.)	Contaminant	Efficiency	Range of Particles Size Collected (in microns) (If applicable)	Basis for Efficiency (Section V Item 5)
Water Injection	NO_x	48%	NA	Attach. C

E. Fuels

Type (Be Specific)	Consumption*		Maximum Heat Input (MMBTU/hr)
	avg/hr	max./hr	
No. 2 Fuel Oil	78	78	441.7
Natural Gas	0.491	0.491	441.7

*Units: Natural Gas--MMCF/hr; Fuel Oils--gallons/hr; Coal, wood, refuse, other--lbs/hr.

Fuel Analysis: Fuel Oil

Percent Sulfur: 0.8 maximum Percent Ash: <.01

Density: 7.4 lbs/gal Typical Percent Nitrogen: <.25

Heat Capacity: 19,350 BTU/lb 143,200 BTU/gal

Other Fuel Contaminants (which may cause air pollution):

F. If applicable, indicate the percent of fuel used for space heating.

Annual Average NA Maximum

G. Indicate liquid or solid wastes generated and method of disposal.

Boiler blowdown will be directed to city waste water treatment facility

H. Emission Stack Geometry and Flow Characteristics (Provide data for each stack):

Stack Height: 60.0/33.1 ft. Stack Diameter: Main Stack/By pass stack 12.0/18.9 x 10.25 ft.

Gas Flow Rate: 377,000/686,000 ACFM 238,000/225,000 DSCFM Gas Exit Temperature: 300/950-1000 °F.

Water Vapor Content: 5 to 8 by vol. % Velocity: 56/59 FPS

SECTION IV: INCINERATOR INFORMATION NA

Type of Waste	Type 0 (Plastics)	Type I (Rubbish)	Type II (Refuse)	Type III (Garbage)	Type IV (Pathological)	Type V (Liq.& Gas By-prod.)	Type VI (Solid By-prod.)
Actual lb/hr Incinerated							
Uncontrolled (lbs/hr)							

Description of Waste _____

Total Weight Incinerated (lbs/hr) _____ Design Capacity (lbs/hr) _____

Approximate Number of Hours of Operation per day _____ day/wk _____ wks/yr. _____

Manufacturer _____

Date Constructed _____ Model No. _____

	Volume $(ft)^3$	Heat Release (BTU/hr)	Fuel		Temperature (°F)
			Type	BTU/hr	
Primary Chamber					
Secondary Chamber					

Stack Height: _____ ft. Stack Diamter: _____ Stack Temp. _____

Gas Flow Rate: _____ ACFM _____ DSCFM* Velocity: _____ FPS

*If 50 or more tons per day design capacity, submit the emissions rate in grains per standard cubic foot dry gas corrected to 50% excess air.

Type of pollution control device: [ ] Cyclone [ ] Wet Scrubber [ ] Afterburner

[ ] Other (specify) _____

Brief description of operating characteristics of control devices: _____

Ultimate disposal of any effluent other than that emitted from the stack (scrubber water, ash, etc.):

NOTE: Items 2, 3, 4, 6, 7, 8, and 10 in Section V must be included where applicable.

SECTION V: SUPPLEMENTAL REQUIREMENTS

Please provide the following supplements where required for this application.

1. Total process input rate and product weight -- show derivation [Rule 17-2.100(127)] Attachment B
2. To a construction application, attach basis of emission estimate (e.g., design calculations, design drawings, pertinent manufacturer's test data, etc.) and attach proposed methods (e.g., FR Part 60 Methods 1, 2, 3, 4, 5) to show proof of compliance with applicable standards. To an operation application, attach test results or methods used to show proof of compliance. Information provided when applying for an operation permit from a construction permit shall be indicative of the time at which the test was made. Attachments B and C
3. Attach basis of potential discharge (e.g., emission factor, that is, AP42 test). Attachment B
4. With construction permit application, include design details for all air pollution control systems (e.g., for baghouse include cloth to air ratio; for scrubber include cross-section sketch, design pressure drop, etc.) Attachment C
5. With construction permit application, attach derivation of control device(s) efficiency. Include test or design data. Items 2, 3 and 5 should be consistent: actual emissions = potential (1-efficiency). Attachment C
6. An 8 1/2" x 11" flow diagram which will, without revealing trade secrets, identify the individual operations and/or processes. Indicate where raw materials enter, where solid and liquid waste exit, where gaseous emissions and/or airborne particles are evolved and where finished products are obtained. Attachment A
7. An 8 1/2" x 11" plot plan showing the location of the establishment, and points of airborne emissions, in relation to the surrounding area, residences and other permanent structures and roadways (Example: Copy of relevant portion of USGS topographic map). Attachment A
8. An 8 1/2" x 11" plot plan of facility showing the location of manufacturing processes and outlets for airborne emissions. Relate all flows to the flow diagram. Attachment A

9. The appropriate application fee in accordance with Rule 17-4.05. The check should be made payable to the Department of Environmental Regulation.

10. With an application for operation permit, attach a Certificate of Completion of Construction indicating that the source was constructed as shown in the construction permit.

SECTION VI: BEST AVAILABLE CONTROL TECHNOLOGY

A. Are standards of performance for new stationary sources pursuant to 40 C.F.R. Part 60 applicable to the source?

[X] Yes [ ] No

Contaminant	Rate or Concentration
Nitrogen Oxides	% by vol= 0.0075 (14.4/Y) + F
	Y = heat rate at peak load (kj/watt-hr)
	F = fuel-bound nitrogen allowance
Sulfur Dioxide	150 ppm or less than 0.8% sulfur fuel by weight

B. Has EPA declared the best available control technology for this class of sources (If yes, attach copy)

[X] Yes [ ] No

Contaminant	Rate or Concentration
Nitrogen Oxides	See Attachment D
Sulfur Dioxide	See Attachment D

C. What emission levels do you propose as best available control technology?

Contaminant	Rate or Concentration
Nitrogen Oxides	NSPS: % by volume = 0.0075 (14.4Y) + F
Sulfur Dioxide	0.8% max fuel sulfur content by weight

D. Describe the existing control and treatment technology (if any). Nitrogen Oxides (see Item)

1. Control Device/System:
2. Operating Principles:
3. Efficiency:*
4. Capital Costs:

*Explain method of determining

5. Useful Life:

6. Operating Costs:

7. Energy:

8. Maintenance Cost:

9. Emissions:

Contaminant	Rate or Concentration

10. Stack Parameters — Nitrogen Oxides

a. Height: ft.

b. Diameter: ft.

c. Flow Rate: ACFM

d. Temperature: °F.

e. Velocity: FPS

E. Describe the control and treatment technology available (As many types as applicable, use additional pages if necessary).

1.

a. Control Device: Water injection

b. Operating Principles: Lower combustion temperature

c. Efficiency:[1] 48%

d. Capital Cost: $60,000.

e. Useful Life: 30 years

f. Operating Cost: Additional fuel at 18.1×10^6 Btu/hr

g. Energy:[2] Increases heat rate by 140 Btu/KWH

h. Maintenance Cost: No additional maintenance costs.

i. Availability of construction materials and process chemicals: Can be purchased as package with turbine unit.

j. Applicability to manufacturing processes: Specifically designed for package unit.

k. Ability to construct with control device, install in available space, and operate within proposed levels: Available as package from turbine manufacturer.

2. Ability to meet emission levels documented in Attachment C.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

[1]Explain method of determining efficiency. See Attachment C

[2]Energy to be reported in units of electrical power - KWH design rate.

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

3.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

4.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Costs:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

F. Describe the control technology selected:

1. Control Device: Water injection (see Item E)

2. Efficiency:[1]

3. Capital Cost:

4. Useful Life:

5. Operating Cost:

6. Energy:[2]

7. Maintenance Cost:

8. Manufacturer:

9. Other locations where employed on similar processes: See Attachment D.

a. (1) Company:

(2) Mailing Address:

(3) City:

(4) State:

[1]Explain method of determining efficiency. See Attachment C.
[2]Energy to be reported in units of electrical power - KWH design rate.

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions:[1]

Contaminant	Rate or Concentration

(8) Process Rate:[1]

b. (1) Company:

(2) Mailing Address:

(3) City: (4) State:

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions:[1]

Contaminant	Rate or Concentration

(8) Process Rate:[1]

10. Reason for selection and description of systems: Add-on NO_x controls are currently in the experimental phase. The proposed water injection rate will reduce NO_x emissions by 48 percent and will meet NSPS without significantly reducing thermal efficiency. Impacts from the new source are predicted to be insignificant, less than 1 $\mu g/m^3$ on an annual average. Therefore, further reduction in NO_x emissions is not justified.

SECTION VII - PREVENTION OF SIGNIFICANT DETERIORATION

A. Company Monitored Data

1. _____no. sites _____ TSP _____( ) SO^{2}* _____ Wind spd/dir

Period of Monitoring _____/_____/_____ to _____/_____/_____
month day year month day year

Other data recorded _____

Attach all data or statistical summaries to this application.

*Specify bubbler (B) or continuous (C).

[1]Applicant must provide this information when available. Should this information not be available, applicant must state the reason(s) why.

5. Useful Life:

6. Operating Costs:

7. Energy:

8. Maintenance Cost:

9. Emissions:

Contaminant	Rate or Concentration

10. Stack Parameters

a. Height: ft.

b. Diameter: ft.

c. Flow Rate: ACFM

d. Temperature: °F.

e. Velocity: FPS

E. Describe the control and treatment technology available (As many types as applicable, use additional pages if necessary).

1.

a. Control Device: Wet scrubber

b. Operating Principles: SO_2 is absorbed by alkaline solution. Sludge is separated and treated for disposal.

c. Efficiency:[1] 90% +

d. Capital Cost: $4 million

e. Useful Life: 5 to 10 years

f. Operating Cost: Annualized cost approx. $2.5 million

g. Energy:[2] 2,500 kw

h. Maintenance Cost:

i. Availability of construction materials and process chemicals: Assumed Available.

j. Applicability to manufacturing processes: Has not been applied to cumbustion turbines.

k. Ability to construct with control device, install in available space, and operate within proposed levels: Assumed adequate.

2.

a. Control Device: low sulfur fuel

b. Operating Principles: Lower sulfur fuel replaces higher sulfur fuel

c. Efficiency:[1] Variable

d. Capital Cost: NA

e. Useful Life: NA

f. Operating Cost: Price differential over high sulfur fuel approx. $6-8/bbl

g. Energy:[2] NA

h. Maintenance Cost: NA

i. Availability of construction materials and process chemicals: Currently available at premium.

[1]Explain method of determining efficiency. Published literature.

[2]Energy to be reported in units of electrical power - KWH design rate.

j. Applicability to manufacturing processes: Widely applied.

k. Ability to construct with control device, install in available space, and operate within proposed levels: Adequate.

3.

a. Control Device: b. Operating Principles:

c. Efficiency:[1] d. Capital Cost:

e. Useful Life: f. Operating Cost:

g. Energy:[2] h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

4.

a. Control Device: b. Operating Principles:

c. Efficiency:[1] d. Capital Costs:

e. Useful Life: f. Operating Cost:

g. Energy:[2] h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

F. Describe the control technology selected: Maximum sulfur content of fuel oil = 0.8%

1. Control Device: Low sulfur fuel 2. Efficiency:[1] Variable

3. Capital Cost: NA 4. Useful Life: NA

5. Operating Cost: Price differential between low and high sulfur fuel approx. $6-8/bbl 6. Energy:[2] NA

7. Maintenance Cost: NA 8. Manufacturer: NA

9. Other locations where employed on similar processes: See Attachment D.

a. (1) Company:

(2) Mailing Address:

(3) City: (4) State:

[1]Explain method of determining efficiency.
[2]Energy to be reported in units of electrical power - KWH design rate.

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions:[1]

Contaminant	Rate or Concentration

(8) Process Rate:[1]

b. (1) Company:

(2) Mailing Address:

(3) City: (4) State:

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions:[1]

Contaminant	Rate or Concentration

(8) Process Rate:[1]

10. Reason for selection and description of systems: The primary fuel will be natural gas and actual emissions are expected to be approximately 21 ton/year. When fuel oil is burned, ground level impacts are expected to be below de minimis levels. The additional capital and operating costs for an add-on scrubber system are not justified from the standpoint of improving air quality or reducing emissions on a long-term basis. The BACT chosen for this facility is low-sulfur fuel (0.8% max). Lower sulfur fuel is not justified since fuel oil burned will be minimized and environmental impacts at 0.8% sulfur fuel are not significant. Economic penalty would also be incurred with burning of lower sulfur fuel.

SECTION VII _ PREVENTION OF SIGNIFICANT DETERIORATION

A. Company Monitored Data NA

1. _____ no. sites _____ TSP _____ ( ) SO_2* _____ Wind spd/dir

Period of Monitoring _____ / _____ / _____ to _____ / _____ / _____
month day year month day year

Other data recorded No monitoring data available in vicinity of site

Attach all data or statistical summaries to this application.

*Specify bubbler (B) or continuous (C).

[1]Applicant must provide this information when available. Should this information not be available, applicant must state the reason(s) why.

2. Instrumentation, Field and Laboratory NA

a. Was instrumentation EPA referenced or its equivalent? [ ] Yes [ ] No

b. Was instrumentation calibrated in accordance with Department procedures?

[ ] Yes [ ] No [ ] Unknown

B. Meteorological Data Used for Air Quality Modeling

1. 5 Year(s) of data from 01 / 01 / 74 (month / day / year) to 12 / 31 / 78 (month / day / year)

2. Surface data obtained from (location) Orlando

3. Upper air (mixing height) data obtained from (location) Tampa

4. Stability wind rose (STAR) data obtained from (location) Orlando

C. Computer Models Used

1. CRSTER Modified? If yes, attach description.

2. ISCST Modified? If yes, attach description.

3. ISCLT Modified? If yes, attach description.

4. _____ Modified? If yes, attach description.

Attach copies of all final model runs showing input data, receptor locations, and principle output tables.

D. Applicants Maximum Allowable Emission Data

Pollutant	Emission Rate	
TSP	1.98	grams/sec
SO^2	48.9	grams/sec

E. Emission Data Used in Modeling Attached PSD analysis

Attach list of emission sources. Emission data required is source name, description of point source (on NEDS point number), UTM coordinates, stack data, allowable emissions, and normal operating time.

F. Attach all other information supportive to the PSD review. Attached PSD Analysis

G. Discuss the social and economic impact of the selected technology versus other applicable technologies (i.e., jobs, payroll, production, taxes, energy, etc.). Include assessment of the environmental impact of the sources.

Proposed project will provide more reliable electrical power to the Kissimmee Utilities service area. Dependence on purchased power will be reduced, possibly offsetting fuel oil consumption at other generating stations owned by Orlando Utilities Commission. The city has projected savings to consumers in excess of $10 million through 1985.

H. Attach scientific, engineering, and technical material, reports, publications, journals, and other competent relevant information describing the theory and application of the requested best abailable control technology. Attachment C

PM, HC, CO, Hg, Be

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions*:

Contaminant	Rate or Concentration

(8) Process Rate*:

10. Reason for selection and description of systems:

The impacts of TSP, HC, CO, Hg, and Be are all predicted to be below air quality de minimis levels (Table 5 of PSD report) and impacts of TSP, Hg, and Be are below air quality significance levels.
The cost of add-on particulate control equipment is not justified by any reduction in environmental impacts.

There are no demonstrated add-on control methods for HC, CO, Hg, or Be emissions from combustion turbines.

BACT proposed for HC and CO is proper combustion technique.

*Applicant must provide this information when available. Should this information not be available, applicant must state the reason(s) why.

PERMIT ATTACHMENT A

SOURCE DESCRIPTION

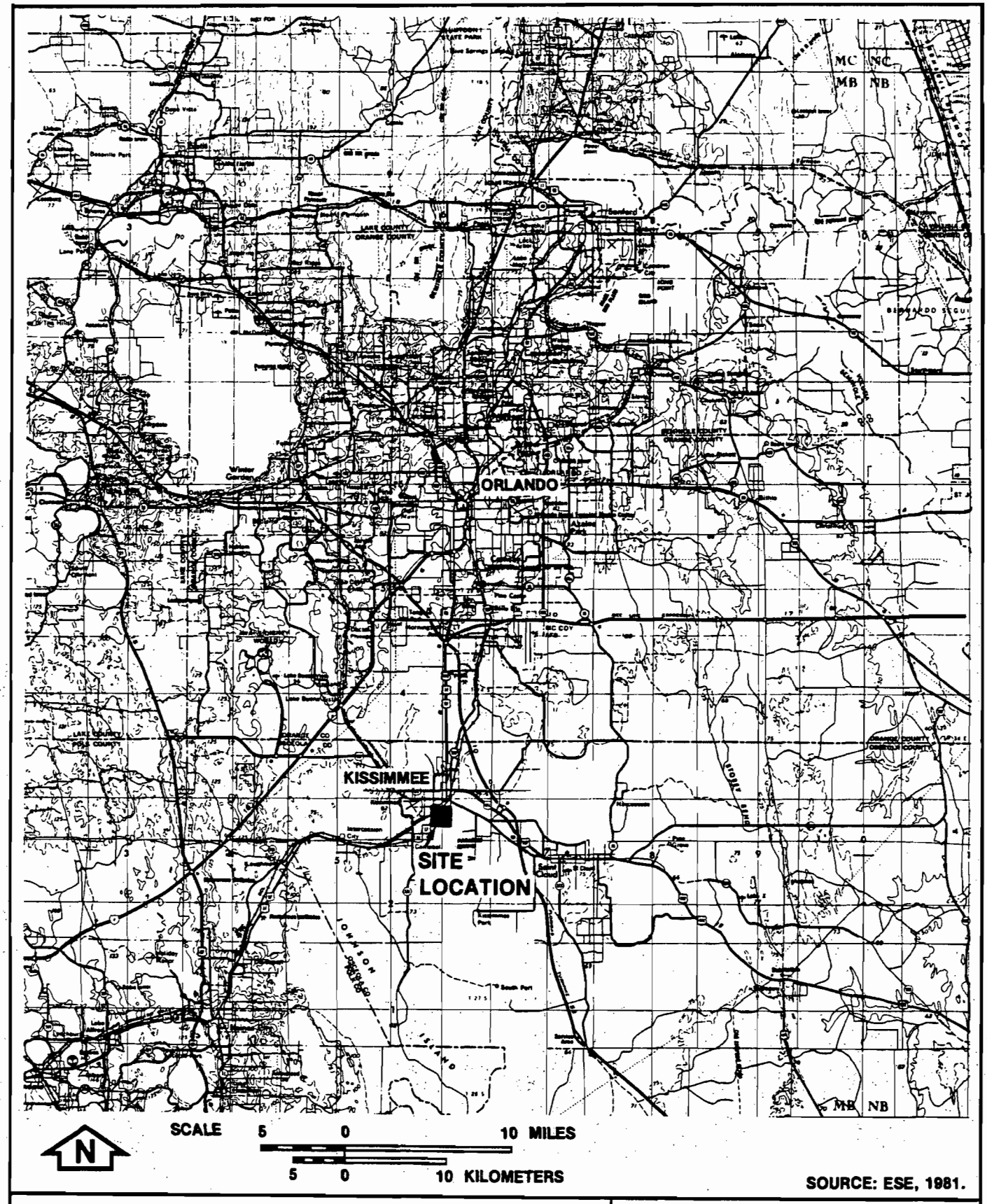


Figure A-1
CITY OF KISSIMMEE AND SURROUNDING AREA

Prepared for:
CITY OF KISSIMMEE

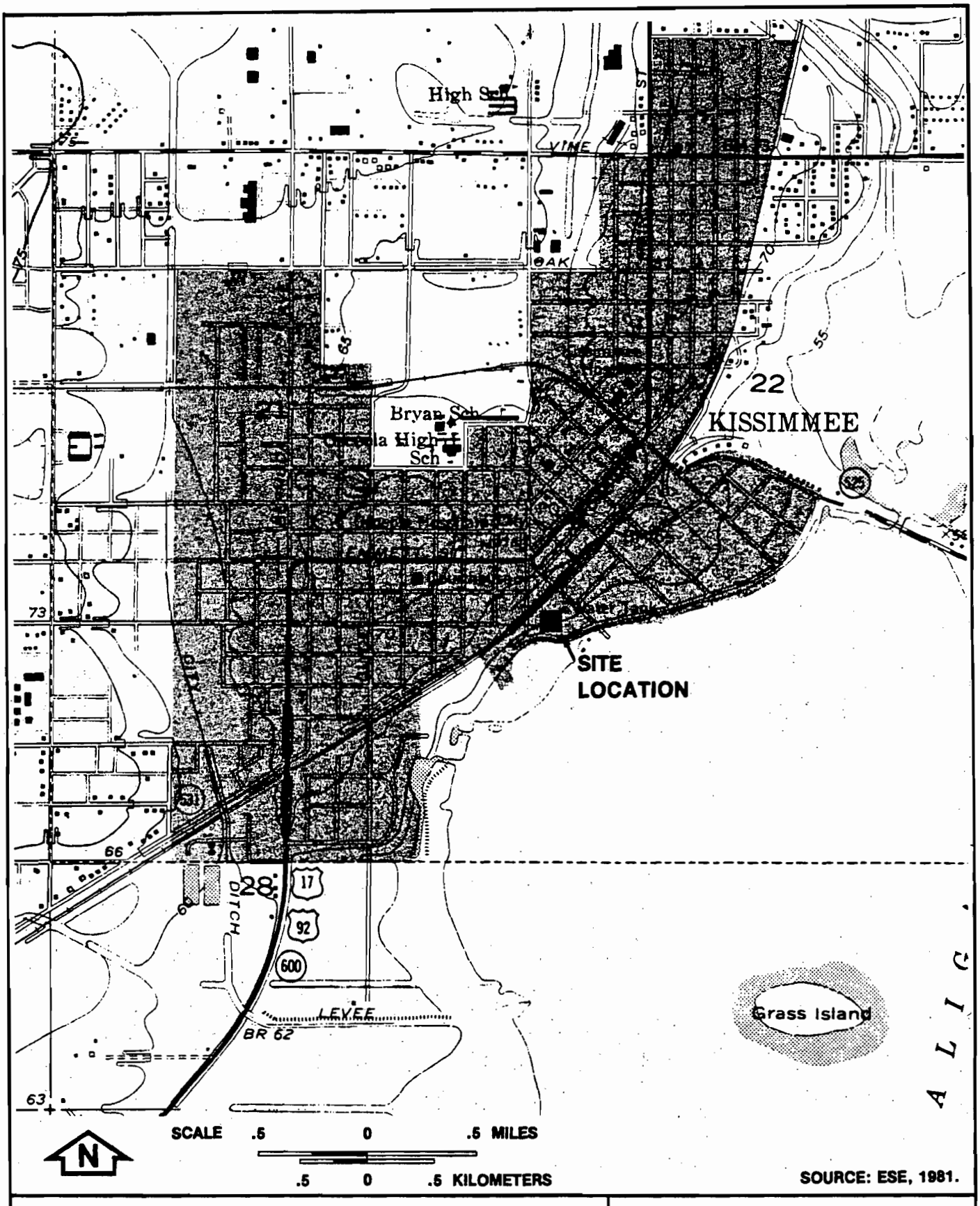


Figure A-2
LOCATION OF KISSIMMEE UTILITIES GENERATING STATION

Prepared for:
CITY OF KISSIMMEE

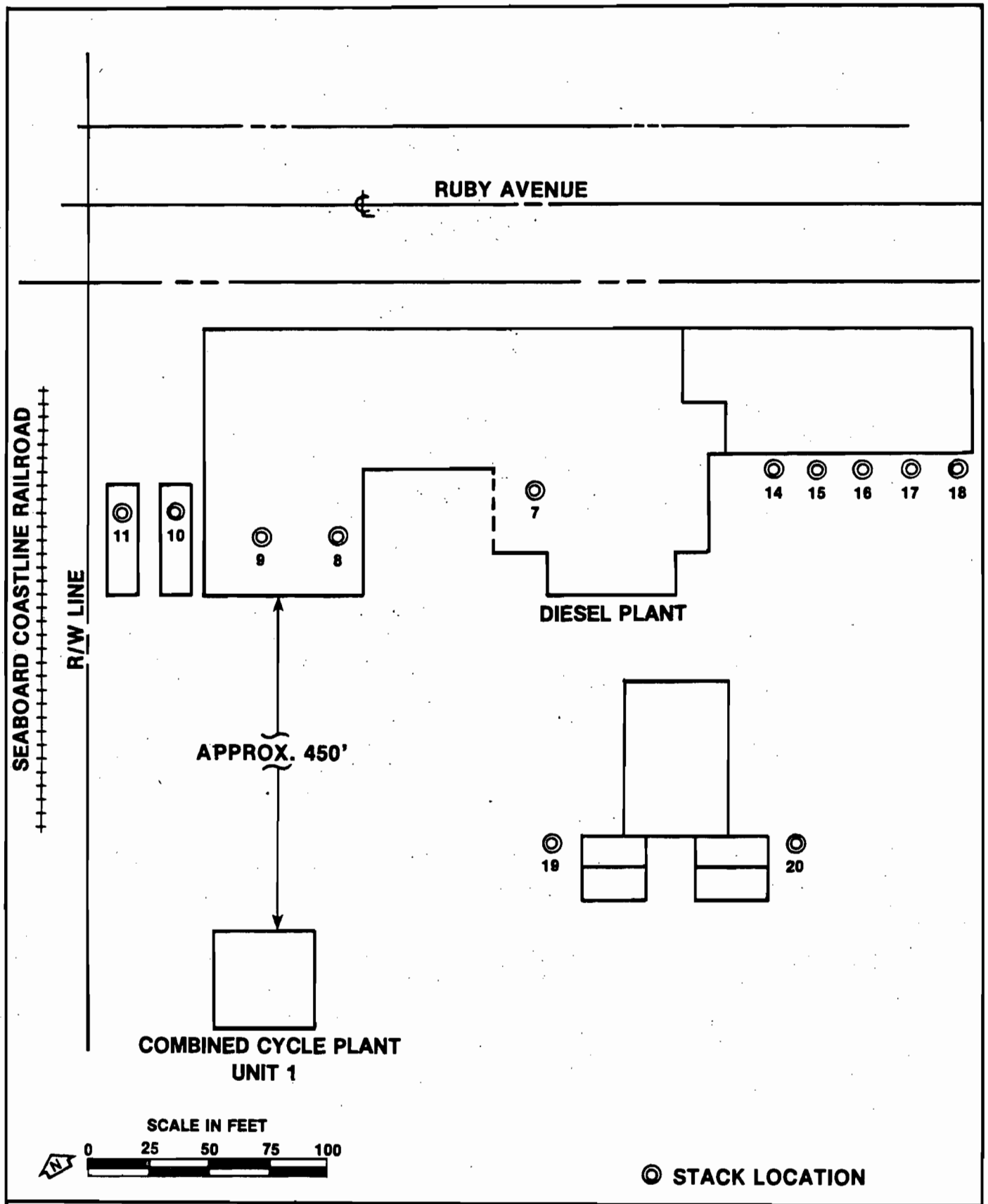


Figure A-3

PLOT PLAN FOR ROY HANSEL GENERATING STATION

SOURCE: KISSIMMEE UTILITIES, 1981.

Prepared For:
CITY OF KISSIMMEE

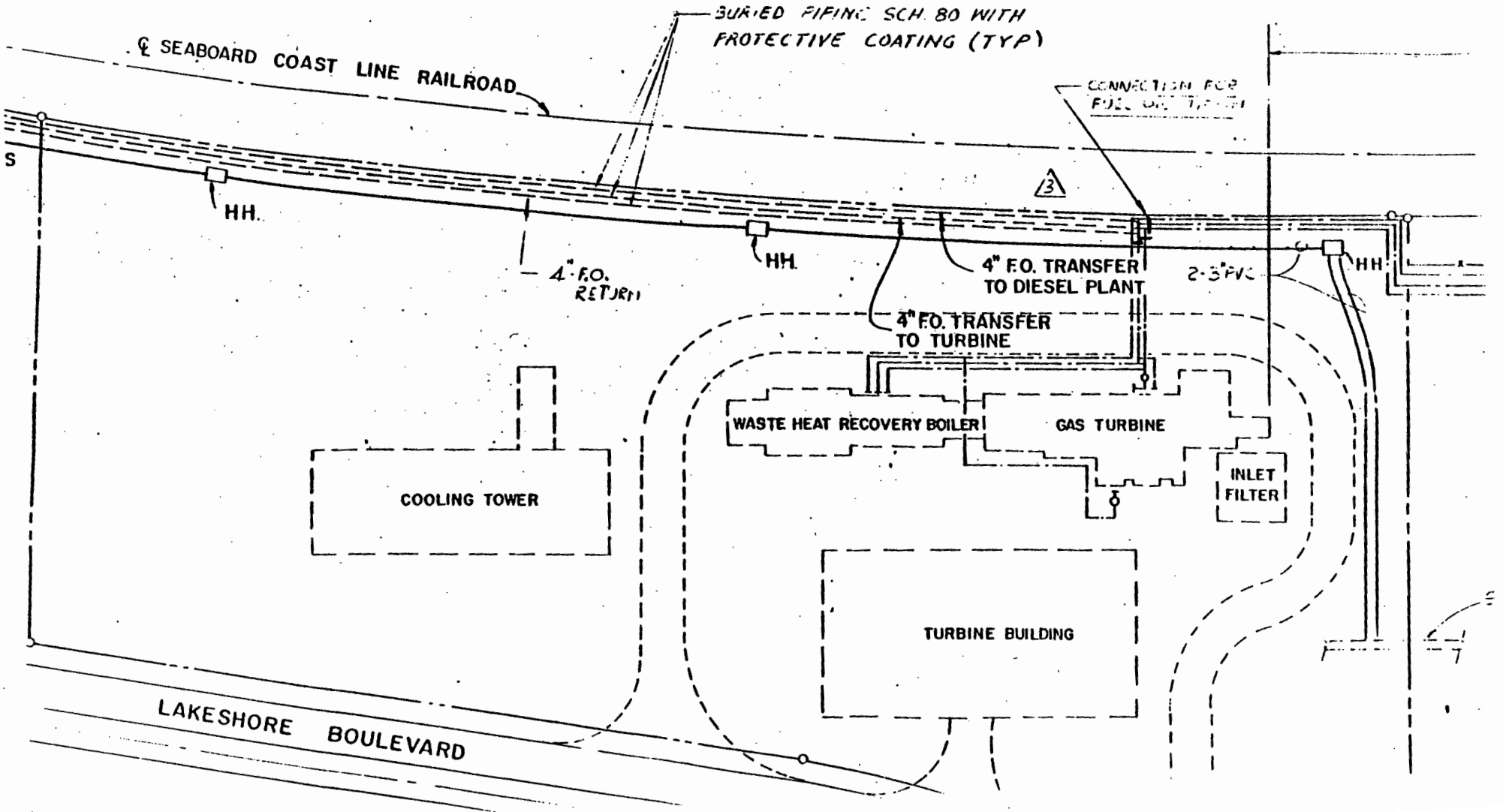
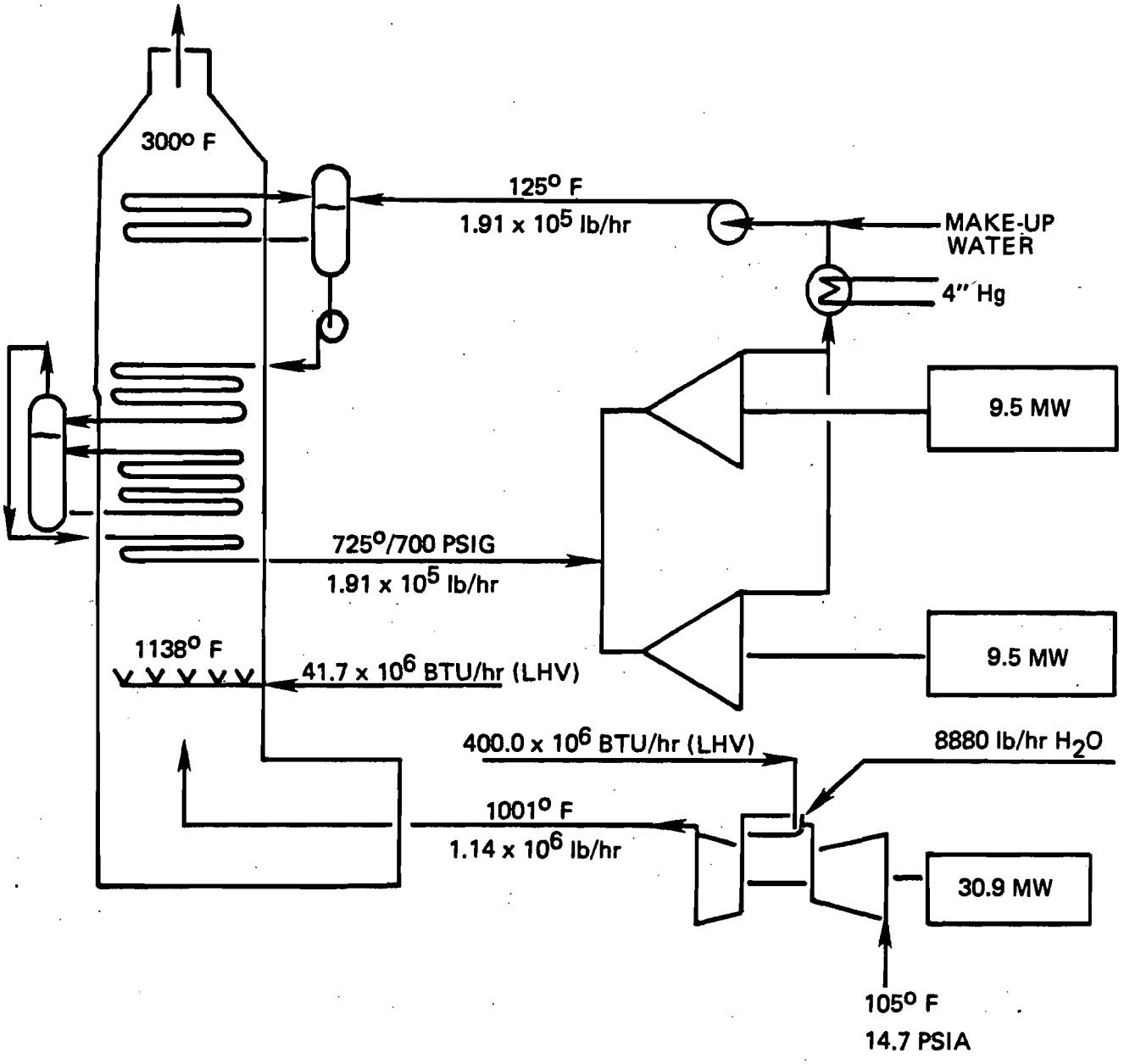


Figure A-4. Plot Plan of New Combined Cycle Unit



$$\text{HEAT RATE (LHV)} = \frac{(41.7 + 400.0)10^6}{(49.9)10^3} = 8852 \text{ BTU/KW-HR (GROSS)}$$

Figure A- 5

SCHEMATIC FLOW DIAGRAM OF COMBINED CYCLE WITH WATER INJECTION

SOURCE: KISSIMMEE UTILITIES, 1981.

Prepared For:
CITY OF KISSIMMEE

PERMIT ATTACHMENT B

EMISSION CALCULATIONS

SYSTEM CONSTANTS (See Figure A-4)

Heat Input to Turbine	400×10^6 Btu/hr (LHV)
Heat Input for Supplemental Heat	41.7×10^6 Btu/hr (LHV)
Heat Rate of Combined Cycle Plant	8,852 Btu/kW-hr (LHV) (9.34 kJ/Watt-hr)
Heat Rate of Gas Turbine Only	12,945 Btu/kW-hr (LHV) (13.66 kJ/Watt-hr)
Water Injected into Turbine	8,880 lb/hr
Total Mass Flow at Turbine Exit	1.14×10^6 lb/hr

ASSUMED FUEL CHARACTERISTICS

NATURAL GAS	
Density	0.049 lb/SCF
Heating Value	1,000 Btu/SCF (HHV); 900 Btu/SCF (LHV)
Water Produced by Combustion at Theoretical Air	1.92 lb H_2O/lb fuel
Theoretical Air	14.7 lb/lb fuel
Excess Air for Supplemental Heating	15%
NO. 2 FUEL OIL	
API Gravity at 60°F	28°
Density	7.4 lb/gal
Heating Value	19,350 Btu/lb (HHV) 18,200 Btu/lb (LHV)
Theoretical Air	14.2 lb/lb fuel
Excess Air for Supplemental Heating	25%
Water Producted by Combustion at Theoretical Air	1.09 lb H_2O/lb fuel
Molecular Weight of Combustion Products	29 lb/lb-mole

NSPS EMISSION LIMITATIONS

SULFUR DIOXIDE	0.015% by volume or $\leq$0.8% fuel sulfur content
NITROGEN OXIDES	$0.0075 \frac{14.4}{Y} + F$ [% by volume]

Y = Manufacturer's rated heat rate at rated load (gas turbine only): 13.66 kJ/Watt-hr

F = Allowance for fuel-bound nitrogen: 0.005 (assume N$\geq$0.25% by weight for worst-case emissions)

$$0.0075 \frac{14.4}{13.66} + 0.005 = 0.0129\%$$

$$= \underline{129 \text{ ppm}}$$

FUEL USAGE AND COMBUSTION GAS RATES--NATURAL GAS

Fuel for Supplemental Heat:

(41.7×10^6) (1 SCF/900 Btu) = 46,300 SCFH
(46,300 SCF/hr)(0.049 lb/SCF) = 2,270 lb/hr

Air for Supplemental Heat @ 115% Theoretical:

(2,269) (14.7) (1.15) = 38,360 lb/hr

Water from Combustion (Supplemental Heat):

(2,270) (1.92) = 4,360 lb/hr

Fuel for turbine:

(400×10^6) (1 SCF/900 Btu) = 444,400 SCFH
(444,400 SCF/hr) (0.049 lb/SCF) = 21,780 lb/hr

Water from Combustion (Turbine):

(21,700) (1.92) = 41,800 lb/hr

Air Supply for Primary Combustion is Determined by System Requirement of 1.14×10^6 lb/hr (39,310 lb-mole/hr) Mass Flow Rate Through Turbine.

Total Mass of Combustion Products =

	1.14×10^6
+	2,270 supplemental fuel
+	38,360 supplemental air
	1,181,000 lb/hr
	(40,700 lb-mole/hr)

Total Mass of Water in Combustion Gases =

4,360	supplemental
41,800	turbine (2,322 lb-mole/hr)
8,880	injection (493 lb-mole/hr)
55,040	lb/hr
(3,060	lb-mole/hr)

Volumetric Flow Rate, $V = \frac{nRT}{P}$

Total Flow at Stack Exit = $\frac{(40,700)\ (1,545.3)\ (760)}{(14.7 \times 144)\ (60)}$ = 376,300 ACFM

Dry Flow at Standard Conditions = $\frac{(40,700 - 3,060)\ (1,545.3)\ (520)}{(14.7 \times 144)\ (60)}$ = 238,000 DSCFM

Gas Flow, Turbine Only, Assumed at 15 percent O_2 = $\frac{(39,310 - 2,322 - 493)(1,545.3)(520)}{(14.7 \times 144)(60)}$ = 230,900 DSCFM

FUEL USAGE AND COMBUSTION GAS RATES--FUEL OIL

Fuel for Supplemental Heat:

(41.7×10^6) (1 lb/18,200 Btu) = 2,290 lb/hr

Air for Supplemental Heat at 125% Theoretical:

(2,290) (14.2) (1.25) = 40,650 lb/hr

Water from Combustion (Supplemental Heat):

(2,290) (1.09) = 2,500 lb/hr

Fuel for Turbine:

(400×10^6) (1 lb/18,200 Btu) = 22,000 lb/hr

Water from Combustion (Turbine):

(22,000) (1.09) = 24,000 lb/hr

Air Supply for Primary Combustion is determined by System Requirement of 1.14×10^6 lb/hr (39,310 lb-mole/hr) Mass Flow Rate Through Turbine.

Total Mass of Combustion Products =

	1.14×10^6
+	2,290 supplemental fuel
+	40,650 supplemental air
	1,183,000 lb/hr
	(40,800 lb-mole/hr)

Total Mass of Water in Combustion Gases =

2,500	supplemental
24,000	turbine (1,333 lb-mole/hr)
8,880	injection (493 lb-mole/hr)
35,400	lb/hr
(1,970	lb-mole/hr)

Volumetric Flow Rate, $V = \frac{nRT}{P}$

Total Flow at Stack Exit = $\frac{(40,800)\ (1,545.3)\ (760)}{(14.7 \times 144)\ (60)}$ = 377,000 ACFM

Dry Flow at Standard Conditions = $\frac{(40,800 - 1,970)\ (1,545.3)\ (520)}{(14.7 \times 144)\ (60)}$ = 246,000 DSCFM

Gas Flow, Turbine Only, Assumed at 15 Percent O_2 = $\frac{(39,310 - 1,333 - 493)(1,545.3)(520)}{(14.7 \times 144)\ (60)}$ = 237,150 DSCFM

BASIS FOR POTENTIAL EMISSIONS

TURBINE: AP-42, Table 3.3.1-2 (See Attachment C)

	Volatile Organics	Carbon Monoxide	Particulate
Gas Fired ($lb/10^6$ ft^3 gas)	42	115	14
Oil Fired ($lb/10^3$ gal oil)	5.57	78.1 lb/hr*	21.2 lb/hr*

SUPPLEMENTAL HEATER: AP-42, Supplement 13, Table 1.3-1 and 1.4-1

Natural Gas ($lb/10^6$ ft^3)	5.8	35	1 to 5
Fuel Oil ($lb/10^3$ gal oil)	0.25	5	2

SULFUR DIOXIDE: Conversion of all sulfur in fuel to SO_2 was assumed.

NITROGEN OXIDES: Based upon actual NO_x emissions and assuming 48 percent removal efficiency by water injection system.

NONCRITERIA POLLUTANTS: Ackerman et al., 1980. Health Impacts, Emissions, and Emission Factors for Noncriteria Pollutants Subject to de minimis Guidelines and Emitted from Stationary Conventional Combustion Processes (see Table 4-4), EPA-450/2-80-074.

	Mercury	Beryllium
Natural Gas ($lb/10^{12}$ Btu)	11.42	Nil
Distillate Oil ($lb/10^{12}$ Btu)	0.91	0.33

* Manufacturer's data used since those estimates were greater than AP-42 estimates.

ANNUAL EMISSIONS (TPY)†

Pollutant	Gas-Fired Turbine	Gas-Fired Supplemental Firing	Gas-Fired Total	Fuel-Oil Fired Turbine	Fuel-Oil Fired Supplemental Firing	Fuel-Oil Fired Total	PSD Significant Emission Rate*
Potential NO_x††	1877	28	1905	1927	27	1954	—
Actual NO_x	976**	28	1004	1002**	27	1029	40
Hydrocarbons (as CH_4)	82	1	83	73	<1	73	40
Carbon Monoxide	224	7	231	342	7	349	100
Particulate	27	1	28	93	3	96	25
Sulfur Dioxide†††	19	2	21	1,542	160	1,702	40
Mercury	0.02	—	0.02	0.002	—	0.002	0.01
Beryllium	—	—	—	0.0006	—	0.0006	0.0004

† Assumes 8,760 hr/yr operation.

* Federal Register, Vol. 45, No. 154, 1980.

†† Based upon actual NO_x emissions and assuming 48 percent removal in turbine by water injection system.

** Based upon turbine gas flow rate and 129 ppm NO_x, according to the following equation:
(DSCFM) (166 ppm) (2,000 ug/m^3-ppm) (0.0283 m^3/ft^3) (10^{-6} g/ug)
(60 min/hr) (8,760 hr/yr) (1 lb/454 g) (1 ton/2,000 lb).

††† Assumed that natural gas has 0.01 percent sulfur content. Fuel oil calculation based on total conversion of 0.8 percent sulfur oil.

NOTE: Emission rates assume continuous firing of 100 percent gas or 100 percent fuel oil.

Potential and maximum emissions in Section IIIC are reported as the greater of the two fuels. Actual emissions are based on gas combustion.

PERMIT ATTACHMENT C

CONTROL TECHNOLOGY

3.3 OFF-HIGHWAY STATIONARY SOURCES

In general, engines included in this category are internal combustion engines used in applications similar to those associated with external combustion sources (see Chapter 1). The major engines within this category are gas turbines and large, heavy-duty, general utility reciprocating engines. Emission data currently available for these engines are limited to gas turbines and natural-gas-fired, heavy-duty, general utility engines. Most stationary internal combustion engines are used to generate electric power, to pump gas or other fluids, or to compress air for pneumatic machinery.

3.3.1 Stationary Gas Turbines for Electric Utility Power Plants

3.3.1.1 General — Stationary gas turbines find application in electric power generators, in gas pipeline pump and compressor drives, and in various process industries. The majority of these engines are used in electrical generation for continuous, peaking, or standby power.[1] The primary fuels used are natural gas and No. 2 (distillate) fuel oil, although residual oil is used in a few applications.

3.3.1.2 Emissions — Data on gas turbines were gathered and summarized under an EPA contract.[2] The contractor found that several investigators had reported data on emissions from gas turbines used in electrical generation but that little agreement existed among the investigators regarding the terms in which the emissions were expressed. The efforts represented by this section include acquisition of the data and their conversion to uniform terms. Because many sets of measurements reported by the contractor were not complete, this conversion often involved assumptions on engine air flow or fuel flow rates (based on manufacturers' data). Another shortcoming of the available information was that relatively few data were obtained at loads below maximum rated (or base) load.

Available data on the population and usage of gas turbines in electric utility power plants are fairly extensive, and information from the various sources appears to be in substantial agreement. The source providing the most complete information is the Federal Power Commission, which requres major utilities (electric revenues of $1 million or more) to submit operating and financial data on an annual basis. Sawyer and Farmer[3] employed these data to develop statistics on the use of gas turbines for electric generation in 1971. Although their report involved only the major, publicly owned utilities (not the private or investor-owned companies), the statistics do appear to include about 87 percent of the gas turbine power used for electric generation in 1971.

Of the 253 generating stations listed by Sawyer and Farmer, 137 have more than one turbine-generator unit. From the available data, it is not possible to know how many hours *each* turbine was operated during 1971 for these multiple-turbine plants. The remaining 116 (single-turbine) units, however, were operated an average of 1196 hours during 1971 (or 13.7 percent of the time), and their average load factor (percent of rated load) during operation was 86.8 percent. This information alone is not adequate for determining a representative operating pattern for electric utility turbines, but it should help prevent serious errors.

Using 1196 hours of operation per year and 250 starts per year as normal, the resulting average operating day is about 4.8 hours long. One hour of no-load time per day would represent about 21 percent of operating time, which is considered somewhat excessive. For economy considerations, turbines are not run at off-design conditions any longer than necessary, so time spent at intermediate power points is probably minimal. The bulk of turbine operation must be at base or peak load to achieve the high load factor already mentioned.

If it is assumed that time spent at off-design conditions includes 15 percent at zero load and 2 percent each at 25 percent, 50 percent, and 75 percent load, then the percentages of operating time at rated load (100 percent) and peak load (assumed to be 125 percent of rated) can be calculated to produce an 86.8 percent load factor. These percentages turn out to be 19 percent at peak load and 60 percent at rated load; the postulated cycle based on this line of reasoning is summarized in Table 3.3.1-1.

Table 3.3.1-1. TYPICAL OPERATING CYCLE FOR ELECTRIC UTILITY TURBINES

Condition, % of rated power	Percent operating time spent at condition	Time at condition based on 4.8-hr day		Contribution to load factor at condition
		hours	minutes	
0	15	0.72	43	0.00 x 0.15 = 0.0
25	2	0.10	6	0.25 x 0.02 = 0.005
50	2	0.10	6	0.50 x 0.02 = 0.010
75	2	0.10	6	0.75 x 0.02 = 0.015
100 (base)	60	2.88	173	1.0 x 0.60 = 0.60
125 (peak)	19	0.91	55	1.25 x 0.19 = 0.238
		4.81	289	Load factor = 0.868

The operating cycle in Table 3.3.1-1 is used to compute emission factors, although it is only an estimate of actual operating patterns.

The operating cycle in Table 3.3.1-1 is used to compute emission factors, although it is only an estimate of actual operating patterns. Table 3.3.1-2 is the resultant composite emission factors based on the operating cycle of Table 3.3.1-1 and the 1971 population of electric utility turbines.

Different values for time at base and peak loads are obtained by changing the total time at lower loads (0 through 75 percent) or by changing the distribution of time spent at lower loads. The cycle given in Table 3.3.1-1 seems reasonable, however, considering the fixed load factor and the economies of turbine operation. Note that the cycle determines *only* the importance of each load condition in computing composite emission factors for each type of turbine, *not* overall operating hours.

The top portion of Table 3.3.1-2 gives separate factors for gas-fired and oil-fired units. and the bottom portion gives fuel-based factors that can be used to estimate emission rates when overall fuel consumption data are available. Fuel-based emission factors on a mode basis would also be useful, but present fuel consumption data are not adequate for this purpose.

3.3.1.3 Nitrogen Oxide Control[4,5]—Nitrogen oxide emissions from gas turbines are reduced by injecting water or steam into the primary flame zone of the combustion system. Moisture is added to the fuel or combustion air, or is injected directly into the combustion chamber. The addition of water limits the combustion temperature and thereby controls the formation of nitrogen oxide.

Water and steam injection rates, commonly expressed as a water-to-fuel ratio (by weight), have an effect on turbine efficiency. Injection of water and fuel with a ratio of 1 *reduces* gas turbine efficiency by approximately 1 percent. Injection of steam at the same ratio *increases* efficiency by 1 percent. For a combined-cycle turbine using steam from the waste-heat boiler, there is an overall reduction in efficiency of 1 percent at a steam/fuel injection ratio of 1. The incremental effectiveness of injecting either steam or water is sharply reduced at water/fuel ratios above 1. Table 3.3.1-3 gives average percentages of nitrogen oxide emission reduction for various water-to-fuel ratios.

Another possible means of controlling nitrogen oxide emissions is the modification of operations and system designs to include catalysts in the combustion and catalytic cleaning in the exhaust stream. These improvements, still in the experimental stage, would be used in addition to the water-injection methods.

Table 3.3.1-2. COMPOSITE EMISSION FACTORS FOR 1971 POPULATION OF ELECTRIC UTILITY TURBINES
EMISSION FACTOR RATING: B

Time basis	Nitrogen oxides	Organics (CH^4)	Carbon Monoxide	Particulate	Sulfur oxides
Entire population					
lb/hr rated load[a]	8.84	0.79	2.18	0.52	0.33
kg/hr rated load	4.01	0.36	0.99	0.24	0.15
Gas-fired only					
lb/hr rated load	7.81	0.79	2.18	0.27	0.098
kg/hr rated load	3.54	0.36	0.99	0.12	0.044
Oil-fired only					
lb/hr rated load	9.60	0.79	2.18	0.71	0.50
kg/hr rated load	4.35	0.36	0.99	0.32	0.23
Fuel basis					
Gas-fired only					
lb/10^6 ft^3 gas	413.	42.	115.	14.	940S[b]
kg/10^6 m^3 gas	6615.	673.	1842.	224.	15,000S
Oil-fired only					
lb/10^3 gal oil	67.8	5.57	15.4	5.0	140S
kg/10^3 liter oil	8.13	0.668	1.85	0.60	16.8S

[a] Rated load expressed in megawatts.

[b] S is the percentage sulfur. Example: If the factor is 940 and the sulfur content is 0.01 percent, the sulfur oxides emitted would be 940 times 0.01, or 9.4 lb/10^6 ft^3 gas.

Table 3.3.1-3. PERCENT REDUCTION OF NO_x EMISSIONS FROM WATER OR STEAM INJECTION[a]

EMISSION FACTOR RATING: B

Water-to-fuel ratio	Percent reduction of NO_x emissions
0.2	28
0.4	48
0.6	63
0.8	73
1.0	79
1.2	84
1.4	88
1.6	90
1.8	92
2.0	92

[a] Not corrected for efficiency variations.

References for Section 3.3.1

1. O'Keefe, W. and R. G. Schwieger. Prime Movers. *115*:522-531, November 1971.

2. Hare, C. T. and K. J. Springer. Exhaust Emissions from Uncontrolled Vehicles and Related Equipment Using Internal Combustion Engines, Final Report, Part 6: Gas Turbine Electric Utility Power Plants. Southwest Research Institute, San Antonio, Tx. Prepared for U.S. Environmental Protection Agency, Research Triangle Park, N.C., under Contract No. EHS 70-108. February 1974.

3. Sawyer, V. W. and R. C. Farmer. Gas Turbines in U.S. Electric Utilities. Gas Turbine International. January-April 1973.

4. Durkee, K. R., E. A. Noble, and R. Jenkins. An Investigation of the Best Systems of Emission Reduction for Stationary Gas Turbines — Standards Support and Environmental Impact Statement. U.S. Environmental Protection Agency, Research Triangle Park, N.C. Publication No. EPA-450/2-77-017a. 1977.

5. Control Techniques for Nitrogen Oxide Emissions from Stationary Sources. Acurex Corporation, Aerotherm Division. Prepared for U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, N.C. Contract No. 68-02-2611. Publication No. EPA-450/1-78-001. January 1978.

Westinghouse
Electric Corporation

Power Generation
Group

Combustion Turbine
Systems Division

Box 251
Concordville Pennsylvania 19331

July 22, 1981

Mr. M. H. Dybevick
Environmental Science and
Engineering
P. O. Box E.S.E.
Gainsville, Florida 32602

Dear Mr. Dybevick:

In response to your request regarding the City of Kissimee, we are enclosing the following information on water injection in combustion turbines:

1. One-page summary

2. Write-up from Instruction Book I.B. 50-114A (5 pages)

3. Schematic (2 pages)

4. Cutaway of nozzle PDL-15A. Note: Water injection would be made through the atomizing air port in the cutaway.

We hope this information is what you want. If any additional details are desired, please let us know.

Sincerely,

Dale Stephenson
CTSD Marketing

cc: W Jacksonville, Fla Ofc - D. Goodling

CTSD 180 - R. L. Wolfinger

W-501 WATER INJECTION SYSTEM

Each combustion turbine can be equipped with an automatic water injection system. The water used in the system must be relatively free from contaminants. (The total contaminants of the fuel and water must be below a specified limit. Please refer to the section on fuel treatment for allowable contaminant levels). The injection system is started automatically by the combustion turbine control system when the generator breaker closes. When water pressure reaches a sufficient level, the water injection pump pressure switch opens the water isolation valve allowing the water to flow to the combustors through the air atomization piping network. (The air atomization network is used only during starting and the nozzles are located in precisely the correct location in the combustor for maximum water injection benefit). The air and water systems are separated by a series of check valves in appropriate places to prevent potential water contamination in the plant compressed air system and to prevent backflow from the combustion turbine. The amount of water injected is a function of load and is regulated by means of an analog control signal from the Control System and feedback signal from the water flowmeter.

1.9 WATER INJECTION SYSTEM W-501 COMBUSTION TURBINE

The Water Injection System is provided for the purpose of reducing NO_x (Oxides of Nitrogen) in the combustion turbine exhaust gases. The level of NO_x emissions is proportional to combustion turbine power output. The system is shown schematically in Figure 1.

Water of proper quality and free of contaminants, supplied by the customer, enters into the system through a strainer (Item 1) and then to a three phase, 460 VAC motor driven centrifugal pump (Item 2). The high pressure water passes through a filter (Item 3) and continues through a flowmeter (Item 4), water control valve (Item 5), and isolation valve (Item 6). The control valve regulates the flow as a function of load using the flowmeter as a feedback signal to the controller (Item 7). The water isolation valve provides redundant and positive shut-off protection. Redundant check valves (Item 8), downstream of the water isolation valve, prevents backflow from the turbine. The water is pumped through the atomizing air manifold (Item 9), and into the turbine combustion system via the atomizing air nozzle passages. Two check valves (Item 10, 11) for redundancy, are provided in the atomizing air line to prevent water from entering the compressed air supply (Item 12). A water drain valve (Item 13), is provided, which has a delayed opening during turbine shutdown, to drain water from the air/water manifold. An atomizing air purge valve (Not associated with water injection), (Item 14), opens with the closure of the atomizing air isolation/regulation valve to provide continuous purge of the nozzle air passages during turbine run. The purge valve must be closed during water injection to prevent water from backflowing into the purge air line. A high pressure selector valve (Item 15) (located in the pressure switch and gauge cabinet) passes signal air to the purge valve when atomizing air or water injection is used.

Combustion switch/lamps are located on the operator's panel decaled WATER INJEC ON and WATER INJEC OFF. The selection is made by the operator any time before starting or during turbine operation. If the choice is to use water injection, the system is started automatically by the controller when the generator breaker closes. A CCO to the water pump motor starter closes, thus energizing the motor and starting the water pump. The water injection pump discharge pressure switch, 63-WI, reads pump pressure and activates at a set operating level - opening the water injection isolation valve and closing the purge system valve, via solenoid valve 20-WI located in the Pressure Switch and Gauge Cabinet. If 63-WI does not activate within 15 seconds, the water pump motor will be de-energized. The pump motor will also be de-energized if 63-WI is de-activated when the system is running in a steady state condition.

NOTE

If the pump shuts down due to an abnormal condition, a pushbutton switch on the water injection panel of the motor control center must be pressed to reset the system before the next starting attempt.

The water isolation valve is equipped with a limit switch which indicates an open or closed valve. The limit switch is wired to the Control System as a CCI and gives an alarm signal, WATER INJECTION TROUBLE, when it is in the wrong position for the turbine operating condition.

When the CCO to the water pump motor starter is closed, the Control System generates an analog signal voltage as a function of MW load. This analog output is transmitted to the controller via the water isolation valve limit switch. The limit switch prevents the analog signal from opening the water control valve until the isolation valve is open. When the isolation valve is open, a pneumatic controller (Item 7) compares the analog signal with the flowmeter feedback signal and changes the position of the water control valve accordingly.

The analog signal feeds into a voltage to pressure transducer (Item 16) and then through a high limit relay (Item 17) (Limits control signal as a function of maximum system water flow) before

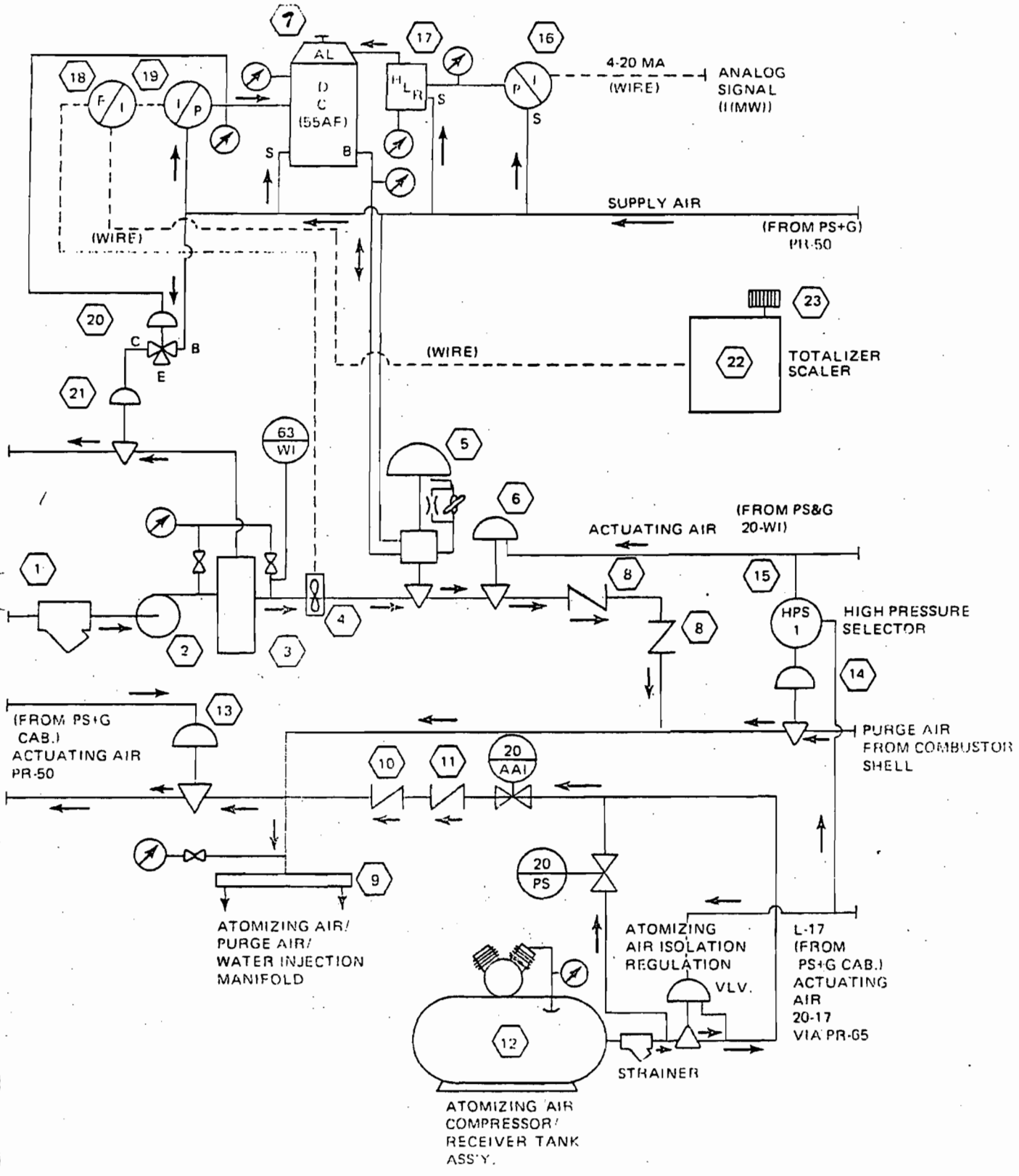


Figure 1. Water Injection System Schematic

input to the controller. The flow meter feedback circuit consists of a frequency to current transducer (Item 18) into a current pressure transducer (Item 19) before input to the other side of the controller.

The flowmeter feedback signal is also directed to a totalizer scaler (Item 22) installed in the control package. The totalizer processes the signal to advance the counter (Item 23) which indicates the total of water used.

A three-way pressure operated pilot valve (Item 20), receiving its signal pressure from the flowmeter input, closes at a pre-set pressure (approximately with generator breaker closure) directing actuating air to the customer water return valve (Item 21) closing it, thus diverting full water injection system flow to the turbine instead of back to the customer water supply tank.

During shutdown, simultaneous with closing of the fuel valve, two solenoid valves 20-PS and 20-AA1, are opened and the purge valve (Item 14) is closed. This will allow a high pressure surge of air to pass through the water injection manifold and fuel nozzles to clear them. Residual fuel in the nozzle will also be eliminated. After a short time interval, the solenoid valves are closed. Then the water drain valve (Item 13) is opened to keep the piping clear.

The water injection system will shut down if:

1) Pressure switch 63/WI (water pump discharge pressure) deactivates with loss of pressure.

2) The blade path thermocouple spread exceeds a specified limit.

3) The blade path thermocouple average is below a specified limit.

NOTE

When either 2 or 3 (above) occur, the operator can manually reset and restart the water injection system two times in a one-hour period.

The water isolation valve will close if:

1) The overspeed trip relay is not set.

2) Pressure switch 63/WI is open.

3) When a turbine shutdown occurs, the water isolation valve closes simultaneously with the fuel overspeed trip valve, and the water system is automatically de-energized.

SYSTEM COMPONENTS

Components of this system and their function are as follows:

STRAINER

This coarse strainer at the entrance of the system keeps foreign objects from entering the water injection pump.

WATER INJECTION PUMP

This is a high-speed centrifugal type pump driven by a 60 HP, 460 VAC, 3-phase, 60 Hz motor with a normal speed of 3500 rpm. A step-up gearbox is used to increase motor speed. The maximum pump capability is 136 gpm at 393 psig. Minimum inlet pressure is 15 psig which must be supplied by customer. The minimum discharge flow of 36 gpm is necessary to prevent overheating the pump.

FILTER

This is a 50 micron fibrous-medium cartridge filter that removes particles to protect the flowmeter, control valves, and turbine nozzles.

FLOWMETER

This fluidic-type meter has no moving parts. It generates an electronic pulse that is sent to frequency-to-current converter. The flow meter output varies linearly with rate of flow.

CONTROL VALVE

This is a diaphragm type, plug valve that controls water flow to the turbine. The valve is pneumatically actuated by a signal from the controller located in the control box to limit water flow.

ISOLATION VALVE

This is a pneumatically-operated diaphragm, plug-type valve that is opened when the generator breaker is closed and closes when breaker opens. Actuating air is supplied through solenoid valve, 20-WI, in pressure switch and gauge cabinet. A limit switch will cause an alarm should the valve close during turbine operation.

CHECK VALVES

A check valve on the water injection skid and one on the turbine are located in series with isolation valve to prevent pressurized air from entering water system. Redundant check valves are installed on the atomizing air line to prevent water from entering the air system.

BYPASS VALVE

This is a pneumatically-operated diaphragm valve to allow a minimum water flow through the pump. The valve is controlled by a pilot valve and water is returned to storage. The bypass valve is closed when turbine water requirements are above minimum pump flow.

HIGH LIMIT RELAY

This pneumatic relay, located in control box, limits the water flow to a maximum preset value.

TRANSDUCER, CURRENT-TO-PRESSURE

This transducer, located in control box, converts the independent analog signal to a pressure signal that is fed to controller.

CONTROLLER

This pneumatic pressure controller, located in control box, has proportional and reset control. The output signal determines position of control valve. The signal is a result of two inputs; one feeding back from flow meter and the other originating from the controller. The analog signal is a function of generator megawatts.

TOTALIZER SCALER AND COUNTER

This monitor is mounted on the control box. The totalizer is calibrated to output one pulse per gallon to a digital counter which indicates total flow.

PRESSURE SWITCH, 63-WI

A pressure switch is located on the water injection skid to shut down pump should discharge pressure fall below set limit.

SOLENOID VALVE, 20/AA1

This solenoid valve is located in the mechanical package on the atomizing air piping to permit passage of air into the water injection system to atomize fuel during starts and to purge residual water and fuel during shutdown.

SOLENOID VALVE, 20/PS

This solenoid valve is located in the mechanical package. It is activated during shutdown along with valve, 20/AA1, to allow a surge of high pressure air of short duration to pass through the water injection manifold and fuel nozzles.

WATER DRAIN VALVE

A pneumatically controlled valve is located on the turbine in the line to the manifold that supplies atomizing air, purge air, and water to the fuel nozzles. The valve is closed during all turbine operation and opened at shutdown, after the line purge sequence, to drain any water that may remain.

P.S.&G. CABINET

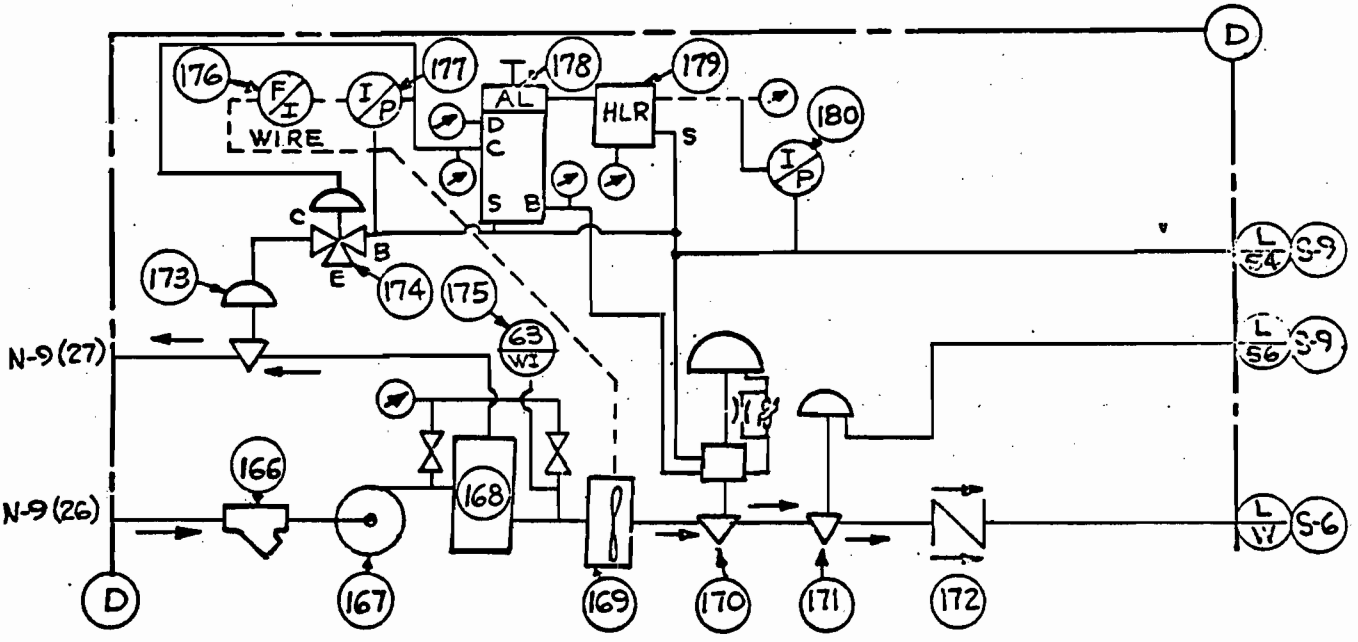
The following components are located in the pressure switch and gauge cabinet:

REGULATOR PR-50

This valve functions as an air pressure limiting device in the air supply to the water injection skid. The regulated air is also used to close the water drain valve on the turbine.

WATER INJECTION ISOLATION VALVE AIR SOLENOID VALVE 20/WI

This valve is opened to pass control air to the isolation valve while water injection is used.

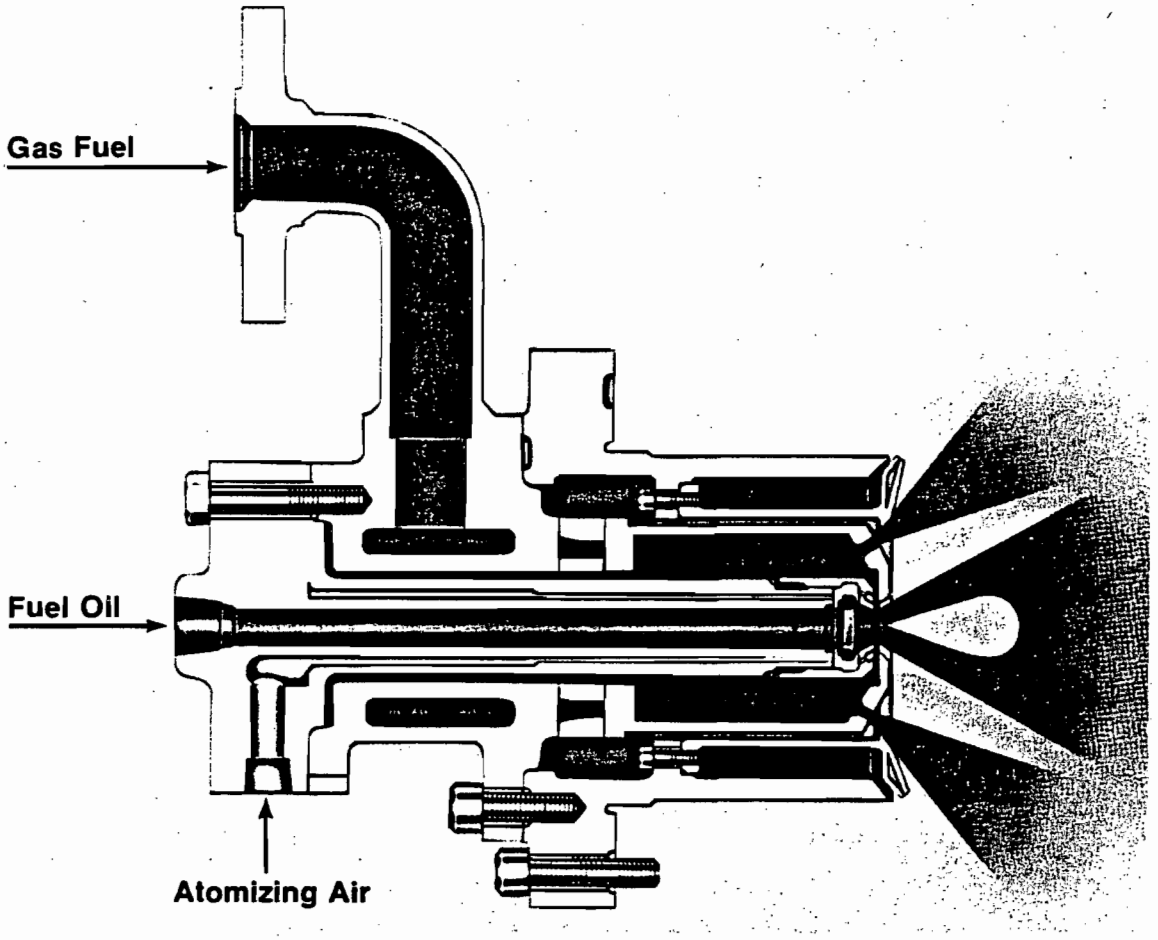


WATER INJECTION SYSTEM

WATER INJECTION

166. Strainer
167. Centrifugal Pump
168. Filter
169. Flow Meter
170. Control Valve

171. Isolation Valve
172. Check Valve
173. Water Return Valve
174. Water Return Valve - Pilot Valve Actuator
175. Pressure Switch - 63WI
176. Transducer - Frequency to Current
177. Transducer - Current to Pressure
178. Controller - Type 55AF
179. High Limit Relay
180. Transducer - Current to Pressure


Gas Fuel
Fuel Oil
Atomizing Air

MEMORANDUM

DATE: July 31, 1983

TO: James C. Welsh, Electric Utilities Director

FROM: O. Sam Ackley, City Manager

SUBJECT: Signature Authorization

COPY:

The purpose of this memorandum is to authorize you to act in my behalf in requesting operation permits for the generating units at the Kissimmee Power Plant. Your signature on permit applications will be binding with the City management.

O. Sam Ackley
City Manager

/pf

PERMIT ATTACHMENT D

PREVIOUS EPA BACT DETERMINATIONS

BACT/LAER CLEARINGHOUSE REPORT

(3.0)

SOURCE TYPE/SIZE: Pipeline Pump Station/13,500 hp

NAME/ADDRESS: Alaska Pipeline Service Company, Anckorage, Alaska

DETERMINATION DATA: CONDITIONAL/(FINAL)/PENDING for BACT/LAER on (NEW)/MODIFIED SOURCE
KEY DATES: Application-Recd._____, Completed_____; Determination-Proposed_____, Final 9/18/79

BY: (Agency) EPA Region X Person Paul Boys Phone_____

AFFECTED FACILITIES	THROUGHPUT CAPACITY	EMISSION RATE,* -UNCONTROLLED	EMISSION LIMITS (Basis)**	CONTROL STRATEGY DESCRIPTION Equipment type, etc.	Eff. %
Pump Turbines (2)	13,500 hp each	NOx	0.0150 $(\frac{14.4}{Y})+F^{@}$ (B) % by volume	Dry controls	

SOURCE OPERATION: BATCH/CONTINUOUS: _____ hrs/yr; % by Season W____ Sp____ Su____ F____

NOTES: Y = manufactures rated heat rate @ peak load -(see subpart GG of NSPS)
F = emission allowance for fuel bound nitrogen

* Specify pollutant (PM, SO_2, NO_x, HC, CO or other) and mass emission rate

** Basis symbols: Use B = BACT, N = NSPS, S = SIP, A = Achieved-in-Practice (AIP)

Rev. 5/80

D-1

BACT/LAER CLEARINGHOUSE REPORT

3.0

SOURCE TYPE/SIZE: Power production

NAME/ADDRESS: Puget Power Ferndale, WA.

DETERMINATION DATA: CONDITIONAL/(FINAL)/PENDING for BACT/LAER on NEW/(MODIFIED) SOURCE
KEY DATES: Application-Recd. _____, Completed _____; Determination-Proposed _____, Final 9/7/79
BY: (Agency) EPA Region X Person Paul Boys Phone _____

AFFECTED FACILITIES	THROUGHPUT CAPACITY	EMISSION RATE* -UNCONTROLLED	EMISSION LIMITS (Basis)**	CONTROL STRATEGY DESCRIPTION Equipment type, etc.	Eff.
Gasturbines	2 074.8MN*	NOx	75 ppm (B)	waterinjection	
		SO_2	150 ppm @15% 02 (B)	0.870 S maxin fuel	
		PM	10% opacity (B)	limited fuel ash content	

SOURCE OPERATION: BATCH/CONTINUOUS: _____ hrs/yr; % by Season _____ (W) _____ (Sp) _____ (Su) _____ (F)

NOTES: * = baseload

* Specify pollutant (PM, SO_2, NO_x, HC, CO or other) and mass emission rate

** Basis symbols: Use B = BACT, N = NSPS, S = SIP, A = Achieved-in-Practice (AIP)

Rev. 5/80

BACT/LAER CLEARINGHOUSE REPORT

(3.0)

SOURCE TYPE/SIZE: Gas turbine generators/179 MW total

NAME/ADDRESS: Puget Power Frederickson, WA

DETERMINATION DATA: CONDITIONAL/(FINAL)/PENDING for BACT/LAER on (NEW)/MODIFIED SOURCE
KEY DATES: Application-Recd._____, Completed_____; Determination-Proposed_____, Final 6/24/80

BY: (Agency) EPA Region X Person Paul Boys Phone_____

AFFECTED FACILITIES	THROUGHPUT CAPACITY	EMISSION RATE* -UNCONTROLLED	EMISSION LIMITS (Basis)**	CONTROL STRATEGY DESCRIPTION Equipment type, etc.	Eff. %
Combustion	89.5 MW	NOx	75 ppm@15% O2 (B)	Water injection	
Turbines (2)	(each - peak)	SO_2	150 ppm@15% O2 (N)	Low S fuel	

SOURCE OPERATION: BATCH/CONTINUOUS: _____ hrs/yr; % by Season W____ Sp____ Su____ F____

NOTES:

* Specify pollutant (PM, SO_2, NO_x, HC, CO or other) and mass emission rate

** Basis symbols: Use B = BACT, N = NSPS, S = SIP, A = Achieved-in-Practice (AIP)

BACT/LAER CLEARINGHOUSE REPORT

SOURCE TYPE/SIZE: Approximately 513 MW Combined Cycle Electric Generation Facility

NAME/ADDRESS: Stony Brook Energy Center, Mass Municipal Wholesale Electric Co., Ludlow, Massachusetts

DETERMINATION IS: CONDITIONAL/FINAL/~~PENDING~~ ISSUED on _____ (date), BASIS* of BACT[1]/LAER/BAC
for NEW/MODIFIED SOURCE

BY U.S. EPA - Region I (Agency) Linda Murphy (Person) FTS 223-4448 (Phon

PERMIT PARAMETERS: AFFECTED FACILITIES	THROUGHPUT CAPACITY (Weight Rate)	POLLUTANT(s) EMITTED	EMISSION LIMIT(s) and (basis for)**	CONTROL STRATEGY DESCRIPT Equipment Type, Etc.	Ef
Gas Turbines	2 simple cycles @	SO_2		- 0.30% S #2 fuel oil * B	
	85 MW each	Particulates	- 0.040 lbs/MM Btu * S		
	3 combined cycle	NO_x	- 0.0075% by volume @15%O.		
	@ 85 MW each		on a dry basis * N		
Steam Turbine	approx. 100 MW				

NOTES:

* Circle one. BACT[1] means a determination made under pre-1977 amendments; BACT[2] means post-1977 amendments to CAA.

** Basis symbols: Use B=BACT, N=NSPS, S=SIP, L=LAER

PREVENTION OF SIGNIFICANT DETERIORATION (PSD) REPORT

FOR THE PROPOSED COMBUSTION TURBINE

AT KISSIMMEE UTILITIES, OSCEOLA COUNTY, FLORIDA

1.0 INTRODUCTION

Kissimmee Utilities (KU) currently operates 12 diesel generating units with a total output rated at 26.8 megawatts (MW). The proposed plant is a combined cycle combustion turbine/steam generator, with a total net generating capacity of 46.5 MW and a gross generating capacity of 49.9 MW. The turbine will be fired with natural gas; No. 2 fuel oil will be used as a standby fuel. The proposed source will be a major modification for particulate matter (PM), sulfur dioxide (SO_2), nitrogen oxides (NO_x), hydrocarbons (HC), and carbon monoxide (CO) and as such, requires Prevention of Significant Deterioration (PSD) review.

Components of the federal PSD review are:

1. Control Technology Review,
2. Source Impact Analysis,
3. Air Quality Analysis,
4. Source Information, and
5. Additional Impact Analysis.

Components 1 and 4, the control technology review and source information, are contained in the accompanying construction permit application. No air quality analysis (preconstruction monitoring) is required since impacts of all pollutants are below federal de minimis levels, as documented in Section 2.3. Representative air quality data have not been collected in the vicinity of the site, so appropriate background concentrations were assumed as recommended in Ambient Monitoring Guidelines for Prevention of Significant Deterioration, EPA-450/2-78-019, May 1978. The remaining components are discussed in this PSD report.

2.0 SOURCE IMPACT ANALYSIS

2.1 EMISSIONS INVENTORY

Permitted point sources within 50 kilometers (km) of KU are listed in Table 1. The basis for this inventory was the 1980 edition of the Florida Air Permit Inventory System. SO_2 and PM emissions from Florida Power Corporation (FPC) Intercession City, St. Cloud Utilities, and the existing KU diesels were estimated from emission factors published in AP-42 (Tables 3.3.3-1, 3.3.2-1, and 3.3.1-2).

Short-term impacts were projected using listed emissions from all sources within 15 km and estimated emissions from the St. Cloud and FPC sources. Annual average impacts were projected using all sources within 15 km and all sources within 50 km with emissions greater than 40 tons per year of SO_2, 25 tons per year of PM, or 40 tons per year of NO_x.

2.2 DISPERSION MODELING AND METEOROLOGY

Critical meteorology and general location of highest, second-highest impacts were determined by 5-year CRSTER runs. Refined analyses including local source contribution and possible interactions were carried out with the ISCST model. Annual average concentrations were predicted with the ISCLT model.

Meteorological data input to the model consisted of hourly surface observations from Orlando International Airport combined with upper air observations from Tampa International Airport. Data collected during the 5-year period (1974-1978) were used.

The existing structure housing the diesels at KU is 38 feet high. The new stack will not be within the area of influence of this or any other structure with potential to cause downwash conditions.

Initial modeling showed that the critical meteorology and impact area were determined by existing diesel emissions. The 3-hour SO_2 impact was

less than 30 percent of the Ambient Air Quality Standard (AAQS) of 1,300 micrograms per cubic meter (ug/m^3), so no refinements were made for this averaging time. Since both SO_2 and PM emissions from the diesels were directly proportional to the fuel rate, refined modeling for these emissions was carried out at the same point; no separate 5-year total suspended particulate (TSP) run was made.

Estimated PM emissions from St. Cloud Utilities and FPC Intercession City were less than SO_2 emissions from the same sources. Since the SO_2 interaction analysis indicated the maximum SO_2 contribution from these sources in the area of influence of KU was only 4 ug/m^3 and occurred in a noncritical direction, no TSP interaction modeling was performed.

CO, beryllium (Be), and mercury (Hg) impacts of the new source were estimated by comparing emission rates (Table 2) and adjusting SO_2 concentrations by the appropriate ratios.

Long-term NO_x concentrations were determined by assuming that the existing diesels are fired continuously with fuel oil and are in operation 5,260 hours per year.

2.3 AIR QUALITY IMPACTS

Table 2 shows the predicted highest, second-highest short-term and annual impacts that will result from KU and surrounding source emissions. Table 3 shows the effects of plume interaction with nearby major sources.

No violations of state or federal AAQS (Table 4) are predicted. Impacts due to the new source alone are below federal de minimis levels for all pollutants (Table 5), thus exempting the source from preconstruction monitoring.

Impacts for all pollutants except SO_2 are below significance levels; when burning natural gas, SO_2 impacts will also be below significance

levels. No TSP or SO_2 nonattainment areas are located within 100 km; no impacts on nonattainment areas are predicted.

2.4 INCREMENTAL IMPACTS

Table 2 shows that all impacts due to the new source alone are below federal Class II increments (Table 6). The only other permitted increment-consuming sources in the vicinity are Stokely Van Camp and C.W. Bailey. Since no emissions were listed for these sources and the new source impacts are less than 20 percent of the allowable increment, no further incremental analysis was performed.

The KU site is 125 km from the nearest Class I area, the Chassahowitzka National Wildlife Refuge; no impact on this area is predicted.

3.0 ADDITIONAL IMPACTS ON SOILS, VEGETATION, AND VISIBILITY

3.1 IMPACTS ON SOILS AND VEGETATION

Vegetation in the Kissimmee area is comprised of slash pine, saw palmetto, and wire grass. Improved pasture with bahia and carpet grass are also found. Soils are generally of the Leon-Plummer-Rutledge classification--thick acid sands, poorly drained due to a prevalent organic hardpan.

The projected highest, second-highest 3-hour SO_2 concentration of 392 ug/m^3 and annual mean concentration of 40 ug/m^3 (see Table 2) are below levels generally reported for damage to sensitive plant species. European studies by Heck and Brandt (1977) have found 1/2-hour levels of 3,406 ug/m^3 and long-term means of 393 ug/m^3 to approximate threshold levels for several species. According to studies by Heck and Brandt (1977), alfalfa, commonly thought to be one of the most SO_2-sensitive species, has a 2-hour threshold level of at least 2,620 ug/m^2 and an 8-hour threshold of 655 ug/m^2.

According to Jacobson & Hill (1970), PM is generally considered to have a relatively unimportant effect on vegetation. TSP impacts from the new source are predicted to be less than 1 ug/m^3, 24-hour average.

Plant species classified as "sensitive" to NO_2, such as pinto bean, cucumber, lettuce, and tomato, displayed injury when exposed to NO_2 levels of 3,760 to 4,960 ug/m^3 for a 2-hour period. Extremely resistant species, such as heath, were unaffected by an exposure of 1,900,000 ug/m^3 for 1 hour. Blue grass, orange tree plants, and rye are all classified as "intermediate" in resistance to NO_2 injury.

Jacobson and Hill (1970) found that NO_x concentration is more important to plant injury than the duration of exposure. NO_x impacts of the new source are predicted to be below 1 ug/m^3, annual average.

Based on these experimental results, the effects of SO_2, NO_2, and PM emissions upon soils and vegetation are expected to be negligible.

3.2 VISIBILITY IMPACTS

The proposed source is not expected to have any significant impact on visibility in the immediate area. A Level I visibility screening analysis confirmed that no visibility impairment should occur in any Class I area. The absolute values of the three Level I contrast parameters (C1--plume contrast against the sky; C2--plume contrast against terrain; and C3--change in the sky/terrain contrast caused by primary and secondary aerosol) were well below 0.1, indicating that it is highly unlikely that the emissions source would cause adverse visibility impacts in Class I areas. Further analysis of potential visibility impacts was therefore unnecessary (EPA, 1980).

Table 1. Permitted Point Sources by County

Plant	Points	Plant Name	UTM Coordinates E	UTM Coordinates N	Total Plant Emissions (tons per year) PM	SO_2	NO_x
		Osceola County					
01	04-08, 11-15	City of Kissimmee	460.1	3129.3	--	--	--
02	02, 04-08	City of St. Cloud	471.8	3124.9	--	--	--
03	01	Concrete Materials	473.7	3124.9	--	--	--
04	01	Concrete Materials	460.6	3129.8	--	--	--
05	01	Florida Dept. of Agriculture	458.7	3133.4	--	--	--
06	01	Kissimmee Community Hospital	459.9	3130.3	--	--	--
07	01	Stokely Van Camp	451.1	3125.8	--	--	--
08	01	Castcrete Corp.	460.1	3133.8	--	--	--
09	01	Rinker Materials	459.9	3130.1	--	--	--
10	02-03	St. Cloud Hospital	470.3	3124.1	--	--	--
11	01	C. W. Bailey	470.8	3133.8	--	--	--
14	01-10	Florida Power Corp.	446.3	3126.0	--	--	--
26	01	Transgulf Pipeline	462.0	3135.0	--	--	--
		Orange County					
02	01	Basic Asphalt	455.9	3166.8	23	--	3
03	01-02	Bordens Dairy	460.6	3155.8	2	--	--
04	01	Buchanan	462.4	3155.1	6	--	--
06	01-04	Coca Cola	445.9	3173.6	10	13	1
08	01	V.A.	462.8	3155.6	--	--	--
09	01	Goodyear Recap	462.4	3154.4	--	--	--
10	01	Jensen's Furniture	464.0	3157.3	--	--	--
11	01-04	Florida Minerals & Materials	462.0	3149.0	44	--	--

Table 1. Permitted Point Sources by County (Continued, Page 2 of 6)

Plant	Points	Plant Name	UTM Coordinates E	UTM Coordinates N	Total Plant Emissions (tons per year) PM	SO_2	NO_x
		Orange County (Continued)					
12	01, 02	Florida Minerals & Materials	444.5	3160	32	--	--
13	01, 02	Florida Minerals & Materials	470.7	3163.8	22	--	--
14	01	Florida Power Corp.	475.2	3156.8	1	31	9
15	01	University of Central Florida	480.5	3163.4	1	--	--
16	01	Kane Furniture	456.2	3158.2	1	--	--
17	01	Winter Park Memorial	467.9	3163.3	6	--	1
18	01	B. R. Tire Company	462.8	3154.3	--	--	--
19	01, 02	Houdaille	461.9	3141.9	1	--	--
20	01	Inland Materials	459.9	3160.9	26	--	--
21	01	Orlando Paving	453.8	3160.7	36	--	8
22	01	Quality Vaults	446.9	3158.8	1	--	--
23	01	Kissimmee Rock Industry	461.3	3157.9	43	--	--
24	01-03	Florida Rock Industry	459.2	3174.2	129	--	--
25	01, 02	Rinker Materials	458.3	3165	90	--	--
26	02-04	Martin Marietta	454.9	3146.5	2	--	7
27	01, 02	Lone Star	462.6	3154.2	44	--	--
28	01	Mercy Hospital	457.8	3159.7	1	--	12
29	01-06	GE Lamp	444.8	3174	1	--	1
30	01	Orlando Humane Society	457.5	3158.3	1	--	--
31	01	Orlando Paving Company	465.3	3145.9	42	10	8
32	01, 02	Owens Illinois	460.7	3142	52	--	--

Table 1. Permitted Point Sources by County (Continued, Page 3 of 6)

Plant	Points	Plant Name	UTM Coordinates E	UTM Coordinates N	Total Plant Emissions (tons per year) PM	SO_2	NO_x
		Orange County (Continued)					
33	01-06	Orlando Utilities	463.3	3159	187	5,196	151
36	01	Rinker Materials	470.7	3163.9	40	--	--
37	01, 02	Rinker Materials	462.5	3154.3	92	--	--
38	02-06	Rinker Materials	450.6	3145.5	209	--	62
39	01, 03-04	Southern Fruit	462.9	3153.3	61	32	--
40	01-04	Southern Gold	458.7	3161.3	50	2	16
41	01	Dixie Asphalt	463.2	3143.0	50	9	20
42	01	Plymouth Citrus	455.2	3174.0	1	3	1
43	01-04	Aircraft Service	469	3146.2	--	--	--
44	01, 02	Boise Cascade Can Co.	460.7	3142.4	--	--	4
45	01-14	Martin Marietta Corp.	454.5	3146.2	15	1	--
46	01-08, 10-13, 16-18, 20-21	Martin Marietta Corp.	454.5	3146.2	51	--	--
47	01, 02	Martin Marietta Aerospace	455.2	3146.2	--	--	--
50	01-05	Carns Concrete Pipe	454.6	3167.8	69	--	--
53	01-03, 06, 08-14	Winter Garden Citrus	443.8	3159.6	303	39	68
54	01	City Chemicals Company	470.7	3163.9	1	--	--
56	01-06	Gould Battery	460.4	3142.3	14	--	--
58	01-03	Al Block Company	462.5	3155.0	141	--	1
59	01, 02	Medusa Cement Company	462.6	3154.7	69	--	--
60	01-08	Ashland Chemical Co.	460.4	3147.9	--	--	--
61	01-08	City of Orlando	456.3	3152.7	64	8	112
63	01, 02	Florida Hospital	463.8	3160.7	23	--	49

Table 1. Permitted Point Sources by County (Continued, Page 4 of 6)

Plant	Points	Plant Name	UTM Coordinates E	UTM Coordinates N	Total Plant Emissions (tons per year) PM	SO_2	NO_x
		Orange County (Continued)					
65	01	Lucerne General Hospital	463.1	3153	--	--	--
66	01	West Orange Hospital	443.1	3160.0	3	1	1
67	01	Orlando Regional	463.1	3155.3	4	--	7
69	01-07, 11-13	Central Florida Pipeline	463.8	3143.8	--	--	--
70	01	Aaron Scrap Metals	454.8	3167.1	1	--	--
71	01-05	Florida Rock Industry	463.0	3145.5	119	--	4
74	01-03, 05	Citrus Central Metals	445.6	3173.8	9	--	--
77	01	Macasphalt Corporation	450.6	3145.4	4	1	--
78	01, 02	Frito Lay	459.1	3161	14	--	6
79	01-06	Naval Training Center	467.8	3160	10	--	6
80	01	Harry L. Hanes	463.8	3162.4	1	--	--
		Polk County					
01	05	Alcoma Packing	451.6	3085.5	65	--	--
07	01-03	Owens Illinois	423.4	3102.8	93	--	--
14	01-04	Standard Sand Silica	441.5	3118.2	125	240	--
17	01-05	Swift Agrichem	427.9	3097.4	114	--	--
22	01, 02	Owens Illinois	423.4	3102.8	11	--	3
23	01-03	Coca Cola	421.3	3103.6	123	--	72
29	01	Hunt Brothers	445.3	3083	--	2	1

Table 1. Permitted Point Sources by County (Continued, Page 5 of 6)

Plant	Points	Plant Name	UTM Coordinates E	UTM Coordinates N	Total Plant Emissions (tons per year) PM	SO_2	NO_x
		Polk County (Continued)					
33	01, 02	Bordo Citrus	438	3109	100	--	--
37	01	Adams Packing	421.7	3104.2	34	--	--
61	01-05	Holly Hill Fruit	441	3115.4	77	--	--
71	01-03	Uranium Recovery	465	3080	6	--	--
76	01	International Paper	421.7	3104.3	--	--	--
82	01	Macasphalt	423.1	3101.5	49	--	--
88	01	Morris Canning	428.1	3103.4	--	--	--
90	03	Florida Distillers	428	3108.1	--	--	--
96	01, 02	Jacquin Florida Dist.	421.4	3102.9	--	--	--
103	01	Kandors Thriftway	428.1	3100.6	--	--	--
105	01	Dundee Citrus	438.8	3099.9	--	--	--
108	01, 02	Concrete Materials	439.4	3109.4	--	--	--
113	02, 03	Gall Silica Mining	450.2	3085.4	--	--	--
115	01	Phoenix Industry	428	3096	--	--	--
122	01	Monier Resources	423.5	3104.6	--	--	--
124	01	Duncan Browning	422.8	3104.7	--	--	--
		Seminole County					
01	01	Sunrise Materials	469.8	3177.8	4	--	--
02	01-04	Central Florida Drum	474.7	3173.4	13	4	3
04	01, 02	Inland Materials	466	3172.1	33	--	--
05	01	Kissam Concrete	465.1	3170.4	38	--	--

Table 1. Permitted Point Sources by County (Continued, Page 6 of 6)

Plant	Points	Plant Name	UTM Coordinates E	UTM Coordinates N	Total Plant Emissions (tons per year) PM	SO_2	NO_x
		Seminole County (Continued)					
06	01-03	Coca Cola	459.4	3170.5	52	4	26
07	01	L.D Plante Inc.	474.5	3176.2	4	34	12
08	01	Lone Star	465.8	3172	18	--	--
19	01	Macasphalt Corp.	470.2	3175.8	8	13	3
		Lake County					
11	01-03	Clermont Builders	424.4	3159	33	--	--
13	01	S. Lake Memorial Hospital	424.9	3158.6	--	--	--
31	01	Tower Chemical Co.	433	3158.2	1	--	--

NOTE: Blanks indicate no allowable or actual emissions listed in APIS 1980.

Source: ESE, 1981.
APIS, 1980.

Table 2. Air Quality Impacts (ug/m^3)*

	SO_2			TSP		NO_x	CO	Hg and Be
	24-hour	3-hour	Annual	24-hour	Annual	Annual	3-hour	24-hour
All Sources	135	372	20	81	12	69	—	—
Plus Background	20	20	20	40	40	20	—	—
	155	392	40	121	52	89	—	—
Day (period)/year	325/78	278(5)/77	—	—	—	—	—	—
Direction (degrees)/ distance (m)	180/500	240/300	—	—	—	—	—	—
New Source	10	44	<1	<1†	<1†	<1†	1.4	<0.0005
Day (period)/year	279/74	103(4)/78	—	—	—	—	—	—
Direction (degrees)/ distance (m)	180/4,000	360/2,000	—	—	—	—	—	—

* Highest, second-highest for 24-hour and 3-hour averaging times.
† Calculated as ratio from SO_2 runs.

Source: ESE, 1981.

Table 3. Source Interactions

Interacting Source	Direction (deg.)	Day/Year	SO_2 Concentration (ug/m^3)	
			KU Only	KU with Interaction
City of St. Cloud	290	113/78	72	76
FPC Intercession City	75	158/75	69	69

Source: ESE, 1981.

Table 4. National and State of Florida AAQS

Pollutant	Averaging Time	National Primary Standard	National Secondary Standard	Florida
Suspended PM	Annual Geometric Mean	75 ug/m^3	60 ug/m^3	60 ug/m^3
	24-Hour Maximum*	260 ug/m^3	150 ug/m^3	150 ug/m^3
SO_2	Annual Arithmetic Mean	80 ug/m^3	NA†	60 ug/m^3
	24-Hour Maximum*	365 ug/m^3	NA†	260 ug/m^3
	3-Hour Maximum*	NA†	1,300 ug/m^3	1,300 ug/m^3
CO	8-Hour Maximum*	10 mg/m^3	10 mg/m^3	10 mg/m^3
	1-Hour Maximum*	40 mg/m^3	40 mg/m^3	40 mg/m^3
HC	3-Hour Maximum* (6 to 9 A.M.)	160 ug/m^3	160 ug/m^3	160 ug/m^3
NO_2	Annual Arithmetic Mean	100 ug/m^3	100 ug/m^3	100 ug/m^3
Ozone	1-Hour Maximum*	235 ug/m^3	235 ug/m^3	160 ug/m^3
Lead	Calendar Quarter Arithmetic Mean	1.5 ug/m^3	1.5 ug/m^3	NA†

* Maximum concentration not to be exceeded more than once per year.
† No standard exists.

Sources: 40 CFR Part 50, 1980.
FAC Chapter 17-2.

Table 5. Significant Emission Rates and De Minimis Air Quality Impact Levels

Pollutant	De Minimis Emission Rate (Tons per year)	De Minimis Air Quality Impact Level (For Use In Determining Monitoring) (ug/m^3)
CO	100	575, 8-hour average
NO_2	40	14, annual
Total Suspended Particulates	25	10, 24-hour
SO_2	40	13, 24-hour
Ozone* (volatile organic compounds)	40	
Lead	0.6	0.1, 3-month
Hg	0.1	0.25, 24-hour
Be	0.0004	0.0005, 24-hour
Asbestos†	0.007	
Fluorides	3	0.25, 24-hour
Sulfuric Acid Mist†	7	
Vinyl Chloride	1	15, maximum value
Total Reduced Sulfur	10	10, 1-hour
Hydrogen Sulfide	10	0.04, 1-hour
Reduced Sulfur Compounds	10	10, 1-hour
Inorganic Arsenic†	0	
Radionuclides†	0	
Benzene†	0	
Ethylene Dichloride†	0	
Polyvinyl Chloride†	0	

* A de minimis air quality level is not given for ozone. However, a plant which is subject to PSD review and has a net increase of 100 tons per year of volatile organic compounds would be required to perform an ambient air quality analysis.

† No measurement method or de minimis air quality impact level has been established.

Source: Federal Register, Vol. 45, No. 154, 1980.

Table 6. Federal and State of Florida PSD Allowable Increments (ug/m^3)

Pollutant/Averaging Time	Class I	Class II	Class III
PM			
Annual Geometric Mean	5	19	37
24-Hour Maximum*	10	37	75
SO_2			
Annual Arithmetic Mean	2	20	40
24-Hour Maximum*	5	91	182
3-Hour Maximum*	25	512	700

* Maximum concentration not to be exceeded more than once per year.

Sources: Public Law 95-95, Clean Air Act Amendments of 1977.
Federal Register, Vol. 43, No. 118, June 19, 1978.

REFERENCES

Heck, W.W., and Brandt, C.S. 1977. Air Pollution, Effects on Vegetation: Native Crops, Forests. In: Air Pollution. A.C. Stern, Editor. Vol. II. The Effects of Air Pollution. Academic Press, Inc., New York.

Jacobson, J.L., and Hill, A.C. 1970. Recognition of Air Pollution Injury to Vegetation: A Pictorial Atlas. Air Pollution Control Association, Pittsburgh, Pennsylvania.

U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. 1980. Workbook for Estimating Visibility Impairment. RTP No. 27711. July 1980.

U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. 1978a. Ambient Air Guidelines for Prevention of Significant Deterioration. EPA-450/2-78-019.

U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. 1978b. Guideline on Air Quality Models. EPA-450/2-78-027.

U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. 1978c. Guidelines for Determining Best Available Control Technology (BACT).

U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. 1978d. Technical Support for Determination of Good Engineering Practice Stack Height. Research Triangle Park, North Carolina.

ATTACHMENT 2

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301-8241

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

October 6, 1983

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. James C. Welsh, Utilities Director
Kissimmee Utilities
P. O. Box 1608
Kissimmee, Florida 32741

Dear Mr. Welsh:

The Bureau of Air Quality Management has received and reviewed the new information you submitted to us September 6, 1983, concerning your application to construct a combined cycle gas turbine in the City of Kissimmee, Orange County, Florida. We have determined the application is incomplete in the following sections.

Section II. General Project Information

A. In order to specify permit conditions and test procedures, we need the following information:

1. Will the steam boiler be operated as a separate source when the turbine is out of service? If so, is there a projected schedule for this type of operation?

2. Is the fuel oil used to fire the turbine and the boiler stored in the same tank?

D. This part must be completed.

Section III. Air Pollution Sources and Control Devices

E. Fuels.

What will be the maximum oil consumption rate if oil with lower sulfur content is burned? Typical No. 2 distillate oil has a 0.5% sulfur content. Will No. 2 oil be blended to 0.8% sulfur? If so, with what type and grade of oil.

As soon as the requested information is received, we will resume processing your application. If you have any questions on this matter, please call Teresa Heron, review engineer, at (904)488-1344 or write to me at the above address.

Sincerely,

for C. H. Fancy, P. E.
Deputy Chief
Bureau of Air Quality
Management

CHF/TH/s

cc: David A. Buff, Environmental Science and Engineering
Charles Collins, DER St. Johns River District

ATTACHMENT 3

ELECTRIC UTILITIES

CITY OF KISSIMMEE
FLORIDA

P. O. BOX 1608 • KISSIMMEE, FLORIDA 32741 • 305/847-2821

October 31, 1983

DER
NOV 07 1983
BAQM

C. H. Fancy, P.E., Deputy Chief
Department of Environmental Regulation
Bureau of Air Quality Management
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, FL 32301-8241

Dear Mr. Fancy:

In response to your October 6, 1983 letter, the following information will hopefully answer your specific questions and allow you to resume processing of our application.

Section II.A., Item 1 - The steam boiler will not be operated when the gas turbine is out of service.

Section II.A., Item 2 - The fuel oil used to fire both the gas turbine and the boiler will be stored in the same storage tank.

Section II.D. - Previous DER permit for this emission point: AC49-46521, issued November 25, 1981; expired January 30, 1983.

Section III.E. - Kissimmee Utilities will not perform any blending of fuel oils. Oil will be received in a pipeline directly to the oil storage tank for the combined cycle unit. Typical No. 2 distillate oil does have a typical sulfur content of 0.5 percent. A maximum sulfur content of 0.8 percent was specified in the construction permit application to represent a worst-case situation for emissions. The heating value of the fuel oil would not vary substantially over the range of sulfur contents; therefore, based upon available design information, the maximum oil consumption rate will not change with 0.5 percent sulfur oil versus 0.8 percent sulfur oil.

If I can answer any additional questions related to this matter, please contact me.

Sincerely,

James C. Welsh

James C. Welsh, P.E.
Electric Utilities Director

cc: Steve Cowen, RS&H
David A. Buff, ESE
Max Alderman, C of K

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

file
PSD

REGION IV

345 COURTLAND STREET
ATLANTA, GEORGIA 30365

JUL - 1 1987

4APT/APB-ljf

Scan
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Permit

DER
JUL 4 1987
BAQM

Mr. Clair Fancy, P.E.
Deputy Chief
Bureau of Air Quality Management
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32301

Re: Kissimmee Utilities (Osceola County)

Dear Mr. Fancy:

This is in regard to your letter of April 10, 1987, forwarding the above company's request to increase the allowable nitrogen oxides emissions from their 49.9 MW combined cycle gas turbine. They have requested to increase their allowable emissions concentration limit from 79 ppm to 130 ppm using the fuel bound nitrogen credit as provided for in the New Source Performance Standards, Subpart GG.

We have reviewed the company's request to use the nitrogen content of their natural gas supply in calculating the emissions rate from equations contained in Subpart GG, New Source Performance Standards. During our review, we contacted the Office of Air Quality Planning and Standards regarding the definition of fuel bound nitrogen and data regarding measured concentrations of fuel bound nitrogen in natural gas. Their response was that natural gas does not contain measurable amounts of fuel bound nitrogen and that the nitrogen content reported by the supplier is probably atmospheric nitrogen which is not credible as fuel bound nitrogen. Therefore, the company's analysis supporting their request to increase their nitrogen oxides emissions rate is not valid.

In summary, the company's request to increase nitrogen oxides emissions when burning natural gas should be denied on the basis that the reported nitrogen content of the natural gas is not fuel bound nitrogen. Unless the supplier is able to provide an analysis of their natural gas which determines fuel bound nitrogen only, with supporting documentation of test methods and procedures, credit cannot be given in the calculation of allowable nitrogen oxide emissions as provided under the New Source Performance Standards, Subpart GG.

If you have any questions regarding this determination, you may contact Michael Brandon of my staff at (404) 347-2864.

Sincerely,

Bruce P. Miller

Bruce P. Miller, Chief
Air Programs Branch
Air, Pesticides and Toxics
Management Division

Teresa Heron
Bill Thomas

ELECTRIC UTILITIES
DEPARTMENT

CITY OF KISSIMMEE
FLORIDA

P.O. BOX 1608 ● KISSIMMEE, FLORIDA 32742-1608 ● 305/847-2821

March 29, 1984

DER
APR 02 1984
BAQM

Mr. Ed Palagyi
Department of Environmental Regulation
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32301-8241

Re: Air Pollution Permit AC 49-74856

Dear Mr. Palagyi:

This letter is intended to satisfy the requirements of NSPS monitoring under 60.334 (a) subpart GG, 40 CFR for Kissimmee Utility's W251 B8 gas turbine NO_x control.

The system is installed exactly as is described in the construction permit application of September 9, 1983 having the following features:

- Water injection on/off lighted panel button in the control room.
- Fuel flow is continuously monitored and recorded at this point.
- Water injection skid is housed about 25 paces from the control room.
- The integrator is used to record water flow by receiving a signal from the flow meter.
- The integrator valve is incremented by one count for each gallon of water to the burner.
- An alarm is activated in the control room when water flow is lost.

Attached is a copy of the operators log used to monitor and record water flow to burners.

Very truly yours,

James C. Welsh

James C. Welsh, P.E.
Electric Utilities Director

GM:JCW/rk
Attachment

cc - Steve Neck
Max Alderman

BEST AVAILABLE COPY

CITY OF KISSIMMEE
FLORIDA

OFFICE OF THE UTILITIES DIRECTOR

P.O. BOX 1608 • KISSIMMEE, FLORIDA 32744 • 305 [illegible]
32741-2-1608

January 16, 1984

DER
[illegible]
BAQM

Mr. C. H. Fancy
Deputy Chief
Bureau of Air Quality Management
Department of Environmental Regulation
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32301-8241

Re: Preliminary Determination - Kissimmee Utilities
Combined Cycle Unit #1, Osceola County
State Permit No. AC 49-74856
Federal Permit No. PSD-FL-087

Dear Mr. Fancy:

In compliance with the 14-day publication requirement of the Notice of Porposed Agency Action, please find enclosed a tear sheet of the Notice which appeared in the Osceola Little Sentinel, The Orlando Sentinel, Sunday, January 15, 1984.

Very truly yours,

James C. Welsh, P.E.
Electric Utilities Director

/pf
Enclosure

CC: David A. Buff, Environmental Science & Engineering, W/Encl.
Charles Collins, DER St. Johns River District, W/Encl.

1 LEGAL NOTICES

PUBLIC NOTICE

A modification to an existing air pollution source is being proposed by Kissimmee Utilities located in the City of Kissimmee, Osceola County, Florida. The proposed modification is the construction of a 49.9 MW combined cycle gas turbine. The modification will increase emissions of air pollutants, in tons per year, by the following amounts:

PM	SO2	NOx	CO	VOC
96	1702	1029	349	83

The proposed modificaton has been reviewed by the Florida Department of Environmental Regulation (FDER) under Chapter 403, Florida Statutes, and Federal regulation 40 CFR 52.21, Prevention of Significant Deterioration (PSD). The Department has made a preliminary determination that the construction can be approved provided certain conditions are met. A summary of the basis for the determination and the application for State and Federal permits submitted by Kissimmee Utilities are available for public review at the following offices:

Bureau of Air Quality Management
Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, Florida 32301

St. Johns River District
Department of Environmental Regulation
3319 Maguire Blvd., Suite 232
Orlando, Florida 32803

Kissimmee Public Library
305 E. Broadway
Kissimmee, Florida 32741

The maximum percentages of allowable PSD increments consumed by the proposed modification will be as follows:

	Annual	24-Hour	3-Hour
PM	Negligible	Negligible	NA
SO2	5	11	9

Any person may submit written comments to FDER regarding the proposed modification. All comments, postmarked not later than 30 days from the date of notice, will be considered by FDER in making a final determination regarding approval for construction of this source. Those comments will be made available for public review on request. Furthermore, a public hearing can berequested by any person. Such request should be submitted within 14 days of the date of this notice. Letters should be addressed to:

Mr. C.H. Fancy, P.E.
Deputy Chief
Bureau of Air Quality Management
Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, Florida 32301

OS-403

Jan.15,1984

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301-8241

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

January 5, 1984

CERTIFIED MAIL-RETURN RECEIPT REQUESTED

Mr. James C. Welsh
Utilities Director
Kissimmee Utilities
Post Office Box 1608
Kissimmee, Florida 32741

Dear Mr. Welsh:

RE: Preliminary Determination - Kissimmee Utilities
Combined Cycle Unit #1, Osceola County
State Permit No. AC 49-74856, Federal Permit No. PSD-FL-087

The Florida Department of Environmental Regulation, under the authority delegated by the U.S. Environmental Protection Agency, Region IV, has reviewed your application to modify the referenced source under the provisions of the Prevention of Significant Deterioration Regulations (40 CFR 52.21) and has made a preliminary determination of approval with conditions. Please find enclosed one copy of the Preliminary Determination and proposed state and federal permits.

Before final action can be taken on your proposed permit, you are required by Florida Administrative Code Rule 17-1.62(3) to publish the attached Notice of Proposed Agency Action in the legal advertising section of a newspaper of general circulation in Osceola County no later than fourteen days after receipt of this letter. The department must be provided with proof of publication within seven days of the date the notice is published. Failure to publish the notice may be grounds for denial of the permit.

A copy of the Preliminary Determination and your application will be open to public review and comment for a period of 30 days after publication of the notice. The public can also request a public hearing to review and discuss specific issues. At the end of this period, the department will evaluate the comments received and make a final determination regarding the proposed construction.

The Preliminary Determination and proposed permit constitutes a proposed action of the department and is subject to administrative hearing under the provisions of Chapter 120, Florida Statutes, if requested within fourteen days from receipt of this letter. Any petition for hearing must comply with the requirements of Florida Administrative Code Rule 28-5.201 and be filed with the Office of General Counsel, Florida Department of Environmental Regulation, Twin Towers Office Building, 2600 Blair Stone Road, Tallahassee, Florida 32301. Failure to file a request for hearing within fourteen days shall constitute a waiver of your right to a hearing. Filing is deemed complete upon receipt by the Office of General Counsel.

Please submit, in writing, any comments which you wish to have considered concerning the department's proposed action to Mr. Bill Thomas of the Bureau of Air Quality Management.

Sincerely,

C. H. Fancy, P.E.
Deputy Chief
Bureau of Air Quality
Management

CHF/TH/pa

Attachments

cc: David A. Buff, P.E., Environmental Science and Engineering
Charles Collins, DER St. Johns River District

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301-8241

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

January 6, 1984

Mr. Ron Fahs
State A-95 Coordinator
Florida State Planning and
Development Clearinghouse
Office of Planning and Budget
The Capitol
Tallahassee, Florida 32301

Dear Mr. Fahs:

RE: Preliminary Determination - Kissimmee Utilities
Combined Cycle Unit #1, PSD-FL-087

I wish to bring to your attention that Kissimmee Utilities proposes to modify its existing facilities in Osceola County, Florida, and that emissions of air pollutants will thereby be increased. The Florida Department of Environmental Regulation, under the authority delegated by the U.S. Environmental Protection Agency, has reviewed the proposed construction under Federal Prevention of Significant Deterioration Regulations (40 CFR 52.21) and reached a preliminary determination of approval, with conditions, for this construction.

Please also be aware that the attached Public Notice announcing the preliminary determination, the availability of pertinent information for public scrutiny and the opportunity for public comment will be published in a local newspaper in the near future. This notice has been mailed to you for your information and in accordance with regulatory requirements. You need take no action unless you wish to comment on the proposed construction. If you have any questions, please feel free to call Mr. Bill Thomas or myself at (904)488-1344.

Sincerely,

Patty Adams

for C. H. Fancy, P.E.
Deputy Chief
Bureau of Air Quality
Management

CHF/pa
Enclosure

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301-8241

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

January 6, 1984

Mrs. Elenor Gentry
Kissimmee Public Library
305 E. Broadway
Kissimmee, Florida 32741

Dear Mrs. Gentry:

RE: Preliminary Determination - Kissimmee Utilities
Combined Cycle Unit #1, Federal Permit No. PSD-FL-087

As was discussed over the phone, we need to make the enclosed information available for public inspection pursuant to Federal Prevention of Significant Deterioration Regulations (40 CFR 52.21, Paragraph (q)). A notice directing people to the library will be published in a local newspaper in the near future.

The information must be available upon request for a period of at least 30 days from the notice date. At the end of the period, we will forward to you a Final Determination on the permit application which must be available for an additional 30 days.

We appreciate your help in providing this valuable public service. Should you have any questions, please call me at (904)488-1344.

Sincerely,

Patty Adams

for C. H. Fancy, P.E.
Deputy Chief
Bureau of Air Quality
Management

CHF/pa

Enclosure

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301-8241

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

January 6, 1984

Mr. James T. Wilburn, Chief
Air Management Branch
Air & Waste Management Division
U.S. EPA, Region IV
345 Courtland Street, N.E.
Atlanta, Georgia 30365

Dear Mr. Wilburn:

RE: Preliminary Determination - Kissimmee Utilities
Combined Cycle Unit #1, PSD-FL-087

Enclosed for your review and comment are the Public Notice and Preliminary Determination for the modification of the above referenced federal permit for Kissimmee Utilities.

Please inform my office at (904)488-1344 if you have comments or questions regarding this determination.

Sincerely,

Patty Adams

for C. H. Fancy, P.E.
Deputy Chief
Bureau of Air Quality
Management

CHF/pa

Enclosure

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301-8241

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

January 6, 1984

Osceola County Commissioners
Post Office Box 2107
Kissimmee, Florida 32741

Dear Commissioners:

RE: Preliminary Determination - Kissimmee Utilities
Combined Cycle Unit #1, PSD-FL-087

I wish to bring to your attention that Kissimmee Utilities proposes to modify its existing facilities in Osceola County, Florida, and that emissions of air pollutants will thereby be increased. The Florida Department of Environmental Regulation, under the authority delegated by the U.S. Environmental Protection Agency, has reviewed the proposed construction under Federal Prevention of Significant Deterioration Regulations (40 CFR 52.21) and reached a preliminary determination of approval, with conditions, for this construction.

Please also be aware that the attached Public Notice announcing the preliminary determination, the availability of pertinent information for public scrutiny and the opportunity for public comment will be published in a local newspaper in the near future. This notice has been mailed to you for your information and in accordance with regulatory requirements. You need take no action unless you wish to comment on the proposed construction. If you have any questions, please feel free to call Mr. Bill Thomas or myself at (904)488-1344.

Sincerely,

Patty Adams

for C. H. Fancy, P.E.
Deputy Chief
Bureau of Air Quality
Management

CHF/pa
Enclosure

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301-8241

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

January 6, 1984

Mr. Clifford Gullet
1011 Wymore Road
Winter Park, Florida 32769

Dear Mr. Gullet:

RE: Preliminary Determination - Kissimmee Utilities
Combined Cycle Unit #1, PSD-FL-087

I wish to bring to your attention that Kissimmee Utilities proposes to modify its existing facilities in Osceola County, Florida, and that emissions of air pollutants will thereby be increased. The Florida Department of Environmental Regulation, under the authority delegated by the U.S. Environmental Protection Agency, has reviewed the proposed construction under Federal Prevention of Significant Deterioration Regulations (40 CFR 52.21) and reached a preliminary determination of approval, with conditions, for this construction.

Please also be aware that the attached Public Notice announcing the preliminary determination, the availability of pertinent information for public scrutiny and the opportunity for public comment will be published in a local newspaper in the near future. This notice has been mailed to you for your information and in accordance with regulatory requirements. You need take no action unless you wish to comment on the proposed construction. If you have any questions, please feel free to call Mr. Bill Thomas or myself at (904)488-1344.

Sincerely,

Patty Adams

for C. H. Fancy, P.E.
Deputy Chief
Bureau of Air Quality
Management

CHF/pa
Enclosure

OFFICE OF THE UTILITIES DIRECTOR

CITY OF KISSIMMEE FLORIDA

P.O. BOX 1608 • KISSIMMEE, FLORIDA 32742-1608 • 305/847-2821

January 11, 1984

Patty

Mr. C. H. Fancy
Deputy Chief
Bureau of Air Quality Management
Department of Environmental Regulation
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32301-8241

Re: Preliminary Determination - Kissimmee Utilities
Combined Cycle Unit #1, Osceola County
State Permit No. AC 49-74856
Federal Permit No. PSD-FL-087

Dear Mr. Fancy:

Receipt is acknowledged of your letter of January 5, 1984, with attached Public Notice and Technical Evaluation and Preliminary Determination. These were received in this office January 9 and in keeping with the requirement of 14-day publication of the Notice of Proposed Agency Action, the Public Notice will appear in the Osceola Little Sentinel, Sentinel Star, on Sunday, January 15, 1984, in the legal section. A copy of this publication will be forwarded to your office.

Very truly yours,

James C. Welsh

James C. Welsh, P.E.
Electric Utilities Director

/pf
CC: David A. Buff, P.E., Environmental Science & Engineering
Charles Collins, DER St. Johns River District

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301-8241

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

October 6, 1983

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. James C. Welsh, Utilities Director
Kissimmee Utilities
P. O. Box 1608
Kissimmee, Florida 32741

Dear Mr. Welsh:

The Bureau of Air Quality Management has received and reviewed the new information you submitted to us September 6, 1983, concerning your application to construct a combined cycle gas turbine in the City of Kissimmee, Orange County, Florida. We have determined the application is incomplete in the following sections.

Section II. General Project Information

A. In order to specify permit conditions and test procedures, we need the following information:

1. Will the steam boiler be operated as a separate source when the turbine is out of service? If so, is there a projected schedule for this type of operation?

2. Is the fuel oil used to fire the turbine and the boiler stored in the same tank?

D. This part must be completed.

Section III. Air Pollution Sources and Control Devices

E. Fuels.

What will be the maximum oil consumption rate if oil with lower sulfur content is burned? Typical No. 2 distillate oil has a 0.5% sulfur content. Will No. 2 oil be blended to 0.8% sulfur? If so, with what type and grade of oil.

As soon as the requested information is received, we will resume processing your application. If you have any questions on this matter, please call Teresa Heron, review engineer, at (904)488-1344 or write to me at the above address.

Sincerely,

for C. H. Fancy, P. E.
Deputy Chief
Bureau of Air Quality
Management

CHF/TH/s

cc: David A. Buff, Environmental Science and Engineering
Charles Collins, DER St. Johns River District

ELECTRIC UTILITIES

CITY OF KISSIMMEE
FLORIDA

P. O. BOX 1608 • KISSIMMEE, FLORIDA 32741 • 305/847-2821

October 31, 1983

DER
NOV 07 1983
BAQM

C. H. Fancy, P.E., Deputy Chief
Department of Environmental Regulation
Bureau of Air Quality Management
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, FL 32301-8241

Dear Mr. Fancy:

In response to your October 6, 1983 letter, the following information will hopefully answer your specific questions and allow you to resume processing of our application.

Section II.A., Item 1 - The steam boiler will not be operated when the gas turbine is out of service.

Section II.A., Item 2 - The fuel oil used to fire both the gas turbine and the boiler will be stored in the same storage tank.

Section II.D. - Previous DER permit for this emission point: AC49-46521, issued November 25, 1981; expired January 30, 1983.

Section III.E. - Kissimmee Utilities will not perform any blending of fuel oils. Oil will be received in a pipeline directly to the oil storage tank for the combined cycle unit. Typical No. 2 distillate oil does have a typical sulfur content of 0.5 percent. A maximum sulfur content of 0.8 percent was specified in the construction permit application to represent a worst-case situation for emissions. The heating value of the fuel oil would not vary substantially over the range of sulfur contents; therefore, based upon available design information, the maximum oil consumption rate will not change with 0.5 percent sulfur oil versus 0.8 percent sulfur oil.

If I can answer any additional questions related to this matter, please contact me.

Sincerely,

James C. Welsh

James C. Welsh, P.E.
Electric Utilities Director

cc: Steve Cowen, RS&H
David A. Buff, ESE
Max Alderman, C of K

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET
ATLANTA, GEORGIA 30365

DER
FEB 24 1982
BAQM

FEB 19 1982

REF: 4AW-AF

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Jack T. Danforth
Utilities Director
Kissimmee Utilities
P.O. Box 1608
Kissimmee, FL 32741

Re: PSD-FL-087

Dear Mr. Danforth:

Review of your August 13, 1981 application to construct a combined cycle generator in Kissimmee, FL has been completed. The construction is subject to rules for the Prevention of Significant Air Quality Deterioration (PSD) contained in 40 CFR §52.21. The Florida Department of Environmental Regulation performed the preliminary determination concerning the proposed construction and published a request for public comment on October 28, 1981. Only comments from the U. S. EPA were submitted.

The Environmental Protection Agency has determined that the modification/ construction as described in the application meets all the applicable requirements of 40 CFR §52.21. Accordingly, enclosed with this letter is a Permit to Construct - Part I Specific Conditions and Part II General Conditions. This authority to construct is based solely on the requirements of 40 CFR §52.21, the federal regulations governing significant deterioration of air quality. It does not apply to other permits issued by this agency or by other agencies. Please be advised that a violation of any condition issued as part of this approval, as well as any construction which proceeds in material variance with information submitted in your application, will be subject to enforcement action.

This final permitting decision is subject to appeal under 40 CFR §124.19 by petitioning the Administrator of the U. S. EPA within 30 days after receipt of this letter of approval to construct. The petitioner must submit a statement of reasons for the appeal and the Administrator must decide on the petition within a reasonable time period. If the petition is denied, the permit becomes immediately effective. The petitioner may then seek judical review.

Authority to modify this facility will take effect on the date specified in the permit. The complete analysis which justifies this approval has been fully documented for future reference, if necessary. Any questions concerning this approval may be directed to Dr. Kent Williams, Chief, New Source Review Section, Air and Waste Management Division at (404) 881-4552.

Sincerely yours,

Charles R. Jeter
Regional Administrator

Enclosures

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET
ATLANTA, GEORGIA 30365

PERMIT TO CONSTRUCT UNDER THE RULES FOR THE PREVENTION OF SIGNIFICANT DETERIORATION OF AIR QUALITY

Pursuant to and in accordance with the provisions of Part C, Subpart 1 of the Clean Air Act, as amended, 42 U.S.C. §7470 et seq., and the regulations promulgated thereunder at 40 C.F.R. §52.21, as amended at 45 Fed. Reg. 52676, 52735-41 (August 7, 1980),

Kissimmee Utilities
P.O. Box 1608
Kissimmee, Florida 32741

is hereby authorized to construct/modify a stationary source at the following location:

112 Ruby Street
Kissimmee, Florida

UTM Coordinates: E 17-460.1, N 3129.3

Upon completion of this authorized construction and commencement of operation/production, this stationary source shall be operated in accordance with the emission limitations, sampling requirements, monitoring requirements and other conditions set forth in the attached Specific Conditions (Part I) and General Conditions (Part II).

This permit shall become effective on FEB 19 1982

If construction does not commence within 18 months after the effective date of this permit, or if construction is discontinued for a period of 18 months or more, or if construction is not completed within a reasonable time this permit shall expire and authorization to construct shall become invalid.

This authorization to construct/modify shall not relieve the owner or operator of the responsibility to comply fully with all applicable provisions of Federal, State, and Local law.

FEB 19 1982
Date Signed

Charles R. Jeter
Regional Administrator

PERMIT NO.: PSD-FL-087
APPLICANT: Kissimmee Utilities

SPECIFIC CONDITIONS:

1. The new source shall be constructed in accordance with the capacities and specifications stated in the application.

2. The maximum emission rates for the 49.9 MW combined cycle gas turbine shall not exceed the emission limits listed in Table 2 of the preliminary determination.

3. The plant shall be allowed to operate continuously (8736 hours per year).

4. The source shall be allowed to use either natural gas or No. 2 fuel oil.

5. Maximum sulfur (S) content in the oil shall not exceed 0.8 percent S by weight.

6. Maximum No. 2 fuel oil consumption shall be 78 barrels/hr.

7. Before this construction permit expires, the 49.9 MW combined cycle gas turbine will be tested for particulate matter, sulfur dioxide, VE, carbon monoxide and nitrogen oxides. Except as provided under 40 CFR 60.8(b), the performance tests shall be in accordance with the provisions of the following reference methods in Appendix A of 40 CFR 60.

   a. Method 1. Sample and Velocity Traverses

   b. Method 2. Volumetric Flow Rate

   c. Method 3. Gas Analysis

   d. Reference method 5 must be used to determine the initial compliance status of the unit with respect to the PM standard. Thereafter visible emissions may be used unless 10% opacity is exceeded. In that case compliance must be demonstrated by method 5. Compliance with the opacity limitation will be determined by reference method 9.

   e. Compliance with the sulfur dioxide emission limits will be determined by reference method 20 or by calculations based on fuel analysis (ASTM D2880-77 and 01072-70) for sulfur content.

   f. Compliance with carbon monoxide emission limits will be determined by reference method 10.

   g. Compliance with volatile organic compound emission limits will be assumed provided the CO allowable emission rate is achieved; specific VOC compliance testing is not required.

PERMIT NO.: PSD-FL-087
APPLICANT: Kissimmee Utilities

h. Compliance with the allowable emissions limits for nitrogen oxides shall be conducted using EPA reference method 20 subpart GG Section 60.335.

During performance tests to determine compliance with the proposed standard, measured NO_x emission at 15 percent oxygen will be adjusted to ISO ambient atmospheric conditions by the following correction factor:

$$NO_x = (NO_{x\ obs}) \left(\frac{P_{ref}}{P_{obs}}\right)^{0.5} e^{19\ (H_{obs} - 0.00633)} \left(\frac{TAMB}{288^{\circ}K}\right)^{1.53}$$

where:

NO_x = Emissions of NO_x at 15 percent oxygen and ISO standard ambient conditions.

$NO_{x_{obs}}$ = Measured NO_x emission at 15 percent oxygen, ppmv.

P_{ref} = Reference combustor inlet absolute pressure at 101.3 kilopascals (1 atmosphere) ambient pressure.

P_{obs} = Measured combustor inlet absolute pressure at test ambient pressure.

H_{obs} = Specific humidity of ambient air at test.

e = Transcendental constant (2.718)

T_{AMB} = Temperature of ambient air at test.

Test results will be the average of 3 valid runs. The Department will be notified 30 days in advance of the compliance test. The test will be conducted at permitted capacity ±10%.

8. A continuous monitoring system shall be installed to monitor and record the fuel consumption and the ratio of water to fuel being fired in the turbine.

9. Sulfur and nitrogen content of the fuel being fired in the gas turbine shall be determined and recorded as specified in the NSPS for Gas Turbines 40 CFR 60, Subpart GG, Section 60.334. The records of fuel oil usage will be kept by the company, available for regulatory agency's inspection, for a two year period.

PERMIT NO.: PSD-FL-087
APPLICANT: Kissimmee Utilities

10. The applicant shall comply with all requirements of 40 CFR 60, Subpart GG, Standards of Performance for stationary gas turbines.

11. Reasonable precautions to prevent fugitive particulate emissions during construction such as coating or spraying roads and construction sites used by contractors will be taken by the applicant.

12. The applicant shall report any delays in construction and completion of this unit to the Department's South Florida Subdistrict Office.

13. The applicant will demonstrate compliance with the conditions of the construction permit, and submit a complete application for an operating permit to the Department's South Florida Subdistrict Office prior to 90 days of the expiration date of the construction permit. The applicant may continue to operate in compliance with all terms of the construction permit until its expiration date or issuance of an operating permit.

14. Upon obtaining an operating permit, the applicant will be required to submit periodic test reports on the actual operation and emissions of the facility. These reports will give the data specified in 40 CFR 60.334.

15. The source shall comply with the provisions and requirements of the attached general conditions.

16. Stack sampling facilities will include the eyebolt and angle described in Chapter 17-2.23, FAC.

GENERAL CONDITIONS

1. The permittee shall notify the permitting authority in writing of the beginning of construction of the permitted source within 30 days of such action and the estimated date of start-up of operation.

2. The permittee shall notify the permitting authority in writing of the actual start-up of the permitted source within 30 days of such action and the estimated date of demonstration of compliance as required in the specific conditions.

3. Each emission point for which an emission test method is established in this permit shall be tested in order to determine compliance with the emission limitations contained herein within sixty (60) days of achieving the maximum production rate, but in no event later than 180 days after initial start-up of the permitted source. The permittee shall notify the permitting authority of the scheduled date of compliance testing at least thirty (30) days in advance of such test. Compliance test results shall be submitted to the permitting authority within forty-five (45) days after the complete testing. The permittee shall provide (1) sampling ports adequate for test methods applicable to such facility, (2) safe sampling platforms, (3) safe access to sampling platforms, and (4) utilities for sampling and testing equipment.

4. The permittee shall retain records of all information resulting from monitoring activities and information indicating operating parameters as specified in the specific conditions of this permit for a minimum of two (2) years from the date of recording.

5. If, for any reason, the permittee does not comply with or will not be able to comply with the emission limitations specified in this permit, the permittee shall provide the permitting authority with the following information in writing postmarked within five (5) days of such conditions:

   (a) description of noncomplying emission(s),

   (b) cause of noncompliance,

   (c) anticipated time the noncompliance is expected to continue or, if corrected, the duration of the period of noncompliance,

   (d) steps taken by the permittee to reduce and eliminate the noncomplying emission,

   and

(e) steps taken by the permittee to prevent recurrence of the noncomplying emission.

Failure to provide the above information when appropriate shall constitute a violation of the terms and conditions of this permit. Submittal of this report does not constitute a waiver of the emission limitations contained within this permit.

6. Any change in the information submitted in the application regarding facility emissions or changes in the quantity or quality of materials processed that will result in new or increased emissions must be reported to the permitting authority. If appropriate, modifications to the permit may then be made by the permitting authority to reflect any necessary changes in the permit conditions. In no case are any new or increased emissions allowed that will cause violation of the emission limitations specified herein.

7. In the event of any change in control or ownership of the source described in the permit, the permittee shall notify the succeeding owner of the existence of this permit by letter and forward a copy of such letter to the permitting authority.

8. The permittee shall allow representatives of the state environmental control agency and/or representatives of the Environmental Protection Agency, upon the presentation of credentials:

(a) to enter upon the permittee's premises, or other premises under the control of the permittee, where an air pollutant source is located or in which any records are required to be kept under the terms and conditions of the permit;

(b) to have access to and copy at reasonable times any records required to be kept under the terms and conditions of this permit, or the Act;

(c) to inspect at reasonable times any monitoring equipment or monitoring method required in this permit;

(d) to sample at reasonable times any emission of pollutants;

and

(e) to perform at reasonable times an operation and maintenance inspection of the permitted source.

All correspondence required to be submitted by this permit to the permitting agency shall be mailed to the:

Chief, Air Facilities Branch
Air and Waste Management Division
U. S. Environmental Protection Agency
Region IV
345 Courtland Street, NE
Atlanta, GA 30365

10. The conditions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances and the remainder of this permit, shall not be affected thereby.

The emission of any pollutant more frequently or at a level in excess of that authorized by this permit shall constitute a violation of the terms and conditions of this permit.

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

January 11, 1982

Mr. Kent Williams, Chief
New Source Review Section
Air Facilities Branch
U.S. Environmental Protection
Agency, Region IV
345 Courtland Street
Atlanta, Georgia 30365

Dear Mr. Williams:

RE: PSD Permit Application - Kissimmee Utilities - PSD-FL-087

Enclosed please find a copy of the proof of publication of the public notice, the public comments and the Department's response to the public comments and Final Determination for the subject project. We recommend that the applicant be granted Authority to Construct, subject to the conditions in the Final Determination.

Sincerely,

C. H. Fancy, P.E.
Central Air Permitting

CHF:caa

SENTINEL STAR
Published Daily
Kissimmee, Osceola County, Florida

ADVERTISING CHARGE $22.13

State of Florida } SS.
COUNTY OF ORANGE

Before the undersigned authority personally appeared

Betty M. Kinney, who on oath says that she is the Legal Advertising Representative of the Sentinel Star, a Daily newspaper published at Kissimmee, in Osceola County, Florida; that the attached copy of advertisement, being a Public Notice in the matter of

A Modification to an existing air pollution source, etc.

in the Court, was published in said newspaper in the issues of

October 28, 1981

Affiant further says that the said Sentinel Star is a newspaper published at Kissimmee, in said Osceola County, Florida, and that the said newspaper has heretofore been continuously published in said Osceola County, Florida, each Week Day and has been entered as second-class mail matter at the post office in Kissimmee in said Osceola County, Florida, for a period of one year next preceding the first publication of the attached copy of advertisement; and affiant further says that he/she has neither paid nor promised any person, firm or corporation any discount, rebate, commission or refund for the purpose of securing this advertisement for publication in the said newspaper.

Betty M. Kinney

Sworn to and subscribed before me this 30th day of December A.D., 1981

Naomi C. Parks
Notary Public

Seal

Notary Public, State of Florida at Large
My Commission Expires Jan. 21, 1984

PUBLIC NOTICE

A modification to an existing air pollution source is being proposed by Kissimmee Utilities located in the City of Kissimmee, Osceola County, Florida. The proposed modification is the construction of a 49.9 MW combined cycle gas turbine. The modification will increase emissions of air pollutants, in tons per year, by the following amounts:

PM	SO_2	NO_x	CO	VOC
69	1700	1095	227	82

The proposed modification has been reviewed by the Florida Department of Environmental Regulation (FDER) under Chapter 403, Florida Statutes, and Federal regulation 40 CFR 52.21, Prevention of Significant Deterioration (PSD) The Department has made a preliminary determination that the construction can be approved provided certain conditions are met. A summary of the basis for the determination and the application for State and Federal permits submitted by Kissimmee Utilities are available for public review at the following offices:

Bureau of Air Quality Management
Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, Florida 32301

South Florida Subdistrict
Dept. of Environmental Regulation
2745 S. E. Morningside Blvd.
Port St. Lucie, Florida 33452

Kissimmee Public Library
305 E. Broadway
Kissimmee, Florida 32741

The maximum percentages of allowable PSD increments consumed by the proposed modification will be as follows:

	Annual	24-Hour	3-Hour
PM	Negligible	Negligible	NA
SO_2	5	11	9

Any person may submit written comments to FDER regarding the proposed modification. All comments, postmarked not later than 30 days from the date of notice, will be considered by FDER in making a final determination regarding approval for construction of this source. Those comments will be made available for public review on request. Furthermore, a public hearing can be requested by any person. Such request should be submitted within 14 days of the date of this notice. Letters should be addressed to:

Mr. C. H. Fancy
Bureau of Air Quality Management
Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, Florida 32301

OS-37 Oct. 28, 1981

Response to Public Comment

Kissimmee Utilities

PSD-FL-087

Comments were received from Michael H. Dybevick, Environmental Science and Engineering, Inc. (ESE) and Mr. Tommie Gibbs of U.S. Environmental Protection Agency.

Mr. Dybevick questioned the Department's specific conditions in the Preliminary Determination.

The areas of question and DER's responses are as follows:

Comment

ESE request that condition No. 9 be modified to more nearly reflect the requirements of 40 CFR, Part 60, Subpart GG, Section 60.334 on which it is based. Specifically, they request 1) the requirement for determining the fuel heating value be deleted, 2) the option for developing a custom sampling schedule based on substantiating data be included, and 3) the provision for sampling only on each occasion that fuel is transferred to bulk storage be included.

Response

The Department considered the comments indicated above and modified specific condition No. 9 as follows:

> Sulfur and nitrogen content of the fuel being fired in the gas turbine shall be determined and recorded as specified in the NSPS for Gas Turbines 40 CFR 60, Subpart GG, Section 60.334. The records of fuel oil usage will be kept by the company, available for regulatory agency's inspection, for a two year period.

This does not require analysis for fuel heating value. Regarding comment No. 2 and 3, the waiver of compliance test requirements may be accomplished in accordance with section 60.334(b)(1) and (2). Therefore, this option is available to the applicant and no change to the specific conditions is required.

Mr. Gibbs commented on the specific condition 3, plant operation time, and specific condition 7, compliance test.

Comment

Continuous operation is 8,760 hours per year.

Response

The specific condition states the plant will be allowed to operate continuously (8,736 hours per year). We believe the statement "operate continuously" expresses the Department's intent that there is no time limitation on the operation of the generator and have not changed the condition in the final determination.

Comment

EPA asked if the required VE test should be a VOC test.

Response

The Department's intent was to require a VE test and thus the specific condition was not changed. The condition stated under what circumstances a VOC test will be requested.

Conclusion

The comments received were considered as indicated above in the development of the Department's Final Determination for the proposed construction of a 49.9 MW Combined Cycle Gas Turbine by Kissimmee Utilities.

Final Determination

Kissimmee Utilities

49.9 MW Combined Cycle Gas Turbine

Federal Permit Number:

PSD-FL-087

Florida Department of Environmental Regulation

Bureau of Air Quality Management

Central Air Permitting

January 11, 1982

Table of Contents

I. SYNOPSIS OF APPLICATION

A. Name and Address of Applicant

Kissimmee Utilities
P. O. Box 1608
Kissimmee, Florida 32741

B. Source Location

The proposed source is located at 112 Ruby Street in the City of Kissimmee, in Osceola County, Florida. The UTM coordinates are: Zone 17-460.1 Km East and 3,129.3 Km North.

C. Project Description

The applicant proposes to install and operate a combined cycle combustion gas turbine, with a total net generating capacity of 46.5 megawatts (MW) and a gross generating capacity of 49.9 MW. The turbine will be fired with natural gas. No. 2 fuel oil, having a maximum sulfur content of 0.8 percent, will be used as a standby fuel. The maximum heat input will be 441.7 MMBTU/hr (LHV).

Kissimmee Utilities (KU) currently operates 12 diesel generating units with a total output rated at 26.8 MW at this site.

II. APPLICABILITY

A. Federal Regulations

The proposed project is subject to preconstruction review under federal Prevention of Significant Deterioration (PSD) regulations, Section 52.21 of Title 40 of the Code of Federal Regulations as amended in the Federal Register of August 7, 1980 (45 CFR 52.21). Specifically, Kissimmee Utilities' combined cycle combustion gas turbine is a major stationary source (40 CFR 52.21(b)(1)) located in an area currently designated as attainment in accordance with 40 CFR 81.310 for all criteria pollutants regulated under the Clean Air Act (CAA).

The proposed source will be a major modification (40 CFR 52.21(b)(2)) for particulate matter (PM), sulfur dioxide (SO_2), nitrogen oxides (NO_x), Beryllium (Be), volatile organic compounds (VOC), and carbon monoxide (CO). Emissions of PM, SO_2, NO_x, Be, VOC and CO will increase above the significant criteria set in the PSD regulations. Therefore, the proposed project is subject to PSD review for these pollutants.

This review consists of a determination of Best Available Control Technology (BACT) and unless otherwise exempted, an analysis of the air quality impact of the increased emissions. No air quality impact analysis is required for ozone, even though there will be a significant increase in VOC emissions, because this increase is less than 100 tons per year. The review also includes an analysis of the project's impacts on soils, vegetation and visibility along with air quality impacts resulting from associated commercial, residential and industrial growth.

The proposed project is also subject to the provisions of the federal New Source Performance Standard (NSPS) for gas turbines, 40 CFR 60, Subpart GG.

B. State Regulations

The proposed project is subject to preconstruction review under the provisions of Chapter 403, Florida Statutes, and Chapter 17-2, Florida Administrative Code. Specifically, the proposed source is a major emitting facility for NO_x and SO_2 as defined in Chapter 17-2 because the potential emissions of each pollutant exceed 250 tons per year. The source is located in the area of influence of the Orange County ozone nonattainment area.

This project is subject to the provisions of Subsection 17-2.04(6), Prevention of Significant Deterioration (PSD) review, which requires the use of Best Available Control Technology (BACT). The source is also subject to the provisions of the federal New Source Performance Standards (NSPS) for gas turbines, 40 CFR 60, Subpart GG. This NSPS has been adopted by reference in Section 17-2.21.

The proposed source is exempt from the provisions of Section 17-2.17, New Source Review for Nonattainment Areas, by Section 17-2.17(1)(c)2.a.

III. SOURCE IMPACT ANALYSIS

A. Emissions Limitations

The operation of the proposed combined cycle gas turbine, will produce emissions of particulate matter (PM), sulfur dioxide (SO_2), nitrogen oxides (NO_x), beryllium (Be), Mercury (Hg), carbon monoxide (CO) and volatile organic compounds (VOC) to the atmosphere.

Table 1 summarizes potential to emit of all pollutants regulated under the Act which are affected by the proposed source.

Best Available Control Technology (BACT) has been determined for NO_x, SO_2, PM, VOC, Be and CO. The emission limiting standards selected as BACT and made a condition of the permit are listed in Table 2. Justification for the standards selected is included in Technical Appendix A.

The permitted emissions, including those determined as BACT, are in compliance with New Source Performance Standard (NSPS) requirements of 40 CFR 60, Subpart GG.

B. Air Quality Impacts

An air quality impacts analysis has been performed to evaluate the impact of the proposed project on ambient concentrations of NO_x, SO_2, PM, CO and Be. Dispersion modeling was used to evaluate the impacts.

Results of the analysis provide reasonable assurance that the project, as described in this permit and subject to the conditions herein, will not lead to any violation of National Ambient Air Quality Standards or PSD increments. Details of the analysis are discussed in the Technical Appendix B.

Table 1

SUMMARY OF EMISSIONS

(tons per year)

Pollutant	Potential Emissions[a]				Significance Level[e]
	Fuel Oil No. 2 - Fired		Natural Gas - Fired		
	(Before Control)	(After Control)	(Before Control)	(After Control)	
NO_x[b]	2,580	1,340	2,480	1,290	40
SO_2[c]	1,700	1,700	21	21	40
PM	69	69	30	30	25
VOC	74	74	82	82	40
CO	207	207	227	227	100
Mercury[d]	0.002	0.002	0.02	0.02	0.1
Beryllium[d]	0.0006	0.0006	-		0.0004

(a) Potential emissions in accordance with state and federal definitions as estimated by the applicant.

(b) A 48 percent emission reduction is expected with the proposed water injection technique.

(c) Assumed natural gas has 0.01 percent sulfur content. Fuel oil calculations based on total conversion of 0.8 percent sulfur in fuel oil to sulfur dioxide.

(d) Emissions calculated based on emissions factors from Stationary Conventional Combustion Processes, EPA, -450/2-80-074.

(e) 40 CFR 52.21(b)(23).

Table 2

ALLOWABLE EMISSION LIMITS

49.9 MW Combined Cycle Combustion Turbine

Pollutant	Standard	Gas Turbine[a]	Gas Turbine and Boiler[b]	Basis
NO_x [a]	$0.0075\ (\frac{14.4}{Y})$ + F	129 PPM at 15 percent oxygen on a dry basis	250 lb/hr	NSPS, BACT
SO_2	0.8 percent S by weight 0.015 percent by volume at 15 percent oxygen on a dry basis	0.8 percent S by weight	388 lb/hr	NSPS, BACT
PM	20% Opacity	-	16 lb/hr	BACT, Chapter 17-2
VOC	-	-	19 lb/hr	BACT
CO	-	-	52 lb/hr	BACT
Mercury (Hg)	-	-	0.0004 lb/hr	Estimated by Applicant
Beryllium (Be)	-	-	0.000145 lb/hr	BACT

(a) The allowable NO_x emission rate for the gas turbine was determined by the following formula:

$STD = 0.0075\ (\frac{14.4}{Y}) + F$ where:

STD = allowable NO_x emissions (percent by volume at 15 percent oxygen and on a dry basis).

Y = manufacturer's rated heat rate at manufacturer's rated load (kilojoules per watt hour) or, actual measured heat rate based on lower heating value of fuel as measured at actual peak load for the facility. The value of Y shall not exceed 14.4 kilojoules per watt hour. The efficiency factor must be based on the gas turbine efficiency itself, not the overall efficiency of the gas turbine combined with other equipment.

F = NO_x emission allowance for fuel-bound nitrogen as follows:

Fuel-bound nitrogen (Percent by weight)	F (NO_x percent by volume)
$N \leq 0.015$	0
$0.015 < N \leq 0.1$	0.04(N)
$0.1 < N \leq 0.25$	0.04+0.0067(N-0.1)
$N > 0.25$	0.005

where: N = the nitrogen content of the fuel (percent by weight)

(b) Emission rates based on continuous firing of 100 percent fuel oil No. 2 as estimated by the applicant.

C. Additional Impact Analysis

An additional impacts analysis has been performed to assess (1) the impact of the proposed project on soils, vegetation, and visibility and (2) any air quality impacts resulting from associated commercial, residential, or industrial growth. No adverse impacts are expected; details of the analysis are discussed in Technical Appendix C.

IV. CONCLUSIONS

Based on review of the data submitted by Kissimmee Utilities for the installation and operation of a 49.9 MW combined cycle gas turbine, the FDER concludes that compliance with all applicable federal and state air quality regulations will be achieved provided certain specific conditions are met. The NSPS emission limits for NO_x, SO_2, and the permitted emissions limits of 0.0004 lb/hr for Hg, 0.000145 lb/hr, for Be, 16 lb/hr for PM, 19 lb/hr for VOC and 52 lb/hr for CO have been determined to be Best Available Control Technology (BACT) for this source. The impact of the emissions from the 49.9 MW combined cycle gas turbine will not cause or contribute to a violation of any ambient air quality standard or PSD increment. Appendix D includes the proposed general and specific conditions in the Federal Permit (PSD-FL-087).

TECHNICAL APPENDIX A

FEDERAL BACT ANALYSIS

The applicant is required, under the provisions of 40 CFR 52.21, as revised August 7, 1980 (45 FR 52676), to apply BACT to all criteria and noncriteria pollutants emitted in significant levels. BACT is determined for each pollutant on a case-by-case review taking into account energy, environmental and economic impacts.

The applicant has proposed BACT for each applicable pollutant and has presented justification for the standards selected. The Department of Environmental Regulation (DER) has reviewed and accepted the technology and emission limits proposed as BACT. The federal PSD permit shall include these limits or any more stringent emission standards that are imposed by the State of Florida. These limits are summarized in Table 2. A discussion of the BACT for each pollutant follows:

PM Control

The BACT limitation proposed for particulate matter (PM), 16 lb/hr, is based upon emission for Stationary Gas Turbines AP-42.

Particulate emissions from stationary gas turbines depend on the ash content of the fuel which are minimal for the proposed fuels. The applicant has reported an ash percentage of less than 0.1 in the fuel oil analysis. Therefore, FDER feels that the applicant proposed 0.0362 lb/MMBTU (16 lb/hr) emission limit for PM is reasonable as BACT.

Carbon Monoxide and Hydrocarbon Control

The applicant proposes emissions levels for carbon monoxide (CO) and volatile organic compounds (VOC) based on emission estimates from Stationary Gas Turbines AP-42.

CO and HC emissions are function of combustion efficiency. The higher the percentage of peak load at which a turbine operates, the more efficient the combustion of the fuel.

HC and CO emissions from stationary gas turbines operating at peak load are relatively low. Gas turbines normally operate at 80 to 100 percent of peak load with HC emission averaging less than 50 ppm and CO emission averaging less than 500 ppm concentration at 15 percent oxygen.

Based on the above facts, FDER agrees that emission limits of 0.1177 lb/MMBTU (52 lb/hr) for CO and 0.043 lb/MMBTU (19 lb/hr) for VOC constitute BACT for the proposed source.

SO_2 Control

The applicant proposes an emission limit of 388 lb SO_2/hr and 0.8 percent sulfur content in the fuel oil. The basis of this proposed emission limit is found in the AP-42 emission factors for Stationary Gas Turbines and NSPS for Gas Turbines.

SO_2 emissions from stationary gas turbines depend on the sulfur content of the fuel since nearly 100 percent of the sulfur is converted to SO_2 during the combustion process. Due to the high volumes of exhaust gases, the cost of flue gas desulfurization (FGD) is considered unreasonable. Therefore, FDER concurs with the applicant NSPS selection of low sulfur oil (0.8%S), and of 0.015 percent SO_2 by volume at 15 percent O_2, on a dry basis as BACT for the proposed source.

NO_x Control

The applicant proposes to control NO_x with a wet control technique (water injection) and limiting the maximum fuel-bound nitrogen content to 0.25 percent.

Total NO_x emissions from any combustion source, including stationary gas turbines, are a function of both thermal NO_x and organic NO_x formation. Thermal NO_x is formed by a high temperature reaction between nitrogen and oxygen from the combustion air. Organic NO_x, however, is formed by the oxidation of fuel-bound nitrogen during combustion.

NO_x formation within a turbine generally increases exponentially with increased pressure and temperature. High efficiency turbines, therefore, generally discharge gases with higher NO_x concentrations than low efficiency turbines. Since the

relative fuel consumption of gas turbines varies linearly with efficiency, an adjustment factor was selected (NSPS) that permitted increased NO_x emissions for the efficient turbines.

Gas turbines with waste heat recovery (combined cycle gas turbine) have a higher overall efficiency than the gas turbine alone. The application of the efficiency adjustment factor to the entire system would permit greater NO_x emission. The efficiency adjustment factor in the selected NSPS must be based on the gas turbine efficiency itself, not the overall efficiency of a gas turbine combined with other equipment. This consideration is discussed at length in the preamble to the selected NSPS for stationary gas turbines.

Based on the above facts, the KU gas turbine would actually be allowed an emission rate of 129 PPM due to the efficiency adjustment factor, which is an increase of the nominal 75 PPM NO_x emission by 5.64%. Therefore, FDER determines that the selected NSPS emission limit of 129 PPM or 0.0075 $\frac{(14)}{Y}$ + F at 15% oxygen on a dry basis (see formula, Table 2) is BACT for this source when using No. 2 fuel oil containing 0.25 percent nitrogen.

Beryllium Control

The applicant proposes an emission limit of 0.00015 lb/hr for beryllium based on the emission factor from Stationary Combustion Processes (EPA 450/2-80-074).

Since beryllium emissions from gas turbines were not selected for control by standards of performance and there is not an applicable National Emission Standards for Hazardous Air Pollutants (NESHAP) for beryllium emission from gas turbines, FDER accepts the applicant's proposed 3.4×10^{-7} lb/MMBTU as BACT for this source.

Best Available Control Technology (BACT) Determination

Kissimmee Utilities

Osceola County

Kissimmee Utilities, Kissimmee, Florida, plans to increase their existing electric generating capability by an additional 49.9 gross megawatts. The proposed supplementary-fired combined cycle gas turbine system is composed of one 400 million Btu/hr heat input gas turbine (30.9 megawatt gross output) from which the exhaust gases discharge into a waste heat boiler. The steam produced will operate two steam turbines each producing 9.5 megawatt gross output. The boiler has a 41.7 million Btu per hour supplemental heat source to generate additional steam.

The system will fire natural gas with No. 2 oil as stand-by fuel. Hourly fuel consumption at maximum firing will be 0.491 million cubic feet or gas or 78 barrels of oil. The system is scheduled to operate 8,760 hours per year.

BACT Determination Requested by the Applicant:

Pollutant	Emission Limit
NO_x	NSPS % by volume = 0.0075 (14.4/Y) + F Y = heat rate at peak load (kJ/watt-hr) F = fuel-bound nitrogen allowance
SO_2	0.8% maximum fuel sulfur content

Date of Receipt of a BACT Application:

August 13, 1981

Date of Publication in the Florida Administrative Weekly:

September 4, 1981

Review Group Members:

There have been no significant technology improvements since the promulgation of the applicable NSPS to justify a formal review group. Comments were obtained from the New Source Review Section and the Air Modeling Section.

BACT Determination by DER:

Pollutant	Emission Limit
NO_x	NSPS Subpart GG, subsection 60.332(a)(1).
SO_2	No. 2 fuel oil with sulfur content not to exceed 0.8%.
Visible Emissions	Maximum 20% opacity.

Justification of DER Determination:

Nitric oxides produced by the combustion of fuel in the gas turbine are formed by the combination of nitrogen and oxygen in the combustion air. NO_x is also formed from the reaction of the nitrogen in the fuel with the oxygen in the combustion air. Formation of the latter NO_x will be minimized by the applicant's use of natural gas or distillate oil as fuel, both of which have low nitrogen content.

NO_x formation is extremely sensitive to flame temperature, therefore injecting water or steam into the gas turbine reaction zone will reduce production of NO_x. The use of the wet control technique to reduce NO_x emissions to or below the NSPS limits is determined to be BACT.

The SO_2 emissions from the gas turbine are strictly a function of the fuel sulfur content. Flue gas desulfurization systems are economically unattractive compared to the cost of low sulfur fuels. The firing of natural gas or No. 2 oil containing a maximum of 0.8% sulfur is determined as BACT.

The reduction of NO_x emissions results in an increase in CO emissions. CO emissions are considered to be a local problem since CO readily reacts to form CO_2. NO_x emissions, however, are linked to the formation of photochemical oxidants and are subject to long range transport. As a result of this trade-off, no emission limit for CO is specified in this determination.

Test methods for NO_x emissions are per NSPS, Subpart GG. Oil analysis by the applicant's fuel supplier or natural gas consumption records can be used to determine compliance with SO_2 emission limit. Compliance with the opacity limitation will be determined in accordance with 40 CFR 60, Appendix A; Method 9.

Details of the Analysis May be Obtained by Contacting:

Edward Palagyi, BACT Coordinator
Department of Environmental Regulation
Bureau of Air Quality Management
2600 Blair Stone Road
Tallahassee, Florida 32301

Recommended By:

Steve Smallwood, Chief, BAQM

Date:

10/2/81

Approved:

Victoria Tschinkel, Secretary

Date:

10/5/81

SS:caa

APPENDIX B

AIR QUALITY IMPACT ANALYSIS

A. Summary

The State PSD review for PM and SO_2 requires an air quality impact analysis which includes a PSD increment analysis and a Florida Ambient Air Quality Standards (FAAQS) analysis. The State PSD increment and FAAQS analyses depend on air quality modeling carried out in accordance with FDER-approved methods.

The air quality impact analysis required under federal PSD review for PM, SO_2, CO, NO_x, and Beryllium (Be) includes:

- An analysis of existing air quality;
- A PSD increment analysis (for PM and SO_2 only);
- A National Ambient Air Quality Standards (NAAQS) analysis; and,
- An analysis of impact on soils, vegetation and visibility and growth-related air quality impacts.

The analysis of existing air quality may require preconstruction monitoring; the PSD and NAAQS analyses depend on air quality modeling carried out in accordance with EPA-approved methods. Federal PSD review also requires a good engineering practice (GEP) stack height evaluation.

Based on these required State and federal air quality impact analyses, FDER has reasonable assurance that the KU modification, as described in this permit and subject to the conditions of approval proposed herein, will not cause or contribute to a violation of any State or federal PSD increment or ambient air quality standard. A discussion of the required analyses follows.

B. Discussion

1. Modeling Methodology

Two FDER and EPA-approved dispersion models were used in the State and federal air quality impact analyses. These were the Single-Source (CRSTER) and Industrial Source Complex (ISC) models.

These models were used to determine the maximum predicted annual concentrations and to identify the absolute worst-case short-term meteorological conditions which would affect emissions from KU after the proposed modification is completed. They were also used to identify days on which meteorological conditions produced worst-case short-term KU impacts in the vicinity of the facility with interacting sources located directly upwind.

The maximum short-term impacts due to emissions from KU and all major interacting sources were analyzed using a refined grid spacing of 0.1 to 0.2 kilometers between receptors and only the days on which worst-case meteorological conditions occurred.

Since worst-case impacts for each pollutant subject to analysis occur under different fuel burning conditions, modeling and analysis for each of these pollutants was performed using the worst-case fuel.

The surface meteorological data used in the models were National Weather Service data collected at Orlando, Florida during the period 1974-78. Upper air meteorological data used in the models were collected during the same time period at Tampa, Florida.

Final stack parameters and emission rates used in evaluating the proposed KU modification are contained in Tables B-1 and B-2.

Table B-1

Stack Parameters for Kissimmee Utilities - Baseline Case

Emissions Unit	Stack Height (m)	Stack Diameter (m)	Exit Velocity (m/s)	Exit Temperature (K)	Emission Rate (g/sec) SO_2	PM
Unit #7	13.11	.61	16.30	466.50	.87	.52
Units #8,#9	16.15	.85	17.60	477.60	3.36	2.01
Units #10,#11	7.01	.76	9.60	466.50	2.28	1.36
Units #14-#18	13.41	.80	8.70	505.40	5.37	3.21
Units #19,#20	8.69	.90	17.20	505.40	2.89	1.73

Table B-2

Stack Parameters for Kissimmee Utilities - Projected Case

Emissions Unit	Stack Height (m)	Stack Diameter (m)	Exit Velocity (m/s)	Exit Temperature (K)	Emission Rate (g/sec) SO_2	PM	NO_x	CO
Unit #7	13.11	.61	16.30	466.50	.87	.52	4.46	.79
Units #8,#9	16.15	.85	17.60	477.60	3.36	2.01	17.10	3.16
Units #10,#11	7.01	.76	9.60	466.50	2.28	1.36	10.58	2.12
Units #14-#18	13.41	.80	8.70	505.40	5.37	3.21	11.34	5.45
Units #19,#20	8.69	.90	17.20	505.40	2.89	1.73	14.66	2.64
Combustion Turbine	~~9.14~~ 18.29	~~2.44~~ 3.66	38.03	422.00	48.9	~~1.98~~ 2.77	30.70	~~6.53~~ 10.08

2. Analysis of Existing Air Quality

In order to evaluate existing air quality in the area of a proposed project, FDER may require a period of continuous preconstruction monitoring for any pollutant subject to PSD review. An exemption from this requirement may be obtained if the net emissions increase of the pollutant from the modification would cause an air quality impact less than a certain de minimus level as defined in 40 CFR 52.21(i)(8). Based on the modeling results shown in the following table, this exemption is applicable to the proposed modification for all of the pollutants subject to PSD review. Therefore, no preconstruction monitoring has been required.

Projected Air Quality Impacts From Combustion Turbine

Pollutant	Averaging Time	Projected Impact (ug/m^3)	De Minimus Level (ug/m^3)
SO_2	24-hour	10	13
TSP	24-hour	< 1	10
NO_x	24-hour	6	14
CO	8-hour	< 610	575
Be	24-hour	< 0.0005	.0005

There are no FDER or EPA-approved TSP, SO_2, NO_x, or CO monitors within 25 kilometers of the KU facility. Since the KU facility is located in a remote area with respect to non-specified sources, FDER has assumed the following pollutant background values: 0 ug/m^3 for CO, 20 ug/m^3 for SO_2 and NO_x, 40 ug/m^3 for TSP. These background values are used for all

averaging times and are consistent with EPA monitoring guidelines. FDER assumed no background value for the non-criteria pollutant, Be.

3. PSD Increment Analysis

Both the State and federal PSD increment analyses pertain to PM and SO_2 for which maximum allowable increases (increments) are defined. The proposed KU modification will be located in an area where the Class II increments apply. The nearest Class I area is more than 100 kilometers away from the proposed site.

The predicted maximum TSP and SO_2 increment consumption is the same in both the State and federal PSD increment analyses. Increment consumption at KU is affected by the construction of the combustion turbine alone.

As shown in the following table, modeling results predict that the maximum TSP and SO_2 increment consumption will not exceed allowable increments. The highest, second-highest short-term predicted concentrations are given in the table since five years of meteorological data were used in the modeling.

Maximum Increment Consumption

(ug/m^3)

State and Federal

OK

	Averaging Time		
Pollutant	3-hour	24-hour	Annual
SO_2: Maximum KU Impact	44	10	< 1
SO_2: Allowable Class II Increment	512	91	20
PM: Maximum KU Impact	NA	< 1	< 1
PM: Allowable Class II Increment	NA	37	19

There are other increment consuming sources within the vicinity of KU. Even though these sources consume increment in the area around KU, this consumption is very small. The combined impacts of these sources and KU in the interacting directions are less than the maximum increment consumed by KU only.

The nearest Class I area is Chassahowitza National Wilderness Area which is 125 kilometers away from KU. At this distance, it can be assumed that no Class I increment will be consumed as a result of emissions from KU.

4. Ambient Air Quality Standards Analysis

Both State and federal PSD regulations require the permit applicant to demonstrate that, given existing air quality in an area, a proposed emissions increase subject to PSD review will not cause or contribute to any violation of ambient air quality standards. For the proposed project at KU, an ambient air quality standards analysis is required for PM, SO_2, CO, NO_x, and Be.

As shown in the following table, modeling results predict that maximum ground-level concentrations for each of these pollutants will be below both the FAAQS and NAAQS. The highest, second-highest short-term predicted values are given in this table since five years of meteorological data were used in the modeling.

Pollutant	Averaging Time	Projected Air Quality* (ug/m^3)	NAAQS (ug/m^3)	FAAQS (ug/m^3)
SO_2	annual	40	80	60
	24-hour	155	365	260
	3-hour	392	1300	1300
TSP	annual	52	75	60
	24-hour	121	150	150
NO_2	annual	89	100	100
CO	8-hour	< 500	10,000	10,000
	1-hour	< 1000	40,000	40,000
Be	24-hour	< 0.0005**	N/A	N/A

*Includes background concentrations of 40 ug/m^3 for annual and 24-hour TSP, 20 ug/m^3 for SO_2 for all averaging times, and 20 ug/m^3 for NO_2.

** Air quality impact calculated for the proposed modification only.

Modeling was also performed to evaluate the impacts of interactions of emissions from other sources with those from KU. Maximum contributions from surrounding sources are very small compared to maximum ground-level concentrations from KU and they occur in non-critical directions. Therefore, no violations are predicted to occur due to interacting sources.

5. Good Engineering Practice Stack Height Evaluation

The stack height proposed for the KU combustion turbine is less than the Good Engineering Practice (GEP) stack height of 65 meters for stacks uninfluenced by structures or terrain. A building downwash analysis was not performed since the new stack will not be within the area of influence of any structure with the potential to cause downwash conditions.

APPENDIX C

ANALYSIS OF IMPACT ON SOILS, VEGETATION AND VISIBILITY AND GROWTH-RELATED AIR QUALITY IMPACTS

The maximum impact of the proposed modification, as demonstrated through the air quality analysis, will be below the national secondary air quality standards for PM and SO_2. These standards were established to protect public welfare related values. Also, the maximum impact of the proposed modification on NO_2, CO, and Be concentrations will be insignificant. Therefore, no adverse effects on soils, vegetation and visibility is expected.

There will be no increase in the number of employees at this site due to the project. Therefore no secondary residential, commercial or industrial growth which will adversely affect air quality in the area is expected.

APPENDIX D

SPECIFIC CONDITIONS

FDER proposes a final determination of approval with conditions for the project (construction of a 49.9 MW combined cycle gas turbine) requested by Kissimmee Utilities in the complete permit applications submitted on August 13, 1981 (federal application) and August 31, 1981 (state application).

Special conditions listed in the State permit AC 49-46521, are adopted as special conditions for the federal permit, PSD-FL-087, for this source.

The attached General Conditions (federal) are also made a part of the proposed federal permit PSD-FL-087.

PERMIT NO.: PSD-FL-087
APPLICANT: Kissimmee Utilities

SPECIFIC CONDITIONS:

1. The new source shall be constructed in accordance with the capacities and specifications stated in the application.

2. The maximum emission rates for the 49.9 MW combined cycle gas turbine shall not exceed the emission limits listed in Table 2 of the preliminary determination.

3. The plant shall be allowed to operate continuously (8736 hours per year).

4. The source shall be allowed to use either natural gas or No. 2 fuel oil.

5. Maximum sulfur (S) content in the oil shall not exceed 0.8 percent S by weight.

6. Maximum No. 2 fuel oil consumption shall be 78 barrels/hr.

7. Before this construction permit expires, the 49.9 MW combined cycle gas turbine will be tested for particulate matter, sulfur dioxide, VE, carbon monoxide and nitrogen oxides. Except as provided under 40 CFR 60.8(b), the performance tests shall be in accordance with the provisions of the following reference methods in Appendix A of 40 CFR 60.

   a. Method 1. Sample and Velocity Traverses

   b. Method 2. Volumetric Flow Rate

   c. Method 3. Gas Analysis

   d. Reference method 5 must be used to determine the initial compliance status of the unit with respect to the PM standard. Thereafter visible emissions may be used unless 10% opacity is exceeded. In that case compliance must be demonstrated by method 5. Compliance with the opacity limitation will be determined by reference method 9.

   e. Compliance with the sulfur dioxide emission limits will be determined by reference method 20 or by calculations based on fuel analysis (ASTM D2880-77 and 01072-70) for sulfur content.

   f. Compliance with carbon monoxide emission limits will be determined by reference method 10.

   g. Compliance with volatile organic compound emission limits will be assumed provided the CO allowable emission rate is achieved; specific VOC compliance testing is not required.

h. Compliance with the allowable emissions limits for nitrogen oxides shall be conducted using EPA reference method 20 subpart GG Section 60.335.

During performance tests to determine compliance with the proposed standard, measured NO_x emission at 15 percent oxygen will be adjusted to ISO ambient atmospheric conditions by the following correction factor:

$$NO_x = (NO_{x\ obs}) \left(\frac{P_{ref}}{P_{obs}}\right)^{0.5} e^{19\,(H_{obs} - 0.00633)} \left(\frac{TAMB}{288^{\circ}K}\right)^{1.53}$$

where:

NO_x = Emissions of NO_x at 15 percent oxygen and ISO standard ambient conditions.

$NO_{x_{obs}}$ = Measured NO_x emission at 15 percent oxygen, ppmv.

P_{ref} = Reference combustor inlet absolute pressure at 101.3 kilopascals (1 atmosphere) ambient pressure.

P_{obs} = Measured combustor inlet absolute pressure at test ambient pressure.

H_{obs} = Specific humidity of ambient air at test.

e = Transcendental constant (2.718)

T_{AMB} = Temperature of ambient air at test.

Test results will be the average of 3 valid runs. The Department will be notified 30 days in advance of the compliance test. The test will be conducted at permitted capacity $\pm$10%.

8. A continuous monitoring system shall be installed to monitor and record the fuel consumption and the ratio of water to fuel being fired in the turbine.

9. Sulfur and nitrogen content of the fuel being fired in the gas turbine shall be determined and recorded as specified in the NSPS for Gas Turbines 40 CFR 60, Subpart GG, Section 60.334. The records of fuel oil usage will be kept by the company, available for regulatory agency's inspection, for a two year period.

10. The applicant shall comply with all requirements of 40 CFR 60, Subpart GG, Standards of Performance for stationary gas turbines.

11. Reasonable precautions to prevent fugitive particulate emissions during construction such as coating or spraying roads and construction sites used by contractors will be taken by the applicant.

12. The applicant shall report any delays in construction and completion of this unit to the Department's South Florida Subdistrict Office.

13. The applicant will demonstrate compliance with the conditions of the construction permit, and submit a complete application for an operating permit to the Department's South Florida Subdistrict Office prior to 90 days of the expiration date of the construction permit. The applicant may continue to operate in compliance with all terms of the construction permit until its expiration date or issuance of an operating permit.

14. Upon obtaining an operating permit, the applicant will be required to submit periodic test reports on the actual operation and emissions of the facility. These reports will give the data specified in 40 CFR 60.334.

15. The source shall comply with the provisions and requirements of the attached general conditions.

16. Stack sampling facilities will include the eyebolt and angle described in Chapter 17-2.23, FAC.

GENERAL CONDITIONS

1. The permittee shall notify the permitting authority in writing of the beginning of construction of the permitted source within 30 days of such action and the estimated date of start-up of operation.

2. The permittee shall notify the permitting authority in writing of the actual start-up of the permitted source within 30 days of such action and the estimated date of demonstration of compliance as required in the specific conditions.

3. Each emission point for which an emission test method is established in this permit shall be tested in order to determine compliance with the emission limitation contained herein within sixty (60) days of achieving the maximum production rate, but in no event later than 180 days after initial start-up of the permitted source. The permittee shall notify the permitting authority of the scheduled date of compliance testing at least thirty (30) days in advance of such test. Compliance test results shall be submitted to the permitting authority within forty-five (45) days after the complete testing. The permittee shall provide (1) sampling ports adequate for test methods applicable to such facility, (2) safe sampling platforms, (3) safe access to sampling platforms, and (4) utilities for sampling and testing equipment.

4. The permittee shall retain records of all information resulting from monitoring activities and information indicating operating parameters as specifed in the specific conditions of this permit for a minimum of two (2) years from the date of recording.

5. If, for any reason, the permittee does not comply with or will not be able to comply with the emission limitations specified in this permit, the permittee shall provide the permitting authority with the following information in writing within five (5) days of such conditions:

   (a) description of noncomplying emission(s),

   (b) cause of noncompliance,

   (c) anticipated time the noncompliance is expected to continue or, if corrected, the duration of the period of noncompliance,

   (d) steps taken by the permittee to reduce and eliminate the noncomplying emission,

   and

   (e) steps taken by the permittee to prevent recurrence of the noncomplying emission.

Failure to provide the above information when appropriate shall constitute a violationof the terms and conditions of this permit. Submittal of this report does not constitute a waiver of the emission limitations contained within this permit.

6. Any change in the information submitted in the application regarding facility emissions or changes in the quantity or quality of materials processed that will result in new or increases emissions must be reported to the permitting authority. If appropriate, modifications to the permit may then be made by the permitting authority to reflect any necessary changes in the permit conditions. In no case are any new or increased emissions allowed that will cause violation of the emission limitations specified herein.

7. In the event of any change in control or ownership of the source described in the permit, the permittee shall notify the succeeding owner of the existence of this permit by letter and forward a copy of such letter to the permitting authority.

8. The permittee shall allow representatives of the State environmental control agency or representatives of the Environmental Protection Agency, upon the presentation of credentials:

   (a) to enter upon the permittee's premises, or other premises under the control of the permittee, where an air pollutant source is located or in which any records are required to be kept under the terms and conditions of the permit;

   (b) to have access to any copy at reasonable times any records required to be kept under the terms and conditions of this permit, or the Act;

   (c) to inspect at reasonable times any monitoring equipment or monitoring methods required in this permit;

   (d) to sample at reasonable times any emission of pollutants;

   and

   (e) to perform at reasonable times an operation and maintenance inspection of the permitted source.

9. All correspondence required to be submitted by this permit to the permitting agency shall be mailed to:

   Chief, Air Facilities Branch
   Air and Hazardous Materials Division
   U. S. Environmental Protection Agency
   Region IV
   345 Courtland Street
   Atlanta, Georgia 30308

10. The conditions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

The emission of any pollutant more frequently or at a level in excess of that authorized by this permit constitute a violation of the terms and conditions of this permit.

SENTINEL STAR
Published Daily
Kissimmee, Osceola County, Florida

ADVERTISING CHARGE $22.13

State of Florida } ss.
COUNTY OF ORANGE

Before the undersigned authority personally appeared

Betty M. Kinney, who on oath says that she is the Legal Advertising Representative of the Sentinel Star, a Daily newspaper published at Kissimmee, in Osceola County, Florida; that the attached copy of advertisement, being a Public Notice in the matter of

A Modification to an existing air pollution source, etc.

in the Court, was published in said newspaper in the issues of

October 28, 1981

Affiant further says that the said Sentinel Star is a newspaper published at Kissimmee, in said Osceola County, Florida, and that the said newspaper has heretofore been continuously published in said Osceola County, Florida, each Week Day and has been entered as second-class mail matter at the post office in Kissimmee in said Osceola County, Florida, for a period of one year next preceding the first publication of the attached copy of advertisement; and affiant further says that he/she has neither paid nor promised any person, firm or corporation any discount, rebate, commission or refund for the purpose of securing this advertisement for publication in the said newspaper.

Betty M. Kinney

Sworn to and subscribed before me this 30th day of December A.D., 1981

Naomi C. Parks
Notary Public

Seal

Notary Public, State of Florida at Large
My Commission Expires Jan. 21, 1984

PUBLIC NOTICE

A modification to an existing air pollution source is being proposed by Kissimmee Utilities located in the City of Kissimmee, Osceola County, Florida. The proposed modification is the construction of a 49.9 MW combined cycle gas turbine. The modification will increase emissions of air pollutants, in tons per year, by the following amounts:

PM	SO_2	NO_x	CO	VOC
69	1700	1095	227	82

The proposed modification has been reviewed by the Florida Department of Environmental Regulation (FDER) under Chapter 403, Florida Statutes, and Federal regulation 40 CFR 52.21, Prevention of Significant Deterioration (PSD). The Department has made a preliminary determination that the construction can be approved provided certain conditions are met. A summary of the basis for the determination and the application for State and Federal permits submitted by Kissimmee Utilities are available for public review at the following offices:

Bureau of Air Quality Management
Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, Florida 32301

South Florida Subdistrict
Dept. of Environmental Regulation
2745 S. E. Morningside Blvd.
Port St. Lucie, Florida 33452

Kissimmee Public Library
305 E. Broadway
Kissimmee, Florida 32741

The maximum percentages of allowable PSD increments consumed by the proposed modification will be as follows:

	Annual	24-Hour	3-Hour
PM	Negligible	Negligible	NA
SO_2	5	11	9

Any person may submit written comments to FDER regarding the proposed modification. All comments postmarked not later than 30 days from the date of notice, will be considered by FDER in making a final determination regarding approval for construction of this source. Those comments will be made available for public review on request. Furthermore, a public hearing can be requested by any person. Such request should be submitted within 14 days of the date of this notice. Letters should be addressed to:

Mr. C. H. Fancy
Bureau of Air Quality Management
Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, Florida 32301

OS-37 Oct. 28, 1981

ESE ENVIRONMENTAL SCIENCE AND ENGINEERING, INC.

John

November 19, 1981
ESE NO. 81 613 101

Mr. C. H. Fancy, P.E.
Deputy Chief
Bureau of Air Quality Management
Florida Department of
Environmental Regulation
2600 Blair Stone Road
Tallahassee, Florida 32301

Correspondence

RE: Preliminary Determination for Kissimmee Utilities
(AC 49-46521, PSD-FL-087)

Dear Mr. Fancy:

The proposed specific condition Number 9 requires daily monitoring of fuel sulfur and nitrogen content and lower heating value.

We request that this condition be modified to more nearly reflect the requirements of 40 CFR, Part 60, Subpart GG, Section 60.334 on which it is based. Specifically, we request that 1) the requirement for determining the fuel heating value be deleted, 2) the option for developing a custom sampling schedule based on substantiating data be included, and 3) the provision for sampling only on each occasion that fuel is transferred to bulk storage be included.

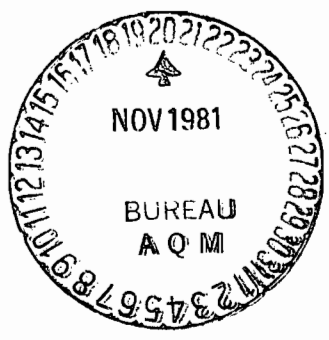
I appreciate the efficiency with which this permit has been processed. Do not hesitate to call with any questions or if we can help during Environmental Protection Agency review.

Sincerely,

MH Dybevick

Michael H. Dybevick
Associate Engineer
Air Modeling and Permitting

MHD/ctw



PSD-FL-067

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

October 22, 1981

Mr. T. Michael Taimi, Chief
Consolidated Permits Branch
EPA Region IV
345 Courtland Street N.E.
Atlanta, Georgia 30308

RE: Preliminary Determination - Kissimmee Utilities
Proposed 50 MW Combustion Turbine Generator

Dear Mr. Taimi:

Enclosed for your review and comment are the Public Notice and Preliminary Determination for Kissimmee Utilities proposed construction of a 50 MW combustion turbine generator in Kissimmee, Osceola County, Florida. The Public Notice will appear in the Orlando Sentinel-Star on October 28, 1981.

Please inform my office if you have comments or questions regarding this determination, at (904) 488-1344.

Sincerely,

C. H. Fancy, P.E.
Deputy Chief
Bureau of Air Quality
Management

CF/bjm

Attachment

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

CERTIFIED MAIL

October 27, 1981

Mr. Jack T. Danforth
Utilities Director
Kissimmee Utilities
P. O. Box 1608
Kissimmee, Florida

RE: Preliminary Determination - Kissimmee Utilities
Proposed Construction of a New 50 MW Combustion Turbine Generator (AC 49-46521, PSD-FL-087)

Dear Mr. Danforth:

Please find enclosed two copies of the Preliminary Determination for both State and Federal air construction permit applications as referenced.

A public notice will appear in a local newspaper, the Orlando Sentinel-Star, in the near future. A copy of the Preliminary Determination and your application will be open to public review and comment for a period of 30 days. The public can also request a public hearing to review and discuss specific issues. At the end of this period, the Department will evaluate the comments received and make a final determination regarding the proposed construction.

Should you have any questions regarding this information, please contact Mr. Bill Thomas at (904) 488-1344.

Sincerely,

C. H. Fancy, P.E.
Deputy Chief
Bureau of Air Quality Management

cc: David Buff, ESE Consultants
Chuck Collins, FDER, St. Johns River District

CHF/TP/bjm

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

October 23, 1981

Mrs. Elenor Gentry
Kissimmee Public Library
305 E. Broadway
Kissimmee, Florida 32741

RE: Preliminary Determination - Kissimmee Utilities
Proposed Construction of a New 50 MW Combustion
Turbine Generator

As was discussed over the phone, we need to make the enclosed information available for public inspection, pursuant to Federal Prevention of Significant Deterioration Regulations (40 CFR 52.21, Paragraph (q)). A notice directing people to the library will be published in the Orlando Sentinel-Star on October 28, 1981.

The information must be available upon request for a period of at least 30 days from the notice date. At the end of the period, we will forward to you a Final Determination on the permit application which must be available for an additional 30 days.

We appreciate your help in providing this valuable public service. Should you have any questions, please call Tim Powell at (904) 488-1344.

Sincerely,

C. H. Randy, P.E.
Deputy Chief
Bureau of Air Quality Management

CF/bjm

Technical Evaluation

and

Preliminary Determination

Kissimmee Utilities

49.9 MW Combined Cycle Combustion Gas Turbine

Osceola County, Florida

Permit Numbers:

State	AC 49-46521
Federal	PSD-FL-087

Florida Department of Environmental Regulation

Bureau of Air Quality Management

Central Air Permitting

October 25, 1981

Table of Contents

PUBLIC NOTICE

A modification to an existing air pollution source is being proposed by Kissimmee Utilities located in the City of Kissimmee, Osceola County, Florida. The proposed modification is the construction of a 49.9 MW combined cycle gas turbine. The modification will increase emissions of air pollutants, in tons per year, by the following amounts:

PM	SO_2	NO_x	CO	VOC
69	1700	1095	227	82

The proposed modification has been reviewed by the Florida Department of Environmental Regulation (FDER) under Chapter 403, Florida Statutes, and Federal regulation 40 CFR 52.21, Prevention of Significant Deterioration (PSD). The Department has made a preliminary determination that the construction can be approved provided certain conditions are met. A summary of the basis for the determination and the application for State and Federal permits submitted by Kissimmee Utilities are available for public review at the following offices:

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2745 S. E. Morningside Blvd.
Port St. Lucie, Florida 33452

Kissimmee Public Library
305 E. Broadway
Kissimmee, Florida 32741

The maximum percentages of allowable PSD increments consumed by the proposed modification will be as follows:

	Annual	24-Hour	3-Hour
PM	Negligible	Negligible	NA
SO_2	5	11	9

Any person may submit written comments to FDER regarding the proposed modification. All comments, postmarked not later than 30 days from the date of notice, will be considered by FDER in making a final determination regarding approval for construction of this source. Those comments will be made available for public review on request. Furthermore, a public hearing

can be requested by any person. Such request should be submitted within 14 days of the date of this notice. Letters should be addressed to:

Mr. C. H. Fancy
Bureau of Air Quality Management
Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, Florida 32301

I. SYNOPSIS OF APPLICATION

A. Name and Address of Applicant

Kissimmee Utilities
P. O. Box 1608
Kissimmee, Florida 32741

B. Source Location

The proposed source is located at 112 Ruby Street in the City of Kissimmee, in Osceola County, Florida. The UTM coordinates are: Zone 17-460.1 Km East and 3,129.3 Km North.

C. Project Description

The applicant proposes to install and operate a combined cycle combustion gas turbine, with a total net generating capacity of 46.5 megawatts (MW) and a gross generating capacity of 49.9 MW. The turbine will be fired with natural gas. No. 2 fuel oil, having a maximum sulfur content of 0.5 percent, will be used as a standby fuel. The maximum heat input will be 441.7 MMBTU/hr (LHV).

Kissimmee Utilities (KU) currently operates 12 diesel generating units with a total output rated at 26.8 MW at this site.

II. APPLICABILITY

A. Federal Regulations

The proposed project is subject to preconstruction review under federal Prevention of Significant Deterioration (PSD) regulations, Section 52.21 of Title 40 of the Code of Federal Regulations as amended in the Federal Register of August 7, 1980 (45 CFR 52.21). Specifically, Kissimmee Utilities' combined cycle combustion gas turbine is a major stationary source (40 CFR 52.21(b)(1)) located in an area currently designated as attainment in accordance with 40 CFR 81.310 for all criteria pollutants regulated under the Clean Air Act (CAA).

The proposed source will be a major modification (40 CFR 52.21(b)(2)) for particulate matter (PM), sulfur dioxide (SO_2), nitrogen oxides (NO_x), Beryllium (Be), volatile organic compounds (VOC), and carbon monoxide (CO). Emissions of PM, SO_2, NO_x, Be, VOC and CO will increase above the significant criteria set in the PSD regulations. Therefore, the proposed project is subject to PSD review for these pollutants.

This review consists of a determination of Best Available Control Technology (BACT) and unless otherwise exempted, an analysis of the air quality impact of the increased emissions. No air quality impact analysis is required for ozone, even though there will be a significant increase in VOC emissions, because this increase is less than 100 tons per year. The review also includes an analysis of the project's impacts on soils, vegetation and visibility along with air quality impacts resulting from associated commercial, residential and industrial growth.

The proposed project is also subject to the provisions of the federal New Source Performance Standard (NSPS) for gas turbines, 40 CFR 60, Subpart GG.

B. State Regulations

The proposed project is subject to preconstruction review under the provisions of Chapter 403, Florida Statutes, and Chapter 17-2, Florida Administrative Code. Specifically, the proposed source is a major emitting facility for NO_x and SO_2 as defined in Chapter 17-2 because the potential emissions of each pollutant exceed 250 tons per year. The source is located in the area of influence of the Orange County ozone nonattainment area.

This project is subject to the provisions of Subsection 17-2.04(6), Prevention of Significant Deterioration (PSD) review, which requires the use of Best Available Control Technology (BACT). The source is also subject to the provisions of the federal New Source Performance Standards (NSPS) for gas turbines, 40 CFR 60, Subpart GG. This NSPS has been adopted by reference in Section 17-2.21.

The proposed source is exempt from the provisions of Section 17-2.17, New Source Review for Nonattainment Areas, by Section 17-2.17(1)(c)2.a.

III. SOURCE IMPACT ANALYSIS

A. Emissions Limitations

The operation of the proposed combined cycle gas turbine, will produce emissions of particulate matter (PM), sulfur dioxide (SO_2), nitrogen oxides (NO_x), beryllium (Be), Mercury (Hg), carbon monoxide (CO) and volatile organic compounds (VOC) to the atmosphere.

Table 1 summarizes potential to emit of all pollutants regulated under the Act which are affected by the proposed source.

Best Available Control Technology (BACT) has been determined for NO_x, SO_2, PM, VOC, Be and CO. The emission limiting standards selected as BACT and made a condition of the permit are listed in Table 2. Justification for the standards selected is included in Technical Appendix A.

The permitted emissions, including those determined as BACT, are in compliance with New Source Performance Standard (NSPS) requirements of 40 CFR 60, Subpart GG.

B. Air Quality Impacts

An air quality impacts analysis has been performed to evaluate the impact of the proposed project on ambient concentrations of NO_x, SO_2, PM, CO and Be. Dispersion modeling was used to evaluate the impacts.

Results of the analysis provide reasonable assurance that the project, as described in this permit and subject to the conditions herein, will not lead to any violation of National Ambient Air Quality Standards or PSD increments. Details of the analysis are discussed in the Technical Appendix B.

Table 1

SUMMARY OF EMISSIONS

(tons per year)

Pollutant	Potential Emissions[a]				Significance Level[e]
	Fuel Oil No. 2 - Fired		Natural Gas - Fired		
	(Before Control)	(After Control)	(Before Control)	(After Control)	
NO_x[b]	2,580	1,340	2,480	1,290	40
SO_2[c]	1,700	1,700	21	21	40
PM	69	69	30	30	25
VOC	74	74	82	82	40
CO	207	207	227	227	100
Mercury[d]	0.002	0.002	0.02	0.02	0.1
Beryllium[d]	0.0006	0.0006	-		0.0004

(a) Potential emissions in accordance with state and federal definitions as estimated by the applicant.

(b) A 48 percent emission reduction is expected with the proposed water injection technique.

(c) Assumed natural gas has 0.01 percent sulfur content. Fuel oil calculations based on total conversion of 0.8 percent sulfur in fuel oil to sulfur dioxide.

(d) Emissions calculated based on emissions factors from Stationary Conventional Combustion Processes, EPA, -450/2-80-074.

(e) 40 CFR 52.21(b)(23).

Table 2

ALLOWABLE EMISSION LIMITS

49.9 MW Combined Cycle Combustion Turbine

Pollutant	Standard	Gas Turbine[a]	Gas Turbine and Boiler[b]	Basis
NO_x [a]	$0.0075\ (\frac{14.4}{Y}) + F$	129 PPM at 15 percent oxygen on a dry basis	250 lb/hr	NSPS, BACT
SO_2	0.8 percent S by weight 0.015 percent by volume at 15 percent oxygen on a dry basis	0.8 percent S by weight	388 lb/hr	NSPS, BACT
PM	20% Opacity	-	16 lb/hr	BACT, Chapter 17-2
VOC	-	-	19 lb/hr	BACT
CO	-	-	52 lb/hr	BACT
Mercury (Hg)	-	-	0.0004 lb/hr	Estimated by Applicant
Beryllium (Be)	-	-	0.000145 lb/hr	BACT

(a) The allowable NO_x emission rate for the gas turbine was determined by the following formula:

$STD = 0.0075\ (\frac{14.4}{Y}) + F$ where:

STD = allowable NO_x emissions (percent by volume at 15 percent oxygen and on a dry basis).

Y = manufacturer's rated heat rate at manufacturer's rated load (kilojoules per watt hour) or, actual measured heat rate based on lower heating value of fuel as measured at actual peak load for the facility. The value of Y shall not exceed 14.4 kilojoules per watt hour. The efficiency factor must be based on the gas turbine efficiency itself, not the overall efficiency of the gas turbine combined with other equipment.

F = NO_x emission allowance for fuel-bound nitrogen as follows:

Fuel-bound nitrogen (Percent by weight)	F (NO_x percent by volume)
$N \leq 0.015$	0
$0.015 < N \leq 0.1$	$0.04(N)$
$0.1 < N \leq 0.25$	$0.04+0.0067(N-0.1)$
$N > 0.25$	0.005

where: N = the nitrogen content of the fuel (percent by weight)

(b) Emission rates based on continuous firing of 100 percent fuel oil No. 2 as estimated by the applicant.

C. Additional Impact Analysis

An additional impacts analysis has been performed to assess (1) the impact of the proposed project on soils, vegetation, and visibility and (2) any air quality impacts resulting from associated commercial, residential, or industrial growth. No adverse impacts are expected; details of the analysis are discussed in Technical Appendix C.

IV. CONCLUSIONS

Based on review of the data submitted by Kissimmee Utilities for the installation and operation of a 49.9 MW combined cycle gas turbine, the FDER concludes that compliance with all applicable federal and state air quality regulations will be achieved provided certain specific conditions are met. The NSPS emission limits for NO_x, SO_2, and the permitted emissions limits of 0.0004 lb/hr for Hg, 0.000145 lb/hr, for Be, 16 lb/hr for PM, 19 lb/hr for VOC and 52 lb/hr for CO have been determined to be Best Available Control Technology (BACT) for this source. The impact of the emissions from the 49.9 MW combined cycle gas turbine will not cause or contribute to a violation of any ambient air quality standard or PSD increment. Appendix D includes the proposed general and specific conditions in the draft state permit (AC 49-46521) and federal permit (PSD-FL-087).

TECHNICAL APPENDIX A

FEDERAL BACT ANALYSIS

The applicant is required, under the provisions of 40 CFR 52.21, as revised August 7, 1980 (45 FR 52676), to apply BACT to all criteria and noncriteria pollutants emitted in significant levels. BACT is determined for each pollutant on a case-by-case review taking into account energy, environmental and economic impacts.

The applicant has proposed BACT for each applicable pollutant and has presented justification for the standards selected. The Department of Environmental Regulation (DER) has reviewed and accepted the technology and emission limits proposed as BACT. The federal PSD permit shall include these limits or any more stringent emission standards that are imposed by the State of Florida. These limits are summarized in Table 2. A discussion of the BACT for each pollutant follows:

PM Control

The BACT limitation proposed for particulate matter (PM), 16 lb/hr, is based upon emission for Stationary Gas Turbines AP-42.

Particulate emissions from stationary gas turbines depend on the ash content of the fuel which are minimal for the proposed fuels. The applicant has reported an ash percentage of less than 0.1 in the fuel oil analysis. Therefore, FDER feels that the applicant proposed 0.0362 lb/MMBTU (16 lb/hr) emission limit for PM is reasonable as BACT.

Carbon Monoxide and Hydrocarbon Control

The applicant proposes emissions levels for carbon monoxide (CO) and volatile organic compounds (VOC) based on emission estimates from Stationary Gas Turbines AP-42.

CO and HC emissions are function of combustion efficiency. The higher the percentage of peak load at which a turbine operates, the more efficient the combustion of the fuel.

HC and CO emissions from stationary gas turbines operating at peak load are relatively low. Gas turbines normally operate at 80 to 100 percent of peak load with HC emission averaging less than 50 ppm and CO emission averaging less than 500 ppm concentration at 15 percent oxygen.

Based on the above facts, FDER agrees that emission limits of 0.1177 lb/MMBTU (52 lb/hr) for CO and 0.043 lb/MMBTU (19 lb/hr) for VOC constitute BACT for the proposed source.

SO_2 Control

The applicant proposes an emission limit of 388 lb SO_2/hr and 0.8 percent sulfur content in the fuel oil. The basis of this proposed emission limit is found in the AP-42 emission factors for Stationary Gas Turbines and NSPS for Gas Turbines.

SO_2 emissions from stationary gas turbines depend on the sulfur content of the fuel since nearly 100 percent of the sulfur is converted to SO_2 during the combustion process. Due to the high volumes of exhaust gases, the cost of flue gas desulfurization (FGD) is considered unreasonable. Therefore, FDER concurs with the applicant NSPS selection of low sulfur oil (0.8%S), and of 0.015 percent SO_2 by volume at 15 percent O_2, on a dry basis as BACT for the proposed source.

NO_x Control

The applicant proposes to control NO_x with a wet control technique (water injection) and limiting the maximum fuel-bound nitrogen content to 0.25 percent.

Total NO_x emissions from any combustion source, including stationary gas turbines, are a function of both thermal NO_x and organic NO_x formation. Thermal NO_x is formed by a high temperature reaction between nitrogen and oxygen from the combustion air. Organic NO_x, however, is formed by the oxidation of fuel-bound nitrogen during combustion.

NO_x formation within a turbine generally increases exponentially with increased pressure and temperature. High efficiency turbines, therefore, generally discharge gases with higher NO_x concentrations than low efficiency turbines. Since the

relative fuel consumption of gas turbines varies linearly with efficiency, an adjustment factor was selected (NSPS) that permitted increased NO_x emissions for the efficient turbines.

Gas turbines with waste heat recovery (combined cycle gas turbine) have a higher overall efficiency than the gas turbine alone. The application of the efficiency adjustment factor to the entire system would permit greater NO_x emission. The efficiency adjustment factor in the selected NSPS must be based on the gas turbine efficiency itself, not the overall efficiency of a gas turbine combined with other equipment. This consideration is discussed at length in the preamble to the selected NSPS for stationary gas turbines.

Based on the above facts, the KU gas turbine would actually be allowed an emission rate of 129 PPM due to the efficiency adjustment factor, which is an increase of the nominal 75 PPM NO_x emission by 5.64%. Therefore, FDER determines that the selected NSPS emission limit of 129 PPM or 0.0075 $\frac{(14)}{y}$ + F at 15% oxygen on a dry basis (see formula, Table 2) is BACT for this source when using No. 2 fuel oil containing 0.25 percent nitrogen.

Beryllium Control

The applicant proposes an emission limit of 0.00015 lb/hr for beryllium based on the emission factor from Stationary Combustion Processes (EPA 450/2-80-074).

Since beryllium emissions from gas turbines were not selected for control by standards of performance and there is not an applicable National Emission Standards for Hazardous Air Pollutants (NESHAP) for beryllium emission from gas turbines, FDER accepts the applicant's proposed 3.4×10^{-7} lb/MMBTU as BACT for this source.

Best Available Control Technology (BACT) Determination

Kissimmee Utilities

Osceola County

Kissimmee Utilities, Kissimmee, Florida, plans to increase their existing electric generating capability by an additional 49.9 gross megawatts. The proposed supplementary-fired combined cycle gas turbine system is composed of one 400 million Btu/hr heat input gas turbine (30.9 megawatt gross output) from which the exhaust gases discharge into a waste heat boiler. The steam produced will operate two steam turbines each producing 9.5 megawatt gross output. The boiler has a 41.7 million Btu per hour supplemental heat source to generate additional steam.

The system will fire natural gas with No. 2 oil as stand-by fuel. Hourly fuel consumption at maximum firing will be 0.491 million cubic feet or gas or 78 barrels of oil. The system is scheduled to operate 8,760 hours per year.

BACT Determination Requested by the Applicant:

Pollutant	Emission Limit
NO_x	NSPS % by volume = 0.0075 (14.4/Y) + F Y = heat rate at peak load (kJ/watt-hr) F = fuel-bound nitrogen allowance
SO_2	0.8% maximum fuel sulfur content

Date of Receipt of a BACT Application:

August 13, 1981

Date of Publication in the Florida Administrative Weekly:

September 4, 1981

Review Group Members:

There have been no significant technology improvements since the promulgation of the applicable NSPS to justify a formal review group. Comments were obtained from the New Source Review Section and the Air Modeling Section.

BACT Determination by DER:

Pollutant	Emission Limit
NO_x	NSPS Subpart GG, subsection 60.332(a)(1).
SO_2	No. 2 fuel oil with sulfur content not to exceed 0.8%.
Visible Emissions	Maximum 20% opacity.

Justification of DER Determination:

Nitric oxides produced by the combustion of fuel in the gas turbine are formed by the combination of nitrogen and oxygen in the combustion air. NO_x is also formed from the reaction of the nitrogen in the fuel with the oxygen in the combustion air. Formation of the latter NO_x will be minimized by the applicant's use of natural gas or distillate oil as fuel, both of which have low nitrogen content.

NO_x formation is extremely sensitive to flame temperature, therefore injecting water or steam into the gas turbine reaction zone will reduce production of NO_x. The use of the wet control technique to reduce NO_x emissions to or below the NSPS limits is determined to be BACT.

The SO_2 emissions from the gas turbine are strictly a function of the fuel sulfur content. Flue gas desulfurization systems are economically unattractive compared to the cost of low sulfur fuels. The firing of natural gas or No. 2 oil containing a maximum of 0.8% sulfur is determined as BACT.

The reduction of NO_x emissions results in an increase in CO emissions. CO emissions are considered to be a local problem since CO readily reacts to form CO_2. NO_x emissions, however, are linked to the formation of photochemical oxidants and are subject to long range transport. As a result of this trade-off, no emission limit for CO is specified in this determination.

Test methods for NO_x emissions are per NSPS, Subpart GG. Oil analysis by the applicant's fuel supplier or natural gas consumption records can be used to determine compliance with SO_2 emission limit. Compliance with the opacity limitation will be determined in accordance with 40 CFR 60, Appendix A; Method 9.

Details of the Analysis May be Obtained by Contacting:

Edward Palagyi, BACT Coordinator
Department of Environmental Regulation
Bureau of Air Quality Management
2600 Blair Stone Road
Tallahassee, Florida 32301

Recommended By:

for Steve Smallwood, Chief, BAQM

Date:

10/2/81

Approved:

Victoria Tschinkel, Secretary

Date:

10/5/81

SS:caa

APPENDIX B

AIR QUALITY IMPACT ANALYSIS

A. Summary

The State PSD review for PM and SO_2 requires an air quality impact analysis which includes a PSD increment analysis and a Florida Ambient Air Quality Standards (FAAQS) analysis. The State PSD increment and FAAQS analyses depend on air quality modeling carried out in accordance with FDER-approved methods.

The air quality impact analysis required under federal PSD review for PM, SO_2, CO, and NO_x includes:

- An analysis of existing air quality;
- A PSD increment analysis (for PM and SO_2 only);
- A National Ambient Air Quality Standards (NAAQS) analysis; and,
- An analysis of impact on soils, vegetation and visibility and growth-related air quality impacts.

The analysis of existing air quality may require preconstruction monitoring; the PSD and NAAQS analyses depend on air quality modeling carried out in accordance with EPA-approved methods. Federal PSD review also requires a good engineering practice (GEP) stack height evaluation.

Based on these required State and federal air quality impact analyses, FDER has reasonable assurance that the KU modification, as described in this permit and subject to the conditions of approval proposed herein, will not cause or contribute to a violation of any State or federal PSD increment or ambient air quality standard. A discussion of the required analyses follows.

B. Discussion

1. Modeling Methodology

Two FDER and EPA-approved dispersion models were used in the State and federal air quality impact analyses. These were the Single-Source (CRSTER) and Industrial Source Complex (ISC) models.

These models were used to determine the maximum predicted annual concentrations and to identify the absolute worst-case short-term meteorological conditions which would affect emissions from KU after the proposed modification is completed. They were also used to identify days on which meteorological conditions produced worst-case short-term KU impacts in the vicinity of the facility with interacting sources located directly upwind.

The maximum short-term impacts due to emissions from KU and all major interacting sources were analyzed using a refined grid spacing of 0.1 to 0.2 kilometers between receptors and only the days on which worst-case meteorological conditions occurred.

Since worst-case impacts for each pollutant subject to analysis occur under different fuel burning conditions, modeling and analysis for each of these pollutants was performed using the worst-case fuel.

The surface meteorological data used in the models were National Weather Service data collected at Orlando, Florida during the period 1974-78. Upper air meteorological data used in the models were collected during the same time period at Tampa, Florida.

Final stack parameters and emission rates used in evaluating the proposed KU modification are contained in Tables B-1 and B-2.

Table B-1

Stack Parameters for Kissimmee Utilities - Baseline Case

Emissions Unit	Stack Height (m)	Stack Diameter (m)	Exit Velocity (m/s)	Exit Temperature (K)	Emission Rate (g/sec) SO_2	PM
Unit #7	13.11	.61	16.30	466.50	.87	.52
Units #8,#9	16.15	.85	17.60	477.60	3.36	2.01
Units #10,#11	7.01	.76	9.60	466.50	2.28	1.36
Units #14-#18	13.41	.80	8.70	505.40	5.37	3.21
Units #19,#20	8.69	.90	17.20	505.40	2.89	1.73

Table B-2

Stack Parameters for Kissimmee Utilities - Projected Case

Emissions Unit	Stack Height (m)	Stack Diameter (m)	Exit Velocity (m/s)	Exit Temperature (K)	Emission Rate (g/sec) SO_2	PM	NO_x	CO
Unit #7	13.11	.61	16.30	466.50	.87	.52	4.46	.79
Units #8,#9	16.15	.85	17.60	477.60	3.36	2.01	17.10	3.16
Units #10,#11	7.01	.76	9.60	466.50	2.28	1.36	10.58	2.12
Units #14-#18	13.41	.80	8.70	505.40	5.37	3.21	11.34	5.45
Units #19,#20	8.69	.90	17.20	505.40	2.89	1.73	14.66	2.64
Combustion Turbine	9.14	2.44	38.03	422.00	48.9	1.98	30.70	6.53

2. Analysis of Existing Air Quality

In order to evaluate existing air quality in the area of a proposed project, FDER may require a period of continuous preconstruction monitoring for any pollutant subject to PSD review. An exemption from this requirement may be obtained if the net emissions increase of the pollutant from the modification would cause an air quality impact less than a certain de minimus level as defined in 40 CFR 52.21(i)(8). Based on the modeling results shown in the following table, this exemption is applicable to the proposed modification for all of the pollutants subject to PSD review. Therefore, no preconstruction monitoring has been required.

Projected Air Quality Impacts From Combustion Turbine

Pollutant	Averaging Time	Projected Impact (ug/m^3)	De Minimus Level (ug/m^3)
SO_2	24-hour	10	13
TSP	24-hour	< 1	10
NO_x	24-hour	6	14
CO	8-hour	< 6	575
Be	24-hour	< 0.0005	.0005

There are no FDER or EPA-approved TSP, SO_2, NO_x, or CO monitors within 25 kilometers of the KU facility. Since the KU facility is located in a remote area with respect to non-specified sources, FDER has assumed the following pollutant background values: 0 ug/m^3 for CO, 20 ug/m^3 for SO_2 and NO_x, 40 ug/m^3 for TSP. These background values are used for all

averaging times and are consistent with EPA monitoring guidelines.

3. PSD Increment Analysis

Both the State and federal PSD increment analyses pertain to PM and SO_2 for which maximum allowable increases (increments) are defined. The proposed KU modification will be located in an area where the Class II increments apply. The nearest Class I area is more than 100 kilometers away from the proposed site.

The predicted maximum TSP and SO_2 increment consumption is the same in both the State and federal PSD increment analyses. Increment consumption at KU is affected by the construction of the combustion turbine alone.

As shown in the following table, modeling results predict that the maximum TSP and SO_2 increment consumption will not exceed allowable increments. The highest, second-highest short-term predicted concentrations are given in the table since five years of meteorological data were used in the modeling.

Maximum Increment Consumption

(ug/m^3)

State and Federal

	Averaging Time		
Pollutant	3-hour	24-hour	Annual
SO_2: Maximum KU Impact	44	10	< 1
SO_2: Allowable Class II Increment	512	91	20
PM: Maximum KU Impact	NA	< 1	< 1
PM: Allowable Class II Increment	NA	37	19

There are other increment consuming sources within the vicinity of KU. Even though these sources consume increment in the area around KU, this consumption is very small. The combined impacts of these sources and KU in the interacting directions are less than the maximum increment consumed by KU only.

The nearest Class I area is Chassahowitza National Wilderness Area which is 125 kilometers away from KU. At this distance, it can be assumed that no Class I increment will be consumed as a result of emissions from KU.

4. Ambient Air Quality Standards Analysis

Both State and federal PSD regulations require the permit applicant to demonstrate that, given existing air quality in an area, a proposed emissions increase subject to PSD review will not cause or contribute to any violation of ambient air quality standards. For the proposed project at KU, an ambient air quality standards analysis is required for PM, SO_2, CO and NO_x.

As shown in the following table, modeling results predict that maximum ground-level concentrations for each of these pollutants will be below both the FAAQS and NAAQS. The highest, second-highest short-term predicted values are given in this table since five years of meteorological data were used in the modeling.

Pollutant	Averaging Time	Projected Air Quality* (ug/m^3)	NAAQS (ug/m^3)	FAAQS (ug/m^3)
SO_2	annual	40	80	60
	24-hour	155	365	260
	3-hour	392	1300	1300
TSP	annual	52	75	60
	24-hour	121	150	150
NO_2	annual	89	100	100
CO	8-hour	< 500	10,000	10,000
	1-hour	< 1000	40,000	40,000

*Includes background concentrations of 40 ug/m^3 for annual and 24-hour TSP, 20 ug/m^3 for SO_2 for all averaging times, and 20 ug/m^3 for NO_2.

** Air quality impact calculated for the proposed modification only.

Modeling was also performed to evaluate the impacts of interactions of emissions from other sources with those from KU. Maximum contributions from surrounding sources are very small compared to maximum ground-level concentrations from KU and they occur in non-critical directions. Therefore, no violations are predicted to occur due to interacting sources.

5. Good Engineering Practice Stack Height Evaluation

The stack height proposed for the KU combustion turbine is less than the Good Engineering Practice (GEP) stack height of 65 meters for stacks uninfluenced by structures or terrain. A building downwash analysis was not performed since the new stack will not be within the area of influence of any structure with the potential to cause downwash conditions.

APPENDIX C

ANALYSIS OF IMPACT ON SOILS, VEGETATION AND VISIBILITY AND GROWTH-RELATED AIR QUALITY IMPACTS

The maximum impact of the proposed modification, as demonstrated through the air quality analysis, will be below the national secondary air quality standards for PM and SO_2. These standards were established to protect public welfare related values. Also, the maximum impact of the proposed modification on NO_2, CO, and Be concentrations will be insignificant. Therefore, no adverse effects on soils, vegetation and visibility is expected.

There will be no increase in the number of employees at this site due to the project. Therefore no secondary residential, commercial or industrial growth which will adversely affect air quality in the area is expected.

APPENDIX D

SPECIFIC CONDITIONS

FDER proposes a preliminary determination of approval with conditions for the project (construction of a 49.9 MW combined cycle gas turbine) requested by Kissimmee Utilities in the complete permit applications submitted on August 13, 1981 (federal application) and August 31, 1981 (state application).

Special conditions listed in the draft State permit AC 49-46521, are adopted as special conditions for the draft federal permit, PSD-FL-087, for this source.

The attached General Conditions (federal) are also made a part of the proposed federal permit PSD-FL-087.

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301

BOB GRAHAM
GOVERNOR
Victoria J. Tschinkel
SECRETARY

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

APPLICANT: Kissimmee Utilities
P. O. Box 1608
Kissimmee, Florida 32741

PERMIT/CERTIFICATION
NO. AC 49-46521

COUNTY: Osceola

PROJECT: 49.9 MW Combined Cycle Gas Turbine

This permit is issued under the provisions of Chapter 403, Florida Statutes, and Chapter 17-2 and 17-4, Florida Administrative Code. The above named applicant, hereinafter called Permittee, is hereby authorized to perform the work or operate the facility shown on the approved drawing(s), plans, documents, and specifications attached hereto and made a part hereof and specifically described as follows:

For the construction of a 49.9 MW combined cycle combustion gas turbine to be located at Kissimmee Utilities Power plant on 112 Ruby Street, City of Kissimmee, Osceola County, Florida. The UTM coordinates of the proposed plant are 460.1 Km East and 3129.3 Km North.

Construction shall be in accordance with the attached permit application, plans, documents and drawings except as otherwise noted on page 3 and 5, Specific Conditions.

Attachments:

1. Application to Construct Air Pollution Sources, DER Form 17-1.122(16) received on August 31, 1981.

2. BACT determination, dated October 5, 1981.

PERMIT NO.: AC 49-46521
APPLICANT: Kissimmee Utilities

GENERAL CONDITIONS:

1. The terms, conditions, requirements, limitations, and restrictions set forth herein are "Permit Conditions:, and as such are binding upon the permittee and enforceable pursuant to the authority of Section 403.161(1), Florida Statutes. Permittee is hereby placed on notice that the department will review this permit periodically and may initiate court action for any violation of the "Permit Conditions" by the permittee, its agents, employees, servants or representatives.

2. This permit is valid only for the specific processes and operations indicated in the attached drawings or exhibits. Any unauthorized deviation from the approved drawings, exhibits, specifications, or conditions of this permit shall constitute grounds for revocation and enforcement action by the department.

3. If, for any reason, the permittee does not comply with or will be unable to comply with any condition or limitation specified in this permit, the permittee shall immediately notify and provide the department with the following information: (a) a description of and cause of non-compliance; and (b) the period of non-compliance, including exact dates and times; or, if not corrected, the anticipated time the non-compliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the non-compliance. The permittee shall be responsible for any and all damages which may result and may be subject to enforcement action by the department for penalties or revocation of this permit.

4. As provided in subsection 403.087(6), Florida Statutes, the issuance of this permit does not convey any vested rights or any exclusive privileges. Nor does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations.

5. This permit is required to be posted in a conspicuous location at the work site or source during the entire period of construction or operation.

6. In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data and other information relating to the construction or operation of this permitted source, which are submitted to the department, may be used by the department as evidence in any enforcement case arising under the Florida Statutes or department rules, except where such use is proscribed by Section 403.111, F.S.

7. In the case of an operation permit, permittee agrees to comply with changes in department rules and Florida Statutes after a reasonable time for compliance, provided, however, the permittee does not waive any other rights granted by Florida Statutes or department rules.

8. This permit does not relieve the permittee from liability for harm or injury to human health or welfare, animal, plant, or aquatic life or property and penalities therefore caused by the construction or operation of this permitted source, nor does it allow the permittee to cause pollution in contravention of Florida Statutes and department rules, except where specifically authorized by an order from the department granting a variance or exception from department rules or state statutes.

9. This permit is not transferable. Upon sale or legal transfer of the property or facility covered by this permit, the permittee shall notify the department within thirty (30) days. The new owner must apply for a permit transfer within thirty (30) days. The permittee shall be liable for any non-compliance of the permitted source until the transferee applies for and receives a transfer of permit.

10. The permittee, by acceptance of this permit, specifically agrees to allow access to permitted source at reasonable times by department personnel presenting credentials for the purposes of inspection and testing to determine compliance with this permit and department rules.

11. This permit does not indicate a waiver of or approval of any other department permit that may be required for other aspects of the total project.

12. This permit conveys no title to land or water, nor constitutes state recognition or acknowledgement of title, and does not constitute authority for the reclamation of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the state. Only the Trustees of the Internal Improvement Trust Fund may express state opinion as to title.

13. This permit also constitutes:

[X] Determination of Best Available Control Technology (BACT)
[X] Determination of Prevention of Significant Deterioration (PSD)
[ ] Certification of Compliance with State Water Quality Standards (Section 401, PL 92-500)

PERMIT NO.: AC 49-46521
APPLICANT: Kissimmee Utilities

GENERAL CONDITIONS:

1. The terms, conditions, requirements, limitations, and restrictions set forth herein are "Permit Conditions:, and as such are binding upon the permittee and enforceable pursuant to the authority of Section 403.161(1), Florida Statutes. Permittee is hereby placed on notice that the department will review this permit periodically and may initiate court action for any violation of the "Permit Conditions" by the permittee, its agents, employees, servants or representatives.

2. This permit is valid only for the specific processes and operations indicated in the attached drawings or exhibits. Any unauthorized deviation from the approved drawings, exhibits, specifications, or conditions of this permit shall constitute grounds for revocation and enforcement action by the department.

3. If, for any reason, the permittee does not comply with or will be unable to comply with any condition or limitation specified in this permit, the permittee shall immediately notify and provide the department with the following information: (a) a description of and cause of non-compliance; and (b) the period of non-compliance, including exact dates and times; or, if not corrected, the anticipated time the non-compliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the non-compliance. The permittee shall be responsible for any and all damages which may result and may be subject to enforcement action by the department for penalties or revocation of this permit.

4. As provided in subsection 403.087(6), Florida Statutes, the issuance of this permit does not convey any vested rights or any exclusive privileges. Nor does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations.

5. This permit is required to be posted in a conspicuous location at the work site or source during the entire period of construction or operation.

6. In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data and other information relating to the construction or operation of this permitted source, which are submitted to the department, may be used by the department as evidence in any enforcement case arising under the Florida Statutes or department rules, except where such use is proscribed by Section 403.111, F.S.

7. In the case of an operation permit, permittee agrees to comply with changes in department rules and Florida Statutes after a reasonable time for compliance, provided, however, the permittee does not waive any other rights granted by Florida Statutes or department rules.

8. This permit does not relieve the permittee from liability for harm or injury to human health or welfare, animal, plant, or aquatic life or property and penalities therefore caused by the construction or operation of this permitted source, nor does it allow the permittee to cause pollution in contravention of Florida Statutes and department rules, except where specifically authorized by an order from the department granting a variance or exception from department rules or state statutes.

9. This permit is not transferable. Upon sale or legal transfer of the property or facility covered by this permit, the permittee shall notify the department within thirty (30) days. The new owner must apply for a permit transfer within thirty (30) days. The permittee shall be liable for any non-compliance of the permitted source until the transferee applies for and receives a transfer of permit.

10. The permittee, by acceptance of this permit, specifically agrees to allow access to permitted source at reasonable times by department personnel presenting credentials for the purposes of inspection and testing to determine compliance with this permit and department rules.

11. This permit does not indicate a waiver of or approval of any other department permit that may be required for other aspects of the total project.

12. This permit conveys no title to land or water, nor constitutes state recognition or acknowledgement of title, and does not constitute authority for the reclamation of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the state. Only the Trustees of the Internal Improvement Trust Fund may express state opinion as to title.

13. This permit also constitutes:

[X] Determination of Best Available Control Technology (BACT)
[X] Determination of Prevention of Significant Deterioration (PSD)
[ ] Certification of Compliance with State Water Quality Standards (Section 401, PL 92-500)

PERMIT NO.: AC 49-46521
APPLICANT: Kissimmee Utilities

SPECIFIC CONDITIONS:

1. The new source shall be constructed in accordance with the capacities and specifications stated in the application.

2. The maximum emission rates for the 49.9 MW combined cycle gas turbine shall not exceed the emission limits listed in Table 2 of the preliminary determination.

3. The plant shall be allowed to operate continuously (8736 hours per year).

4. The source shall be allowed to use either natural gas or No. 2 fuel oil.

5. Maximum sulfur (S) content in the oil shall not exceed 0.8 percent S by weight.

6. Maximum No. 2 fuel oil consumption shall be 78 barrels/hr.

7. Before this construction permit expires, the 49.9 MW combined cycle gas turbine will be tested for particulate matter, sulfur dioxide, VE, carbon monoxide and nitrogen oxides. Except as provided under 40 CFR 60.8(b), the performance tests shall be in accordance with the provisions of the following reference methods in Appendix A of 40 CFR 60.

   a. Method 1. Sample and Velocity Traverses

   b. Method 2. Volumetric Flow Rate

   c. Method 3. Gas Analysis

   d. Reference method 5 must be used to determine the initial compliance status of the unit with respect to the PM standard. Thereafter visible emissions may be used unless 10% opacity is exceeded. In that case compliance must be demonstrated by method 5. Compliance with the opacity limitation will be determined by reference method 9.

   e. Compliance with the sulfur dioxide emission limits will be determined by reference method 20 or by calculations based on fuel analysis (ASTM D2880-77 and 01072-70) for sulfur content.

   f. Compliance with carbon monoxide emission limits will be determined by reference method 10.

   g. Compliance with volatile organic compound emission limits will be assumed provided the CO allowable emission rate is achieved; specific VOC compliance testing is not required.

h. Compliance with the allowable emissions limits for nitrogen oxides shall be conducted using EPA reference method 20 subpart GG Section 60.335.

During performance tests to determine compliance with the proposed standard, measured NO_x emission at 15 percent oxygen will be adjusted to ISO ambient atmospheric conditions by the following correction factor:

$$NO_x = (NO_{x\ obs}) \left(\frac{P_{ref}}{P_{obs}}\right)^{0.5} e^{19\ (H_{obs} - 0.00633)} \left(\frac{TAMB}{288^{o}K}\right)^{1.53}$$

where:

NO_x = Emissions of NO_x at 15 percent oxygen and ISO standard ambient conditions.

$NO_{x_{obs}}$ = Measured NO_x emission at 15 percent oxygen, ppmv.

P_{ref} = Reference combustor inlet absolute pressure at 101.3 kilopascals (1 atmosphere) ambient pressure.

P_{obs} = Measured combustor inlet absolute pressure at test ambient pressure.

H_{obs} = Specific humidity of ambient air at test.

e = Transcendental constant (2.718)

T_{AMB} = Temperature of ambient air at test.

Test results will be the average of 3 valid runs. The Department will be notified 30 days in advance of the compliance test. The test will be conducted at permitted capacity ±10%.

8. A continuous monitoring system shall be installed to monitor and record the fuel consumption and the ratio of water to fuel being fired in the turbine.

9. Sulfur, nitrogen content and lower heating value of the fuel being fired in the gas turbine shall be recorded daily. The records of fuel oil usage will be kept by the company, available for regulatory agency's inspection, for a two-year period.

10. The applicant shall comply with all requirements of 40 CFR 60, Subpart GG, Standards of Performance for stationary gas turbines.

11. Reasonable precautions to prevent fugitive particulate emissions during construction such as coating or spraying roads and construction sites used by contractors will be taken by the applicant.

12. The applicant shall report any delays in construction and completion of this unit to the Department's South Florida Subdistrict Office.

13. The applicant will demonstrate compliance with the conditions of the construction permit, and submit a complete application for an operating permit to the Department's South Florida Subdistrict Office prior to 90 days of the expiration date of the construction permit. The applicant may continue to operate in compliance with all terms of the construction permit until its expiration date or issuance of an operating permit.

14. Upon obtaining an operating permit, the applicant will be required to submit periodic test reports on the actual operation and emissions of the facility. These reports will give the data specified in 40 CFR 60.334.

15. The source shall comply with the provisions and requirements of the attached general conditions.

16. Stack sampling facilities will include the eyebolt and angle described in Chapter 17-2.23, FAC.

Expiration Date: January 30, 1983

Issued this _____ day of _____, 19_____.

_____ Pages Attached.

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

_____
Signature

PERMIT NO.:
APPLICANT:

SPECIFIC CONDITIONS:

GENERAL CONDITIONS

1. The permittee shall notify the permitting authority in writing of the beginning of construction of the permitted source within 30 days of such action and the estimated date of start-up of operation.

2. The permittee shall notify the permitting authority in writing of the actual start-up of the permitted source within 30 days of such action and the estimated date of demonstration of compliance as required in the specific conditions.

3. Each emission point for which an emission test method is established in this permit shall be tested in order to determine compliance with the emission limitation contained herein within sixty (60) days of achieving the maximum production rate, but in no event later than 180 days after initial start-up of the permitted source. The permittee shall notify the permitting authority of the scheduled date of compliance testing at least thirty (30) days in advance of such test. Compliance test results shall be submitted to the permitting authority within forty-five (45) days after the complete testing. The permittee shall provide (1) sampling ports adequate for test methods applicable to such facility, (2) safe sampling platforms, (3) safe access to sampling platforms, and (4) utilities for sampling and testing equipment.

4. The permittee shall retain records of all information resulting from monitoring activities and information indicating operating parameters as specifed in the specific conditions of this permit for a minimum of two (2) years from the date of recording.

5. If, for any reason, the permittee does not comply with or will not be able to comply with the emission limitations specified in this permit, the permittee shall provide the permitting authority with the following information in writing within five (5) days of such conditions:

   (a) description of noncomplying emission(s),

   (b) cause of noncompliance,

   (c) anticipated time the noncompliance is expected to continue or, if corrected, the duration of the period of noncompliance,

   (d) steps taken by the permittee to reduce and eliminate the noncomplying emission,

   and

   (e) steps taken by the permittee to prevent recurrence of the noncomplying emission.

Failure to provide the above information when appropriate shall constitute a violationof the terms and conditions of this permit. Submittal of this report does not constitute a waiver of the emission limitations contained within this permit.

6. Any change in the information submitted in the application regarding facility emissions or changes in the quantity or quality of materials processed that will result in new or increases emissions must be reported to the permitting authority. If appropriate, modifications to the permit may then be made by the permitting authority to reflect any necessary changes in the permit conditions. In no case are any new or increased emissions allowed that will cause violation of the emission limitations specified herein.

7. In the event of any change in control or ownership of the source described in the permit, the permittee shall notify the succeeding owner of the existence of this permit by letter and forward a copy of such letter to the permitting authority.

8. The permittee shall allow representatives of the State environmental control agency or representatives of the Environmental Protection Agency, upon the presentation of credentials:

   (a) to enter upon the permittee's premises, or other premises under the control of the permittee, where an air pollutant source is located or in which any records are required to be kept under the terms and conditions of the permit;

   (b) to have access to any copy at reasonable times any records required to be kept under the terms and conditions of this permit, or the Act;

   (c) to inspect at reasonable times any monitoring equipment or monitoring methods required in this permit;

   (d) to sample at reasonable times any emission of pollutants;

   and

   (e) to perform at reasonable times an operation and maintenance inspection of the permitted source.

9. All correspondence required to be submitted by this permit to the permitting agency shall be mailed to:

   Chief, Air Facilities Branch
   Air and Hazardous Materials Division
   U. S. Environmental Protection Agency
   Region IV
   345 Courtland Street
   Atlanta, Georgia 30308

10. The conditions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalud, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

The emission of any pollutant more frequently or at a level in excess of that authorized by this permit constitute a violation of the terms and conditions of this permit.

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

October 23, 1981

RE: Preliminary Determination - Kissimmee Utilities Application to Construct a 50 MW Combustion Turbine Generator (PSD-FL-087)

Dear

I wish to bring to your attention that Kissimmee Utilities proposes to construct a new 50 MW Combustion Turbine Generator, at their facility in Kissimmee, Osceola County, Florida, and that emissions of air pollutants will thereby be increased. The Florida Department of Environmental Regulation, under the authority delegated by the Environmental Protection Agency, has reviewed the proposed construction under Federal Prevention of Significant Deterioration Regulations (40 CFR 52.21) and reached a preliminary determination of approval, with conditions, for this construction. This approval applies only to Federal regulatory requirements and has no bearing on other State or local functions.

Please also be aware that the attached Public Notice announcing the preliminary determination, the availability of pertinent information for public scrutiny and the opportunity for public comment will be published in a local newspaper, the Orlando Sentinel-Star, in the near future. This notice has been mailed to you for your information and in accordance with regulatory requirements. You need take no action unless you wish to comment on the proposed construction.

If you have any question, please feel free to call Mr. Bill Thomas or myself at (904) 488-1344.

Sincerely,

C. H. Fancy, P.E.
Deputy Chief, Bureau of Air
Quality Management

PSD-FL-087

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

October 21, 1981

Orlando Sentinel-Star
Legal Advertising
633 N. Orange Avenue
Orlando, Florida 32801

Dear Sir, Madam, or Ms:

Please publish the enclosed Public Notice in your newspaper on Sunday, October 25, 1981.

The cost of publication of the notice will be paid by Kissimmee Utilities. The affidavit and voucher should be addressed to:

Kissimmee Utilities
Electric Utilities Department
P. O. Box 1608
Kissimmee, Florida 32741

We also need a copy of the affidavit for our files. Please address this to myself, Bureau of Air Quality Management, at the letterhead address. I can be reached at (904) 488-1344 if you have any questions or problems with this matter.

Sincerely,

Tim Powell
Bureau of Air Quality
Management

Enclosure

cc: Jack T. Danforth, Kissimmee Utilities

TP/bjm

State of Florida
DEPARTMENT OF ENVIRONMENTAL REGULATION

INTEROFFICE MEMORANDUM

For Routing To District Offices And/Or To Other Than The Addressee		
To: _____ Loctn.: _____		
To: _____ Loctn.: _____		
To: _____ Loctn.: _____		
From: _____ Date: _____		
Reply Optional [ ]	Reply Required [ ]	Info. Only [ ]
Date Due: _____	Date Due: _____	

TO: Permit File PSD-FL-087

THRU: Clair Fancy
Bill Thomas
Larry George

FROM: Teresa M. Heron TH

DATE: September 4, 1981

SUBJ: Preliminary Rule Applicability - Kissimmee Utilities, Osceola County

An application for a federal prevention of significant deterioration (PSD) permit was submitted to the Bureau of Air Quality Management on August 31, 1981, by Kissimmee Utilities (KU). The application is undergoing completeness review.

The proposed project is the addition of a combined cycle combustion turbine/steam generator, with a total net generating capacity of 46.5 MW and a gross generating capacity of 49.9 MW, to KU's existing power plant. The turbine will be fired with natural gas; No. 2 fuel oil will be used as a standby fuel.

The KU power plant is located in an area designated in 40 CFR 81.310 as attainment for all criteria pollutants. The KU site is 125 km from the nearest Class I area, the Chassahowitzka National Wilderness Area.

The proposed source is a major stationary source (40 CFR 52.21(b)(1) for nitrogen oxides because potential emissions of this pollutant exceed 250 tons per year.

The proposed source will be a major modification (40 CFR 52.21(b)(2)) for particulate matter (PM), sulfur dioxide (SO_2), beryllium (Be), nitrogen oxides (NO_x), vol. org. comp. (VOC), and carbon monoxide (CO) and as such subject to preconstruction review under federal PSD regulations (40 CFR 52.21(i)). Full PSD review consists of a determination of best available control technology (BACT) and an analysis of the air quality impact of the increased emission for each regulated pollutant that would be emitted in a significant net amount. The projected emissions increases and applicable significant emission rates for the proposed project are listed as follows:

	Pollutant (tons per year)						
Projected Net Emissions Increase	PM	SO_2	CO	VOC	NO_x	Hg	Be
	69	1700	227	82	1,290	0.02	0.0006
Significant Emission Rate	25	40	100	40	40	0.1	0.0004

The source is also subject to the provisions of the federal New Source Performance Standard (NSPS) for Gas Turbines, 40 CFR 60, Subpart GG.

APPROVED	DISAPPROVED	SIGNATURE AND DATE
✓		Larry George 10/14/81
✓		Bill Thomas 10/29/81
✓		Clair Fancy 10/29/81

TH:caa

AC 49-46521

Received @ BAQM:
20 AUG '81

Received @ District:
13 AUG '81

KISSIMMEE UTILITIES PERMIT APPLICATION AND PSD REPORT

ESE ENVIRONMENTAL SCIENCE AND ENGINEERING, INC.

KISSIMMEE UTILITIES PERMIT APPLICATION AND PSD REPORT

Prepared for:

KISSIMMEE UTILITIES
Kissimmee, Florida

Prepared by:

ENVIRONMENTAL SCIENCE AND ENGINEERING, INC.
Gainesville, Florida 32602

ESE No. 81-613-101

July 1981

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SECTION I AIR CONSTRUCTION PERMIT APPLICATION

SECTION II PSD REPORT

LIST OF TABLES IN PSD REPORT

AIR CONSTRUCTION PERMIT APPLICATION

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

RECEIVED
AUG 13 1981
Dept. of Environmental Reg.
Port St. Lucie

APPLICATION TO OPERATE/CONSTRUCT AIR POLLUTION SOURCES

SOURCE TYPE: Combustion Turbine [x] New[1] [ ] Existing[1]

APPLICATION TYPE: [x] Construction [ ] Operation [ ] Modification

COMPANY NAME: Kissimmee Utilities COUNTY: Osceola

Identify the specific emission point source(s) addressed in this application (i.e. Lime Kiln No. 4 with Venturi Scrubber; Peeking Unit No. 2, Gas Fired) Combined Cycle Unit #1

SOURCE LOCATION: Street 112 Ruby Street City Kissimmee

UTM: East 17-460.1 North 3129.3

Latitude 28 ° 17 ' 20 "N Longitude 81 ° 24 ' 20 "W

APPLICANT NAME AND TITLE: Jack T. Danforth, Utilities Director

APPLICANT ADDRESS: Post Office Box 1608, Kissimmee, Florida 32741

SECTION I: STATEMENTS BY APPLICANT AND ENGINEER

A. APPLICANT

I am the undersigned owner or authorized representative* of Kissimmee Utilities

I certify that the statements made in this application for a Construction permit are true, correct and complete to the best of my knowledge and belief. Further, I agree to maintain and operate the pollution control source and pollution control facilities in such a manner as to comply with the provision of Chapter 403, Florida Statutes, and all the rules and regulations of the department and revisions thereof. I also understand that a permit, if granted by the department, will be non-transferable and I will promptly notify the department upon sale or legal transfer of the permitted establishment.

*Attach letter of authorization

Signed: Jack T. Danforth

Jack T. Danforth, Utilities Director
Name and Title (Please Type)

Date: 7/31/81 Telephone No. (305) 847-2821

B. PROFESSIONAL ENGINEER REGISTERED IN FLORIDA (where required by Chapter 471, F.S.)

This is to certify that the engineering features of this pollution control project have been designed/examined by me and found to be in conformity with modern engineering principles applicable to the treatment and disposal of pollutants characterized in the permit application. There is reasonable assurance, in my professional judgment, that the pollution control facilities, when properly maintained and operated, will discharge an effluent that complies with all applicable statutes of the State of Florida and the rules and regulations of the department. It is also agreed that the undersigned will furnish, if authorized by the owner, the applicant a set of instructions for the proper maintenance and operation of the pollution control facilities and, if applicable, pollution sources.

Signed: David A. Buff

David A. Buff
Name (Please Type)

(Affix Seal)

ESE, Inc.
Company Name (Please Type)

P.O. Box ESE, Gainesville, Fl 32602
Mailing Address (Please Type)

Florida Registration No. 19011 Date: 8-4-81 Telephone No. (904) 372-3318

[1]See Section 17-2.02(15) and (22), Florida Administrative Code, (F.A.C.)

MEMORANDUM

DATE: July 31, 1981

TO: Jack T. Danforth, Utilities Director

FROM: Kenneth R. Hammons, City Manager

SUBJECT: SIGNATURE AUTHORIZATION

COPY:

The purpose of this memorandum is to authorize you to act in my behalf in requesting operation permits for the generating units at the Kissimmee Power Plant. Your signature on permit applications will be binding with the City management.

Kenneth R. Hammons
City Manager

/pw

SECTION II: GENERAL PROJECT INFORMATION

A. Describe the nature and extent of the project. Refer to pollution control equipment, and expected improvements in source performance as a result of installation. State whether the project will result in full compliance. Attach additional sheet if necessary.

New 30.9 MW combustion turbine fired with natural gas or No. 2 fuel oil. NO_x control by water injection. Waste heat used to produce steam to drive two 9.5 MW steam turbines for total net generation of 46.5 MW and a gross generation capacity of 49.9 MW. Supplemental firing of natural gas or No. 2 oil in waste heat boiler to meet steam requirements. (See Attachment A.)

B. Schedule of project covered in this application (Construction Permit Application Only)

Start of Construction September 1981 Completion of Construction July 1982

C. Costs of pollution control system(s): (Note: Show breakdown of estimated costs only for individual components/units of the project serving pollution control purposes. Information on actual costs shall be furnished with the application for operation permit.)

Additional capital cost of water injection system is $60,000.

D. Indicate any previous DER permits, orders and notices associated with the emission point, including permit issuance and expiration dates.

Not Applicable--New Source

E. Is this application associated with or part of a Development of Regional Impact (DRI) pursuant to Chapter 380, Florida Statutes, and Chapter 22F-2, Florida Administrative Code? ____ Yes X No

F. Normal equipment operating time: hrs/day 24 ; days/wk 7 ; wks/yr 52 ; if power plant, hrs/yr 8,760 ;

if seasonal, describe: ____

G. If this is a new source or major modification, answer the following questions. (Yes or No)

1. Is this source in a non-attainment area for a particular pollutant? No
   a. If yes, has "offset" been applied? ____
   b. If yes, has "Lowest Achievable Emission Rate" been applied? ____
   c. If yes, list non-attainment pollutants. ____
2. Does best available control technology (BACT) apply to this source? If yes, see Section VI. Yes
3. Does the State "Prevention of Significant Deterioriation" (PSD) requirements apply to this source? If yes, see Sections VI and VII. Yes
4. Do "Standards of Performance for New Stationary Sources" (NSPS) apply to this source? Yes
5. Do "National Emission Standards for Hazardous Air Pollutants" (NESHAP) apply to this source? No

Attach all supportive information related to any answer of "Yes". Attach any justification for any answer of "No" that might be considered questionable.

SECTION III: AIR POLLUTION SOURCES & CONTROL DEVICES (Other than Incinerators)

A. Raw Materials and Chemicals Used in your Process, if applicable: NA

Description	Contaminants		Utilization Rate - lbs/hr	Relate to Flow Diagram
	Type	% Wt		

B. Process Rate, if applicable: (See Section V, Item 1) NA

1. Total Process Input Rate (lbs/hr): _____

2. Product Weight (lbs/hr): _____

C. Airborne Contaminants Emitted: See Attachment B

Name of Contaminant	Emission[1]		Allowed Emission[2] Rate per Ch. 17-2, F.A.C.	Allowable[3] Emission lbs/hr	Potential Emission[4]		Relate to Flow Diagram
	Maximum lbs/hr	Actual T/yr			lbs/hr	T/yr	
SO_2	388	21	NA	NA	388	1,700	Attach. A
PM	16	30	NA	NA	16	69	
NO_x	306	1,290	NA	NA	589	2,580	
HC (as CH_4)	19	82	NA	NA	19	82	
CO	52	227	NA	NA	52	227	

D. Control Devices: (See Section V, Item 4) See Attachment C

Name and Type (Model & Serial No.)	Contaminant	Efficiency	Range of Particles[5] Size Collected (in microns)	Basis for Efficiency (Sec. V, It[5]
Water Injection	NO_x	48%	NA	Attach. C

[1] See Section V, Item 2.

[2] Reference applicable emission standards and units (e.g., Section 17-2.05(6) Table II, E. (1), F.A.C. – 0.1 pounds per million BTU heat input)

[3] Calculated from operating rate and applicable standard

[4] Emission, if source operated without control (See Section V, Item 3)

[5] If Applicable

E. Fuels

Type (Be Specific)	Consumption*		Maximum Heat Input (MMBTU/hr)
	avg/hr	max./hr	
No. 2 Fuel Oil	78	78	441.7
Natural Gas	0.491	0.491	441.7

*Units Natural Gas, MMCF/hr; Fuel Oils, barrels/hr; Coal, lbs/hr

Fuel Analysis: Fuel Oil

Percent Sulfur: 0.8 maximum Percent Ash: <.01

Density: 7.4 lbs/gal Typical Percent Nitrogen: <.01

Heat Capacity: 19,350 BTU/lb 143,200 BTU/gal

Other Fuel Contaminants (which may cause air pollution): _____

F. If applicable, indicate the percent of fuel used for space heating. Annual Average NA Maximum _____

G. Indicate liquid or solid wastes generated and method of disposal.

Boiler blowdown will be directed to city waste water treatment facility

H. Emission Stack Geometry and Flow Characteristics (Provide data for each stack):

Stack Height: 30 ft. Stack Diameter: 8 ft.

Gas Flow Rate: 377,000 ACFM Gas Exit Temperature: 300 °F.

Water Vapor Content: 5 to 8 by vol. % Velocity: 125 FPS

SECTION IV: INCINERATOR INFORMATION

NA

Type of Waste	Type 0 (Plastics)	Type I (Rubbish)	Type II (Refuse)	Type III (Garbage)	Type IV (Pathological)	Type V (Liq & Gas By-prod.)	Type VI (Solid By-prod.)
Lbs/hr Incinerated							

Description of Waste _____

Total Weight Incinerated (lbs/hr) _____ Design Capacity (lbs/hr) _____

Approximate Number of Hours of Operation per day _____ days/week _____

Manufacturer _____

Date Constructed _____ Model No. _____

	Volume $(ft)^3$	Heat Release (BTU/hr)	Fuel		Temperature (°F)
			Type	BTU/hr	
Primary Chamber					
Secondary Chamber					

Stack Height: _____ ft. Stack Diameter _____ Stack Temp. _____

Gas Flow Rate: _____ ACFM _____ DSCFM* Velocity _____ FPS

*If 50 or more tons per day design capacity, submit the emissions rate in grains per standard cubic foot dry gas corrected to 50% excess air.

Type of pollution control device: [ ] Cyclone [ ] Wet Scrubber [ ] Afterburner [ ] Other (specify) _____

Brief description of operating characteristics of control devices: _____

Ultimate disposal of any effluent other than that emitted from the stack (scrubber water, ash, etc.):

SECTION V: SUPPLEMENTAL REQUIREMENTS

Please provide the following supplements where required for this application.

1. Total process input rate and product weight — show derivation. Attachment B
2. To a construction application, attach basis of emission estimate (e.g., design calculations, design drawings, pertinent manufacturer's test data, etc.,) and attach proposed methods (e.g., FR Part 60 Methods 1, 2, 3, 4, 5) to show proof of compliance with applicable standards. To an operation application, attach test results or methods used to show proof of compliance. Information provided when applying for an operation permit from a construction permit shall be indicative of the time at which the test was made. Attachments B and C
3. Attach basis of potential discharge (e.g., emission factor, that is, AP42 test). Attachment B
4. With construction permit application, include design details for all air pollution control systems (e.g., for baghouse include cloth to air ratio; for scrubber include cross-section sketch, etc.). Attachment C
5. With construction permit application, attach derivation of control device(s) efficiency. Include test or design data. Items 2, 3, and 5 should be consistent: actual emissions = potential (1-efficiency). Attachment C
6. An 8½" x 11" flow diagram which will, without revealing trade secrets, identify the individual operations and/or processes. Indicate where raw materials enter, where solid and liquid waste exit, where gaseous emissions and/or airborne particles are evolved and where finished products are obtained. Attachment A
7. An 8½" x 11" plot plan showing the location of the establishment, and points of airborne emissions, in relation to the surrounding area, residences and other permanent structures and roadways (Example: Copy of relevant portion of USGS topographic map). Attachment A
8. An 8½" x 11" plot plan of facility showing the location of manufacturing processes and outlets for airborne emissions. Relate all flows to the flow diagram. Attachment A

9. An application fee of $20, unless exempted by Section 17-4.05(3), F.A.C. The check should be made payable to the Department of Environmental Regulation.

10. With an application for operation permit, attach a Certificate of Completion of Construction indicating that the source was constructed as shown in the construction permit.

SECTION VI: BEST AVAILABLE CONTROL TECHNOLOGY

A. Are standards of performance for new stationary sources pursuant to 40 C.F.R. Part 60 applicable to the source?
[X] Yes [ ] No

Contaminant	Rate or Concentration
Nitrogen Oxides	% by vol = 0.0075 (14.4/Y) + F
	Y = heat rate at peak load (kJ/watt-hr)
	F = fuel-bound nitrogen allowance
Sulfur Dioxide	150 ppm or less than 0.8% sulfur fuel

B. Has EPA declared the best available control technology for this class of sources (If yes, attach copy) [X] Yes [ ] No

Contaminant	Rate or Concentration
Nitrogen Oxides	See Attachment D
Sulfur Dioxide	See Attachment D

C. What emission levels do you propose as best available control technology?

Contaminant	Rate or Concentration
Nitrogen Oxides	NSPS: % by volume = 0.0075 (14.4/Y) + F
Sulfur Dioxide	0.8% max fuel sulfur content

D. Describe the existing control and treatment technology (if any). Nitrogen Oxides (see Item E)

1. Control Device/System:
2. Operating Principles:
3. Efficiency:*
4. Capital Costs:
5. Useful Life:
6. Operating Costs:
7. Energy:
8. Maintenance Cost:
9. Emissions:

Contaminant	Rate or Concentration

*Explain method of determining D 3 above.

Nitrogen Oxides

10. Stack Parameters

a. Height: ft. b. Diameter: ft.

c. Flow Rate: ACFM d. Temperature: °F

e. Velocity: FPS

E. Describe the control and treatment technology available (As many types as applicable, use additional pages if necessary).

1.

a. Control Device: Water injection

b. Operating Principles: Lower combustion temperature

c. Efficiency*: 48% d. Capital Cost: $60,000.

e. Useful Life: 30 years f. Operating Cost: Additional fuel for 18.1 x 10^6 Btu/hr

g. Energy*: Increases heat rate by 140 Btu/KWH h. Maintenance Cost: No additional maintenance costs.

i. Availability of construction materials and process chemicals:
Can be purchased as package with turbine unit.

j. Applicability to manufacturing processes: Specifically designed for package unit.

k. Ability to construct with control device, install in available space, and operate within proposed levels:
Available as package from turbine manufacturer.
Ability to meet emission levels documented in Attachment C.

2.

a. Control Device:

b. Operating Principles:

c. Efficiency*: d. Capital Cost:

e. Useful Life: f. Operating Cost:

g. Energy**: h. Maintenance Costs:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

*Explain method of determining efficiency. See Attachment C.

**Energy to be reported in units of electrical power – KWH design rate.

3.

a. Control Device:

b. Operating Principles:

c. Efficiency*: d. Capital Cost:

e. Life: f. Operating Cost:

g. Energy: h. Maintenance Cost:

*Explain method of determining efficiency above.

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space and operate within proposed levels:

4.

a. Control Device

b. Operating Principles:

c. Efficiency*:

d. Capital Cost:

e. Life:

f. Operating Cost:

g. Energy:

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

F. Describe the control technology selected:

1. Control Device: Water injection (see Item E).
2. Efficiency*:
3. Capital Cost:
4. Life:
5. Operating Cost:
6. Energy:
7. Maintenance Cost:
8. Manufacturer:
9. Other locations where employed on similar processes: See Attachment D.

a.

(1) Company:

(2) Mailing Address:

(3) City:

(4) State:

(5) Environmental Manager:

(6) Telephone No.:

*Explain method of determining efficiency above.

(7) Emissions*:

Contaminant	Rate or Concentration

(8) Process Rate*:

b.

(1) Company:

(2) Mailing Address:

(3) City:

(4) State:

*Applicant must provide this information when available. Should this information not be available, applicant must state the reason(s) why.

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions*:

Contaminant	Rate or Concentration

(8) Process Rate*:

10. Reason for selection and description of systems:

Add-on NO_x controls are currently in the experimental phase. The proposed water injection rate will reduce NO_x emissions by 48 percent and will meet NSPS without significantly reducing thermal efficiency. Impacts from the new source are predicted to be insignificant, less than 1 ug/m^3 on an annual average. Therefore, further reduction in NO_x emissions is not justified.

*Applicant must provide this information when available. Should this information not be available, applicant must state the reason(s) why.

10. Stack Parameters

a. Height: ft. b. Diameter: ft.

c. Flow Rate: ACFM d. Temperature: °F

e. Velocity: FPS

E. Describe the control and treatment technology available (As many types as applicable, use additional pages if necessary).

1.

a. Control Device: Wet scrubber

b. Operating Principles: SO_2 is absorbed by alkaline solution. Sludge is separated and treated for disposal.

c. Efficiency*: 90% + d. Capital Cost: $4 million

e. Useful Life: 5 to 10 years f. Operating Cost: Annualized cost approx.

g. Energy**: 2,500 kW h. Maintenance Cost: $2.5 million

i. Availability of construction materials and process chemicals: Assumed available.

j. Applicability to manufacturing processes: Has not been applied to combustion turbines.

k. Ability to construct with control device, install in available space, and operate within proposed levels: Assumed adequate.

2.

a. Control Device: Low sulfur fuel

b. Operating Principles: Lower sulfur fuel replaces higher sulfur fuel

c. Efficiency*: Variable d. Capital Cost: NA

e. Useful Life: NA f. Operating Cost: Price differential over high sulfur fuel approx. $6-8/bbl

g. Energy**: NA h. Maintenance Costs: NA

i. Availability of construction materials and process chemicals: Currently available at cost premium.

j. Applicability to manufacturing processes: Widely applied.

k. Ability to construct with control device, install in available space, and operate within proposed levels: Adequate.

*Explain method of determining efficiency.

**Energy to be reported in units of electrical power – KWH design rate.

3.

a. Control Device:

b. Operating Principles:

c. Efficiency*: d. Capital Cost:

e. Life: f. Operating Cost:

g. Energy: h. Maintenance Cost:

*Explain method of determining efficiency above. Published literature.

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space and operate within proposed levels:

4.

a. Control Device

b. Operating Principles:

c. Efficiency*:

d. Capital Cost:

e. Life:

f. Operating Cost:

g. Energy:

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

F. Describe the control technology selected: Maximum sulfur content of fuel oil = 0.8%

1. Control Device: Low sulfur fuel
2. Efficiency*: Variable
3. Capital Cost: NA
4. Life: NA
5. Operating Cost: Price differential between low and high sulfur fuel approx. $6-8/bbl
6. Energy: NA
7. Maintenance Cost: NA
8. Manufacturer: NA
9. Other locations where employed on similar processes: See Attachment D.

a.

(1) Company:

(2) Mailing Address:

(3) City:

(4) State:

(5) Environmental Manager:

(6) Telephone No.:

*Explain method of determining efficiency above.

(7) Emissions*:

Contaminant	Rate or Concentration

(8) Process Rate*:

b.

(1) Company:

(2) Mailing Address:

(3) City:

(4) State:

*Applicant must provide this information when available. Should this information not be available, applicant must state the reason(s) why.

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions*:

Contaminant	Rate or Concentration

(8) Process Rate*:

10. Reason for selection and description of systems:

The primary fuel will be natural gas and actual emissions are expected to be approximately 21 tons/year. When fuel oil is burned, ground level impacts are expected to be below de minimis levels. The additional capital and operating costs for an add-on scrubber system are not justified from the standpoint of improving air quality or reducing emissions on a long-term basis.

The BACT chosen for this facility is low-sulfur fuel. Lower sulfur fuel is not justified since fuel oil burned will be minimized and environmental impacts at 0.8% sulfur fuel are not significant. Economic penalty would also be incurred with burning of lower sulfur fuel.

*Applicant must provide this information when available. Should this information not be available, applicant must state the reason(s) why.

PM, HC, CO, Hg, Be

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions*:

Contaminant	Rate or Concentration

(8) Process Rate*:

10. Reason for selection and description of systems:

The impacts of TSP, HC, CO, Hg, and Be are all predicted to be below air quality de minimis levels (Table 5 of PSD report) and impacts of TSP, Hg, and Be are below air quality significance levels.
The cost of add-on particulate control equipment is not justified by any reduction in environmental impacts.

There are no demonstrated add-on control methods for HC, CO, Hg, or Be emissions from combustion turbines.

BACT proposed for HC and CO is proper combustion technique.

*Applicant must provide this information when available. Should this information not be available, applicant must state the reason(s) why.

SECTION VII – PREVENTION OF SIGNIFICANT DETERIORATION

A. Company Monitored Data NA

1. _____ no sites _____ TSP _____( ) SO^{2*} _____ Wind spd/dir

Period of monitoring ____/____/____ to ____/____/____
month day year month day year

Other data recorded No monitoring data available in vicinity of site.

Attach all data or statistical summaries to this application.

2. Instrumentation, Field and Laboratory NA

a) Was instrumentation EPA referenced or its equivalent? _____ Yes _____ No

b) Was instrumentation calibrated in accordance with Department procedures? _____ Yes _____ No _____ Unknown

B. Meteorological Data Used for Air Quality Modeling

1. 5 Year(s) of data from 01 / 01 / 74 to 12 / 31 / 78
month day year month day year

2. Surface data obtained from (location) Orlando

3. Upper air (mixing height) data obtained from (location) Tampa

4. Stability wind rose (STAR) data obtained from (location) Orlando

C. Computer Models Used

1. CRSTER Modified? If yes, attach description.

2. ISCST Modified? If yes, attach description.

3. ISCLT Modified? If yes, attach description.

4. _____ Modified? If yes, attach description.

Attach copies of all final model runs showing input data, receptor locations, and principle output tables.

D. Applicants Maximum Allowable Emission Data

Pollutant	Emission Rate
TSP	1.98 grams/sec
SO^2	48.9 grams/sec

E. Emission Data Used in Modeling Attached PSD analysis.

Attach list of emission sources. Emission data required is source name, description on point source (on NEDS point number), UTM coordinates, stack data, allowable emissions, and normal operating time.

F. Attach all other information supportive to the PSD review. Attached PSD analysis.

*Specify bubbler (B) or continuous (C).

G. Discuss the social and economic impact of the selected technology versus other applicable technologies (i.e., jobs, payroll, production, taxes, energy, etc.). Include assessment of the environmental impact of the sources.

Proposed project will provide more reliable electrical power to the Kissimmee Utilities service area. Dependence on purchased power will be reduced, possibly offsetting fuel oil consumption at other generating stations owned by Orlando Utilities Commission. The city has projected savings to consumers in excess of $10 million through 1985.

H. Attach scientific, engineering, and technical material, reports, publications, journals, and other competent relevant information describing the theory and application of the requested best available control technology. Attachment C

PERMIT ATTACHMENT A:

SOURCE DESCRIPTION:

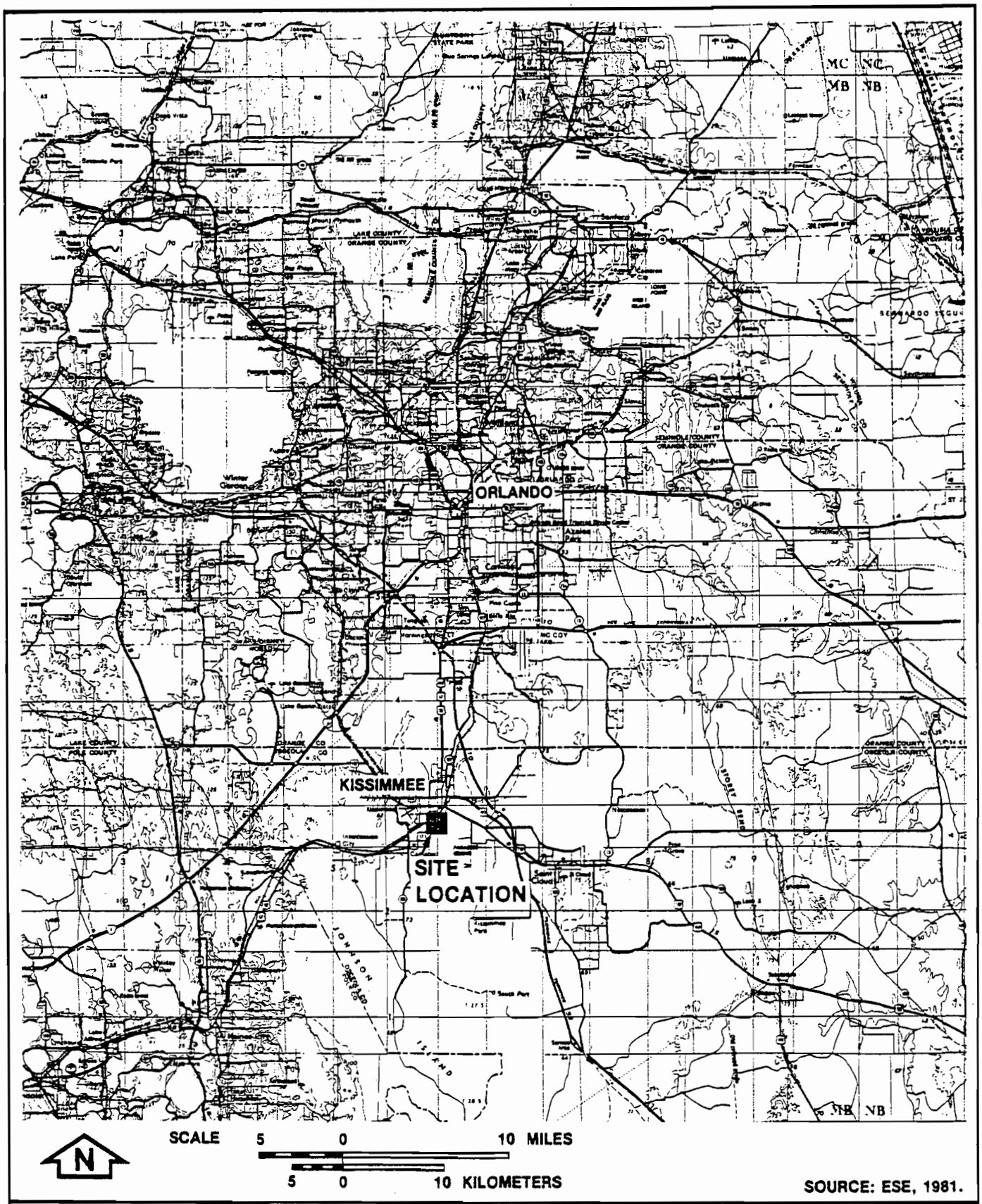


Figure A-1
CITY OF KISSIMMEE AND SURROUNDING AREA

Prepared for:
CITY OF KISSIMMEE

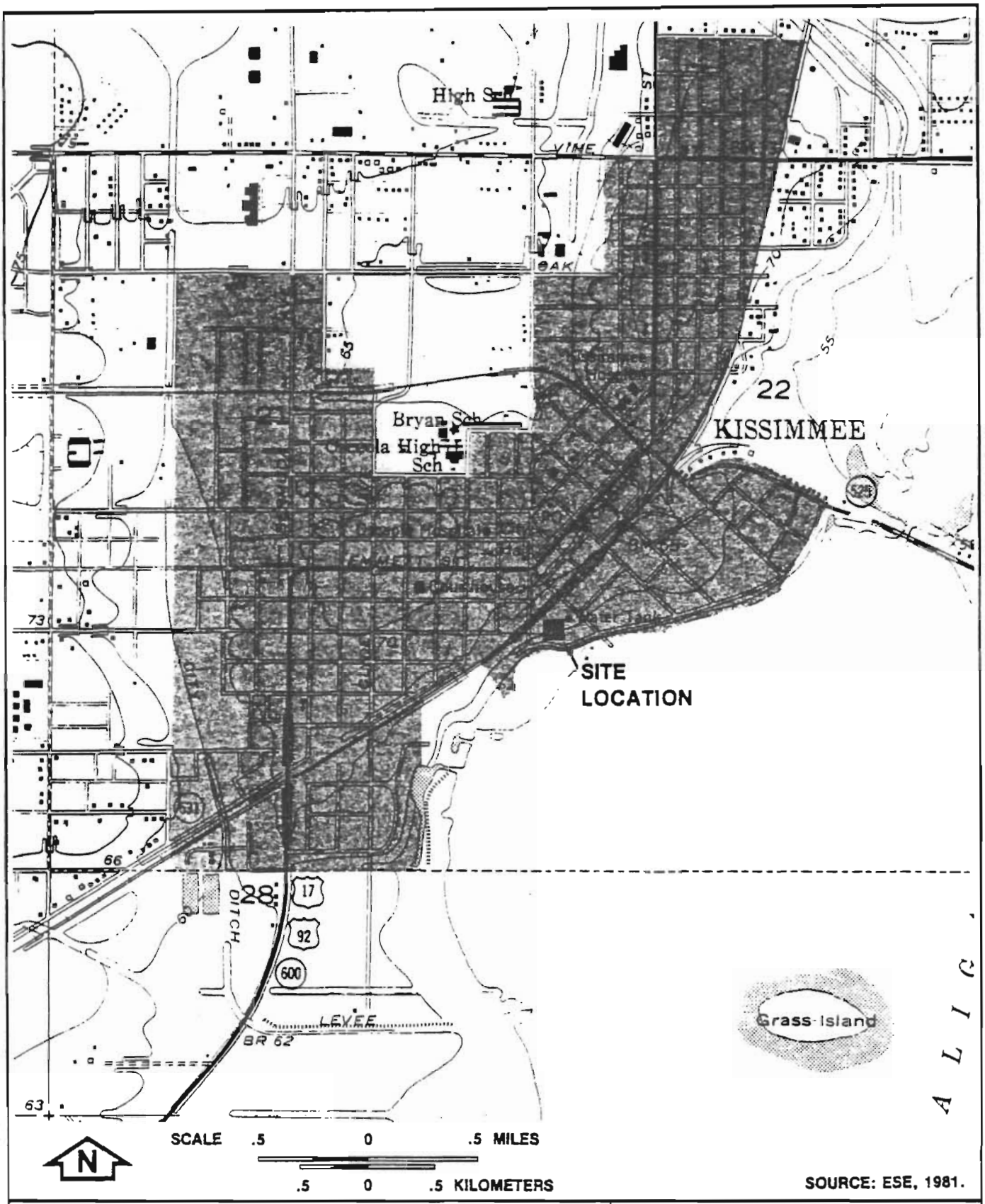


Figure A-2
LOCATION OF KISSIMMEE UTILITIES GENERATING STATION

Prepared for:
CITY OF KISSIMMEE

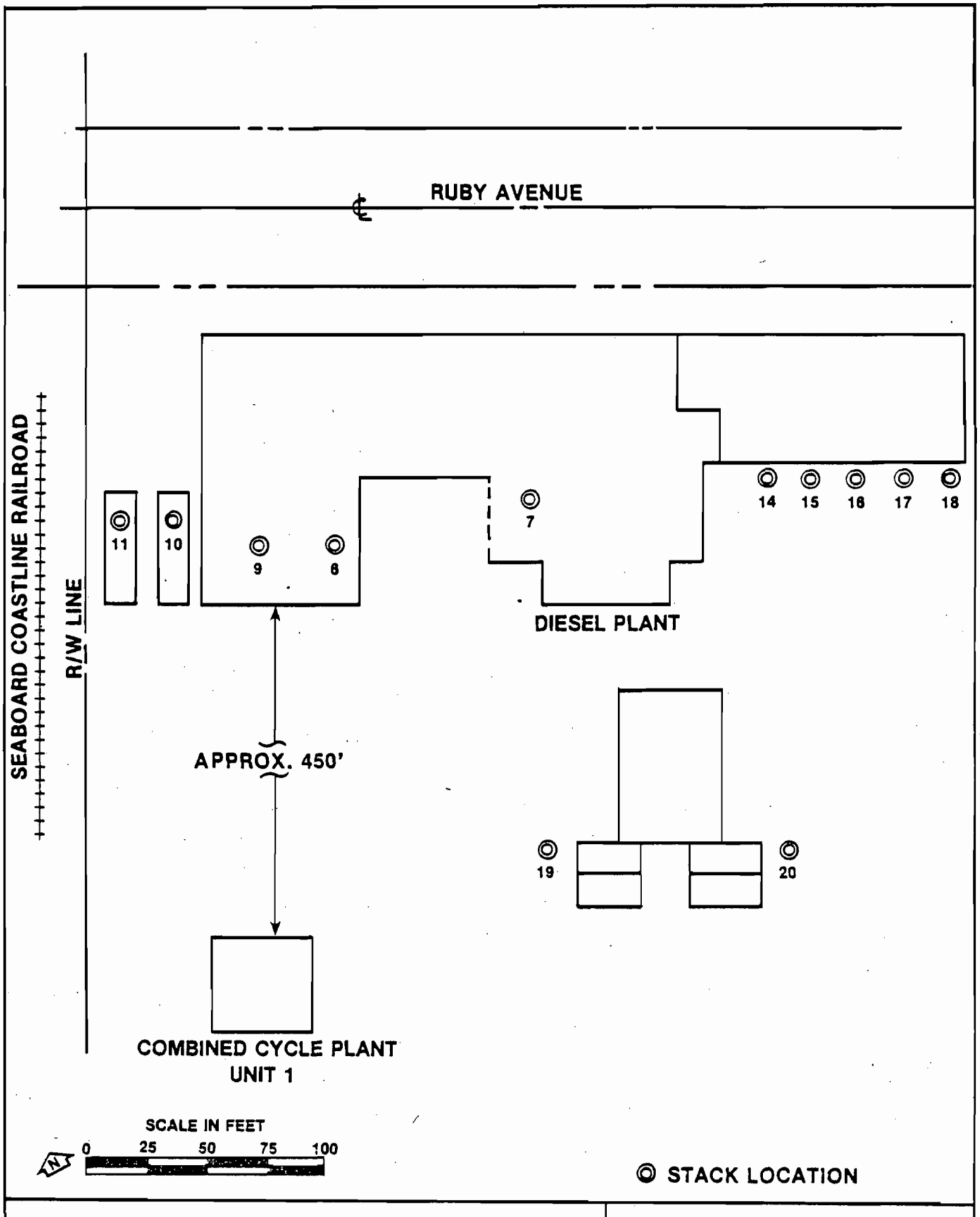
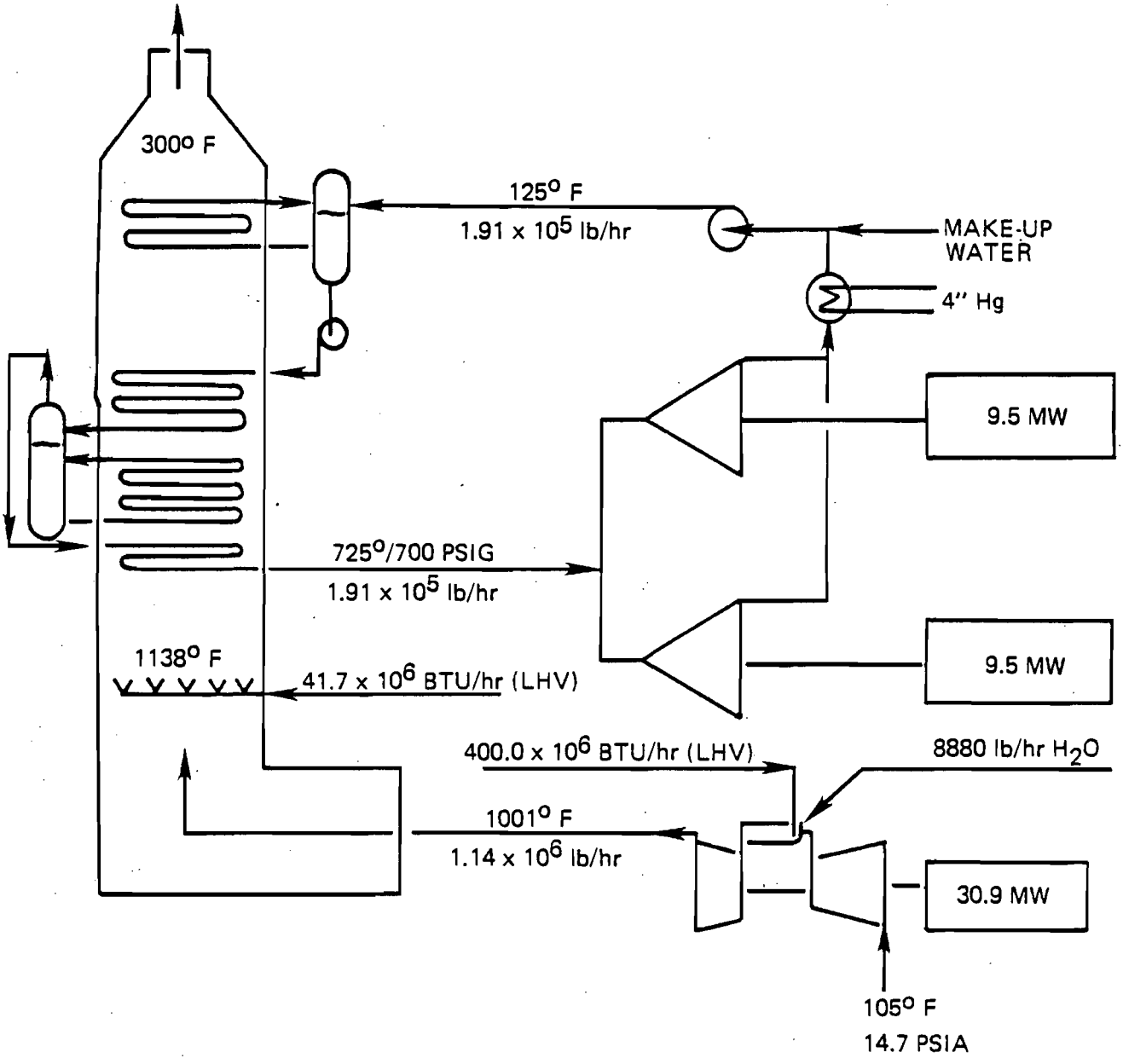


Figure A-3

PLOT PLAN FOR ROY HANSEL GENERATING STATION

SOURCE: KISSIMMEE UTILITIES, 1981.

Prepared For:
CITY OF KISSIMMEE



$$\text{HEAT RATE (LHV)} = \frac{(41.7 + 400.0)10^6}{(49.9)10^3} = 8852 \text{ BTU/KW-HR (GROSS)}$$

Figure A-4

SCHEMATIC FLOW DIAGRAM OF COMBINED CYCLE WITH WATER INJECTION

SOURCE: KISSIMMEE UTILITIES, 1981.

Prepared For:
CITY OF KISSIMMEE

PERMIT ATTACHMENT B

EMISSION CALCULATIONS

SYSTEM CONSTANTS (See Figure A-4)

Heat Input to Turbine	400 x 10^6 Btu/hr (LHV)
Heat Input to Supplemental Heat	41.7 x 10^6 Btu/hr (LHV)
Heat Rate =	8,852 Btu/KW-hr
Water Injected into Turbine	8,880 lb/hr
Total Mass Flow at Turbine Exit	1.14 x 10^6 lb/hr

ASSUMED FUEL CHARACTERISTICS

NATURAL GAS	0.049 lb/SCF
Density	1,000 Btu/SCF (HHV)
Heating Value	900 Btu/SCF (LHV)
Water Produced by Combustion at Theoretical Air	1.92 lb H_2O/lb fuel
Theoretical Air	14.7 lb/lb fuel
Excess Air for Supplemental Heating	15%
NO. 2 FUEL OIL	
API Gravity at 60°F	28°
Density	7.4 lb/gal
Heating Value	19,350 Btu/lb (HHV) 18,200 Btu/lb (LHV)
Theoretical Air	14.2 lb/lb fuel
Excess Air for Supplemental Heating	25%
Water Producted by Combustion at Theoretical Air	1.09 lb H_2O/lb fuel
Molecular Weight of Combustion Products	29 lb/lb-mole

NSPS EMISSION LIMITATIONS

SULFUR DIOXIDE	0.015% by volume or $\leq$0.8% fuel sulfur content
NITROGEN OXIDES	$0.0075 \frac{14.4}{Y} + F$ [% by volume]

Y = Manufacturer's rated heat rate at rated load: 9.34 kW/Watt-hr

F = Allowance for fuel-bound nitrogen: 0.005 (assume N$\geq$0.25% by weight for worst-case emissions)

$$0.0075 \frac{14.4}{9.34} + 0.005 = 0.0166\% = 166 \text{ ppm}$$

FUEL USAGE AND COMBUSTION GAS RATES--NATURAL GAS

Fuel for Supplemental Heat:

(41.7×10^6) (1 SCF/900 Btu) = 46,300 SCFH
(46,300 SCF/hr)(0.049 lb/SCF) = 2,270 lb/hr

Air for Supplemental Heat @ 115% Theoretical:

(2,269) (14.7) (1.15) = 38,360 lb/hr

Water from Combustion:

(2,270) (1.92) = 4,360 lb/hr

Fuel for turbine:

(400×10^6) (1 SCF/900 Btu) = 444,400 SCFH
(444,400 SCF/hr) (0.049 lb/SCF) = 21,780 lb/hr

Water from Combustion:

(21,700) (1.92) = 41,800 lb/hr

Air Supply for Primary Combustion is Determined by System Requirement of 1.14×10^6 lb/hr Mass Flow Rate Through Turbine.

Total Mass of Combustion Products = 1.14×10^6
+ 2,270 supplemental fuel
+ 38,360 supplemental air

1,181,000 lb/hr
(40,700 lb-mole/hr)

Total Mass of Water in Combustion Gases = 4,360 supplemental
41,800 turbine
8,880 injection

55,040 lb/hr
(3,060 lb-mole/hr)

Volumetric Flow Rate, $V = \frac{nRT}{P}$

Total Flow at Stack Exit = $\frac{(40,700)\ (1,545.3)\ (760)}{(14.7 \times 144)\ (60)}$ = 376,300 ACFM

Dry Flow at Standard Conditions = $\frac{(40,700 - 3,060)\ (1,545.3)\ (520)}{(14.7 \times 144)\ (60)}$ = 238,000 DSCFM

FUEL USAGE AND COMBUSTION GAS RATES--FUEL OIL

Fuel for Supplemental Heat:

(41.7×10^6) (1 lb/18,200 Btu) = 2,290 lb/hr

Air for Supplemental Heat at 125% Theoretical:

(2,290) (14.2) (1.25) = 40,650 lb/hr

Water from Combustion:

(2,290) (1.09) = 2,500 lb/hr

Fuel for Turbine:

(400×10^6) (1 lb/18,200 Btu) = 22,000 lb/hr

Water from Combustion:

(22,000) (1.09) = 24,000 lb/hr

Air Supply for Primary Combustion is determined by System Requirement of 1.14×10^6 lb/hr Mass Flow Rate Through Turbine.

Total Mass of Combustion Products =

	1.14×10^6
+	2,290 supplemental fuel
+	40,650 supplemental air
	1,183,000 lb/hr
	(40,800 lb-mole/hr)

Total Mass of Water in Combustion Gases =

2,500	supplemental
24,000	turbine
8,880	injection
35,400	lb/hr
(1,970	lb-mole/hr)

Volumetric Flow Rate, $V = \frac{nRT}{P}$

Total Flow at Stack Exit = $\frac{(40,800)\ (1,545.3)\ (760)}{(14.7 \times 144)\ (60)}$ = 377,000 ACFM

Dry Flow at Standard Conditions = $\frac{(40,800 - 1,970)\ (1,545.3)\ (520)}{(14.7 \times 144)\ (60)}$ = 246,000 DSCFM

BASIS FOR POTENTIAL EMISSIONS

TURBINE: AP-42 Table 3.3.1-2

	Organics (CH_4)	Carbon Monoxide	Particulate	Sulfur Oxides
Gas Fired ($lb/10^6$ ft^3 gas)	42	115	14	940 S*
Oil Fired ($lb/10^3$ gal oil)	5.57	15.4	5.0	140 S*

SUPPLEMENTAL HEATER: AP-42 Table 1.3-1 and 1.4-1

Natural Gas ($lb/10^6$ ft^3)	3	17	5 to 15	0.6
Fuel Oil ($lb/10^3$ gal oil)	1	5	2	142 S*

NONCRITERIA POLLUTANTS: Ackerman et al., 1980. Health Impacts, Emissions, and Emission Factors for Noncriteria Pollutants Subject to de minimis Guidelines and Emitted from Stationary Conventional Combustion Processes (see Table 4-4), EPA-450/2-80-074.

	Mercury	Beryllium
Natural Gas ($lb/10^{12}$ Btu)	11.42	Nil
Distillate Oil ($lb/10^{12}$ Btu)	0.91	0.33

* S = Percent sulfur.

ANNUAL EMISSIONS (TPY)

	Gas-Fired	Fuel Oil-Fired	Significant Emission Rate*
Potential NO_x	2,480	2,580	--
Actual NO_x†	1,290	1,340	40
Hydrocarbon (as CH_4)	82	74	40
Carbon Monoxide	227	207	100
Particulate	30	69	25
Sulfur Dioxide**	21	1,700	40
Mercury	0.02	0.002	0.01
Beryllium	--	0.0006	0.0004

* Federal Register, Vol. 45, No. 154, 1980.

† (DSCFM) (166 ppm) (2,000 ug/m^3-ppm) (0.0283 m^3/ft^3) (10^{-6} g/ug) (60 min/hr) (8,760 hr/yr) (1 lb/454 g) (1 ton/2,000 lb).

** Assumed natural gas has 0.01 percent sulfur content. Fuel oil calculation based on total conversion of 0.8 percent sulfur oil.

NOTE: Emission rates assume continuous firing of 100 percent gas or 100 percent fuel oil.

Potential and maximum emissions in Section IIIC are reported as the greater of the two fuels. Actual emissions are based on gas combustion.

PERMIT ATTACHMENT C

CONTROL TECHNOLOGY

3.3 OFF-HIGHWAY STATIONARY SOURCES

In general, engines included in this category are internal combustion engines used in applications similar to those associated with external combustion sources (see Chapter 1). The major engines within this category are gas turbines and large, heavy-duty, general utility reciprocating engines. Emission data currently available for these engines are limited to gas turbines and natural-gas-fired, heavy-duty, general utility engines. Most stationary internal combustion engines are used to generate electric power, to pump gas or other fluids, or to compress air for pneumatic machinery.

3.3.1 Stationary Gas Turbines for Electric Utility Power Plants

3.3.1.1 General — Stationary gas turbines find application in electric power generators, in gas pipeline pump and compressor drives, and in various process industries. The majority of these engines are used in electrical generation for continuous, peaking, or standby power.[1] The primary fuels used are natural gas and No. 2 (distillate) fuel oil, although residual oil is used in a few applications.

3.3.1.2 Emissions — Data on gas turbines were gathered and summarized under an EPA contract.[2] The contractor found that several investigators had reported data on emissions from gas turbines used in electrical generation but that little agreement existed among the investigators regarding the terms in which the emissions were expressed. The efforts represented by this section include acquisition of the data and their conversion to uniform terms. Because many sets of measurements reported by the contractor were not complete, this conversion often involved assumptions on engine air flow or fuel flow rates (based on manufacturers' data). Another shortcoming of the available information was that relatively few data were obtained at loads below maximum rated (or base) load.

Available data on the population and usage of gas turbines in electric utility power plants are fairly extensive, and information from the various sources appears to be in substantial agreement. The source providing the most complete information is the Federal Power Commission, which requres major utilities (electric revenues of $1 million or more) to submit operating and financial data on an annual basis. Sawyer and Farmer[3] employed these data to develop statistics on the use of gas turbines for electric generation in 1971. Although their report involved only the major, publicly owned utilities (not the private or investor-owned companies), the statistics do appear to include about 87 percent of the gas turbine power used for electric generation in 1971.

Of the 253 generating stations listed by Sawyer and Farmer, 137 have more than one turbine-generator unit. From the available data, it is not possible to know how many hours *each* turbine was operated during 1971 for these multiple-turbine plants. The remaining 116 (single-turbine) units, however, were operated an average of 1196 hours during 1971 (or 13.7 percent of the time), and their average load factor (percent of rated load) during operation was 86.8 percent. This information alone is not adequate for determining a representative operating pattern for electric utility turbines, but it should help prevent serious errors.

Using 1196 hours of operation per year and 250 starts per year as normal, the resulting average operating day is about 4.8 hours long. One hour of no-load time per day would represent about 21 percent of operating time, which is considered somewhat excessive. For economy considerations, turbines are not run at off-design conditions any longer than necessary, so time spent at intermediate power points is probably minimal. The bulk of turbine operation must be at base or peak load to achieve the high load factor already mentioned.

If it is assumed that time spent at off-design conditions includes 15 percent at zero load and 2 percent each at 25 percent, 50 percent, and 75 percent load, then the percentages of operating time at rated load (100 percent) and peak load (assumed to be 125 percent of rated) can be calculated to produce an 86.8 percent load factor. These percentages turn out to be 19 percent at peak load and 60 percent at rated load; the postulated cycle based on this line of reasoning is summarized in Table 3.3.1-1.

Table 3.3.1-1. TYPICAL OPERATING CYCLE FOR ELECTRIC UTILITY TURBINES

Condition, % of rated power	Percent operating time spent at condition	Time at condition based on 4.8-hr day		Contribution to load factor at condition
		hours	minutes	
0	15	0.72	43	0.00 x 0.15 = 0.0
25	2	0.10	6	0.25 x 0.02 = 0.005
50	2	0.10	6	0.50 x 0.02 = 0.010
75	2	0.10	6	0.75 x 0.02 = 0.015
100 (base)	60	2.88	173	1.0 x 0.60 = 0.60
125 (peak)	19	0.91	55	1.25 x 0.19 = 0.238
		4.81	289	Load factor = 0.868

The operating cycle in Table 3.3.1-1 is used to compute emission factors, although it is only an estimate of actual operating patterns.

The operating cycle in Table 3.3.1-1 is used to compute emission factors, although it is only an estimate of actual operating patterns. Table 3.3.1-2 is the resultant composite emission factors based on the operating cycle of Table 3.3.1-1 and the 1971 population of electric utility turbines.

Different values for time at base and peak loads are obtained by changing the total time at lower loads (0 through 75 percent) or by changing the distribution of time spent at lower loads. The cycle given in Table 3.3.1-1 seems reasonable, however, considering the fixed load factor and the economies of turbine operation. Note that the cycle determines *only* the importance of each load condition in computing composite emission factors for each type of turbine, *not* overall operating hours.

The top portion of Table 3.3.1-2 gives separate factors for gas-fired and oil-fired units, and the bottom portion gives fuel-based factors that can be used to estimate emission rates when overall fuel consumption data are available. Fuel-based emission factors on a mode basis would also be useful, but present fuel consumption data are not adequate for this purpose.

3.3.1.3 Nitrogen Oxide Control[4,5] —Nitrogen oxide emissions from gas turbines are reduced by injecting water or steam into the primary flame zone of the combustion system. Moisture is added to the fuel or combustion air, or is injected directly into the combustion chamber. The addition of water limits the combustion temperature and thereby controls the formation of nitrogen oxide.

Water and steam injection rates, commonly expressed as a water-to-fuel ratio (by weight), have an effect on turbine efficiency. Injection of water and fuel with a ratio of 1 *reduces* gas turbine efficiency by approximately 1 percent. Injection of steam at the same ratio *increases* efficiency by 1 percent. For a combined-cycle turbine using steam from the waste-heat boiler, there is an overall reduction in efficiency of 1 percent at a steam/fuel injection ratio of 1. The incremental effectiveness of injecting either steam or water is sharply reduced at water/fuel ratios above 1. Table 3.3.1-3 gives average percentages of nitrogen oxide emission reduction for various water-to-fuel ratios.

Another possible means of controlling nitrogen oxide emissions is the modification of operations and system designs to include catalysts in the combustion and catalytic cleaning in the exhaust stream. These improvements, still in the experimental stage, would be used in addition to the water-injection methods.

Table 3.3.1-2. COMPOSITE EMISSION FACTORS FOR 1971 POPULATION OF ELECTRIC UTILITY TURBINES
EMISSION FACTOR RATING: B

Time basis	Nitrogen oxides	Organics (CH^4)	Carbon Monoxide	Particulate	Sulfur oxides
Entire population					
lb/hr rated load[a]	8.84	0.79	2.18	0.52	0.33
kg/hr rated load	4.01	0.36	0.99	0.24	0.15
Gas-fired only					
lb/hr rated load	7.81	0.79	2.18	0.27	0.098
kg/hr rated load	3.54	0.36	0.99	0.12	0.044
Oil-fired only					
lb/hr rated load	9.60	0.79	2.18	0.71	0.50
kg/hr rated load	4.35	0.36	0.99	0.32	0.23
Fuel basis					
Gas-fired only					
$lb/10^6$ ft^3 gas	413.	42.	115.	14.	940S[b]
$kg/10^6$ m^3 gas	6615.	673.	1842.	224.	15,000S
Oil-fired only					
$lb/10^3$ gal oil	67.8	5.57	15.4	5.0	140S
$kg/10^3$ liter oil	8.13	0.668	1.85	0.60	16.8S

[a]Rated load expressed in megawatts.

[b]S is the percentage sulfur. Example: If the factor is 940 and the sulfur content is 0.01 percent, the sulfur oxides emitted would be 940 times 0.01, or 9.4 $lb/10^6$ ft^3 gas.

Table 3.3.1-3. PERCENT REDUCTION OF NO_x EMISSIONS FROM WATER OR STEAM INJECTION[a]

EMISSION FACTOR RATING: B

Water-to-fuel ratio	Percent reduction of NO_x emissions
0.2	28
0.4	48
0.6	63
0.8	73
1.0	79
1.2	84
1.4	88
1.6	90
1.8	92
2.0	92

[a]Not corrected for efficiency variations.

References for Section 3.3.1

1. O'Keefe, W. and R. G. Schwieger. Prime Movers. *115*:522-531, November 1971.

2. Hare, C. T. and K. J. Springer. Exhaust Emissions from Uncontrolled Vehicles and Related Equipment Using Internal Combustion Engines, Final Report, Part 6: Gas Turbine Electric Utility Power Plants. Southwest Research Institute, San Antonio, Tx. Prepared for U.S. Environmental Protection Agency, Research Triangle Park, N.C., under Contract No. EHS 70-108. February 1974.

3. Sawyer, V. W. and R. C. Farmer. Gas Turbines in U.S. Electric Utilities. Gas Turbine International. January-April 1973.

4. Durkee, K. R., E. A. Noble, and R. Jenkins. An Investigation of the Best Systems of Emission Reduction for Stationary Gas Turbines — Standards Support and Environmental Impact Statement. U.S. Environmental Protection Agency, Research Triangle Park, N.C. Publication No. EPA-450/2-77-017a. 1977.

5. Control Techniques for Nitrogen Oxide Emissions from Stationary Sources. Acurex Corporation, Aerotherm Division. Prepared for U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, N.C. Contract No. 68-02-2611. Publication No. EPA-450/1-78-001. January 1978.

PERMIT ATTACHMENT D

PREVIOUS EPA BACT DETERMINATIONS

BACT/LAER CLEARINGHOUSE REPORT

(3.0)

SOURCE TYPE/SIZE: Pipeline Pump Station/13,500 hp

NAME/ADDRESS: Alaska Pipeline Service Company, Anckorage, Alaska

DETERMINATION DATA: CONDITIONAL/(FINAL)/PENDING for BACT/LAER on (NEW)/MODIFIED SOURCE
KEY DATES: Application-Recd. _____, Completed _____; Determination-Proposed _____, Final 9/18/79

BY: (Agency) EPA Region X Person Paul Boys Phone

AFFECTED FACILITIES	THROUGHPUT CAPACITY	EMISSION RATE* -UNCONTROLLED	EMISSION LIMITS (Basis)**	CONTROL STRATEGY DESCRIPTION Equipment type, etc.	Eff. %
Pump Turbines (2)	13,500 hp each	NOx	$0.0150\ (\frac{14.4}{Y})+F^{@}$ (B) % by volume	Dry controls	

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AUG 1 6 1979
Dept. of Environmental Reg.
Port St. Lucie

SOURCE OPERATION: BATCH/CONTINUOUS: _____ hrs/yr; % by Season W _____ Sp _____ Su _____ F _____

NOTES: Y = manufactures rated heat rate @ peak load -(see subpart GG of NSPS)
F = emission allowance for fuel bound nitrogen

* Specify pollutant (PM, SO_2, NO_x, HC, CO or other) and mass emission rate

** Basis symbols: Use B = BACT, N = NSPS, S = SIP, A = Achieved-in-Practice (AIP)

Rev. 5/80

BACT/LAER CLEARINGHOUSE REPORT

(3.0)

SOURCE TYPE/SIZE: Power production

NAME/ADDRESS: Puget Power Ferndale, WA.

DETERMINATION DATA: CONDITIONAL/(FINAL)/PENDING for BACT/LAER on NEW/(MODIFIED) SOURCE
KEY DATES: Application-Recd. _____, Completed _____; Determination-Proposed _____, Final 9/7/79

BY: (Agency) EPA Region X Person Paul Boys Phone _____

AFFECTED FACILITIES	THROUGHPUT CAPACITY	EMISSION RATE, -UNCONTROLLED*	EMISSION LIMITS (Basis)**	CONTROL STRATEGY DESCRIPTION Equipment type, etc.	Eff. %
Gasturbines	2 @74.8MN*	NOx	75 ppm (B)	waterinjection	
		SO_2	150 ppm @15% 02 (B)	0.8?0 S maxin fuel	
		PM	10% opacity (B)	limited fuel ash content	

SOURCE OPERATION: BATCH/CONTINUOUS: _____ hrs/yr; % by Season W _____ Sp _____ Su _____ F _____

NOTES: * = baseload

* Specify pollutant (PM, SO_2, NO_x, HC, CO or other) and mass emission rate

** Basis symbols: Use B = BACT, N = NSPS, S = SIP, A = Achieved-in-Practice (AIP)

BACT/LAER CLEARINGHOUSE REPORT

(3.0)

SOURCE TYPE/SIZE: Gas turbine generators/179 MW total

NAME/ADDRESS: Puget Power Frederickson, WA

DETERMINATION DATA: CONDITIONAL/(FINAL)/PENDING for BACT/LAER on (NEW)/MODIFIED SOURCE
KEY DATES: Application-Recd._____, Completed_____; Determination-Proposed_____, Final 6/24/80

BY: (Agency) EPA Region X Person Paul Boys Phone_____

AFFECTED FACILITIES	THROUGHPUT CAPACITY	EMISSION RATE* -UNCONTROLLED	EMISSION LIMITS (Basis)**	CONTROL STRATEGY DESCRIPTION Equipment type, etc.	Eff. %
Combustion	89.5 MW	NOx	75 ppm@15% O2 (B)	Water injection	
Turbines (2)	(each - peak)	SO_2	150 ppm@15% O2 (N)	Low S fuel	

SOURCE OPERATION: BATCH/CONTINUOUS: _____ hrs/yr; % by Season W _____ Sp _____ Su _____ F _____

NOTES:

* Specify pollutant (PM, SO_2, NO_x, HC, CO or other) and mass emission rate

** Basis symbols: Use B = BACT, N = NSPS, S = SIP, A = Achieved-in-Practice (AIP)

Rev. 5/80

Best Available Copy

BACT/LAER CLEARINGHOUSE REPORT

SOURCE TYPE/SIZE: Approximately 513 MW Combined Cycle Electric Generation Facility

NAME/ADDRESS: Stony Brook Energy Center, Mass Municipal Wholesale Electric Co., Ludlow, Massachusetts

DETERMINATION IS: CONDITIONAL/FINAL/~~PENDING~~, ISSUED on _____ (date), BASIS* of BACT[1]/LAER/BAC
for NEW/MODIFIED SOURCE

BY U.S. EPA - Region I (Agency) Linda Murphy FTS 223-4448 (Person) (Phon

PERMIT PARAMETERS: AFFECTED FACILITIES	THROUGHPUT CAPACITY (Weight Rate)	POLLUTANT(s) EMITTED	EMISSION LIMIT(s) and (basis for)**	CONTROL STRATEGY DESCRIPT Equipment Type, Etc.	Ef
Gas Turbines	2 simple cycles @	SO_2		- 0.30% S #2 fuel oil * B	
	85 MW each	Particulates	- 0.040 lbs/MM Btu * S		
	3 combined cycle	NO_x	- 0.0075% by volume @15% O,		
	@ 85 MW each		on a dry basis * N		
Steam Turbine	approx. 100 MW				

NOTES:

* Circle one. BACT[1] means a determination made under pre-1977 amendments; BACT[2] means post-1977 amendments to CAA.

** Basis symbols: Use B=BACT, N=NSPS, S=SIP, L=LAER

PREVENTION OF SIGNIFICANT DETERIORATION (PSD) REPORT FOR THE PROPOSED COMBUSTION TURBINE AT KISSIMMEE UTILITIES, OSCEOLA COUNTY, FLORIDA

1.0 INTRODUCTION

Kissimmee Utilities (KU) currently operates 12 diesel generating units with a total output rated at 26.8 megawatts (MW). The proposed plant is a combined cycle combustion turbine/steam generator, with a total net generating capacity of 46.5 MW and a gross generating capacity of 49.9 MW. The turbine will be fired with natural gas; No. 2 fuel oil will be used as a standby fuel. The proposed source will be a major modification for particulate matter (PM), sulfur dioxide (SO_2), nitrogen oxides (NO_x), hydrocarbons (HC), and carbon monoxide (CO) and as such, requires Prevention of Significant Deterioration (PSD) review.

Components of the federal PSD review are:

1. Control Technology Review,
2. Source Impact Analysis,
3. Air Quality Analysis,
4. Source Information, and
5. Additional Impact Analysis.

Components 1 and 4, the control technology review and source information, are contained in the accompanying construction permit application. No air quality analysis (preconstruction monitoring) is required since impacts of all pollutants are below federal de minimis levels, as documented in Section 2.3. Representative air quality data have not been collected in the vicinity of the site, so appropriate background concentrations were assumed as recommended in Ambient Monitoring Guidelines for Prevention of Significant Deterioration, EPA-450/2-78-019, May 1978. The remaining components are discussed in this PSD report.

2.0 SOURCE IMPACT ANALYSIS

2.1 EMISSIONS INVENTORY

Permitted point sources within 50 kilometers (km) of KU are listed in Table 1. The basis for this inventory was the 1980 edition of the Florida Air Permit Inventory System. SO_2 and PM emissions from Florida Power Corporation (FPC) Intercession City, St. Cloud Utilities, and the existing KU diesels were estimated from emission factors published in AP-42 (Tables 3.3.3-1, 3.3.2-1, and 3.3.1-2).

Short-term impacts were projected using listed emissions from all sources within 15 km and estimated emissions from the St. Cloud and FPC sources. Annual average impacts were projected using all sources within 15 km and all sources within 50 km with emissions greater than 40 tons per year of SO_2, 25 tons per year of PM, or 40 tons per year of NO_x.

2.2 DISPERSION MODELING AND METEOROLOGY

Critical meteorology and general location of highest, second-highest impacts were determined by 5-year CRSTER runs. Refined analyses including local source contribution and possible interactions were carried out with the ISCST model. Annual average concentrations were predicted with the ISCLT model.

Meteorological data input to the model consisted of hourly surface observations from Orlando International Airport combined with upper air observations from Tampa International Airport. Data collected during the 5-year period (1974-1978) were used.

The existing structure housing the diesels at KU is 38 feet high. The new stack will not be within the area of influence of this or any other structure with potential to cause downwash conditions.

Initial modeling showed that the critical meteorology and impact area were determined by existing diesel emissions. The 3-hour SO_2 impact was

less than 30 percent of the Ambient Air Quality Standard (AAQS) of 1,300 micrograms per cubic meter (ug/m^3), so no refinements were made for this averaging time. Since both SO_2 and PM emissions from the diesels were directly proportional to the fuel rate, refined modeling for these emissions was carried out at the same point; no separate 5-year total suspended particulate (TSP) run was made.

Estimated PM emissions from St. Cloud Utilities and FPC Intercession City were less than SO_2 emissions from the same sources. Since the SO_2 interaction analysis indicated the maximum SO_2 contribution from these sources in the area of influence of KU was only 4 ug/m^3 and occurred in a noncritical direction, no TSP interaction modeling was performed.

CO, beryllium (Be), and mercury (Hg) impacts of the new source were estimated by comparing emission rates (Table 2) and adjusting SO_2 concentrations by the appropriate ratios.

Long-term NO_x concentrations were determined by assuming that the existing diesels are fired continuously with fuel oil and are in operation 5,260 hours per year.

2.3 AIR QUALITY IMPACTS

Table 2 shows the predicted highest, second-highest short-term and annual impacts that will result from KU and surrounding source emissions. Table 3 shows the effects of plume interaction with nearby major sources.

No violations of state or federal AAQS (Table 4) are predicted. Impacts due to the new source alone are below federal de minimis levels for all pollutants (Table 5), thus exempting the source from preconstruction monitoring.

Impacts for all pollutants except SO_2 are below significance levels; when burning natural gas, SO_2 impacts will also be below significance

levels. No TSP or SO_2 nonattainment areas are located within 100 km; no impacts on nonattainment areas are predicted.

2.4 INCREMENTAL IMPACTS

Table 2 shows that all impacts due to the new source alone are below federal Class II increments (Table 6). The only other permitted increment-consuming sources in the vicinity are Stokely Van Camp and C.W. Bailey. Since no emissions were listed for these sources and the new source impacts are less than 20 percent of the allowable increment, no further incremental analysis was performed.

The KU site is 125 km from the nearest Class I area, the Chassahowitzka National Wildlife Refuge; no impact on this area is predicted.

3.0 ADDITIONAL IMPACTS ON SOILS, VEGETATION, AND VISIBILITY

3.1 IMPACTS ON SOILS AND VEGETATION

Vegetation in the Kissimmee area is comprised of slash pine, saw palmetto, and wire grass. Improved pasture with bahia and carpet grass are also found. Soils are generally of the Leon-Plummer-Rutledge classification--thick acid sands, poorly drained due to a prevalent organic hardpan.

The projected highest, second-highest 3-hour SO_2 concentration of 392 ug/m^3 and annual mean concentration of 40 ug/m^3 (see Table 2) are below levels generally reported for damage to sensitive plant species. European studies by Heck and Brandt (1977) have found 1/2-hour levels of 3,406 ug/m^3 and long-term means of 393 ug/m^3 to approximate threshold levels for several species. According to studies by Heck and Brandt (1977), alfalfa, commonly thought to be one of the most SO_2-sensitive species, has a 2-hour threshold level of at least 2,620 ug/m^2 and an 8-hour threshold of 655 ug/m^2.

According to Jacobson & Hill (1970), PM is generally considered to have a relatively unimportant effect on vegetation. TSP impacts from the new source are predicted to be less than 1 ug/m^3, 24-hour average.

Plant species classified as "sensitive" to NO_2, such as pinto bean, cucumber, lettuce, and tomato, displayed injury when exposed to NO_2 levels of 3,760 to 4,960 ug/m^3 for a 2-hour period. Extremely resistant species, such as heath, were unaffected by an exposure of 1,900,000 ug/m^3 for 1 hour. Blue grass, orange tree plants, and rye are all classified as "intermediate" in resistance to NO_2 injury.

Jacobson and Hill (1970) found that NO_x concentration is more important to plant injury than the duration of exposure. NO_x impacts of the new source are predicted to be below 1 ug/m^3, annual average.

Based on these experimental results, the effects of SO_2, NO_2, and PM emissions upon soils and vegetation are expected to be negligible.

3.2 VISIBILITY IMPACTS

The proposed source is not expected to have any significant impact on visibility in the immediate area. A Level I visibility screening analysis confirmed that no visibility impairment should occur in any Class I area. The absolute values of the three Level I contrast parameters (C1--plume contrast against the sky; C2--plume contrast against terrain; and C3--change in the sky/terrain contrast caused by primary and secondary aerosol) were well below 0.1, indicating that it is highly unlikely that the emissions source would cause adverse visibility impacts in Class I areas. Further analysis of potential visibility impacts was therefore unnecessary (EPA, 1980).

Table 1. Permitted Point Sources by County

Plant	Points	Plant Name	UTM Coordinates E	UTM Coordinates N	Total Plant Emissions (tons per year) PM	SO_2	NO_x
		Osceola County					
01	04-08, 11-15	City of Kissimmee	460.1	3129.3	--	--	--
02	02, 04-08	City of St. Cloud	471.8	3124.9	--	--	--
03	01	Concrete Materials	473.7	3124.9	--	--	--
04	01	Concrete Materials	460.6	3129.8	--	--	--
05	01	Florida Dept. of Agriculture	458.7	3133.4	--	--	--
06	01	Kissimmee Community Hospital	459.9	3130.3	--	--	--
07	01	Stokely Van Camp	451.1	3125.8	--	--	--
08	01	Castcrete Corp.	460.1	3133.8	--	--	--
09	01	Rinker Materials	459.9	3130.1	--	--	--
10	02-03	St. Cloud Hospital	470.3	3124.1	--	--	--
11	01	C. W. Bailey	470.8	3133.8	--	--	--
14	01-10	Florida Power Corp.	446.3	3126.0	--	--	--
26	01	Transgulf Pipeline	462.0	3135.0	--	--	--
		Orange County					
02	01	Basic Asphalt	455.9	3166.8	23	--	3
03	01-02	Bordens Dairy	460.6	3155.8	2	--	--
04	01	Buchanan	462.4	3155.1	6	--	--
06	01-04	Coca Cola	445.9	3173.6	10	13	1
08	01	V.A.	462.8	3155.6	--	--	--
09	01	Goodyear Recap	462.4	3154.4	--	--	--
10	01	Jensen's Furniture	464.0	3157.3	--	--	--
11	01-04	Florida Minerals & Materials	462.0	3149.0	44	--	--

Table 1. Permitted Point Sources by County (Continued, Page 2 of 6)

Plant	Points	Plant Name	UTM Coordinates E	UTM Coordinates N	Total Plant Emissions (tons per year) PM	SO_2	NO_x
		Orange County (Continued)					
12	01, 02	Florida Minerals & Materials	444.5	3160	32	--	--
13	01, 02	Florida Minerals & Materials	470.7	3163.8	22	--	--
14	01	Florida Power Corp.	475.2	3156.8	1	31	9
15	01	University of Central Florida	480.5	3163.4	1	--	--
16	01	Kane Furniture	456.2	3158.2	1	--	--
17	01	Winter Park Memorial	467.9	3163.3	6	--	1
18	01	B. R. Tire Company	462.8	3154.3	--	--	--
19	01, 02	Houdaille	461.9	3141.9	1	--	--
20	01	Inland Materials	459.9	3160.9	26	--	--
21	01	Orlando Paving	453.8	3160.7	36	--	8
22	01	Quality Vaults	446.9	3158.8	1	--	--
23	01	Kissimmee Rock Industry	461.3	3157.9	43	--	--
24	01-03	Florida Rock Industry	459.2	3174.2	129	--	--
25	01, 02	Rinker Materials	458.3	3165	90	--	--
26	02-04	Martin Marietta	454.9	3146.5	2	--	7
27	01, 02	Lone Star	462.6	3154.2	44	--	--
28	01	Mercy Hospital	457.8	3159.7	1	--	12
29	01-06	GE Lamp	444.8	3174	1	--	1
30	01	Orlando Humane Society	457.5	3158.3	1	--	--
31	01	Orlando Paving Company	465.3	3145.9	42	10	8
32	01, 02	Owens Illinois	460.7	3142	52	--	--

Table 1. Permitted Point Sources by County (Continued, Page 3 of 6)

Plant	Points	Plant Name	UTM Coordinates E	UTM Coordinates N	Total Plant Emissions (tons per year) PM	SO_2	NO_x
		Orange County (Continued)					
33	01-06	Orlando Utilities	463.3	3159	187	5,196	151
36	01	Rinker Materials	470.7	3163.9	40	--	--
37	01, 02	Rinker Materials	462.5	3154.3	92	--	--
38	02-06	Rinker Materials	450.6	3145.5	209	--	62
39	01, 03-04	Southern Fruit	462.9	3153.3	61	32	--
40	01-04	Southern Gold	458.7	3161.3	50	2	16
41	01	Dixie Asphalt	463.2	3143.0	50	9	20
42	01	Plymouth Citrus	455.2	3174.0	1	3	1
43	01-04	Aircraft Service	469	3146.2	--	--	--
44	01, 02	Boise Cascade Can Co.	460.7	3142.4	--	--	4
45	01-14	Martin Marietta Corp.	454.5	3146.2	15	1	--
46	01-08, 10-13, 16-18, 20-21	Martin Marietta Corp.	454.5	3146.2	51	--	--
47	01, 02	Martin Marietta Aerospace	455.2	3146.2	--	--	--
50	01-05	Carns Concrete Pipe	454.6	3167.8	69	--	--
53	01-03, 06, 08-14	Winter Garden Citrus	443.8	3159.6	303	39	68
54	01	City Chemicals Company	470.7	3163.9	1	--	--
56	01-06	Gould Battery	460.4	3142.3	14	--	--
58	01-03	Al Block Company	462.5	3155.0	141	--	1
59	01, 02	Medusa Cement Company	462.6	3154.7	69	--	--
60	01-08	Ashland Chemical Co.	460.4	3147.9	--	--	--
61	01-08	City of Orlando	456.3	3152.7	64	8	112
63	01, 02	Florida Hospital	463.8	3160.7	23	--	49

Table 1. Permitted Point Sources by County (Continued, Page 4 of 6)

Plant	Points	Plant Name	UTM Coordinates E	UTM Coordinates N	Total Plant Emissions (tons per year) PM	SO_2	NO_x
		Orange County (Continued)					
65	01	Lucerne General Hospital	463.1	3153	--	--	--
66	01	West Orange Hospital	443.1	3160.0	3	1	1
67	01	Orlando Regional	463.1	3155.3	4	--	7
69	01-07, 11-13	Central Florida Pipeline	463.8	3143.8	--	--	--
70	01	Aaron Scrap Metals	454.8	3167.1	1	--	--
71	01-05	Florida Rock Industry	463.0	3145.5	119	--	4
74	01-03, 05	Citrus Central Metals	445.6	3173.8	9	--	--
77	01	Macasphalt Corporation	450.6	3145.4	4	1	--
78	01, 02	Frito Lay	459.1	3161	14	--	6
79	01-06	Naval Training Center	467.8	3160	10	--	6
80	01	Harry L. Hanes	463.8	3162.4	1	--	--
		Polk County					
01	05	Alcoma Packing	451.6	3085.5	65	--	--
07	01-03	Owens Illinois	423.4	3102.8	93	--	--
14	01-04	Standard Sand Silica	441.5	3118.2	125	240	--
17	01-05	Swift Agrichem	427.9	3097.4	114	--	--
22	01, 02	Owens Illinois	423.4	3102.8	11	--	3
23	01-03	Coca Cola	421.3	3103.6	123	--	72
29	01	Hunt Brothers	445.3	3083	--	2	1

Table 1. Permitted Point Sources by County (Continued, Page 5 of 6)

Plant	Points	Plant Name	UTM Coordinates E	UTM Coordinates N	Total Plant Emissions (tons per year) PM	SO_2	NO_x
		Polk County (Continued)					
33	01, 02	Bordo Citrus	438	3109	100	--	--
37	01	Adams Packing	421.7	3104.2	34	--	--
61	01-05	Holly Hill Fruit	441	3115.4	77	--	--
71	01-03	Uranium Recovery	465	3080	6	--	--
76	01	International Paper	421.7	3104.3	--	--	--
82	01	Macasphalt	423.1	3101.5	49	--	--
88	01	Morris Canning	428.1	3103.4	--	--	--
90	03	Florida Distillers	428	3108.1	--	--	--
96	01, 02	Jacquin Florida Dist.	421.4	3102.9	--	--	--
103	01	Kandors Thriftway	428.1	3100.6	--	--	--
105	01	Dundee Citrus	438.8	3099.9	--	--	--
108	01, 02	Concrete Materials	439.4	3109.4	--	--	--
113	02, 03	Gall Silica Mining	450.2	3085.4	--	--	--
115	01	Phoenix Industry	428	3096	--	--	--
122	01	Monier Resources	423.5	3104.6	--	--	--
124	01	Duncan Browning	422.8	3104.7	--	--	--
		Seminole County					
01	01	Sunrise Materials	469.8	3177.8	4	--	--
02	01-04	Central Florida Drum	474.7	3173.4	13	4	3
04	01, 02	Inland Materials	466	3172.1	33	--	--
05	01	Kissam Concrete	465.1	3170.4	38	--	--

Table 1. Permitted Point Sources by County (Continued, Page 6 of 6)

Plant	Points	Plant Name	UTM Coordinates E	UTM Coordinates N	Total Plant Emissions (tons per year) PM	SO_2	NO_x
		Seminole County (Continued)					
06	01-03	Coca Cola	459.4	3170.5	52	4	26
07	01	L.D Plante Inc.	474.5	3176.2	4	34	12
08	01	Lone Star	465.8	3172	18	--	--
19	01	Macasphalt Corp.	470.2	3175.8	8	13	3
		Lake County					
11	01-03	Clermont Builders	424.4	3159	33	--	--
13	01	S. Lake Memorial Hospital	424.9	3158.6	--	--	--
31	01	Tower Chemical Co.	433	3158.2	1	--	--

NOTE: Blanks indicate no allowable or actual emissions listed in APIS 1980.

Source: ESE, 1981.
APIS, 1980.

Table 2. Air Quality Impacts (ug/m^3)*

	SO_2			TSP		NO_x	CO	Hg and Be
	24-hour	3-hour	Annual	24-hour	Annual	Annual	3-hour	24-hour
All Sources	135	372	20	81	12	69	—	—
Plus Background	20	20	20	40	40	20	—	—
	155	392	40	121	52	89	—	—
Day (period)/year	325/78	278(5)/77	—	—	—	—	—	—
Direction (degrees)/ distance (m)	180/500	240/300	—	—	—	—	—	—
New Source	10	44	<1	<1†	<1†	<1†	1.4	<0.0005
Day (period)/year	279/74	103(4)/78	—	—	—	—	—	—
Direction (degrees)/ distance (m)	180/4,000	360/2,000	—	—	—	—	—	—

* Highest, second-highest for 24-hour and 3-hour averaging times.
† Calculated as ratio from SO_2 runs.

Source: ESE, 1981.

Table 3. Source Interactions

Interacting Source	Direction (deg.)	Day/Year	SO_2 Concentration (ug/m^3)	
			KU Only	KU with Interaction
City of St. Cloud	290	113/78	72	76
FPC Intercession City	75	158/75	69	69

Source: ESE, 1981.

Table 4. National and State of Florida AAQS

Pollutant	Averaging Time	National Primary Standard	National Secondary Standard	Florida
Suspended PM	Annual Geometric Mean	75 ug/m^3	60 ug/m^3	60 ug/m^3
	24-Hour Maximum*	260 ug/m^3	150 ug/m^3	150 ug/m^3
SO_2	Annual Arithmetic Mean	80 ug/m^3	NA†	60 ug/m^3
	24-Hour Maximum*	365 ug/m^3	NA†	260 ug/m^3
	3-Hour Maximum*	NA†	1,300 ug/m^3	1,300 ug/m^3
CO	8-Hour Maximum*	10 mg/m^3	10 mg/m^3	10 mg/m^3
	1-Hour Maximum*	40 mg/m^3	40 mg/m^3	40 mg/m^3
HC	3-Hour Maximum* (6 to 9 A.M.)	160 ug/m^3	160 ug/m^3	160 ug/m^3
NO_2	Annual Arithmetic Mean	100 ug/m^3	100 ug/m^3	100 ug/m^3
Ozone	1-Hour Maximum*	235 ug/m^3	235 ug/m^3	160 ug/m^3
Lead	Calendar Quarter Arithmetic Mean	1.5 ug/m^3	1.5 ug/m^3	NA†

* Maximum concentration not to be exceeded more than once per year.
† No standard exists.

Sources: 40 CFR Part 50, 1980.
FAC Chapter 17-2.

Table 5. Significant Emission Rates and De Minimis Air Quality Impact Levels

Pollutant	De Minimis Emission Rate (Tons per year)	De Minimis Air Quality Impact Level (For Use In Determining Monitoring) (ug/m^3)
CO	100	575, 8-hour average
NO_2	40	14, annual
Total Suspended Particulates	25	10, 24-hour
SO_2	40	13, 24-hour
Ozone* (volatile organic compounds)	40	
Lead	0.6	0.1, 3-month
Hg	0.1	0.25, 24-hour
Be	0.0004	0.0005, 24-hour
Asbestos†	0.007	
Fluorides	3	0.25, 24-hour
Sulfuric Acid Mist†	7	
Vinyl Chloride	1	15, maximum value
Total Reduced Sulfur	10	10, 1-hour
Hydrogen Sulfide	10	0.04, 1-hour
Reduced Sulfur Compounds	10	10, 1-hour
Inorganic Arsenic†	0	
Radionuclides†	0	
Benzene†	0	
Ethylene Dichloride†	0	
Polyvinyl Chloride†	0	

* A de minimis air quality level is not given for ozone. However, a plant which is subject to PSD review and has a net increase of 100 tons per year of volatile organic compounds would be required to perform an ambient air quality analysis.

† No measurement method or de minimis air quality impact level has been established.

Source: Federal Register, Vol. 45, No. 154, 1980.

Table 6. Federal and State of Florida PSD Allowable Increments (ug/m^3)

Pollutant/Averaging Time	Class I	Class II	Class III
PM			
Annual Geometric Mean	5	19	37
24-Hour Maximum*	10	37	75
SO_2			
Annual Arithmetic Mean	2	20	40
24-Hour Maximum*	5	91	182
3-Hour Maximum*	25	512	700

* Maximum concentration not to be exceeded more than once per year.

Sources: Public Law 95-95, Clean Air Act Amendments of 1977.
Federal Register, Vol. 43, No. 118, June 19, 1978.

REFERENCES

Heck, W.W., and Brandt, C.S. 1977. Air Pollution, Effects on Vegetation: Native Crops, Forests. In: Air Pollution. A.C. Stern, Editor. Vol. II. The Effects of Air Pollution. Academic Press, Inc., New York.

Jacobson, J.L., and Hill, A.C. 1970. Recognition of Air Pollution Injury to Vegetation: A Pictorial Atlas. Air Pollution Control Association, Pittsburgh, Pennsylvania.

U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. 1980. Workbook for Estimating Visibility Impairment. RTP No. 27711. July 1980.

U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. 1978a. Ambient Air Guidelines for Prevention of Significant Deterioration. EPA-450/2-78-019.

U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. 1978b. Guideline on Air Quality Models. EPA-450/2-78-027.

U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. 1978c. Guidelines for Determining Best Available Control Technology (BACT).

U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. 1978d. Technical Support for Determination of Good Engineering Practice Stack Height. Research Triangle Park, North Carolina.

NEW SOURCE ONLY

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PLANT NAME: KISS. UTILITIES              POLLUTANT:   SO2      AIR QUALITY UNITS: GM/M**3
ORLANDO/TAMPA MET DATA
    E.R. 48.9 - H 9.14
                 MET FILE       REQUESTED
                STN NO. YR    STN NO. YR
 SURFACE         12815  74     12815  74
 UPPER AIR       12842  74     12842  74
PLANT LOCATION: RURAL
ANEMOMETER HEIGHT IS  7.0 METERS
WIND PROFILE EXPONENTS ARE:   0.100,  0.150,  0.200,  0.250,  0.300,  0.300,
NO TAPE OUTPUT
MET DATA WILL NOT BE PRINTED

DAY-- 1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
      1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
      1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
      1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
      1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
      1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
      1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
      1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
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* * * * * * * * * * * * * * * N O T E * * * * * * * * * * * * * * *

    ALL TABLES, INCLUDING SOURCE CONTRIBUTION, THAT CONTAIN "ANNUAL" IN THE HEADING ARE BASED

    ONLY ON THOSE DAYS MARKED BY A "1" IN THE ABOVE TABLE
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RING DISTANCES(KM)= 0.50 1.00 1.50 2.00 2.50

STACK # 1--UNIT 1

STACK	MONTH	EMISSION RATE (GMS/SEC)	HEIGHT (METERS)	DIAMETER (METERS)	EXIT VELOCITY (M/SEC)	TEMP (DEG.K)	VOLUMETRIC FLOW (M**3/SEC)
1	ALL	48.9000	9.14	2.44	38.03	422.00	177.83

PLANT NAME: KISS. UTILITIES POLLUTANT: SO2 AIR QUALITY UNITS: GM/M**3
MAXIMUM MEAN CONC= 5.0967E-07 DIRECTION= 23 DISTANCE= 2.5 KM
YEAR= 74

ANNUAL MEAN CONCENTRATION AT EACH RECEPTOR

DIR \ RANGE	0.5 KM	1.0 KM	1.5 KM	2.0 KM	2.5 KM
1	2.84368E-09	1.59018E-07	3.34371E-07	4.11159E-07	4.26982E-07
2	3.57846E-09	1.59577E-07	2.97251E-07	3.51085E-07	3.55914E-07
3	2.91020E-09	1.29261E-07	2.32907E-07	2.78502E-07	2.87267E-07
4	3.15005E-09	1.35838E-07	2.41694E-07	2.90414E-07	3.03120E-07
5	5.19749E-09	1.67443E-07	2.85680E-07	3.31487E-07	3.39523E-07
6	4.85075E-09	1.64990E-07	2.76924E-07	3.26314E-07	3.42714E-07
7	3.74400E-09	1.62117E-07	2.68555E-07	3.13953E-07	3.24947E-07
8	3.38412E-09	1.52095E-07	2.42468E-07	2.80831E-07	2.89958E-07
9	4.03271E-09	1.24413E-07	2.04427E-07	2.49376E-07	2.69610E-07
10	5.29352E-09	1.17983E-07	2.01997E-07	2.44560E-07	2.60890E-07
11	7.99045E-09	1.42110E-07	2.38511E-07	2.84362E-07	3.01671E-07
12	8.50632E-09	1.67345E-07	2.73448E-07	3.23243E-07	3.40971E-07
13	5.84270E-09	1.57472E-07	2.60073E-07	3.06026E-07	3.20914E-07
14	3.57574E-09	1.42851E-07	2.79010E-07	3.42252E-07	3.60709E-07
15	1.96719E-09	1.06861E-07	2.12402E-07	2.63141E-07	2.82016E-07
16	1.03693E-09	1.07574E-07	2.19102E-07	2.67825E-07	2.82798E-07
17	6.41573E-10	1.28754E-07	2.63316E-07	3.28600E-07	3.58005E-07
18	8.29210E-10	1.50305E-07	3.25922E-07	4.36041E-07	5.05749E-07
19	1.39868E-09	1.29113E-07	2.42314E-07	2.93480E-07	3.16358E-07
20	3.15491E-09	1.38188E-07	2.72681E-07	3.55303E-07	4.04619E-07
21	3.81801E-09	1.58984E-07	3.06348E-07	3.77960E-07	4.04288E-07
22	5.58387E-09	1.88254E-07	3.66772E-07	4.54620E-07	4.90625E-07
23	6.59359E-09	1.85838E-07	3.75974E-07	4.70937E-07	5.09667E-07
24	4.88433E-09	1.59589E-07	3.36766E-07	4.26898E-07	4.60844E-07
25	2.72423E-09	1.43175E-07	3.04689E-07	3.92122E-07	4.28806E-07
26	3.21332E-09	1.81785E-07	3.25213E-07	3.79937E-07	3.94146E-07
27	3.85841E-09	1.96229E-07	3.55181E-07	4.25147E-07	4.48371E-07
28	3.49072E-09	1.69745E-07	3.07955E-07	3.73941E-07	4.00112E-07
29	3.88591E-09	1.51870E-07	2.79463E-07	3.39694E-07	3.67138E-07
30	6.66249E-09	1.59146E-07	3.03675E-07	3.75904E-07	4.09983E-07
31	9.42705E-09	1.71373E-07	3.15951E-07	3.80096E-07	4.02877E-07
32	1.36237E-08	2.09573E-07	3.44330E-07	3.83174E-07	3.88192E-07
33	8.94711E-09	1.98916E-07	3.34102E-07	3.64340E-07	3.59516E-07
34	4.44734E-09	1.66778E-07	3.25190E-07	3.99348E-07	4.30064E-07
35	3.37589E-09	1.59378E-07	3.19772E-07	3.81541E-07	3.95132E-07
36	2.60382E-09	1.65070E-07	3.70406E-07	4.67142E-07	5.00561E-07

PLANT NAME: KISS. UTILITIES POLLUTANT: SO2 AIR QUALITY UNITS: GM/M**3
MAXIMUM MEAN CONC= 6.5267E-07 DIRECTION= 18 DISTANCE= 5.0 KM
YEAR= 74

ANNUAL MEAN CONCENTRATION AT EACH RECEPTOR

DIR \ RANGE	3.0 KM	3.5 KM	4.0 KM	4.5 KM	5.0 KM
1	4.21042E-07	4.07019E-07	3.92594E-07	3.77320E-07	3.63597E-07
2	3.45199E-07	3.30619E-07	3.17818E-07	3.05875E-07	2.95956E-07
3	2.84463E-07	2.78447E-07	2.73168E-07	2.67200E-07	2.62197E-07
4	3.03053E-07	2.97760E-07	2.92506E-07	2.86456E-07	2.81171E-07
5	3.34724E-07	3.24506E-07	3.13952E-07	3.02597E-07	2.92136E-07
6	3.47592E-07	3.46870E-07	3.45009E-07	3.40376E-07	3.35691E-07
7	3.23464E-07	3.16771E-07	3.09275E-07	2.99956E-07	2.91291E-07
8	2.89921E-07	2.86450E-07	2.82949E-07	2.77766E-07	2.72985E-07
9	2.81017E-07	2.87534E-07	2.92084E-07	2.92540E-07	2.91871E-07
10	2.67392E-07	2.68087E-07	2.66941E-07	2.63216E-07	2.58910E-07
11	3.09200E-07	3.11532E-07	3.12085E-07	3.09003E-07	3.05502E-07
12	3.46341E-07	3.44963E-07	3.41712E-07	3.35787E-07	3.30065E-07
13	3.22978E-07	3.17843E-07	3.10309E-07	3.00364E-07	2.90461E-07
14	3.60780E-07	3.52491E-07	3.42102E-07	3.29604E-07	3.17325E-07
15	2.86542E-07	2.83706E-07	2.78317E-07	2.70578E-07	2.62580E-07
16	2.83703E-07	2.78397E-07	2.71693E-07	2.63458E-07	2.55971E-07
17	3.71481E-07	3.76206E-07	3.77617E-07	3.74242E-07	3.70112E-07
18	5.55378E-07	5.90540E-07	6.19288E-07	6.37523E-07	6.52673E-07
19	3.27601E-07	3.32362E-07	3.35344E-07	3.34938E-07	3.34284E-07
20	4.39828E-07	4.65446E-07	4.86998E-07	5.00538E-07	5.11847E-07
21	4.15324E-07	4.20035E-07	4.24371E-07	4.25493E-07	4.26890E-07
22	5.08244E-07	5.16978E-07	5.24104E-07	5.25849E-07	5.27215E-07
23	5.27429E-07	5.34722E-07	5.39666E-07	5.39411E-07	5.38748E-07
24	4.73316E-07	4.76098E-07	4.76925E-07	4.73982E-07	4.71435E-07
25	4.46122E-07	4.54659E-07	4.61344E-07	4.63675E-07	4.66035E-07
26	3.99257E-07	4.02593E-07	4.07712E-07	4.10341E-07	4.13807E-07
27	4.54257E-07	4.52151E-07	4.48536E-07	4.41909E-07	4.36065E-07
28	4.10041E-07	4.10976E-07	4.08939E-07	4.02797E-07	3.96176E-07
29	3.81479E-07	3.87103E-07	3.89123E-07	3.86237E-07	3.82246E-07
30	4.27554E-07	4.34790E-07	4.38458E-07	4.37803E-07	4.36863E-07
31	4.09763E-07	4.08980E-07	4.06456E-07	4.00488E-07	3.94600E-07
32	3.84742E-07	3.78754E-07	3.74134E-07	3.68223E-07	3.63620E-07
33	3.47647E-07	3.35187E-07	3.25439E-07	3.16122E-07	3.08719E-07
34	4.42670E-07	4.44574E-07	4.43660E-07	4.38786E-07	4.33559E-07
35	3.94349E-07	3.88223E-07	3.82304E-07	3.74665E-07	3.67990E-07
36	5.12572E-07	5.14903E-07	5.15330E-07	5.11651E-07	5.07774E-07

PLANT NAME: KISS. UTILITIES POLLUTANT: SO2 AIR QUALITY UNITS: GM/M**3
MAXIMUM MEAN CONC= 6.8753E-07 DIRECTION= 36 DISTANCE= 2.5 KM
YEAR= 75

ANNUAL MEAN CONCENTRATION AT EACH RECEPTOR

DIR \ RANGE	0.5 KM	1.0 KM	1.5 KM	2.0 KM	2.5 KM
1	6.46801E-09	2.47578E-07	4.59801E-07	5.33091E-07	5.33952E-07
2	6.46993E-09	2.00286E-07	3.76967E-07	4.42400E-07	4.44933E-07
3	5.94187E-09	1.65679E-07	3.14478E-07	3.67066E-07	3.65161E-07
4	5.19371E-09	1.82852E-07	3.34047E-07	3.91192E-07	3.97280E-07
5	5.40605E-09	2.10165E-07	3.63943E-07	4.28132E-07	4.42409E-07
6	4.66709E-09	1.67614E-07	2.81801E-07	3.29953E-07	3.42073E-07
7	7.47060E-09	1.58737E-07	2.78085E-07	3.29027E-07	3.44245E-07
8	1.08951E-08	1.24538E-07	2.33945E-07	2.84613E-07	2.98979E-07
9	8.09841E-09	9.72680E-08	1.90671E-07	2.46779E-07	2.74428E-07
10	4.17990E-09	1.13471E-07	2.14890E-07	2.57919E-07	2.67920E-07
11	3.17444E-09	1.62905E-07	3.14331E-07	3.79466E-07	4.00468E-07
12	3.87107E-09	1.89242E-07	3.61167E-07	4.41969E-07	4.66443E-07
13	4.12364E-09	1.88538E-07	3.60346E-07	4.43721E-07	4.70176E-07
14	3.12729E-09	1.68137E-07	3.23615E-07	3.90276E-07	4.05933E-07
15	2.34039E-09	1.21972E-07	2.27599E-07	2.75511E-07	2.92926E-07
16	1.83318E-09	1.10931E-07	2.26410E-07	2.91134E-07	3.22873E-07
17	1.64780E-09	1.16904E-07	2.29480E-07	2.85752E-07	3.13616E-07
18	1.39128E-09	1.12679E-07	2.37063E-07	3.19004E-07	3.77667E-07
19	1.19400E-09	8.51304E-08	1.80388E-07	2.37278E-07	2.69953E-07
20	1.34851E-09	8.98986E-08	2.08611E-07	2.83704E-07	3.27782E-07
21	1.74495E-09	1.21003E-07	2.73326E-07	3.58441E-07	3.97674E-07
22	2.60094E-09	1.54847E-07	3.28457E-07	4.15615E-07	4.54813E-07
23	3.33454E-09	1.93597E-07	4.24721E-07	5.46108E-07	6.00977E-07
24	3.76268E-09	2.05968E-07	4.20028E-07	5.10862E-07	5.39582E-07
25	3.47328E-09	1.62231E-07	3.05710E-07	3.72261E-07	4.03125E-07
26	3.81215E-09	1.46581E-07	2.80079E-07	3.49597E-07	3.73664E-07
27	4.28147E-09	1.92983E-07	3.84578E-07	4.90441E-07	5.40979E-07
28	3.43814E-09	1.93077E-07	3.67690E-07	4.36519E-07	4.52578E-07
29	2.42773E-09	1.71416E-07	3.33298E-07	3.93072E-07	4.03898E-07
30	2.22863E-09	1.80322E-07	3.68542E-07	4.58831E-07	5.00342E-07
31	2.94562E-09	1.75812E-07	3.29466E-07	3.88903E-07	4.00237E-07
32	3.89520E-09	1.74943E-07	3.10024E-07	3.67475E-07	3.88774E-07
33	6.24315E-09	2.31592E-07	4.11300E-07	4.82245E-07	4.99258E-07
34	8.31010E-09	2.62580E-07	4.87060E-07	5.79823E-07	6.00832E-07
35	6.87683E-09	2.40331E-07	4.22532E-07	4.91216E-07	5.06163E-07
36	5.72319E-09	2.73287E-07	5.30210E-07	6.48296E-07	6.87530E-07

PLANT NAME: KISS. UTILITIES POLLUTANT: SO2 AIR QUALITY UNITS: GM/M**3
MAXIMUM MEAN CONC= 6.9604E-07 DIRECTION= 36 DISTANCE= 3.0 KM
YEAR= 75

ANNUAL MEAN CONCENTRATION AT EACH RECEPTOR

DIR	RANGE	3.0 KM	3.5 KM	4.0 KM	4.5 KM	5.0 KM
1		5.12308E-07	4.84915E-07	4.59952E-07	4.36619E-07	4.16706E-07
2		4.27819E-07	4.06330E-07	3.87422E-07	3.69528E-07	3.54491E-07
3		3.45695E-07	3.22127E-07	3.00557E-07	2.80912E-07	2.64303E-07
4		3.88067E-07	3.74310E-07	3.61398E-07	3.47928E-07	3.36038E-07
5		4.39552E-07	4.28969E-07	4.16831E-07	4.02227E-07	3.88002E-07
6		3.42231E-07	3.37636E-07	3.32524E-07	3.25121E-07	3.18178E-07
7		3.46532E-07	3.42886E-07	3.37900E-07	3.30152E-07	3.22645E-07
8		2.98748E-07	2.91891E-07	2.83617E-07	2.73800E-07	2.64486E-07
9		2.88831E-07	2.95663E-07	2.99572E-07	2.99038E-07	2.97642E-07
10		2.66389E-07	2.60095E-07	2.53449E-07	2.45706E-07	2.38718E-07
11		4.07040E-07	4.06077E-07	4.03780E-07	3.98409E-07	3.92940E-07
12		4.67884E-07	4.57409E-07	4.43873E-07	4.27732E-07	4.11957E-07
13		4.73282E-07	4.64852E-07	4.53322E-07	4.38270E-07	4.23340E-07
14		4.01127E-07	3.86446E-07	3.69400E-07	3.50723E-07	3.32869E-07
15		2.99191E-07	2.99129E-07	2.96632E-07	2.90577E-07	2.83838E-07
16		3.41687E-07	3.52824E-07	3.60273E-07	3.61494E-07	3.60838E-07
17		3.33280E-07	3.48486E-07	3.61727E-07	3.68730E-07	3.74118E-07
18		4.27246E-07	4.67443E-07	5.01246E-07	5.22754E-07	5.39546E-07
19		2.93464E-07	3.10765E-07	3.25097E-07	3.33219E-07	3.39437E-07
20		3.62380E-07	3.91933E-07	4.20525E-07	4.42690E-07	4.63171E-07
21		4.21540E-07	4.38539E-07	4.54385E-07	4.65024E-07	4.74931E-07
22		4.81819E-07	5.04683E-07	5.27296E-07	5.42203E-07	5.55429E-07
23		6.32755E-07	6.52922E-07	6.69994E-07	6.78833E-07	6.86279E-07
24		5.49220E-07	5.50599E-07	5.51263E-07	5.47815E-07	5.44660E-07
25		4.24443E-07	4.40418E-07	4.55046E-07	4.63468E-07	4.70347E-07
26		3.80981E-07	3.81860E-07	3.82429E-07	3.80365E-07	3.78693E-07
27		5.71030E-07	5.89336E-07	6.02808E-07	6.06978E-07	6.08256E-07
28		4.53311E-07	4.48277E-07	4.43065E-07	4.34981E-07	4.27487E-07
29		4.01985E-07	3.96580E-07	3.92006E-07	3.85123E-07	3.78947E-07
30		5.26289E-07	5.42593E-07	5.55324E-07	5.60153E-07	5.62798E-07
31		3.97954E-07	3.92036E-07	3.87348E-07	3.81173E-07	3.76560E-07
32		4.00601E-07	4.07810E-07	4.13688E-07	4.14135E-07	4.13816E-07
33		4.98293E-07	4.89639E-07	4.80545E-07	4.68461E-07	4.57005E-07
34		5.94795E-07	5.76763E-07	5.57362E-07	5.36409E-07	5.17495E-07
35		5.03119E-07	4.91458E-07	4.78772E-07	4.63799E-07	4.49482E-07
36		6.96041E-07	6.89124E-07	6.78750E-07	6.63046E-07	6.47244E-07

6

PLANT NAME: KISS. UTILITIES POLLUTANT: SO2 AIR QUALITY UNITS: GM/M**3
MAXIMUM MEAN CONC= 7.0338E-07 DIRECTION= 18 DISTANCE= 2.5 KM
YEAR= 76

ANNUAL MEAN CONCENTRATION AT EACH RECEPTOR

DIR	RANGE 0.5 KM	1.0 KM	1.5 KM	2.0 KM	2.5 KM
1	3.70035E-09	2.17201E-07	3.96011E-07	4.52181E-07	4.55981E-07
2	3.51158E-09	1.79626E-07	3.44909E-07	4.07411E-07	4.20003E-07
3	4.60094E-09	1.66481E-07	3.14587E-07	3.64856E-07	3.65131E-07
4	3.87624E-09	1.55738E-07	2.84173E-07	3.31344E-07	3.41696E-07
5	5.04742E-09	1.89030E-07	3.48035E-07	4.15531E-07	4.34527E-07
6	5.46012E-09	1.80106E-07	3.30862E-07	3.88649E-07	4.00534E-07
7	4.72089E-09	1.34712E-07	2.45965E-07	2.86914E-07	2.95527E-07
8	6.00962E-09	1.20598E-07	2.35929E-07	2.91871E-07	3.10264E-07
9	7.81973E-09	1.52782E-07	2.98930E-07	3.82725E-07	4.24670E-07
10	2.93997E-09	1.09266E-07	2.15639E-07	2.75958E-07	3.08993E-07
11	1.70222E-09	9.84401E-08	1.94555E-07	2.50339E-07	2.82592E-07
12	3.36418E-09	1.35455E-07	2.65864E-07	3.40693E-07	3.79167E-07
13	5.27805E-09	1.63869E-07	3.11715E-07	3.97110E-07	4.33357E-07
14	5.67739E-09	1.63677E-07	3.04399E-07	3.92914E-07	4.30561E-07
15	4.40259E-09	1.36838E-07	2.40873E-07	3.12043E-07	3.45697E-07
16	3.34676E-09	1.11247E-07	2.03859E-07	2.81952E-07	3.37911E-07
17	2.93623E-09	1.20041E-07	2.39053E-07	3.31481E-07	3.99682E-07
18	2.94320E-09	1.62733E-07	3.81756E-07	5.64864E-07	7.03376E-07
19	5.91018E-09	1.56517E-07	3.18635E-07	4.30625E-07	4.98204E-07
20	1.29111E-08	1.97859E-07	3.69345E-07	4.85620E-07	5.49957E-07
21	9.06522E-09	1.70209E-07	2.83387E-07	3.63112E-07	4.07354E-07
22	1.26224E-08	1.89755E-07	3.03262E-07	3.71414E-07	4.08962E-07
23	7.69839E-09	1.80808E-07	3.22440E-07	3.99625E-07	4.45393E-07
24	2.40006E-09	1.59432E-07	3.18450E-07	4.04653E-07	4.49424E-07
25	3.46958E-09	1.57772E-07	2.99390E-07	3.59011E-07	3.75221E-07
26	5.13835E-09	1.62955E-07	2.84978E-07	3.39745E-07	3.59427E-07
27	5.02540E-09	1.77209E-07	3.24963E-07	3.96121E-07	4.27956E-07
28	4.46325E-09	1.80252E-07	3.30736E-07	3.84132E-07	3.90716E-07
29	4.04920E-09	1.76378E-07	3.24305E-07	3.87419E-07	4.11738E-07
30	5.13401E-09	1.79551E-07	3.30204E-07	4.09064E-07	4.52558E-07
31	8.48516E-09	1.76651E-07	3.25556E-07	3.95365E-07	4.24279E-07
32	9.78577E-09	1.91092E-07	3.43025E-07	4.02218E-07	4.19543E-07
33	6.34514E-09	1.71061E-07	2.99938E-07	3.55564E-07	3.75420E-07
34	5.76036E-09	2.02602E-07	3.54729E-07	4.20687E-07	4.42452E-07
35	5.82121E-09	2.08404E-07	3.38571E-07	3.83159E-07	3.92409E-07
36	5.61147E-09	2.45528E-07	4.52327E-07	5.49977E-07	5.93616E-07

PLANT NAME: KISS. UTILITIES POLLUTANT: SO2 AIR QUALITY UNITS: GM/M**3
MAXIMUM MEAN CONC= 9.5880E-07 DIRECTION= 18 DISTANCE= 5.0 KM
YEAR= 76

ANNUAL MEAN CONCENTRATION AT EACH RECEPTOR

DIR \ RANGE	3.0 KM	3.5 KM	4.0 KM	4.5 KM	5.0 KM
1	4.46671E-07	4.33525E-07	4.21988E-07	4.09143E-07	3.97549E-07
2	4.16237E-07	4.05094E-07	3.92923E-07	3.79001E-07	3.65570E-07
3	3.49100E-07	3.28252E-07	3.08720E-07	2.90425E-07	2.74570E-07
4	3.41063E-07	3.35233E-07	3.28779E-07	3.20197E-07	3.11676E-07
5	4.35105E-07	4.26850E-07	4.16617E-07	4.03317E-07	3.90180E-07
6	3.97859E-07	3.89853E-07	3.81796E-07	3.71666E-07	3.62271E-07
7	2.94669E-07	2.90468E-07	2.86772E-07	2.81824E-07	2.77623E-07
8	3.10981E-07	3.02745E-07	2.92195E-07	2.79833E-07	2.67954E-07
9	4.45083E-07	4.51396E-07	4.52121E-07	4.46514E-07	4.39172E-07
10	3.29604E-07	3.41152E-07	3.48282E-07	3.48978E-07	3.47517E-07
11	3.05118E-07	3.19751E-07	3.30368E-07	3.34722E-07	3.36609E-07
12	4.01901E-07	4.13596E-07	4.19727E-07	4.18506E-07	4.14730E-07
13	4.45304E-07	4.42387E-07	4.33708E-07	4.20456E-07	4.06081E-07
14	4.41158E-07	4.35643E-07	4.23604E-07	4.06716E-07	3.88950E-07
15	3.58692E-07	3.58967E-07	3.54011E-07	3.44576E-07	3.34115E-07
16	3.79914E-07	4.08368E-07	4.28844E-07	4.39275E-07	4.45158E-07
17	4.52799E-07	4.89640E-07	5.15787E-07	5.27670E-07	5.33021E-07
18	8.07842E-07	8.76542E-07	9.23971E-07	9.47224E-07	9.58798E-07
19	5.37007E-07	5.51956E-07	5.56053E-07	5.51284E-07	5.42920E-07
20	5.85018E-07	5.99060E-07	6.04591E-07	6.01353E-07	5.95265E-07
21	4.32052E-07	4.42802E-07	4.48177E-07	4.47401E-07	4.44926E-07
22	4.31760E-07	4.43466E-07	4.50943E-07	4.52416E-07	4.52300E-07
23	4.80589E-07	5.06280E-07	5.27237E-07	5.38883E-07	5.46898E-07
24	4.78300E-07	4.96510E-07	5.10089E-07	5.15233E-07	5.17611E-07
25	3.78863E-07	3.78721E-07	3.79776E-07	3.79041E-07	3.79195E-07
26	3.67911E-07	3.71033E-07	3.73272E-07	3.72076E-07	3.70762E-07
27	4.51190E-07	4.69800E-07	4.87025E-07	4.97293E-07	5.05271E-07
28	3.84517E-07	3.73956E-07	3.64002E-07	3.52939E-07	3.42693E-07
29	4.21042E-07	4.20421E-07	4.16598E-07	4.09096E-07	4.00931E-07
30	4.80996E-07	4.98201E-07	5.10844E-07	5.15864E-07	5.18571E-07
31	4.38305E-07	4.43695E-07	4.46166E-07	4.42994E-07	4.38403E-07
32	4.23103E-07	4.19899E-07	4.15377E-07	4.07757E-07	4.00137E-07
33	3.80713E-07	3.77737E-07	3.72172E-07	3.63185E-07	3.54005E-07
34	4.48188E-07	4.46596E-07	4.44464E-07	4.39843E-07	4.35557E-07
35	3.92444E-07	3.89785E-07	3.88461E-07	3.84793E-07	3.81939E-07
36	6.19360E-07	6.34803E-07	6.47816E-07	6.53123E-07	6.56693E-07

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PLANT NAME: KISS. UTILITIES POLLUTANT: SO2 AIR QUALITY UNITS: GM/M**3
MAXIMUM MEAN CONC= 8.0513E-07 DIRECTION= 36 DISTANCE= 2.5 KM
YEAR= 77

ANNUAL MEAN CONCENTRATION AT EACH RECEPTOR

DIR	RANGE 0.5 KM	1.0 KM	1.5 KM	2.0 KM	2.5 KM
1	6.09537E-09	2.42164E-07	4.48229E-07	5.03964E-07	4.97049E-07
2	3.15922E-09	1.66912E-07	2.92562E-07	3.32268E-07	3.38670E-07
3	2.97935E-09	1.63787E-07	2.77015E-07	3.04768E-07	2.97394E-07
4	4.12708E-09	1.94538E-07	3.33511E-07	3.76710E-07	3.80792E-07
5	5.43618E-09	2.07193E-07	3.47199E-07	4.07273E-07	4.28957E-07
6	7.49443E-09	2.12662E-07	3.29180E-07	3.74161E-07	3.88136E-07
7	9.00905E-09	1.96207E-07	2.85791E-07	3.08589E-07	3.07431E-07
8	5.46466E-09	1.48047E-07	2.41517E-07	2.82503E-07	2.97494E-07
9	3.77230E-09	1.49424E-07	2.94307E-07	3.78852E-07	4.28392E-07
10	3.23945E-09	1.36086E-07	2.63583E-07	3.21781E-07	3.40298E-07
11	4.32520E-09	1.57522E-07	2.94027E-07	3.54955E-07	3.73701E-07
12	6.24088E-09	1.89599E-07	3.58416E-07	4.29705E-07	4.47585E-07
13	5.26805E-09	1.69322E-07	3.29755E-07	3.99359E-07	4.17228E-07
14	5.66461E-09	1.49990E-07	2.95835E-07	3.61470E-07	3.81407E-07
15	4.65388E-09	1.40811E-07	2.84448E-07	3.46549E-07	3.61095E-07
16	3.40501E-09	1.31146E-07	2.53506E-07	3.10989E-07	3.33490E-07
17	4.50233E-09	1.44785E-07	2.84826E-07	3.64114E-07	4.02552E-07
18	4.52995E-09	1.41950E-07	2.84829E-07	4.09788E-07	5.11905E-07
19	3.64693E-09	1.06024E-07	1.71953E-07	2.28420E-07	2.67395E-07
20	3.30219E-09	9.55898E-08	1.63543E-07	2.29022E-07	2.77549E-07
21	2.88820E-09	8.67794E-08	1.65365E-07	2.34733E-07	2.87433E-07
22	3.00492E-09	1.07087E-07	2.09519E-07	2.75921E-07	3.16563E-07
23	4.68855E-09	1.74430E-07	3.58545E-07	4.62300E-07	5.17751E-07
24	5.29973E-09	1.79624E-07	3.67574E-07	4.75938E-07	5.31827E-07
25	4.80421E-09	1.84429E-07	3.47323E-07	4.20215E-07	4.50495E-07
26	4.95882E-09	2.07892E-07	3.89853E-07	4.57310E-07	4.75207E-07
27	5.54159E-09	2.44291E-07	5.21469E-07	6.69656E-07	7.41395E-07
28	6.50943E-09	2.05816E-07	3.84093E-07	4.55589E-07	4.72322E-07
29	7.30248E-09	2.12619E-07	3.49659E-07	3.94110E-07	3.98309E-07
30	9.63426E-09	2.86298E-07	4.88929E-07	5.74953E-07	6.04146E-07
31	9.65201E-09	2.60981E-07	4.08474E-07	4.60658E-07	4.71429E-07
32	4.51400E-09	1.73672E-07	2.93118E-07	3.52351E-07	3.73374E-07
33	2.42852E-09	1.47307E-07	2.62023E-07	3.14471E-07	3.30032E-07
34	2.28024E-09	1.38119E-07	2.67064E-07	3.34039E-07	3.61811E-07
35	4.05244E-09	1.69803E-07	3.36491E-07	4.09589E-07	4.32292E-07
36	8.08863E-09	2.88415E-07	6.05726E-07	7.50547E-07	8.05129E-07

PLANT NAME: KISS. UTILITIES POLLUTANT: SO2 AIR QUALITY UNITS: GM/M**3
MAXIMUM MEAN CONC= 8.3639E-07 DIRECTION= 36 DISTANCE= 4.0 KM
YEAR= 77

ANNUAL MEAN CONCENTRATION AT EACH RECEPTOR

DIR \ RANGE	3.0 KM	3.5 KM	4.0 KM	4.5 KM	5.0 KM
1	4.73584E-07	4.46424E-07	4.22236E-07	3.99509E-07	3.79936E-07
2	3.36887E-07	3.31831E-07	3.27077E-07	3.20710E-07	3.14648E-07
3	2.82002E-07	2.65641E-07	2.51452E-07	2.38564E-07	2.27714E-07
4	3.76258E-07	3.68963E-07	3.62712E-07	3.55194E-07	3.48563E-07
5	4.38417E-07	4.41403E-07	4.43028E-07	4.40680E-07	4.38069E-07
6	3.93899E-07	3.95733E-07	3.97087E-07	3.95104E-07	3.93004E-07
7	3.00866E-07	2.92624E-07	2.85160E-07	2.76547E-07	2.68723E-07
8	3.02992E-07	3.03858E-07	3.03877E-07	3.00848E-07	2.97893E-07
9	4.61882E-07	4.82655E-07	4.96387E-07	4.99487E-07	4.98831E-07
10	3.42641E-07	3.36445E-07	3.27980E-07	3.16878E-07	3.05937E-07
11	3.76972E-07	3.72823E-07	3.67024E-07	3.57921E-07	3.48676E-07
12	4.45462E-07	4.34190E-07	4.21380E-07	4.06388E-07	3.92233E-07
13	4.13164E-07	3.97887E-07	3.80026E-07	3.60911E-07	3.42645E-07
14	3.82409E-07	3.73434E-07	3.61734E-07	3.47878E-07	3.34103E-07
15	3.57458E-07	3.46068E-07	3.33174E-07	3.18556E-07	3.04665E-07
16	3.43448E-07	3.47110E-07	3.48578E-07	3.45239E-07	3.41170E-07
17	4.21835E-07	4.29214E-07	4.31062E-07	4.25824E-07	4.18678E-07
18	5.95869E-07	6.58124E-07	7.05090E-07	7.30610E-07	7.46743E-07
19	2.94067E-07	3.10354E-07	3.21163E-07	3.25038E-07	3.26387E-07
20	3.12965E-07	3.36541E-07	3.53163E-07	3.60946E-07	3.65174E-07
21	3.29790E-07	3.62367E-07	3.89293E-07	4.06560E-07	4.19940E-07
22	3.47105E-07	3.71013E-07	3.92754E-07	4.08322E-07	4.22116E-07
23	5.56272E-07	5.84868E-07	6.10501E-07	6.27214E-07	6.41593E-07
24	5.65604E-07	5.85519E-07	6.00136E-07	6.06015E-07	6.09495E-07
25	4.67780E-07	4.78097E-07	4.86382E-07	4.88347E-07	4.88790E-07
26	4.78275E-07	4.74462E-07	4.70411E-07	4.64094E-07	4.58591E-07
27	7.79822E-07	7.96875E-07	8.05990E-07	8.04295E-07	7.99556E-07
28	4.70464E-07	4.60702E-07	4.50484E-07	4.38601E-07	4.27818E-07
29	3.89320E-07	3.75123E-07	3.61257E-07	3.46765E-07	3.33665E-07
30	6.10348E-07	6.03862E-07	5.94258E-07	5.80172E-07	5.66396E-07
31	4.68309E-07	4.59367E-07	4.50752E-07	4.40337E-07	4.30831E-07
32	3.79319E-07	3.78126E-07	3.75054E-07	3.68450E-07	3.61683E-07
33	3.34755E-07	3.35708E-07	3.36619E-07	3.34204E-07	3.31638E-07
34	3.75861E-07	3.83062E-07	3.88999E-07	3.90822E-07	3.92094E-07
35	4.38496E-07	4.37858E-07	4.36888E-07	4.32521E-07	4.28442E-07
36	8.27917E-07	8.34271E-07	8.36388E-07	8.29760E-07	8.21863E-07

PLANT NAME: KISS. UTILITIES POLLUTANT: SO2 AIR QUALITY UNITS: GM/M**3
MAXIMUM MEAN CONC= 8.5493E-07 DIRECTION= 27 DISTANCE= 2.5 KM
YEAR= 78

ANNUAL MEAN CONCENTRATION AT EACH RECEPTOR

DIR	RANGE 0.5 KM	1.0 KM	1.5 KM	2.0 KM	2.5 KM
1	1.63725E-08	2.29036E-07	3.51837E-07	3.91592E-07	3.89887E-07
2	1.01263E-08	1.82969E-07	2.82261E-07	3.28025E-07	3.41073E-07
3	5.72110E-09	1.44085E-07	2.04561E-07	2.32440E-07	2.37803E-07
4	4.87596E-09	1.45141E-07	2.20311E-07	2.71475E-07	2.98632E-07
5	5.52708E-09	1.48059E-07	2.14693E-07	2.54210E-07	2.71305E-07
6	4.81171E-09	1.41779E-07	1.99479E-07	2.31745E-07	2.46332E-07
7	1.89282E-09	1.03274E-07	1.52993E-07	1.73930E-07	1.80231E-07
8	1.52259E-09	9.48876E-08	1.59828E-07	1.87637E-07	1.94681E-07
9	5.30938E-09	1.11987E-07	1.83722E-07	2.31551E-07	2.63024E-07
10	4.95246E-09	9.30500E-08	1.48528E-07	1.79550E-07	1.95178E-07
11	2.89684E-09	7.40053E-08	1.21257E-07	1.53344E-07	1.71945E-07
12	2.67631E-09	8.99821E-08	1.76770E-07	2.39351E-07	2.77010E-07
13	2.59544E-09	1.18940E-07	2.31608E-07	2.84404E-07	2.99943E-07
14	2.40481E-09	1.15774E-07	2.41624E-07	2.98383E-07	3.12379E-07
15	1.66399E-09	8.36738E-08	1.84346E-07	2.39331E-07	2.66807E-07
16	9.80732E-10	6.24842E-08	1.49470E-07	2.02065E-07	2.32723E-07
17	7.92228E-10	6.75138E-08	1.78722E-07	2.54142E-07	3.03269E-07
18	1.17482E-09	1.00488E-07	2.78828E-07	4.25234E-07	5.31744E-07
19	2.33473E-09	9.64134E-08	2.12972E-07	3.04906E-07	3.62862E-07
20	5.95724E-09	1.42470E-07	2.45643E-07	3.24565E-07	3.74179E-07
21	1.07560E-08	2.18349E-07	3.26073E-07	3.86965E-07	4.17048E-07
22	1.10577E-08	2.54763E-07	3.94153E-07	4.58218E-07	4.81822E-07
23	9.30913E-09	2.69042E-07	4.69616E-07	5.63219E-07	5.94852E-07
24	8.21622E-09	2.82112E-07	4.91614E-07	5.69856E-07	5.84495E-07
25	7.12554E-09	2.92030E-07	4.88748E-07	5.50605E-07	5.56044E-07
26	8.87363E-09	3.72434E-07	6.36477E-07	7.28170E-07	7.43786E-07
27	9.38575E-09	3.90055E-07	6.91617E-07	8.16816E-07	8.54931E-07
28	7.18697E-09	3.04988E-07	5.24377E-07	6.15255E-07	6.35845E-07
29	5.93978E-09	2.57933E-07	4.32949E-07	4.80202E-07	4.70669E-07
30	6.22605E-09	2.75067E-07	4.93765E-07	5.54840E-07	5.58118E-07
31	5.73622E-09	2.58240E-07	4.66747E-07	5.24329E-07	5.28386E-07
32	4.85232E-09	2.12071E-07	3.84165E-07	4.48613E-07	4.62775E-07
33	6.14310E-09	2.17893E-07	3.79971E-07	4.62224E-07	4.99238E-07
34	7.65758E-09	2.49557E-07	4.40078E-07	5.28691E-07	5.57241E-07
35	1.13973E-08	2.84243E-07	4.92206E-07	5.68717E-07	5.77492E-07
36	1.70111E-08	2.97813E-07	5.15429E-07	6.05154E-07	6.24095E-07

PLANT NAME: KISS. UTILITIES POLLUTANT: SO2 AIR QUALITY UNITS: GM/M**3
MAXIMUM MEAN CONC= 8.6541E-07 DIRECTION= 27 DISTANCE= 3.0 KM
YEAR= 78

ANNUAL MEAN CONCENTRATION AT EACH RECEPTOR

DIR \ RANGE	3.0 KM	3.5 KM	4.0 KM	4.5 KM	5.0 KM
1	3.77054E-07	3.60941E-07	3.45654E-07	3.29985E-07	3.15727E-07
2	3.42505E-07	3.38225E-07	3.32660E-07	3.24094E-07	3.15209E-07
3	2.34279E-07	2.26415E-07	2.17953E-07	2.08798E-07	2.00180E-07
4	3.13420E-07	3.19840E-07	3.22906E-07	3.21449E-07	3.18744E-07
5	2.78280E-07	2.79549E-07	2.79267E-07	2.76095E-07	2.72407E-07
6	2.51922E-07	2.51718E-07	2.49770E-07	2.45358E-07	2.40565E-07
7	1.81521E-07	1.79917E-07	1.77743E-07	1.74203E-07	1.70491E-07
8	1.94378E-07	1.90502E-07	1.86129E-07	1.80657E-07	1.75370E-07
9	2.85085E-07	2.97834E-07	3.05644E-07	3.07378E-07	3.06374E-07
10	2.04667E-07	2.09900E-07	2.13375E-07	2.13554E-07	2.12653E-07
11	1.83404E-07	1.89594E-07	1.93496E-07	1.94244E-07	1.93990E-07
12	2.99447E-07	3.10169E-07	3.15189E-07	3.14196E-07	3.10736E-07
13	2.99880E-07	2.91691E-07	2.81242E-07	2.69268E-07	2.57491E-07
14	3.09533E-07	2.98897E-07	2.86461E-07	2.72961E-07	2.60129E-07
15	2.82386E-07	2.89903E-07	2.93389E-07	2.91736E-07	2.88400E-07
16	2.52795E-07	2.64731E-07	2.72424E-07	2.74868E-07	2.75515E-07
17	3.41031E-07	3.68650E-07	3.90783E-07	4.04505E-07	4.14526E-07
18	6.13617E-07	6.71631E-07	7.15042E-07	7.39414E-07	7.54889E-07
19	3.99186E-07	4.18151E-07	4.28112E-07	4.29036E-07	4.26092E-07
20	4.08698E-07	4.31667E-07	4.49343E-07	4.58721E-07	4.64929E-07
21	4.37640E-07	4.52042E-07	4.64852E-07	4.72312E-07	4.78192E-07
22	4.97171E-07	5.09330E-07	5.22081E-07	5.29903E-07	5.36789E-07
23	6.06286E-07	6.08154E-07	6.08251E-07	6.03112E-07	5.97853E-07
24	5.82514E-07	5.75139E-07	5.69237E-07	5.61476E-07	5.55480E-07
25	5.50347E-07	5.43547E-07	5.39924E-07	5.34033E-07	5.30034E-07
26	7.39201E-07	7.28317E-07	7.19503E-07	7.07625E-07	6.97554E-07
27	8.65411E-07	8.62809E-07	8.58411E-07	8.47370E-07	8.36071E-07
28	6.31850E-07	6.17574E-07	6.02252E-07	5.84028E-07	5.66956E-07
29	4.45928E-07	4.18415E-07	3.93799E-07	3.71180E-07	3.51824E-07
30	5.51309E-07	5.43278E-07	5.38344E-07	5.31794E-07	5.26861E-07
31	5.23767E-07	5.18287E-07	5.14675E-07	5.07680E-07	5.01315E-07
32	4.63454E-07	4.59989E-07	4.56788E-07	4.50226E-07	4.44090E-07
33	5.20519E-07	5.33505E-07	5.44122E-07	5.47561E-07	5.49218E-07
34	5.65621E-07	5.66044E-07	5.65943E-07	5.61185E-07	5.56684E-07
35	5.66209E-07	5.49103E-07	5.34353E-07	5.19576E-07	5.07708E-07
36	6.18325E-07	6.01883E-07	5.84338E-07	5.64903E-07	5.47115E-07

PLANT NAME: KISS. UTILITIES POLLUTANT: SO2 AIR QUALITY UNITS: GM/M**3
YEARLY SECOND MAXIMUM 24-HOUR CONC= 1.1245E-05 DIRECTION= 18 DISTANCE= 2.5 KM DAY=279
YEAR= 74

SECOND HIGHEST 24-HOUR CONCENTRATION AT EACH RECEPTOR

RANGE DIR	0.5 KM	1.0 KM	1.5 KM	2.0 KM	2.5 KM
1	1.8873E-07 (80)	2.9136E-06 (152)	4.5887E-06 (152)	4.8538E-06 (152)	4.8881E-06 (354)
2	2.4344E-07 (80)	2.9518E-06 (124)	4.5410E-06 (152)	4.9208E-06 (50)	4.6545E-06 (50)
3	1.8782E-07 (188)	3.1963E-06 (97)	3.1221E-06 (125)	2.9348E-06 (212)	3.3562E-06 (98)
4	1.3573E-07 (174)	2.8664E-06 (146)	4.5813E-06 (153)	4.8734E-06 (153)	4.2076E-06 (125)
5	3.9434E-07 (176)	4.3971E-06 (146)	5.4167E-06 (174)	5.3071E-06 (174)	4.9610E-06 (162)
6	2.2662E-07 (206)	4.9329E-06 (176)	4.8973E-06 (90)	5.1563E-06 (88)	4.9214E-06 (176)
7	2.1278E-07 (192)	3.6788E-06 (169)	4.9871E-06 (192)	4.6705E-06 (89)	4.9974E-06 (203)
8	2.4462E-07 (145)	3.3643E-06 (123)	4.2629E-06 (193)	4.9875E-06 (132)	5.2053E-06 (168)
9	2.2367E-07 (123)	2.5960E-06 (89)	3.5861E-06 (193)	4.3965E-06 (193)	4.2640E-06 (193)
10	2.9796E-07 (89)	2.8147E-06 (150)	3.5405E-06 (89)	4.1114E-06 (89)	4.3292E-06 (89)
11	2.4384E-07 (173)	3.7143E-06 (99)	4.1290E-06 (163)	4.2338E-06 (76)	4.6449E-06 (76)
12	2.9050E-07 (151)	6.1701E-06 (145)	6.1436E-06 (191)	6.1167E-06 (191)	5.8445E-06 (335)
13	3.4372E-07 (211)	5.3627E-06 (145)	5.2230E-06 (114)	4.9714E-06 (114)	5.1189E-06 (337)
14	1.3212E-07 (207)	3.9809E-06 (121)	5.0245E-06 (145)	4.9872E-06 (167)	4.6335E-06 (291)
15	1.0183E-07 (163)	2.9971E-06 (211)	4.2885E-06 (163)	4.4251E-06 (41)	4.1880E-06 (163)
16	8.9207E-08 (163)	2.4398E-06 (107)	3.2168E-06 (120)	4.0519E-06 (76)	4.0452E-06 (76)
17	3.0316E-08 (100)	3.5594E-06 (120)	5.1547E-06 (107)	4.7862E-06 (57)	4.6524E-06 (107)
18	5.7613E-08 (211)	3.5681E-06 (128)	6.9953E-06 (297)	9.1534E-06 (279)	1.1245E-05 (279)
19	9.3871E-08 (181)	3.2551E-06 (128)	3.7493E-06 (279)	4.5530E-06 (51)	4.3851E-06 (108)
20	2.4975E-07 (211)	3.2649E-06 (276)	3.6427E-06 (109)	4.9118E-06 (274)	6.2539E-06 (296)
21	2.2169E-07 (211)	4.1854E-06 (108)	5.3576E-06 (100)	6.2511E-06 (109)	6.8764E-06 (330)
22	4.4733E-07 (225)	4.6739E-06 (100)	6.0489E-06 (109)	5.8733E-06 (171)	5.6312E-06 (283)
23	3.9615E-07 (225)	4.2341E-06 (225)	5.3999E-06 (195)	6.6310E-06 (195)	6.3656E-06 (195)
24	2.2687E-07 (238)	2.6777E-06 (171)	4.3558E-06 (195)	5.7239E-06 (195)	5.7544E-06 (195)
25	1.7681E-07 (67)	1.9451E-06 (227)	3.8468E-06 (235)	5.0067E-06 (340)	4.6276E-06 (262)
26	1.2499E-07 (238)	3.4369E-06 (140)	3.8681E-06 (225)	4.3227E-06 (300)	4.2025E-06 (300)
27	2.1425E-07 (156)	3.8087E-06 (140)	5.3404E-06 (111)	5.2970E-06 (111)	4.9911E-06 (111)
28	2.3729E-07 (165)	2.7327E-06 (141)	4.3702E-06 (215)	5.5036E-06 (215)	5.5343E-06 (219)
29	2.4620E-07 (165)	3.6971E-06 (165)	4.2839E-06 (246)	5.2523E-06 (243)	5.2081E-06 (243)
30	2.1200E-07 (169)	2.7914E-06 (62)	5.8327E-06 (139)	6.7094E-06 (139)	6.1166E-06 (62)
31	7.4165E-07 (135)	3.4653E-06 (220)	4.0035E-06 (65)	4.6444E-06 (62)	4.5690E-06 (62)
32	1.6086E-06 (135)	4.4120E-06 (158)	5.7574E-06 (159)	5.0734E-06 (159)	4.6681E-06 (134)
33	5.9718E-07 (220)	3.7591E-06 (131)	5.1607E-06 (227)	4.9314E-06 (131)	5.3067E-06 (250)
34	2.4524E-07 (207)	2.8243E-06 (94)	5.0664E-06 (94)	5.3100E-06 (132)	5.4847E-06 (94)
35	2.0621E-07 (221)	2.6287E-06 (94)	3.8246E-06 (213)	4.3289E-06 (213)	3.8737E-06 (213)
36	1.0100E-07 (221)	2.6904E-06 (152)	5.0947E-06 (91)	5.5383E-06 (91)	5.3925E-06 (135)

PLANT NAME: KISS, UTILITIES POLLUTANT: SO2 AIR QUALITY UNITS: GM/M**3

YEARLY SECOND MAXIMUM 24-HOUR CONC= 1.2189E-05 DIRECTION= 18 DISTANCE= 3.5 KM DAY=279

YEAR= 74

SECOND HIGHEST 24-HOUR CONCENTRATION AT EACH RECEPTOR

DIR	RANGE 3.0 KM	3.5 KM	4.0 KM	4.5 KM	5.0 KM
1	5.0491E-06 (354)	4.9019E-06 (354)	4.6468E-06 (354)	4.3511E-06 (50)	3.9485E-06 (50)
2	4.1995E-06 (50)	3.7224E-06 (50)	3.2945E-06 (50)	2.9237E-06 (50)	2.6063E-06 (50)
3	3.2987E-06 (34)	3.2083E-06 (98)	2.9582E-06 (98)	2.8786E-06 (50)	2.8600E-06 (50)
4	3.6257E-06 (153)	3.4175E-06 (38)	3.8078E-06 (38)	4.0194E-06 (38)	4.1354E-06 (38)
5	4.5122E-06 (162)	3.9521E-06 (162)	4.0122E-06 (39)	4.1902E-06 (39)	4.2269E-06 (146)
6	4.3957E-06 (176)	3.9034E-06 (176)	3.8780E-06 (174)	3.9536E-06 (174)	4.0042E-06 (174)
7	4.2161E-06 (203)	4.4486E-06 (174)	4.5978E-06 (174)	4.6073E-06 (174)	4.5571E-06 (174)
8	4.9265E-06 (193)	5.9816E-06 (146)	6.0866E-06 (132)	5.8877E-06 (132)	5.6688E-06 (132)
9	3.8484E-06 (7)	3.8971E-06 (89)	4.1079E-06 (89)	4.1586E-06 (89)	4.1498E-06 (89)
10	4.3026E-06 (89)	4.1513E-06 (335)	4.1547E-06 (335)	4.1144E-06 (335)	4.0519E-06 (335)
11	5.0577E-06 (335)	5.3875E-06 (99)	5.0690E-06 (342)	5.5587E-06 (342)	5.8819E-06 (342)
12	5.5611E-06 (145)	5.0664E-06 (336)	5.8032E-06 (335)	5.5838E-06 (40)	5.8802E-06 (40)
13	4.8006E-06 (96)	5.0841E-06 (40)	5.7342E-06 (40)	5.9917E-06 (337)	5.8522E-06 (337)
14	4.6064E-06 (343)	5.1363E-06 (343)	5.4890E-06 (343)	5.6262E-06 (343)	5.6613E-06 (343)
15	4.1494E-06 (280)	4.7967E-06 (280)	5.1749E-06 (280)	5.3531E-06 (280)	5.3914E-06 (280)
16	3.7953E-06 (57)	3.7412E-06 (96)	4.0768E-06 (96)	4.2193E-06 (96)	4.2566E-06 (96)
17	4.0105E-06 (107)	4.2314E-06 (332)	4.4074E-06 (332)	4.5414E-06 (311)	4.8073E-06 (311)
18	1.2145E-05 (279)	1.2189E-05 (279)	1.1867E-05 (279)	1.1358E-05 (279)	1.0766E-05 (279)
19	4.9041E-06 (313)	5.4539E-06 (313)	5.7770E-06 (313)	5.9303E-06 (313)	5.9614E-06 (313)
20	6.9883E-06 (276)	6.3395E-06 (276)	5.7085E-06 (276)	5.1333E-06 (276)	4.8841E-06 (360)
21	7.0430E-06 (330)	6.7932E-06 (330)	6.4121E-06 (330)	6.4270E-06 (348)	6.2659E-06 (277)
22	6.0368E-06 (294)	6.2378E-06 (294)	6.2202E-06 (294)	6.0727E-06 (294)	5.8603E-06 (294)
23	5.9012E-06 (285)	6.2834E-06 (285)	6.4114E-06 (285)	6.3779E-06 (285)	6.2635E-06 (285)
24	5.2810E-06 (195)	4.6818E-06 (195)	4.4613E-06 (8)	4.3895E-06 (8)	4.6616E-06 (73)
25	4.6085E-06 (110)	4.4522E-06 (110)	4.2389E-06 (110)	4.0326E-06 (110)	4.1304E-06 (236)
26	3.8243E-06 (300)	3.5277E-06 (215)	3.5700E-06 (215)	3.5892E-06 (215)	3.4430E-06 (302)
27	4.4922E-06 (140)	4.2310E-06 (101)	4.0528E-06 (101)	3.8234E-06 (101)	3.5774E-06 (101)
28	5.1207E-06 (219)	4.6844E-06 (215)	4.3299E-06 (219)	4.0879E-06 (159)	4.0371E-06 (159)
29	4.7436E-06 (102)	5.0800E-06 (139)	4.7225E-06 (24)	5.0145E-06 (24)	5.1917E-06 (24)
30	5.3280E-06 (62)	4.6538E-06 (62)	4.5172E-06 (139)	4.6302E-06 (219)	4.6602E-06 (361)
31	4.3598E-06 (65)	4.5128E-06 (37)	4.9080E-06 (37)	5.1312E-06 (37)	5.1179E-06 (131)
32	4.5848E-06 (134)	4.6019E-06 (103)	4.7355E-06 (103)	4.7555E-06 (103)	4.7458E-06 (103)
33	4.5941E-06 (250)	4.2089E-06 (94)	4.1338E-06 (94)	4.0428E-06 (94)	3.9461E-06 (94)
34	5.3366E-06 (94)	5.2362E-06 (93)	5.1744E-06 (93)	5.0515E-06 (93)	4.9101E-06 (93)
35	3.7995E-06 (27)	3.8036E-06 (188)	4.1944E-06 (21)	4.4439E-06 (27)	4.3897E-06 (27)
36	5.0023E-06 (176)	5.1942E-06 (176)	5.2762E-06 (176)	5.2695E-06 (176)	5.1967E-06 (176)

PLANT NAME: KISS. UTILITIES POLLUTANT: SO2 AIR QUALITY UNITS: GM/M**3

YEARLY SECOND MAXIMUM 24-HOUR CONC= 8.2554E-06 DIRECTION= 36 DISTANCE= 2.0 KM DAY=290

YEAR= 75

SECOND HIGHEST 24-HOUR CONCENTRATION AT EACH RECEPTOR

RANGE DIR	0.5 KM	1.0 KM	1.5 KM	2.0 KM	2.5 KM
1	1.9505E-07 (207)	4.9164E-06 (167)	7.1687E-06 (167)	6.7936E-06 (167)	5.7740E-06 (167)
2	4.1772E-07 (207)	4.9857E-06 (119)	5.2473E-06 (215)	4.8105E-06 (151)	4.3281E-06 (151)
3	2.0006E-07 (215)	2.7332E-06 (215)	3.5732E-06 (260)	4.5092E-06 (202)	4.5411E-06 (202)
4	2.4828E-07 (215)	2.5368E-06 (203)	5.1119E-06 (188)	4.8410E-06 (82)	4.5550E-06 (82)
5	2.5922E-07 (219)	4.4266E-06 (203)	5.8531E-06 (186)	5.4227E-06 (186)	5.1354E-06 (89)
6	2.8498E-07 (203)	3.7239E-06 (186)	5.0757E-06 (110)	4.6756E-06 (110)	4.3768E-06 (100)
7	2.9667E-07 (158)	4.2713E-06 (158)	6.0374E-06 (110)	5.2433E-06 (158)	5.3179E-06 (158)
8	2.7906E-07 (157)	4.8583E-06 (225)	4.5077E-06 (40)	5.2268E-06 (40)	4.8103E-06 (40)
9	1.7406E-07 (157)	3.7339E-06 (225)	4.0513E-06 (124)	4.3329E-06 (78)	5.2975E-06 (325)
10	2.8108E-07 (138)	2.3836E-06 (129)	3.5504E-06 (129)	4.1575E-06 (186)	4.3529E-06 (124)
11	2.5092E-07 (156)	3.2103E-06 (128)	5.1298E-06 (128)	6.2014E-06 (93)	6.7545E-06 (93)
12	2.4628E-07 (156)	4.4548E-06 (180)	5.9998E-06 (163)	5.9430E-06 (59)	6.2617E-06 (59)
13	2.9261E-07 (105)	3.6828E-06 (180)	5.1324E-06 (163)	5.5345E-06 (67)	7.1412E-06 (67)
14	1.2973E-07 (105)	3.6616E-06 (231)	6.1418E-06 (231)	5.7478E-06 (231)	5.1819E-06 (355)
15	1.3835E-07 (156)	2.9255E-06 (156)	4.1812E-06 (97)	4.3059E-06 (164)	4.2397E-06 (164)
16	9.9510E-08 (155)	2.5707E-06 (102)	3.8138E-06 (96)	4.6111E-06 (95)	4.9031E-06 (95)
17	1.1721E-07 (155)	3.0302E-06 (230)	3.6469E-06 (230)	4.0608E-06 (97)	3.8696E-06 (97)
18	6.5337E-08 (85)	2.6912E-06 (106)	3.7966E-06 (155)	4.9423E-06 (85)	4.3180E-06 (303)
19	7.6665E-08 (106)	2.1316E-06 (244)	3.8042E-06 (106)	4.0382E-06 (131)	3.6656E-06 (131)
20	5.7468E-08 (141)	1.9876E-06 (244)	2.7841E-06 (141)	3.5481E-06 (131)	3.4032E-06 (131)
21	8.0053E-08 (141)	2.7295E-06 (141)	3.8935E-06 (141)	5.0790E-06 (277)	5.0624E-06 (277)
22	1.6676E-07 (182)	4.5241E-06 (182)	5.1703E-06 (145)	4.9064E-06 (182)	4.4136E-06 (283)
23	1.1145E-07 (145)	3.3318E-06 (45)	5.5179E-06 (145)	5.0288E-06 (284)	4.8790E-06 (182)
24	1.7738E-07 (146)	2.9495E-06 (172)	5.1141E-06 (174)	5.5348E-06 (284)	6.0752E-06 (182)
25	2.3852E-07 (146)	2.9716E-06 (103)	4.3317E-06 (144)	4.6251E-06 (144)	4.3466E-06 (144)
26	2.5578E-07 (232)	3.4949E-06 (234)	4.3080E-06 (234)	3.5867E-06 (234)	3.8771E-06 (287)
27	2.1984E-07 (112)	4.6285E-06 (234)	5.7496E-06 (234)	5.2495E-06 (234)	5.1006E-06 (340)
28	1.6331E-07 (234)	4.4068E-06 (205)	4.6750E-06 (114)	5.7241E-06 (288)	5.3114E-06 (205)
29	8.0646E-08 (234)	4.0324E-06 (205)	4.8503E-06 (214)	5.2181E-06 (214)	4.8717E-06 (288)
30	1.4426E-07 (225)	3.7396E-06 (113)	6.4710E-06 (113)	7.2144E-06 (113)	7.5412E-06 (87)
31	2.0153E-07 (120)	2.7505E-06 (227)	3.5907E-06 (234)	4.0355E-06 (234)	3.8034E-06 (117)
32	2.2183E-07 (227)	2.3294E-06 (227)	3.2522E-06 (246)	3.1027E-06 (265)	3.4182E-06 (10)
33	2.2820E-07 (204)	3.0036E-06 (210)	4.9645E-06 (123)	5.4808E-06 (10)	6.8434E-06 (10)
34	2.4288E-07 (109)	3.9204E-06 (115)	5.8969E-06 (151)	6.5528E-06 (151)	6.4191E-06 (261)
35	4.1923E-07 (83)	4.5134E-06 (147)	4.8723E-06 (223)	4.9933E-06 (223)	4.5564E-06 (72)
36	2.5271E-07 (83)	4.7194E-06 (115)	6.4964E-06 (115)	8.2554E-06 (290)	7.3952E-06 (109)

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PLANT NAME: KISS. UTILITIES POLLUTANT: SO2 AIR QUALITY UNITS: GM/M**3
YEARLY SECOND MAXIMUM 24-HOUR CONC= 8.6977E-06 DIRECTION= 18 DISTANCE= 5.0 KM DAY=303
YEAR= 75

SECOND HIGHEST 24-HOUR CONCENTRATION AT EACH RECEPTOR

DIR	RANGE 3.0 KM	3.5 KM	4.0 KM	4.5 KM	5.0 KM
1	5.0576E-06 (331)	5.3069E-06 (331)	5.2479E-06 (119)	4.5814E-06 (119)	4.5362E-06 (20)
2	4.3301E-06 (20)	4.6566E-06 (20)	4.7624E-06 (20)	4.7280E-06 (20)	4.6103E-06 (20)
3	4.2476E-06 (202)	3.8730E-06 (202)	3.5160E-06 (202)	3.1971E-06 (202)	3.1015E-06 (36)
4	4.1830E-06 (82)	4.1122E-06 (188)	3.7674E-06 (25)	3.7088E-06 (25)	3.6525E-06 (25)
5	4.9191E-06 (89)	5.3649E-06 (61)	4.8735E-06 (25)	4.3174E-06 (25)	4.3870E-06 (351)
6	3.9278E-06 (100)	3.8399E-06 (43)	3.8708E-06 (110)	3.9568E-06 (110)	4.0561E-06 (110)
7	5.0270E-06 (178)	5.1342E-06 (73)	5.1792E-06 (73)	5.1184E-06 (73)	5.0162E-06 (73)
8	4.3281E-06 (81)	4.2676E-06 (157)	4.1294E-06 (325)	4.1329E-06 (325)	4.0945E-06 (325)
9	6.0374E-06 (325)	6.5394E-06 (325)	6.8653E-06 (325)	6.9475E-06 (325)	6.9393E-06 (325)
10	4.6253E-06 (124)	4.6458E-06 (124)	4.5618E-06 (124)	4.4233E-06 (124)	4.2610E-06 (124)
11	6.8661E-06 (93)	6.7252E-06 (93)	6.4878E-06 (93)	6.1673E-06 (93)	5.8383E-06 (93)
12	5.9723E-06 (59)	6.0910E-06 (13)	6.1071E-06 (13)	5.7567E-06 (317)	5.3680E-06 (317)
13	7.9224E-06 (67)	7.9213E-06 (317)	7.4916E-06 (317)	7.0019E-06 (317)	6.5067E-06 (317)
14	5.5578E-06 (139)	4.7696E-06 (297)	5.3448E-06 (297)	5.6224E-06 (297)	5.7560E-06 (297)
15	3.8067E-06 (14)	4.0240E-06 (14)	4.5718E-06 (297)	4.5156E-06 (125)	4.3026E-06 (352)
16	5.2158E-06 (94)	5.4134E-06 (102)	5.1016E-06 (102)	4.8479E-06 (102)	4.6661E-06 (102)
17	5.3919E-06 (95)	5.7221E-06 (95)	5.9778E-06 (95)	6.0637E-06 (95)	6.0906E-06 (95)
18	5.9425E-06 (303)	7.1563E-06 (303)	8.0150E-06 (303)	8.4629E-06 (303)	8.6977E-06 (303)
19	3.5596E-06 (2)	3.8920E-06 (353)	4.3747E-06 (363)	4.6831E-06 (64)	4.4395E-06 (64)
20	3.4252E-06 (292)	3.8246E-06 (111)	4.3838E-06 (111)	4.4573E-06 (21)	4.1824E-06 (52)
21	4.6207E-06 (277)	4.3091E-06 (303)	4.3051E-06 (303)	4.2075E-06 (17)	4.3966E-06 (17)
22	4.5508E-06 (283)	4.5421E-06 (283)	4.4819E-06 (283)	4.5900E-06 (240)	4.8151E-06 (240)
23	5.3249E-06 (305)	6.0809E-06 (304)	6.2000E-06 (304)	6.1427E-06 (304)	6.0075E-06 (304)
24	6.1885E-06 (182)	5.9640E-06 (182)	5.6416E-06 (182)	5.2967E-06 (182)	4.9643E-06 (182)
25	3.9395E-06 (144)	3.9080E-06 (74)	3.8828E-06 (74)	4.1611E-06 (251)	4.2181E-06 (181)
26	4.0407E-06 (287)	3.9483E-06 (287)	3.5312E-06 (112)	3.4939E-06 (169)	3.3024E-06 (287)
27	4.9307E-06 (247)	4.8373E-06 (247)	4.6548E-06 (247)	4.4913E-06 (263)	4.6293E-06 (112)
28	5.1945E-06 (288)	4.8200E-06 (222)	4.5198E-06 (222)	4.5057E-06 (313)	4.6133E-06 (313)
29	4.3329E-06 (288)	4.2186E-06 (172)	3.9453E-06 (86)	3.7857E-06 (86)	3.8841E-06 (114)
30	7.0898E-06 (117)	6.5284E-06 (117)	6.0404E-06 (117)	6.4238E-06 (9)	6.7795E-06 (9)
31	3.5754E-06 (104)	3.5927E-06 (196)	3.9839E-06 (47)	4.2167E-06 (47)	4.3755E-06 (47)
32	4.4870E-06 (10)	5.3298E-06 (10)	6.2520E-06 (109)	6.8759E-06 (265)	7.1619E-06 (265)
33	7.3833E-06 (10)	7.3601E-06 (10)	7.1066E-06 (10)	6.7446E-06 (10)	6.3418E-06 (10)
34	6.2967E-06 (266)	6.1733E-06 (266)	5.9213E-06 (266)	5.6136E-06 (266)	5.2920E-06 (266)
35	5.0858E-06 (72)	5.2402E-06 (72)	5.2101E-06 (72)	5.0543E-06 (72)	4.8460E-06 (72)
36	6.4276E-06 (109)	6.3686E-06 (55)	6.2081E-06 (55)	5.9594E-06 (4)	6.0833E-06 (4)

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PLANT NAME: KISS. UTILITIES POLLUTANT: SO2 AIR QUALITY UNITS: GM/M**3
YEARLY SECOND MAXIMUM 24-HOUR CONC= 8.3351E-06 DIRECTION= 18 DISTANCE= 2.5 KM DAY=336
YEAR= 76

SECOND HIGHEST 24-HOUR CONCENTRATION AT EACH RECEPTOR

DIR	RANGE 0.5 KM	1.0 KM	1.5 KM	2.0 KM	2.5 KM
1	1.7533E-07 (152)	3.8319E-06 (32)	6.0482E-06 (32)	5.4960E-06 (152)	4.3747E-06 (215)
2	2.1490E-07 (186)	2.9183E-06 (199)	4.4026E-06 (186)	5.0156E-06 (186)	4.7684E-06 (186)
3	1.8587E-07 (226)	2.9649E-06 (49)	4.9775E-06 (211)	5.6711E-06 (186)	5.1960E-06 (214)
4	2.5039E-07 (226)	3.7306E-06 (116)	4.8155E-06 (95)	4.8280E-06 (95)	4.2120E-06 (116)
5	2.3820E-07 (69)	4.8803E-06 (117)	6.8558E-06 (76)	7.6230E-06 (76)	7.3857E-06 (76)
6	4.3400E-07 (116)	3.5624E-06 (81)	5.3661E-06 (76)	6.0230E-06 (194)	6.0904E-06 (194)
7	3.3263E-07 (116)	1.9797E-06 (116)	4.4151E-06 (133)	5.0355E-06 (133)	4.6119E-06 (133)
8	2.9258E-07 (139)	3.5768E-06 (198)	5.3587E-06 (145)	4.9718E-06 (198)	4.9165E-06 (195)
9	9.1731E-07 (145)	6.4979E-06 (139)	6.9578E-06 (139)	6.8454E-06 (197)	8.1343E-06 (197)
10	1.2464E-07 (204)	2.4667E-06 (17)	4.0986E-06 (198)	4.7565E-06 (198)	4.6757E-06 (198)
11	1.2464E-07 (204)	2.3595E-06 (213)	3.4016E-06 (103)	4.1560E-06 (198)	4.2861E-06 (275)
12	1.9363E-07 (221)	3.0494E-06 (93)	4.7384E-06 (235)	4.6041E-06 (235)	4.7939E-06 (39)
13	5.0480E-07 (200)	3.3694E-06 (235)	3.9790E-06 (323)	5.6821E-06 (362)	5.3334E-06 (361)
14	4.0398E-07 (200)	3.6852E-06 (208)	4.4813E-06 (96)	5.7735E-06 (295)	5.5835E-06 (295)
15	2.5060E-07 (207)	3.5713E-06 (208)	4.3483E-06 (96)	4.8294E-06 (67)	5.0917E-06 (100)
16	2.3278E-07 (247)	2.4530E-06 (220)	3.3555E-06 (124)	3.7390E-06 (356)	4.0302E-06 (306)
17	2.1637E-07 (219)	3.0474E-06 (157)	3.6137E-06 (114)	4.3705E-06 (114)	4.4206E-06 (255)
18	2.4067E-07 (157)	3.7681E-06 (157)	5.1369E-06 (118)	6.1092E-06 (336)	8.3351E-06 (336)
19	4.5461E-07 (184)	3.5167E-06 (191)	4.8110E-06 (287)	5.6430E-06 (318)	8.2844E-06 (318)
20	9.7342E-07 (184)	4.4339E-06 (157)	7.0750E-06 (140)	7.1188E-06 (286)	6.6581E-06 (292)
21	3.8174E-07 (199)	3.8880E-06 (164)	4.6437E-06 (51)	4.6003E-06 (51)	4.5778E-06 (98)
22	2.2305E-07 (245)	3.4827E-06 (199)	4.5446E-06 (243)	4.7450E-06 (165)	5.7973E-06 (232)
23	2.6252E-07 (245)	3.7188E-06 (101)	5.9395E-06 (240)	6.8488E-06 (240)	6.6987E-06 (240)
24	1.6004E-07 (226)	3.2077E-06 (101)	6.3041E-06 (242)	6.5907E-06 (242)	5.7637E-06 (242)
25	1.1759E-07 (245)	2.9178E-06 (225)	5.4862E-06 (243)	6.4403E-06 (243)	6.0708E-06 (225)
26	1.7296E-07 (114)	3.2371E-06 (226)	4.8495E-06 (268)	6.0591E-06 (278)	6.4314E-06 (278)
27	2.8852E-07 (114)	3.8160E-06 (114)	3.9444E-06 (268)	4.0198E-06 (268)	4.0189E-06 (80)
28	2.2835E-07 (114)	4.3290E-06 (63)	4.4272E-06 (204)	4.6758E-06 (120)	4.9427E-06 (269)
29	1.6303E-07 (229)	3.1413E-06 (204)	4.6588E-06 (108)	4.7376E-06 (298)	4.5147E-06 (127)
30	2.4982E-07 (245)	2.7922E-06 (120)	4.1879E-06 (268)	4.2485E-06 (107)	4.5380E-06 (64)
31	2.6888E-07 (135)	2.6281E-06 (154)	3.6525E-06 (126)	4.0308E-06 (135)	4.6855E-06 (135)
32	2.8622E-07 (192)	3.8511E-06 (192)	3.8932E-06 (189)	4.2387E-06 (152)	4.7038E-06 (135)
33	4.0934E-07 (192)	4.3187E-06 (156)	4.4349E-06 (189)	4.4879E-06 (153)	3.8095E-06 (24)
34	2.9283E-07 (192)	4.3427E-06 (228)	6.2019E-06 (185)	5.8975E-06 (228)	5.0970E-06 (144)
35	4.0887E-07 (144)	3.7209E-06 (156)	4.4802E-06 (185)	4.5967E-06 (228)	3.9935E-06 (27)
36	2.0346E-07 (222)	3.9879E-06 (223)	5.9017E-06 (215)	5.7880E-06 (182)	5.0898E-06 (188)

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PLANT NAME: KISS. UTILITIES POLLUTANT: SO2 AIR QUALITY UNITS: GM/M**3
YEARLY SECOND MAXIMUM 24-HOUR CONC= 1.0041E-05 DIRECTION= 18 DISTANCE= 4.0 KM DAY=336
YEAR= 76

SECOND HIGHEST 24-HOUR CONCENTRATION AT EACH RECEPTOR

DIR	RANGE 3.0 KM		3.5 KM		4.0 KM		4.5 KM		5.0 KM	
1	4.0991E-06	(215)	3.9246E-06	(215)	3.8759E-06	(50)	3.7308E-06	(215)	3.8591E-06	(53)
2	4.8913E-06	(187)	4.2853E-06	(69)	4.2324E-06	(69)	4.1148E-06	(69)	3.9887E-06	(69)
3	4.6458E-06	(214)	4.5745E-06	(144)	4.5582E-06	(144)	4.2089E-06	(69)	3.8175E-06	(69)
4	4.0393E-06	(49)	4.3768E-06	(355)	4.6326E-06	(355)	4.7510E-06	(355)	4.7735E-06	(355)
5	6.7869E-06	(76)	6.1398E-06	(117)	5.9073E-06	(69)	5.3465E-06	(69)	5.2272E-06	(116)
6	5.7983E-06	(194)	5.4516E-06	(194)	5.1441E-06	(194)	4.8554E-06	(194)	4.6301E-06	(194)
7	3.9629E-06	(133)	4.4063E-06	(198)	4.2635E-06	(145)	3.7822E-06	(145)	3.3723E-06	(145)
8	4.8023E-06	(197)	4.5562E-06	(197)	4.2389E-06	(197)	4.1357E-06	(122)	4.0729E-06	(122)
9	8.7725E-06	(197)	8.1880E-06	(196)	7.5294E-06	(196)	7.4952E-06	(117)	7.5905E-06	(117)
10	4.5807E-06	(8)	4.6557E-06	(8)	5.2553E-06	(361)	5.6433E-06	(361)	5.4016E-06	(17)
11	4.5198E-06	(300)	5.1835E-06	(300)	5.6477E-06	(300)	5.8691E-06	(300)	5.9790E-06	(300)
12	5.4965E-06	(39)	5.9608E-06	(39)	6.2558E-06	(39)	6.3291E-06	(39)	6.3147E-06	(39)
13	5.6680E-06	(361)	5.6363E-06	(361)	5.4595E-06	(361)	5.2143E-06	(361)	4.9428E-06	(361)
14	5.1157E-06	(295)	5.0807E-06	(364)	5.0448E-06	(364)	5.2344E-06	(352)	5.3903E-06	(352)
15	5.2797E-06	(67)	5.8159E-06	(327)	5.9168E-06	(100)	5.7298E-06	(100)	5.4747E-06	(100)
16	5.0836E-06	(306)	5.4662E-06	(356)	5.5253E-06	(5)	5.7257E-06	(5)	5.8575E-06	(5)
17	4.5598E-06	(337)	5.1976E-06	(337)	5.2619E-06	(77)	5.0238E-06	(77)	5.2948E-06	(19)
18	9.6011E-06	(336)	1.0028E-05	(336)	1.0041E-05	(336)	9.8083E-06	(336)	9.4408E-06	(336)
19	9.0371E-06	(302)	8.6235E-06	(302)	8.7069E-06	(292)	8.7109E-06	(292)	8.5950E-06	(292)
20	7.7648E-06	(292)	7.6959E-06	(286)	7.1938E-06	(286)	6.6607E-06	(286)	6.4723E-06	(318)
21	5.3725E-06	(98)	5.7275E-06	(98)	5.7211E-06	(57)	5.5782E-06	(57)	5.3664E-06	(57)
22	5.2867E-06	(166)	4.6559E-06	(166)	4.1859E-06	(166)	4.0986E-06	(348)	3.9560E-06	(348)
23	6.2101E-06	(242)	5.7957E-06	(242)	5.5276E-06	(232)	5.6100E-06	(232)	5.5682E-06	(232)
24	5.9543E-06	(297)	5.5069E-06	(101)	5.2492E-06	(119)	5.0870E-06	(119)	4.9113E-06	(119)
25	5.2865E-06	(243)	4.7874E-06	(307)	4.6308E-06	(307)	4.4040E-06	(307)	4.1493E-06	(307)
26	6.2661E-06	(278)	5.8579E-06	(278)	5.3953E-06	(278)	4.9415E-06	(278)	4.5203E-06	(278)
27	3.9344E-06	(80)	4.2551E-06	(114)	4.5644E-06	(241)	4.4164E-06	(241)	4.5081E-06	(148)
28	4.4227E-06	(63)	4.1775E-06	(64)	4.2118E-06	(64)	4.1278E-06	(64)	3.9803E-06	(64)
29	4.7910E-06	(127)	4.7797E-06	(127)	4.6449E-06	(127)	4.4447E-06	(127)	4.2148E-06	(127)
30	4.4596E-06	(120)	4.4762E-06	(80)	5.1694E-06	(25)	5.7976E-06	(25)	5.7650E-06	(64)
31	5.0842E-06	(135)	5.1731E-06	(135)	5.1856E-06	(136)	5.7939E-06	(136)	6.1353E-06	(168)
32	4.7683E-06	(47)	4.8960E-06	(47)	4.9398E-06	(135)	4.8182E-06	(135)	4.6784E-06	(135)
33	3.4095E-06	(360)	3.7378E-06	(24)	3.5351E-06	(24)	3.3110E-06	(24)	3.0871E-06	(24)
34	4.3302E-06	(282)	4.5647E-06	(282)	4.3369E-06	(144)	4.2588E-06	(331)	4.2811E-06	(331)
35	4.2201E-06	(27)	4.2338E-06	(27)	4.1776E-06	(27)	4.0914E-06	(27)	3.9942E-06	(27)
36	5.1206E-06	(215)	5.1036E-06	(214)	5.8369E-06	(188)	5.7425E-06	(188)	5.8829E-06	(333)

PLANT NAME: KISS. UTILITTES POLLUTANT: SO2 AIR QUALITY UNITS: GM/M**3
YEARLY SECOND MAXIMUM 24-HOUR CONC= 9.9046E-06 DIRECTION= 27 DISTANCE= 2.5 KM DAY=217
YEAR= 77

SECOND HIGHEST 24-HOUR CONCENTRATION AT EACH RECEPTOR

RANGE DIR	0.5 KM	1.0 KM	1.5 KM	2.0 KM	2.5 KM
1	3.6663E-07 (87)	4.2350E-06 (236)	7.1904E-06 (207)	6.9633E-06 (207)	5.9877E-06 (207)
2	9.6178E-08 (248)	3.6783E-06 (145)	4.2830E-06 (145)	4.4797E-06 (285)	4.6758E-06 (230)
3	1.7283E-07 (180)	3.5084E-06 (189)	4.7071E-06 (251)	4.5161E-06 (145)	4.3627E-06 (285)
4	2.4149E-07 (229)	3.9927E-06 (252)	5.7584E-06 (252)	5.8560E-06 (145)	5.2338E-06 (157)
5	2.4178E-07 (180)	3.4581E-06 (171)	5.9971E-06 (172)	6.9729E-06 (177)	6.3732E-06 (177)
6	3.6864E-07 (190)	3.4813E-06 (158)	4.5398E-06 (208)	4.3120E-06 (77)	5.2114E-06 (172)
7	4.4506E-07 (190)	4.2072E-06 (114)	5.3379E-06 (114)	5.4490E-06 (3)	5.7692E-06 (3)
8	2.0511E-07 (169)	2.9863E-06 (167)	4.1748E-06 (174)	3.7927E-06 (300)	3.9619E-06 (3)
9	2.1908E-07 (134)	3.0205E-06 (174)	4.9918E-06 (128)	5.5619E-06 (176)	6.3600E-06 (81)
10	1.8321E-07 (134)	2.1584E-06 (176)	3.2975E-06 (174)	4.4799E-06 (275)	4.6330E-06 (10)
11	2.4822E-07 (187)	2.6709E-06 (178)	5.4880E-06 (127)	7.1187E-06 (127)	7.4256E-06 (127)
12	3.5990E-07 (187)	3.8173E-06 (161)	6.1959E-06 (178)	6.2042E-06 (164)	5.8884E-06 (164)
13	3.6909E-07 (187)	3.0066E-06 (187)	5.4697E-06 (19)	5.7257E-06 (330)	6.5407E-06 (330)
14	2.7212E-07 (187)	3.0101E-06 (172)	4.0924E-06 (173)	4.3887E-06 (340)	5.1476E-06 (340)
15	1.8141E-07 (267)	2.9387E-06 (164)	4.2712E-06 (134)	4.3156E-06 (32)	5.1403E-06 (32)
16	2.4438E-07 (267)	3.5677E-06 (164)	5.3363E-06 (315)	5.4023E-06 (203)	5.2360E-06 (96)
17	2.0153E-07 (184)	4.3937E-06 (163)	5.4140E-06 (163)	5.1284E-06 (98)	5.2627E-06 (341)
18	2.5578E-07 (184)	3.0958E-06 (163)	4.2336E-06 (163)	5.5422E-06 (143)	6.9881E-06 (38)
19	2.6609E-07 (257)	3.7398E-06 (186)	2.4826E-06 (29)	3.4085E-06 (99)	3.5259E-06 (99)
20	2.1081E-07 (186)	4.1124E-06 (187)	3.2201E-06 (30)	4.4361E-06 (30)	4.8030E-06 (30)
21	1.0594E-07 (156)	2.6710E-06 (187)	2.9809E-06 (105)	3.4988E-06 (205)	4.1595E-06 (39)
22	1.6310E-07 (99)	2.5546E-06 (142)	3.9447E-06 (133)	4.0217E-06 (142)	4.7991E-06 (276)
23	2.2000E-07 (101)	4.0608E-06 (142)	6.1862E-06 (133)	6.6562E-06 (293)	6.7498E-06 (293)
24	3.1219E-07 (255)	4.8435E-06 (101)	6.3789E-06 (278)	8.3932E-06 (278)	8.7908E-06 (278)
25	2.9194E-07 (101)	4.6243E-06 (101)	6.1394E-06 (101)	6.0075E-06 (101)	5.4752E-06 (101)
26	2.1303E-07 (244)	3.7219E-06 (244)	6.2352E-06 (243)	5.6050E-06 (243)	4.8102E-06 (243)
27	3.6458E-07 (242)	3.0511E-06 (243)	7.5373E-06 (217)	9.5342E-06 (217)	9.9046E-06 (217)
28	3.7404E-07 (214)	3.3268E-06 (136)	4.2749E-06 (138)	4.5990E-06 (221)	4.6631E-06 (221)
29	3.7404E-07 (214)	3.5412E-06 (227)	4.8406E-06 (258)	4.9691E-06 (86)	4.8750E-06 (258)
30	3.7512E-07 (136)	6.3627E-06 (136)	9.1001E-06 (136)	8.9139E-06 (136)	8.3590E-06 (62)
31	3.2834E-07 (111)	6.0624E-06 (112)	6.9807E-06 (209)	6.2750E-06 (121)	5.0235E-06 (112)
32	2.1384E-07 (209)	2.9116E-06 (209)	4.2801E-06 (229)	4.0581E-06 (237)	3.8181E-06 (199)
33	1.7118E-07 (181)	3.2394E-06 (188)	4.7240E-06 (202)	5.1155E-06 (202)	4.8703E-06 (202)
34	1.7040E-07 (193)	3.0255E-06 (229)	3.8457E-06 (206)	4.8748E-06 (87)	4.9893E-06 (92)
35	2.0724E-07 (265)	2.8364E-06 (189)	3.8415E-06 (207)	4.1057E-06 (206)	4.3298E-06 (88)
36	3.2492E-07 (236)	5.9965E-06 (214)	9.0212E-06 (207)	9.6529E-06 (207)	9.0176E-06 (207)

PLANT NAME: KISS. UTILITIES POLLUTANT: SO2 AIR QUALITY UNITS: GM/M**3
YEARLY SECOND MAXIMUM 24-HOUR CONC= 1.0442E-05 DIRECTION= 36 DISTANCE= 3.0 KM DAY= 65
YEAR= 77

SECOND HIGHEST 24-HOUR CONCENTRATION AT EACH RECEPTOR

DIR	RANGE 3.0 KM	3.5 KM	4.0 KM	4.5 KM	5.0 KM
1	5.0340E-06 (339)	4.9745E-06 (339)	4.7823E-06 (339)	4.5286E-06 (339)	4.3637E-06 (65)
2	4.0468E-06 (230)	3.9490E-06 (49)	4.0334E-06 (50)	4.2700E-06 (50)	4.3969E-06 (50)
3	4.1332E-06 (285)	3.7216E-06 (285)	3.4660E-06 (170)	3.2010E-06 (170)	3.1609E-06 (146)
4	5.4762E-06 (148)	4.8488E-06 (148)	4.5436E-06 (339)	4.2617E-06 (339)	3.9700E-06 (339)
5	5.7212E-06 (158)	6.2879E-06 (158)	5.7507E-06 (172)	5.1556E-06 (172)	5.1442E-06 (81)
6	4.8370E-06 (172)	4.4429E-06 (157)	4.5262E-06 (157)	4.5400E-06 (157)	4.5391E-06 (157)
7	5.7172E-06 (3)	5.4661E-06 (3)	5.1637E-06 (3)	4.8490E-06 (3)	4.6145E-06 (78)
8	3.9613E-06 (3)	4.2105E-06 (115)	4.8649E-06 (115)	5.2526E-06 (115)	5.3540E-06 (300)
9	7.2261E-06 (36)	7.5197E-06 (81)	7.5142E-06 (81)	7.3172E-06 (81)	7.0981E-06 (128)
10	5.1082E-06 (10)	5.3579E-06 (10)	5.4761E-06 (10)	5.4314E-06 (10)	5.3323E-06 (10)
11	7.1389E-06 (127)	6.6064E-06 (127)	6.0401E-06 (127)	5.5018E-06 (127)	5.0121E-06 (127)
12	5.5032E-06 (161)	4.8967E-06 (19)	4.5954E-06 (19)	4.3209E-06 (47)	4.0685E-06 (47)
13	6.7068E-06 (330)	6.4830E-06 (330)	6.1255E-06 (330)	5.7202E-06 (330)	5.3111E-06 (330)
14	5.3874E-06 (340)	5.2886E-06 (340)	5.0606E-06 (340)	5.0010E-06 (290)	4.9859E-06 (290)
15	5.0013E-06 (117)	4.6679E-06 (286)	4.6889E-06 (48)	4.7936E-06 (48)	4.8034E-06 (48)
16	6.3454E-06 (96)	7.0821E-06 (96)	7.2749E-06 (315)	7.0518E-06 (315)	6.9974E-06 (305)
17	5.5622E-06 (341)	5.5015E-06 (341)	5.3204E-06 (31)	5.5540E-06 (31)	5.6599E-06 (31)
18	8.1761E-06 (38)	9.0371E-06 (38)	9.6417E-06 (38)	9.8833E-06 (38)	9.9707E-06 (38)
19	3.9071E-06 (40)	4.1783E-06 (40)	4.2542E-06 (40)	4.2070E-06 (40)	4.0869E-06 (40)
20	4.9413E-06 (30)	5.0661E-06 (30)	5.3233E-06 (39)	5.8410E-06 (277)	6.1995E-06 (277)
21	4.8076E-06 (39)	5.2272E-06 (41)	5.5787E-06 (205)	5.8989E-06 (205)	6.3689E-06 (102)
22	5.0643E-06 (276)	4.9657E-06 (276)	4.8448E-06 (133)	4.6086E-06 (133)	4.9842E-06 (242)
23	6.6239E-06 (103)	7.2835E-06 (103)	7.4194E-06 (142)	7.0700E-06 (142)	6.7213E-06 (142)
24	8.6068E-06 (278)	8.2082E-06 (278)	8.3467E-06 (277)	8.4067E-06 (102)	7.7977E-06 (102)
25	4.8769E-06 (101)	4.6513E-06 (100)	4.4768E-06 (100)	4.2413E-06 (100)	4.0610E-06 (297)
26	4.5858E-06 (242)	4.3274E-06 (242)	4.0333E-06 (242)	3.7620E-06 (242)	3.7677E-06 (97)
27	9.5380E-06 (217)	8.8577E-06 (217)	8.4011E-06 (240)	8.2126E-06 (240)	7.9762E-06 (240)
28	4.5134E-06 (155)	4.3984E-06 (111)	4.5534E-06 (112)	4.4442E-06 (112)	4.2922E-06 (112)
29	4.7257E-06 (112)	4.4939E-06 (112)	4.2053E-06 (112)	3.9038E-06 (112)	3.7868E-06 (54)
30	8.5408E-06 (258)	8.8504E-06 (86)	8.9487E-06 (86)	8.8022E-06 (86)	8.5506E-06 (86)
31	4.7693E-06 (87)	5.0948E-06 (87)	5.2452E-06 (87)	5.2284E-06 (87)	5.0714E-06 (121)
32	4.5152E-06 (87)	5.2420E-06 (93)	5.4607E-06 (87)	5.5986E-06 (87)	5.6327E-06 (87)
33	4.5268E-06 (249)	4.2128E-06 (93)	4.0461E-06 (202)	4.0752E-06 (63)	3.9699E-06 (93)
34	5.1456E-06 (92)	4.7452E-06 (206)	4.6601E-06 (88)	4.6518E-06 (88)	4.5661E-06 (88)
35	4.7459E-06 (88)	4.7956E-06 (88)	4.6843E-06 (88)	4.4893E-06 (88)	4.3883E-06 (250)
36	1.0442E-05 (65)	1.0197E-05 (94)	9.7786E-06 (94)	9.6877E-06 (233)	1.0199E-05 (233)

PLANT NAME: KISS. UTILITIES POLLUTANT: SO2 AIR QUALITY UNITS: GM/M**3
YEARLY SECOND MAXIMUM 24-HOUR CONC= 9.7511E-06 DIRECTION= 36 DISTANCE= 2.0 KM DAY=102
YEAR= 78

SECOND HIGHEST 24-HOUR CONCENTRATION AT EACH RECEPTOR

DIR	RANGE 0.5 KM	1.0 KM	1.5 KM	2.0 KM	2.5 KM
1	6.6684E-07 (212)	4.4711E-06 (186)	4.8122E-06 (184)	5.3957E-06 (247)	5.3214E-06 (44)
2	2.7929E-07 (183)	3.8027E-06 (119)	6.0879E-06 (25)	7.2907E-06 (25)	6.9143E-06 (184)
3	2.8993E-07 (187)	2.7579E-06 (136)	4.7117E-06 (136)	4.5588E-06 (136)	4.6369E-06 (119)
4	2.6206E-07 (145)	2.6508E-06 (184)	5.0109E-06 (135)	6.0498E-06 (119)	4.9566E-06 (119)
5	2.6216E-07 (175)	2.9127E-06 (119)	3.9711E-06 (69)	5.6045E-06 (135)	4.8465E-06 (135)
6	2.4570E-07 (116)	4.3671E-06 (116)	4.8664E-06 (116)	4.3259E-06 (135)	4.0070E-06 (134)
7	1.0976E-07 (135)	2.3528E-06 (111)	3.2937E-06 (116)	3.4260E-06 (121)	3.2238E-06 (121)
8	1.1671E-07 (116)	2.1805E-06 (111)	4.9358E-06 (111)	5.3251E-06 (111)	4.8992E-06 (111)
9	2.3241E-07 (156)	2.6727E-06 (134)	3.5541E-06 (52)	5.0793E-06 (26)	5.2763E-06 (20)
10	2.3241E-07 (156)	2.3801E-06 (248)	3.7014E-06 (9)	4.1203E-06 (116)	3.5446E-06 (20)
11	2.8265E-07 (182)	2.4583E-06 (160)	2.1291E-06 (248)	2.6204E-06 (53)	3.0450E-06 (53)
12	2.2480E-07 (160)	3.1444E-06 (249)	4.6982E-06 (279)	4.8076E-06 (279)	5.2567E-06 (28)
13	1.9089E-07 (249)	5.0520E-06 (117)	6.1675E-06 (249)	6.1264E-06 (279)	5.6115E-06 (255)
14	2.4378E-07 (250)	4.0838E-06 (231)	5.7819E-06 (117)	6.5938E-06 (279)	6.9950E-06 (76)
15	1.8446E-07 (249)	2.7343E-06 (231)	4.5583E-06 (254)	4.7761E-06 (250)	4.4100E-06 (250)
16	7.4735E-08 (249)	1.7918E-06 (254)	3.8538E-06 (308)	4.6337E-06 (307)	4.6886E-06 (81)
17	1.9948E-08 (250)	1.3448E-06 (125)	2.8794E-06 (308)	3.6948E-06 (11)	4.4867E-06 (41)
18	3.4222E-08 (175)	2.1561E-06 (125)	4.0649E-06 (324)	5.7855E-06 (11)	7.0285E-06 (304)
19	1.2399E-07 (161)	2.3285E-06 (144)	2.8584E-06 (145)	3.9183E-06 (40)	5.7720E-06 (304)
20	2.5828E-07 (161)	2.6182E-06 (144)	4.6537E-06 (145)	4.8205E-06 (125)	4.3532E-06 (316)
21	3.0411E-07 (161)	3.5276E-06 (145)	5.1552E-06 (316)	5.0304E-06 (145)	3.9409E-06 (77)
22	2.8612E-07 (182)	3.7556E-06 (161)	5.6565E-06 (217)	5.3393E-06 (269)	5.3902E-06 (269)
23	2.6895E-07 (186)	3.5607E-06 (251)	6.2772E-06 (269)	7.9810E-06 (269)	7.3948E-06 (237)
24	2.5833E-07 (89)	3.6387E-06 (130)	5.6445E-06 (106)	6.5815E-06 (262)	7.0210E-06 (114)
25	2.2237E-07 (245)	4.0337E-06 (179)	5.4992E-06 (162)	6.0255E-06 (147)	6.1638E-06 (363)
26	2.8523E-07 (245)	4.5824E-06 (195)	8.2899E-06 (149)	9.1331E-06 (149)	8.2397E-06 (163)
27	2.7790E-07 (202)	5.1089E-06 (202)	7.2683E-06 (140)	8.3179E-06 (204)	8.5151E-06 (204)
28	2.9976E-07 (93)	4.1501E-06 (176)	5.1672E-06 (93)	6.3061E-06 (93)	6.5364E-06 (93)
29	2.4717E-07 (190)	4.1021E-06 (144)	5.4130E-06 (205)	5.5318E-06 (203)	5.1918E-06 (113)
30	2.4370E-07 (150)	3.9551E-06 (216)	6.3684E-06 (216)	5.7662E-06 (78)	5.6932E-06 (78)
31	1.7041E-07 (150)	3.9866E-06 (216)	6.4316E-06 (107)	6.6430E-06 (222)	6.4818E-06 (78)
32	2.3428E-07 (108)	3.4295E-06 (108)	5.7646E-06 (201)	5.6351E-06 (201)	4.7128E-06 (201)
33	2.6778E-07 (207)	5.4547E-06 (190)	5.5908E-06 (100)	5.9121E-06 (100)	6.0250E-06 (19)
34	3.1242E-07 (180)	5.8058E-06 (207)	5.7767E-06 (207)	5.6915E-06 (199)	5.8013E-06 (154)
35	5.1600E-07 (180)	5.2485E-06 (129)	7.4507E-06 (120)	7.0323E-06 (120)	6.5825E-06 (102)
36	1.1166E-06 (187)	4.8125E-06 (102)	9.3820E-06 (102)	9.7511E-06 (102)	9.2162E-06 (338)

PLANT NAME: KISS. UTILITIES POLLUTANT: SO2 AIR QUALITY UNITS: GM/M**3
YEARLY SECOND MAXIMUM 24-HOUR CONC= 9.9757E-06 DIRECTION= 27 DISTANCE= 4.0 KM DAY=169
YEAR= 78

SECOND HIGHEST 24-HOUR CONCENTRATION AT EACH RECEPTOR

DIR	RANGE 3.0 KM	3.5 KM	4.0 KM	4.5 KM	5.0 KM
1	4.6968E-06 (247)	4.4485E-06 (338)	4.6181E-06 (338)	4.6343E-06 (338)	4.5827E-06 (338)
2	6.5626E-06 (184)	6.1960E-06 (25)	5.5858E-06 (25)	5.8117E-06 (355)	5.9349E-06 (355)
3	3.6590E-06 (119)	2.9002E-06 (119)	2.7390E-06 (355)	2.8697E-06 (74)	3.0111E-06 (74)
4	5.3498E-06 (85)	5.5764E-06 (85)	5.5652E-06 (85)	5.4181E-06 (85)	5.1990E-06 (85)
5	5.3100E-06 (355)	5.4236E-06 (355)	5.3300E-06 (355)	5.1269E-06 (355)	5.0085E-06 (213)
6	4.1156E-06 (134)	4.0951E-06 (134)	4.0099E-06 (134)	3.8687E-06 (134)	3.7268E-06 (20)
7	2.9835E-06 (69)	3.1408E-06 (13)	3.4857E-06 (353)	3.4749E-06 (353)	3.5643E-06 (55)
8	4.3980E-06 (111)	3.9771E-06 (111)	3.7029E-06 (45)	3.8478E-06 (45)	3.9220E-06 (45)
9	6.6314E-06 (26)	6.6850E-06 (26)	6.6514E-06 (86)	6.8716E-06 (86)	6.9616E-06 (86)
10	4.3453E-06 (20)	4.7459E-06 (20)	4.9339E-06 (20)	4.9769E-06 (20)	4.9378E-06 (20)
11	3.1291E-06 (53)	3.0141E-06 (53)	2.8332E-06 (53)	2.9408E-06 (63)	3.0418E-06 (63)
12	6.1736E-06 (28)	6.6638E-06 (28)	6.9006E-06 (28)	6.8977E-06 (28)	6.7944E-06 (28)
13	5.0129E-06 (53)	4.8005E-06 (53)	4.4865E-06 (53)	4.1438E-06 (53)	3.8069E-06 (53)
14	7.1252E-06 (76)	6.8461E-06 (76)	6.4357E-06 (76)	5.9859E-06 (76)	5.5411E-06 (76)
15	3.9424E-06 (250)	4.3316E-06 (307)	4.9328E-06 (307)	5.2883E-06 (307)	5.4837E-06 (307)
16	4.1223E-06 (346)	4.5459E-06 (346)	4.7832E-06 (346)	5.0398E-06 (280)	5.1935E-06 (280)
17	5.2176E-06 (288)	5.6171E-06 (288)	5.8007E-06 (288)	6.0839E-06 (305)	6.4884E-06 (305)
18	7.7408E-06 (288)	8.4179E-06 (325)	8.8772E-06 (325)	9.0623E-06 (325)	9.0064E-06 (288)
19	6.1477E-06 (304)	6.1448E-06 (304)	6.2198E-06 (36)	6.5277E-06 (36)	6.6585E-06 (36)
20	4.5946E-06 (36)	5.1393E-06 (36)	5.3805E-06 (36)	5.4215E-06 (36)	5.5007E-06 (296)
21	4.3357E-06 (77)	4.3828E-06 (77)	4.1016E-06 (4)	4.0767E-06 (77)	3.9412E-06 (88)
22	5.3494E-06 (271)	5.3417E-06 (271)	5.2275E-06 (271)	5.0510E-06 (271)	4.9953E-06 (302)
23	6.6401E-06 (267)	6.1839E-06 (318)	6.9692E-06 (104)	7.2646E-06 (104)	7.3868E-06 (104)
24	6.0195E-06 (114)	5.1552E-06 (114)	4.8371E-06 (234)	4.9874E-06 (234)	5.0438E-06 (234)
25	6.8623E-06 (363)	7.0690E-06 (363)	7.0306E-06 (363)	6.8343E-06 (363)	6.5596E-06 (363)
26	7.9746E-06 (149)	7.2173E-06 (149)	7.0146E-06 (364)	7.0542E-06 (364)	6.9788E-06 (364)
27	8.9402E-06 (171)	9.5112E-06 (171)	9.9757E-06 (169)	9.7528E-06 (169)	9.4590E-06 (169)
28	6.1653E-06 (93)	6.4216E-06 (113)	6.7201E-06 (113)	6.8152E-06 (113)	6.7750E-06 (113)
29	5.3907E-06 (205)	4.7643E-06 (205)	4.2296E-06 (205)	3.8188E-06 (205)	3.6509E-06 (299)
30	5.1214E-06 (78)	4.6489E-06 (83)	4.7686E-06 (7)	4.9185E-06 (7)	4.6582E-06 (203)
31	5.8894E-06 (78)	5.1815E-06 (78)	4.7611E-06 (80)	4.5931E-06 (80)	4.3693E-06 (80)
32	4.4781E-06 (190)	4.5604E-06 (8)	4.8393E-06 (8)	4.9526E-06 (8)	4.9664E-06 (8)
33	6.2964E-06 (19)	6.4249E-06 (124)	6.6066E-06 (124)	6.5270E-06 (73)	6.4784E-06 (124)
34	5.7558E-06 (210)	5.8091E-06 (199)	5.6371E-06 (199)	5.4844E-06 (331)	5.6287E-06 (331)
35	6.2602E-06 (102)	5.8872E-06 (102)	5.4347E-06 (160)	5.3104E-06 (102)	5.2292E-06 (74)
36	9.7847E-06 (25)	9.0085E-06 (25)	8.2120E-06 (25)	7.4651E-06 (25)	6.7905E-06 (25)

PLANT NAME: KISS. UTILITIES POLLUTANT: SO2 AIR QUALITY UNITS: GM/M**3
YEARLY SECOND MAXIMUM 3-HOUR CONC= 3.8763E-05 DIRECTION= 18 DISTANCE= 2.5 KM DAY=297 TIME PERIOD= 5
YEAR= 74

SECOND HIGHEST 3-HOUR CONCENTRATION AT EACH RECEPTOR

RANGE DIR	0.5 KM	1.0 KM	1.5 KM	2.0 KM	2.5 KM
1	1.5099E-06 (80, 4)	1.9848E-05 (196, 4)	2.4802E-05 (196, 4)	3.0948E-05 (354, 5)	3.1182E-05 (50, 6)
2	1.9476E-06 (80, 4)	2.3125E-05 (152, 4)	2.9710E-05 (152, 4)	2.7555E-05 (78, 4)	2.7410E-05 (78, 4)
3	1.4989E-06 (188, 4)	2.5570E-05 (97, 5)	1.8597E-05 (97, 5)	1.8039E-05 (34, 5)	1.7833E-05 (34, 5)
4	1.0858E-06 (174, 5)	2.8096E-05 (125, 5)	2.9796E-05 (153, 4)	2.9441E-05 (125, 5)	2.7752E-05 (132, 4)
5	3.1547E-06 (176, 4)	2.8044E-05 (176, 4)	3.3743E-05 (146, 5)	3.2349E-05 (146, 5)	2.8729E-05 (146, 5)
6	1.8129E-06 (206, 4)	2.3331E-05 (168, 4)	3.0071E-05 (90, 5)	2.7611E-05 (230, 5)	2.3678E-05 (230, 5)
7	1.5735E-06 (188, 5)	2.0143E-05 (151, 4)	2.4743E-05 (151, 4)	2.4494E-05 (89, 5)	2.5754E-05 (203, 4)
8	1.9568E-06 (145, 5)	1.8081E-05 (169, 4)	2.2565E-05 (106, 4)	2.3106E-05 (106, 4)	1.9876E-05 (203, 4)
9	1.7889E-06 (123, 4)	2.0374E-05 (89, 5)	1.6379E-05 (223, 4)	1.7829E-05 (7, 4)	1.9967E-05 (7, 4)
10	2.3805E-06 (89, 5)	1.9228E-05 (163, 5)	2.1093E-05 (201, 4)	2.1769E-05 (99, 6)	2.1380E-05 (99, 6)
11	1.9501E-06 (173, 4)	2.5845E-05 (163, 5)	2.7697E-05 (150, 5)	2.8119E-05 (202, 4)	2.6316E-05 (167, 5)
12	2.3239E-06 (151, 5)	2.9089E-05 (150, 5)	2.9428E-05 (191, 4)	2.6038E-05 (201, 4)	2.3821E-05 (201, 4)
13	2.7497E-06 (211, 4)	2.5493E-05 (151, 5)	2.6858E-05 (114, 4)	2.6315E-05 (163, 4)	2.2586E-05 (196, 6)
14	1.0569E-06 (207, 6)	2.3591E-05 (196, 5)	2.5325E-05 (145, 5)	2.6074E-05 (291, 4)	2.4975E-05 (206, 6)
15	7.6402E-07 (196, 5)	2.3976E-05 (211, 4)	2.5572E-05 (69, 5)	2.1204E-05 (196, 5)	2.1484E-05 (163, 6)
16	7.0636E-07 (163, 5)	1.1897E-05 (196, 5)	1.9483E-05 (72, 4)	2.0325E-05 (107, 4)	1.8365E-05 (57, 5)
17	2.4251E-07 (100, 5)	2.3923E-05 (124, 4)	3.3177E-05 (124, 4)	2.9343E-05 (124, 4)	2.4881E-05 (124, 4)
18	4.5643E-07 (198, 4)	2.8545E-05 (128, 5)	3.1928E-05 (124, 4)	3.8717E-05 (297, 5)	3.8763E-05 (297, 5)
19	7.5096E-07 (181, 6)	2.6037E-05 (128, 5)	2.0604E-05 (319, 4)	2.0979E-05 (265, 4)	2.1383E-05 (265, 4)
20	1.9980E-06 (211, 5)	2.4304E-05 (108, 5)	2.0171E-05 (276, 5)	2.1047E-05 (296, 5)	2.1421E-05 (257, 4)
21	1.7735E-06 (211, 5)	2.0873E-05 (109, 5)	2.4546E-05 (115, 4)	2.8778E-05 (330, 4)	3.0947E-05 (277, 5)
22	3.5767E-06 (225, 5)	2.4457E-05 (117, 5)	3.2150E-05 (100, 4)	2.9077E-05 (100, 4)	2.3991E-05 (100, 4)
23	3.1686E-06 (225, 5)	2.2271E-05 (67, 6)	3.1931E-05 (171, 5)	3.7368E-05 (278, 5)	3.7233E-05 (278, 5)
24	1.8147E-06 (238, 4)	1.9453E-05 (111, 5)	2.1750E-05 (110, 4)	2.0803E-05 (180, 5)	2.1380E-05 (195, 3)
25	1.4145E-06 (67, 6)	1.5560E-05 (227, 5)	2.0796E-05 (262, 4)	2.4660E-05 (262, 4)	2.3090E-05 (262, 4)
26	9.9994E-07 (238, 4)	1.8438E-05 (140, 5)	2.4671E-05 (224, 5)	2.6178E-05 (140, 5)	2.2904E-05 (301, 5)
27	1.7140E-06 (156, 4)	2.7751E-05 (205, 4)	3.1104E-05 (140, 4)	2.8494E-05 (140, 4)	2.3742E-05 (287, 4)
28	1.7711E-06 (165, 4)	1.8692E-05 (246, 4)	2.7841E-05 (246, 4)	2.3735E-05 (133, 5)	1.8258E-05 (287, 4)
29	1.7711E-06 (165, 4)	1.8283E-05 (170, 4)	2.2617E-05 (321, 4)	2.8654E-05 (243, 5)	2.8762E-05 (243, 5)
30	1.6960E-06 (169, 4)	2.0019E-05 (211, 5)	2.4291E-05 (62, 5)	2.3915E-05 (62, 5)	2.3056E-05 (239, 6)
31	5.9332E-06 (135, 5)	2.0035E-05 (211, 5)	2.4557E-05 (164, 4)	2.1956E-05 (65, 4)	2.0468E-05 (65, 4)
32	1.2869E-05 (135, 5)	2.9983E-05 (103, 5)	3.2205E-05 (243, 4)	2.8441E-05 (159, 4)	2.3790E-05 (159, 4)
33	4.7516E-06 (220, 5)	2.2718E-05 (243, 4)	2.9226E-05 (227, 4)	2.7496E-05 (214, 4)	2.4793E-05 (94, 4)
34	1.9562E-06 (207, 4)	1.6689E-05 (207, 4)	2.2897E-05 (227, 4)	2.7763E-05 (132, 1)	3.1602E-05 (132, 1)
35	1.6489E-06 (221, 4)	2.0531E-05 (94, 5)	2.9208E-05 (152, 5)	2.6918E-05 (152, 5)	2.3303E-05 (158, 4)
36	8.0647E-07 (221, 4)	1.8225E-05 (176, 3)	2.4774E-05 (9, 5)	2.6433E-05 (9, 5)	2.3510E-05 (9, 5)

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PLANT NAME: KISS. UTILITIES POLLUTANT: SO2 AIR QUALITY UNITS: GM/M**3
YEARLY SECOND MAXIMUM 3-HOUR CONC= 3.5682E-05 DIRECTION= 18 DISTANCE= 3.0 KM DAY=279 TIME PERIOD= 6
YEAR= 74

SECOND HIGHEST 3-HOUR CONCENTRATION AT EACH RECEPTOR

DIR	RANGE 3.0 KM	3.5 KM	4.0 KM	4.5 KM	5.0 KM
1	3.0189E-05 (50, 6)	2.8020E-05 (50, 6)	2.5654E-05 (50, 6)	2.3366E-05 (50, 6)	2.1262E-05 (50, 6)
2	2.4643E-05 (78, 4)	2.4191E-05 (38, 4)	2.1714E-05 (50, 5)	1.9276E-05 (50, 5)	1.7201E-05 (50, 5)
3	1.6773E-05 (84, 4)	1.4612E-05 (84, 4)	1.4952E-05 (34, 5)	1.4041E-05 (34, 5)	1.3380E-05 (34, 4)
4	2.6129E-05 (153, 4)	2.2015E-05 (153, 4)	2.0619E-05 (143, 6)	2.1799E-05 (132, 4)	1.9987E-05 (132, 4)
5	2.5066E-05 (146, 5)	2.1771E-05 (146, 5)	1.9016E-05 (146, 5)	1.7657E-05 (349, 8)	1.8702E-05 (50, 7)
6	2.3463E-05 (88, 6)	2.3490E-05 (88, 6)	2.2748E-05 (88, 6)	2.1636E-05 (88, 6)	2.0378E-05 (88, 6)
7	2.0467E-05 (203, 4)	1.8451E-05 (174, 6)	1.8475E-05 (324, 6)	1.8983E-05 (88, 7)	1.9557E-05 (89, 5)
8	1.9022E-05 (106, 4)	1.6622E-05 (193, 5)	1.6303E-05 (146, 1)	1.9680E-05 (146, 1)	2.2512E-05 (146, 1)
9	1.9569E-05 (7, 4)	1.8065E-05 (7, 4)	1.9864E-05 (325, 7)	2.2510E-05 (89, 7)	2.3520E-05 (89, 7)
10	2.1151E-05 (113, 6)	2.1861E-05 (113, 6)	2.1986E-05 (99, 5)	1.8530E-05 (99, 5)	1.6634E-05 (336, 6)
11	2.2251E-05 (167, 5)	2.0089E-05 (351, 6)	2.0158E-05 (351, 6)	2.0454E-05 (335, 3)	2.0224E-05 (335, 3)
12	2.0561E-05 (201, 4)	1.8715E-05 (145, 4)	1.6105E-05 (336, 7)	1.7282E-05 (336, 7)	1.8192E-05 (316, 6)
13	2.1945E-05 (337, 4)	2.1568E-05 (196, 6)	1.9619E-05 (196, 6)	1.7586E-05 (196, 6)	1.8281E-05 (40, 7)
14	2.3282E-05 (325, 4)	2.2408E-05 (206, 6)	2.3451E-05 (325, 1)	2.3649E-05 (325, 1)	2.3489E-05 (325, 1)
15	2.0699E-05 (163, 6)	1.8430E-05 (69, 5)	1.7660E-05 (280, 4)	1.8097E-05 (280, 4)	1.8080E-05 (280, 4)
16	1.7576E-05 (57, 5)	1.5859E-05 (57, 5)	1.6178E-05 (275, 2)	1.7167E-05 (96, 2)	1.7864E-05 (96, 2)
17	2.1201E-05 (148, 4)	1.9033E-05 (51, 5)	1.8011E-05 (57, 4)	1.8466E-05 (311, 2)	1.9711E-05 (311, 2)
18	3.5682E-05 (279, 6)	3.1239E-05 (51, 5)	2.8118E-05 (297, 4)	2.7099E-05 (297, 4)	2.5884E-05 (297, 4)
19	2.0975E-05 (108, 3)	2.0829E-05 (51, 5)	1.9900E-05 (108, 3)	1.8693E-05 (108, 3)	1.7933E-05 (330, 7)
20	2.4200E-05 (296, 6)	2.5169E-05 (296, 5)	2.3907E-05 (296, 5)	2.3479E-05 (297, 1)	2.6232E-05 (297, 1)
21	2.9617E-05 (277, 5)	2.7303E-05 (277, 5)	2.4883E-05 (277, 5)	2.2591E-05 (277, 5)	2.0509E-05 (277, 5)
22	2.1744E-05 (267, 4)	2.1823E-05 (283, 5)	2.1778E-05 (258, 5)	2.1294E-05 (283, 5)	2.3669E-05 (148, 1)
23	3.4784E-05 (195, 4)	2.9446E-05 (195, 4)	2.4898E-05 (195, 4)	2.1172E-05 (195, 4)	1.9843E-05 (285, 5)
24	1.9943E-05 (195, 3)	1.8476E-05 (117, 6)	1.7580E-05 (117, 6)	1.6001E-05 (255, 6)	1.6013E-05 (18, 7)
25	2.0074E-05 (262, 4)	1.7074E-05 (262, 4)	1.6505E-05 (198, 4)	1.5665E-05 (198, 4)	1.6604E-05 (340, 7)
26	2.1933E-05 (301, 5)	2.0147E-05 (301, 5)	1.8264E-05 (301, 5)	1.6671E-05 (302, 6)	1.7538E-05 (194, 7)
27	2.0497E-05 (287, 4)	1.8331E-05 (184, 3)	1.6152E-05 (357, 4)	1.4318E-05 (101, 4)	1.3529E-05 (159, 7)
28	1.6564E-05 (321, 5)	1.6733E-05 (215, 6)	1.5581E-05 (357, 5)	1.6085E-05 (102, 3)	1.6567E-05 (102, 3)
29	2.5639E-05 (139, 5)	2.1327E-05 (139, 5)	2.0898E-05 (102, 7)	2.1541E-05 (24, 6)	2.1458E-05 (24, 6)
30	1.9912E-05 (65, 4)	1.8214E-05 (184, 4)	1.9168E-05 (184, 4)	1.9431E-05 (184, 4)	1.9248E-05 (184, 4)
31	1.8546E-05 (52, 4)	1.8390E-05 (207, 7)	1.7760E-05 (49, 5)	1.7712E-05 (207, 7)	1.6993E-05 (207, 7)
32	1.9402E-05 (159, 4)	1.8392E-05 (131, 3)	1.6192E-05 (24, 5)	1.6385E-05 (24, 5)	1.6316E-05 (131, 3)
33	2.3370E-05 (94, 4)	2.0089E-05 (63, 4)	1.9373E-05 (94, 4)	1.7531E-05 (94, 4)	1.6330E-05 (27, 1)
34	3.1721E-05 (186, 4)	2.9162E-05 (186, 4)	2.6119E-05 (186, 4)	2.3158E-05 (186, 4)	2.1057E-05 (177, 2)
35	1.9904E-05 (309, 5)	1.7516E-05 (21, 2)	2.1738E-05 (27, 4)	2.1397E-05 (27, 4)	2.0710E-05 (27, 4)
36	2.1379E-05 (28, 5)	2.1466E-05 (185, 5)	2.2300E-05 (209, 8)	2.2590E-05 (28, 5)	2.1915E-05 (28, 5)

PLANT NAME: KISS. UTILITIES POLLUTANT: SO2 AIR QUALITY UNITS: GM/M**3
YEARLY SECOND MAXIMUM 3-HOUR CONC= 3.8864E-05 DIRECTION= 8 DISTANCE= 1.0 KM DAY=225 TIME PERIOD= 5
YEAR= 75

SECOND HIGHEST 3-HOUR CONCENTRATION AT EACH RECEPTOR

RANGE DIR	0.5 KM	1.0 KM	1.5 KM	2.0 KM	2.5 KM
1	1.5604E-06 (207, 5)	2.5567E-05 (215, 5)	3.3629E-05 (167, 4)	3.2996E-05 (92, 4)	2.8828E-05 (92, 4)
2	3.3418E-06 (207, 5)	2.4622E-05 (207, 5)	2.6972E-05 (223, 5)	2.7132E-05 (207, 5)	2.3885E-05 (207, 5)
3	1.4112E-06 (126, 4)	1.7439E-05 (166, 5)	2.5647E-05 (166, 5)	2.6414E-05 (66, 5)	2.6209E-05 (66, 5)
4	1.9492E-06 (217, 4)	1.6353E-05 (217, 4)	2.9697E-05 (188, 4)	2.9812E-05 (188, 4)	2.5609E-05 (188, 4)
5	1.8616E-06 (219, 5)	3.0038E-05 (203, 4)	3.0161E-05 (186, 4)	3.2557E-05 (89, 5)	3.3670E-05 (89, 5)
6	2.0973E-06 (219, 5)	2.3964E-05 (191, 4)	3.1302E-05 (191, 4)	2.7216E-05 (191, 4)	2.8521E-05 (37, 6)
7	1.3941E-06 (203, 4)	2.9949E-05 (110, 4)	3.3761E-05 (186, 5)	2.9810E-05 (186, 5)	2.5823E-05 (110, 4)
8	1.4251E-06 (157, 4)	3.8864E-05 (225, 5)	3.5162E-05 (157, 5)	2.9854E-05 (157, 5)	2.5941E-05 (157, 4)
9	1.1818E-06 (124, 5)	1.8278E-05 (157, 5)	2.3571E-05 (124, 5)	2.6371E-05 (1, 5)	2.7117E-05 (1, 5)
10	2.2476E-06 (138, 5)	1.6169E-05 (145, 5)	2.4419E-05 (186, 6)	3.3259E-05 (186, 6)	2.7147E-05 (138, 5)
11	1.4869E-06 (163, 4)	2.4867E-05 (164, 5)	3.4312E-05 (128, 5)	3.2177E-05 (129, 4)	2.6623E-05 (93, 6)
12	1.9117E-06 (163, 5)	2.5992E-05 (180, 5)	2.7297E-05 (129, 4)	2.5833E-05 (55, 5)	2.7132E-05 (55, 5)
13	1.9996E-06 (156, 5)	2.3089E-05 (105, 4)	3.1856E-05 (128, 4)	3.2883E-05 (244, 5)	2.9202E-05 (244, 5)
14	8.6842E-07 (116, 4)	1.8175E-05 (225, 4)	2.6050E-05 (139, 4)	2.7242E-05 (139, 4)	2.4980E-05 (291, 5)
15	1.1016E-06 (156, 5)	1.6880E-05 (96, 5)	2.6262E-05 (231, 5)	2.6258E-05 (94, 4)	2.2920E-05 (361, 4)
16	5.4968E-07 (139, 4)	1.5787E-05 (230, 4)	2.0654E-05 (96, 5)	2.5256E-05 (102, 4)	2.6617E-05 (102, 4)
17	7.1371E-07 (155, 4)	1.8517E-05 (85, 5)	2.1042E-05 (155, 4)	1.9721E-05 (95, 4)	1.8192E-05 (95, 4)
18	5.2087E-07 (85, 5)	2.0587E-05 (106, 5)	2.4519E-05 (106, 5)	2.6937E-05 (85, 5)	2.1384E-05 (85, 5)
19	6.1240E-07 (106, 5)	1.7053E-05 (244, 4)	2.9420E-05 (106, 5)	3.0444E-05 (131, 4)	2.7304E-05 (131, 4)
20	4.5974E-07 (141, 4)	1.5901E-05 (244, 4)	1.5868E-05 (320, 4)	1.8898E-05 (21, 4)	1.8950E-05 (17, 4)
21	6.3983E-07 (141, 4)	1.7001E-05 (181, 5)	2.4744E-05 (141, 4)	2.5157E-05 (320, 4)	2.3686E-05 (184, 4)
22	1.1087E-06 (294, 4)	1.8466E-05 (182, 5)	2.2300E-05 (182, 5)	2.4694E-05 (294, 4)	2.4030E-05 (96, 4)
23	7.7208E-07 (145, 5)	1.7753E-05 (219, 6)	2.5068E-05 (45, 5)	2.9036E-05 (338, 4)	2.7129E-05 (338, 4)
24	1.4164E-06 (146, 4)	2.3288E-05 (170, 5)	3.0031E-05 (103, 5)	2.6288E-05 (300, 5)	2.6441E-05 (284, 5)
25	1.9081E-06 (146, 4)	2.2954E-05 (103, 5)	3.3222E-05 (144, 5)	3.2992E-05 (144, 5)	2.8342E-05 (144, 5)
26	1.7994E-06 (225, 5)	2.1520E-05 (146, 4)	2.5288E-05 (234, 5)	2.2016E-05 (234, 5)	2.0230E-05 (112, 4)
27	1.4310E-06 (232, 5)	2.5149E-05 (112, 5)	3.0172E-05 (112, 5)	2.8006E-05 (112, 5)	2.5549E-05 (112, 5)
28	1.2932E-06 (234, 4)	2.5638E-05 (214, 4)	2.9470E-05 (197, 5)	3.1158E-05 (197, 5)	2.8248E-05 (197, 5)
29	6.1982E-07 (234, 4)	1.8718E-05 (205, 5)	2.1389E-05 (86, 4)	2.3014E-05 (205, 6)	2.4148E-05 (196, 6)
30	1.0902E-06 (225, 4)	1.9595E-05 (117, 4)	2.7669E-05 (260, 5)	2.8019E-05 (117, 4)	2.3735E-05 (260, 5)
31	1.6122E-06 (120, 5)	1.7735E-05 (114, 5)	2.0204E-05 (117, 4)	1.9343E-05 (117, 5)	1.8923E-05 (19, 4)
32	1.7735E-06 (227, 4)	1.6358E-05 (120, 5)	1.8992E-05 (121, 5)	1.8564E-05 (53, 5)	1.8496E-05 (316, 4)
33	1.8193E-06 (204, 4)	2.1524E-05 (147, 4)	2.7208E-05 (123, 4)	2.5554E-05 (123, 4)	2.3235E-05 (210, 5)
34	1.9416E-06 (109, 4)	2.8178E-05 (147, 6)	2.8641E-05 (151, 4)	3.0214E-05 (359, 8)	2.9389E-05 (151, 4)
35	3.3536E-06 (83, 4)	3.0379E-05 (109, 4)	2.7655E-05 (120, 4)	2.4328E-05 (109, 4)	2.0657E-05 (55, 3)
36	2.0184E-06 (83, 4)	2.7472E-05 (190, 5)	3.2509E-05 (218, 5)	3.5338E-05 (190, 5)	2.8707E-05 (190, 5)

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PLANT NAME: KISS. UTILITIES POLLUTANT: SO2 AIR QUALITY UNITS: GM/M**3
YEARLY SECOND MAXIMUM 3-HOUR CONC= 3.2142E-05 DIRECTION= 5 DISTANCE= 3.0 KM DAY= 89 TIME PERIOD= 5
YEAR= 75

SECOND HIGHEST 3-HOUR CONCENTRATION AT EACH RECEPTOR

DIR	RANGE 3.0 KM	3.5 KM	4.0 KM	4.5 KM	5.0 KM
1	2.4894E-05 (167, 4)	2.0685E-05 (167, 4)	1.9178E-05 (191, 3)	1.7908E-05 (50, 2)	1.9270E-05 (331, 4)
2	2.1390E-05 (4, 5)	1.9954E-05 (4, 5)	1.9745E-05 (50, 4)	1.9798E-05 (119, 4)	2.0280E-05 (19, 7)
3	2.4354E-05 (66, 5)	2.1997E-05 (66, 5)	1.9741E-05 (66, 5)	1.7714E-05 (66, 5)	1.5935E-05 (66, 5)
4	2.1157E-05 (188, 4)	2.0783E-05 (50, 5)	1.9951E-05 (50, 5)	1.8846E-05 (50, 5)	1.7654E-05 (50, 5)
5	3.2142E-05 (89, 5)	2.8567E-05 (25, 5)	2.4990E-05 (61, 1)	2.5598E-05 (4, 6)	2.5885E-05 (61, 2)
6	2.4041E-05 (43, 6)	2.3425E-05 (43, 6)	2.2250E-05 (43, 6)	2.0863E-05 (43, 6)	1.9438E-05 (43, 6)
7	2.1459E-05 (101, 5)	2.0717E-05 (101, 5)	2.3535E-05 (66, 7)	2.5369E-05 (66, 7)	2.6265E-05 (73, 5)
8	2.3381E-05 (61, 4)	2.0872E-05 (81, 6)	2.1529E-05 (81, 6)	2.1483E-05 (81, 6)	2.1011E-05 (81, 6)
9	2.4868E-05 (1, 5)	2.1081E-05 (1, 5)	2.0688E-05 (139, 1)	2.2036E-05 (325, 7)	2.3324E-05 (325, 7)
10	2.2180E-05 (93, 5)	2.2699E-05 (124, 6)	2.2102E-05 (186, 6)	1.8971E-05 (186, 6)	1.7368E-05 (73, 7)
11	2.3639E-05 (78, 6)	2.6137E-05 (93, 6)	2.4586E-05 (93, 6)	2.2868E-05 (93, 6)	2.1158E-05 (93, 6)
12	2.6125E-05 (55, 5)	2.4146E-05 (55, 5)	2.2034E-05 (55, 5)	2.1758E-05 (6, 5)	2.1414E-05 (67, 7)
13	2.5873E-05 (244, 5)	2.4036E-05 (67, 5)	2.3565E-05 (67, 5)	2.2645E-05 (67, 5)	2.3741E-05 (1, 8)
14	2.5002E-05 (355, 3)	2.3988E-05 (231, 5)	2.0554E-05 (291, 5)	1.8652E-05 (291, 5)	1.7952E-05 (297, 8)
15	1.9573E-05 (61, 4)	1.8936E-05 (61, 4)	2.0049E-05 (361, 4)	1.8523E-05 (361, 4)	1.7083E-05 (361, 4)
16	2.5422E-05 (65, 3)	2.3221E-05 (15, 3)	2.3954E-05 (15, 3)	2.3985E-05 (15, 3)	2.3832E-05 (15, 3)
17	1.8199E-05 (94, 2)	2.2669E-05 (353, 8)	2.6533E-05 (94, 2)	2.8443E-05 (94, 2)	2.9578E-05 (94, 2)
18	1.6896E-05 (85, 5)	2.1058E-05 (112, 1)	2.5921E-05 (112, 1)	2.8922E-05 (112, 1)	3.0468E-05 (303, 7)
19	2.3666E-05 (303, 4)	2.0221E-05 (64, 4)	2.3133E-05 (303, 4)	2.2087E-05 (303, 4)	2.3596E-05 (363, 1)
20	2.0782E-05 (17, 4)	2.0873E-05 (17, 4)	2.0230E-05 (17, 4)	2.0695E-05 (52, 6)	2.1167E-05 (52, 6)
21	2.1316E-05 (184, 4)	1.8477E-05 (184, 4)	1.7950E-05 (270, 8)	1.8169E-05 (285, 4)	1.8055E-05 (21, 7)
22	2.2613E-05 (283, 5)	2.1542E-05 (283, 5)	2.0139E-05 (283, 5)	2.1632E-05 (319, 6)	2.2158E-05 (319, 6)
23	2.3585E-05 (338, 4)	2.1077E-05 (305, 5)	2.0463E-05 (305, 5)	2.0860E-05 (123, 2)	2.1317E-05 (180, 7)
24	2.4222E-05 (174, 4)	2.4260E-05 (174, 4)	2.3620E-05 (174, 4)	2.3823E-05 (213, 1)	2.2198E-05 (182, 6)
25	2.3423E-05 (144, 5)	1.9258E-05 (144, 5)	1.6930E-05 (239, 6)	1.7367E-05 (239, 6)	1.7365E-05 (239, 6)
26	1.7052E-05 (199, 5)	1.8451E-05 (210, 6)	1.9253E-05 (210, 6)	1.7987E-05 (287, 4)	1.6643E-05 (287, 4)
27	2.3380E-05 (112, 5)	2.1301E-05 (112, 5)	1.9809E-05 (203, 6)	1.8594E-05 (203, 6)	2.0047E-05 (287, 6)
28	2.4463E-05 (197, 5)	2.0920E-05 (197, 5)	1.8272E-05 (114, 4)	1.6512E-05 (205, 6)	1.5594E-05 (205, 6)
29	1.9730E-05 (196, 6)	1.9483E-05 (86, 5)	1.9922E-05 (114, 7)	2.0324E-05 (86, 5)	1.9988E-05 (86, 5)
30	2.2325E-05 (113, 5)	2.2032E-05 (9, 7)	2.6277E-05 (9, 7)	2.5962E-05 (107, 7)	2.7345E-05 (107, 7)
31	1.7556E-05 (104, 4)	1.6782E-05 (19, 4)	1.4897E-05 (19, 4)	1.3815E-05 (265, 8)	1.4232E-05 (167, 1)
32	1.6751E-05 (53, 5)	1.9637E-05 (109, 1)	2.3742E-05 (109, 1)	2.6152E-05 (109, 1)	2.7977E-05 (109, 2)
33	2.0995E-05 (359, 4)	2.1583E-05 (149, 4)	2.1066E-05 (149, 4)	1.9956E-05 (149, 4)	1.9612E-05 (217, 7)
34	2.9043E-05 (8, 4)	3.0276E-05 (8, 4)	3.0228E-05 (8, 4)	2.8441E-05 (359, 8)	2.6300E-05 (359, 8)
35	2.1002E-05 (120, 4)	2.0247E-05 (72, 6)	1.9947E-05 (72, 6)	1.9944E-05 (71, 5)	1.9758E-05 (71, 5)
36	2.4136E-05 (290, 5)	2.2915E-05 (290, 5)	2.1372E-05 (290, 5)	2.1732E-05 (13, 2)	2.1764E-05 (13, 2)

PLANT NAME: KISS. UTILITIES POLLUTANT: SO2 AIR QUALITY UNITS: GM/M**3
YEARLY SECOND MAXIMUM 3-HOUR CONC= 4.2207E-05 DIRECTION= 9 DISTANCE= 1.5 KM DAY=196 TIME PERIOD= 5
YEAR= 76

SECOND HIGHEST 3-HOUR CONCENTRATION AT EACH RECEPTOR

RANGE DIR	0.5 KM	1.0 KM	1.5 KM	2.0 KM	2.5 KM
1	1.1412E-06 (152, 6)	2.3389E-05 (152, 6)	2.9833E-05 (152, 6)	2.5186E-05 (152, 6)	2.1879E-05 (299, 4)
2	1.6131E-06 (186, 4)	1.8115E-05 (221, 5)	2.9426E-05 (187, 4)	2.8074E-05 (90, 5)	2.5545E-05 (187, 4)
3	1.4869E-06 (226, 4)	1.9805E-05 (213, 4)	2.5280E-05 (69, 4)	2.7480E-05 (187, 4)	2.5417E-05 (214, 3)
4	2.0031E-06 (226, 4)	2.5076E-05 (213, 4)	2.6215E-05 (95, 5)	2.5021E-05 (273, 4)	2.3361E-05 (273, 4)
5	1.8809E-06 (69, 5)	2.0780E-05 (117, 5)	3.0679E-05 (95, 5)	2.9097E-05 (95, 5)	2.5886E-05 (32, 6)
6	3.4720E-06 (116, 5)	2.1255E-05 (116, 5)	3.0784E-05 (76, 6)	3.1876E-05 (117, 5)	3.1972E-05 (76, 6)
7	2.6611E-06 (116, 5)	1.6862E-05 (145, 4)	2.3520E-05 (315, 5)	2.6784E-05 (133, 3)	2.5569E-05 (133, 3)
8	4.0418E-06 (145, 4)	2.2895E-05 (198, 4)	2.7204E-05 (145, 5)	2.6694E-05 (197, 3)	2.3858E-05 (198, 4)
9	6.7098E-06 (145, 4)	3.6026E-05 (196, 5)	4.2207E-05 (196, 5)	3.4060E-05 (139, 5)	2.7226E-05 (196, 5)
10	9.9714E-07 (204, 6)	1.6258E-05 (17, 5)	2.5923E-05 (207, 4)	2.6297E-05 (198, 3)	2.6526E-05 (198, 3)
11	9.9714E-07 (204, 6)	1.8422E-05 (213, 5)	2.4674E-05 (213, 5)	2.4747E-05 (275, 5)	2.5418E-05 (275, 5)
12	1.5490E-06 (221, 4)	2.1930E-05 (221, 4)	2.2921E-05 (213, 5)	2.3053E-05 (77, 6)	2.3881E-05 (323, 5)
13	2.0714E-06 (221, 4)	2.3989E-05 (221, 4)	2.7277E-05 (118, 5)	2.3191E-05 (323, 4)	2.1572E-05 (362, 1)
14	2.0306E-06 (200, 4)	2.0330E-05 (157, 5)	2.4701E-05 (295, 4)	2.5218E-05 (236, 4)	2.8644E-05 (295, 4)
15	2.0048E-06 (207, 4)	1.9744E-05 (124, 5)	2.4681E-05 (96, 5)	2.6498E-05 (208, 4)	2.0781E-05 (208, 4)
16	1.8622E-06 (247, 4)	1.7146E-05 (247, 4)	2.2459E-05 (301, 4)	2.5081E-05 (301, 4)	2.2844E-05 (301, 4)
17	1.7310E-06 (219, 4)	2.4303E-05 (157, 4)	1.8898E-05 (220, 5)	2.3407E-05 (255, 3)	1.9836E-05 (157, 4)
18	1.6851E-06 (157, 4)	2.7757E-05 (191, 4)	2.2993E-05 (308, 1)	2.7675E-05 (308, 1)	2.8677E-05 (302, 1)
19	2.7146E-06 (157, 5)	2.1292E-05 (125, 5)	2.4084E-05 (287, 4)	2.4790E-05 (287, 4)	2.6515E-05 (302, 3)
20	7.7873E-06 (184, 6)	3.0677E-05 (157, 5)	3.2678E-05 (140, 4)	3.1304E-05 (100, 5)	3.0833E-05 (100, 5)
21	3.0539E-06 (199, 6)	2.5032E-05 (204, 4)	2.1743E-05 (100, 4)	1.8165E-05 (109, 5)	1.9343E-05 (57, 5)
22	1.7844E-06 (245, 4)	2.7862E-05 (199, 6)	2.7138E-05 (263, 5)	2.4375E-05 (263, 5)	2.0756E-05 (164, 5)
23	2.0974E-06 (245, 4)	2.0376E-05 (264, 5)	3.0455E-05 (264, 5)	2.7474E-05 (242, 4)	2.2671E-05 (242, 4)
24	1.1198E-06 (226, 5)	1.9191E-05 (119, 5)	2.5074E-05 (230, 4)	2.4816E-05 (230, 4)	2.2007E-05 (344, 5)
25	9.1942E-07 (245, 4)	1.6194E-05 (245, 4)	2.6102E-05 (141, 4)	2.4656E-05 (43, 5)	2.2487E-05 (307, 5)
26	1.3363E-06 (114, 5)	1.7616E-05 (268, 5)	2.8632E-05 (268, 5)	3.0036E-05 (290, 4)	2.8783E-05 (290, 4)
27	2.0280E-06 (114, 5)	1.7475E-05 (252, 4)	2.1747E-05 (204, 5)	1.9685E-05 (106, 4)	1.8890E-05 (167, 6)
28	1.7755E-06 (248, 4)	2.0471E-05 (63, 6)	2.3665E-05 (251, 5)	2.4072E-05 (298, 5)	2.2510E-05 (204, 5)
29	1.3042E-06 (229, 4)	2.1833E-05 (251, 5)	2.7193E-05 (251, 5)	2.1425E-05 (251, 5)	1.9947E-05 (134, 6)
30	1.9986E-06 (245, 5)	1.9313E-05 (248, 5)	2.3865E-05 (218, 4)	2.2969E-05 (62, 4)	1.9947E-05 (64, 4)
31	2.1510E-06 (135, 5)	1.9282E-05 (135, 5)	2.4043E-05 (180, 5)	2.3863E-05 (86, 4)	2.4171E-05 (126, 4)
32	2.2667E-06 (192, 4)	2.0600E-05 (192, 4)	2.6935E-05 (189, 5)	3.0326E-05 (269, 4)	2.7840E-05 (168, 4)
33	3.2641E-06 (192, 4)	2.6538E-05 (156, 4)	2.4692E-05 (134, 5)	2.0237E-05 (24, 5)	2.0061E-05 (153, 4)
34	2.3407E-06 (192, 4)	2.6389E-05 (134, 5)	2.8042E-05 (228, 4)	2.3589E-05 (228, 4)	2.2075E-05 (61, 8)
35	3.2702E-06 (144, 4)	2.2391E-05 (223, 5)	2.6861E-05 (148, 5)	2.7339E-05 (148, 5)	2.3913E-05 (102, 4)
36	1.6277E-06 (222, 5)	2.7007E-05 (222, 5)	3.5686E-05 (222, 5)	3.2044E-05 (222, 5)	3.0277E-05 (216, 4)

PLANT NAME: KISS, UTILITIES POLLUTANT: SO2 AIR QUALITY UNITS: GM/M**3

YEARLY SECOND MAXIMUM 3-HOUR CONC= 3.3049E-05 DIRECTION= 18 DISTANCE= 3.5 KM DAY=302 TIME PERIOD= 1

YEAR= 76

SECOND HIGHEST 3-HOUR CONCENTRATION AT EACH RECEPTOR

DIR	RANGE 3.0 KM	3.5 KM	4.0 KM	4.5 KM	5.0 KM
1	2.5649E-05 (32, 5)	2.2395E-05 (32, 5)	1.9633E-05 (32, 5)	2.0898E-05 (234, 7)	2.3528E-05 (234, 7)
2	2.1502E-05 (69, 4)	1.9295E-05 (69, 4)	1.9223E-05 (68, 5)	1.7356E-05 (363, 8)	1.6986E-05 (139, 2)
3	2.3175E-05 (214, 3)	2.0416E-05 (214, 3)	1.8786E-05 (97, 6)	1.7896E-05 (69, 4)	1.6033E-05 (69, 4)
4	2.2186E-05 (69, 5)	2.2187E-05 (355, 7)	2.2214E-05 (355, 7)	2.2644E-05 (49, 7)	2.2226E-05 (8, 4)
5	2.3703E-05 (145, 2)	2.3962E-05 (69, 5)	2.1028E-05 (116, 8)	2.2915E-05 (116, 8)	2.2876E-05 (145, 2)
6	2.9383E-05 (76, 6)	2.6481E-05 (76, 6)	2.3789E-05 (76, 6)	2.1394E-05 (76, 6)	1.9300E-05 (76, 6)
7	2.2457E-05 (53, 6)	2.1338E-05 (53, 6)	2.2767E-05 (198, 2)	2.3127E-05 (145, 4)	2.0853E-05 (145, 4)
8	2.3311E-05 (122, 6)	2.4904E-05 (122, 6)	2.3196E-05 (197, 3)	2.1049E-05 (197, 3)	1.9101E-05 (197, 3)
9	2.4419E-05 (196, 6)	2.4218E-05 (196, 6)	2.3351E-05 (196, 6)	2.5959E-05 (117, 8)	2.5197E-05 (117, 6)
10	2.5654E-05 (198, 3)	2.4236E-05 (361, 7)	2.6664E-05 (93, 7)	2.9492E-05 (93, 7)	3.1480E-05 (93, 7)
11	2.4262E-05 (275, 5)	2.3107E-05 (305, 4)	2.2662E-05 (305, 4)	2.4168E-05 (300, 7)	2.5682E-05 (300, 7)
12	2.2292E-05 (30, 4)	2.2027E-05 (30, 4)	2.3027E-05 (249, 4)	2.3864E-05 (249, 4)	2.5248E-05 (39, 2)
13	2.3499E-05 (362, 1)	2.2464E-05 (151, 4)	2.0383E-05 (151, 4)	2.0934E-05 (313, 1)	2.0591E-05 (362, 1)
14	2.5522E-05 (8, 8)	2.4443E-05 (8, 8)	2.2933E-05 (8, 8)	2.4518E-05 (352, 1)	2.6583E-05 (352, 1)
15	1.9995E-05 (54, 1)	1.9739E-05 (54, 1)	1.8913E-05 (54, 1)	1.8524E-05 (99, 8)	1.8303E-05 (99, 8)
16	2.4193E-05 (5, 3)	2.5125E-05 (5, 3)	2.5189E-05 (5, 3)	2.6099E-05 (306, 1)	2.7300E-05 (306, 1)
17	1.9180E-05 (114, 3)	1.8777E-05 (357, 1)	2.2336E-05 (357, 1)	2.4351E-05 (357, 1)	2.4926E-05 (255, 3)
18	3.2257E-05 (302, 1)	3.3049E-05 (302, 1)	3.1885E-05 (313, 4)	3.1409E-05 (302, 1)	3.3042E-05 (285, 7)
19	2.7020E-05 (302, 3)	2.6018E-05 (302, 3)	2.4526E-05 (302, 3)	2.3057E-05 (297, 2)	2.2284E-05 (58, 4)
20	2.9419E-05 (100, 5)	2.7347E-05 (100, 5)	2.5219E-05 (100, 5)	2.3600E-05 (82, 7)	2.2317E-05 (38, 6)
21	2.1667E-05 (57, 5)	2.1066E-05 (19, 6)	2.1212E-05 (19, 6)	2.0778E-05 (19, 6)	1.9942E-05 (57, 5)
22	2.1086E-05 (166, 4)	2.1058E-05 (348, 8)	2.1390E-05 (159, 7)	2.3313E-05 (159, 7)	2.4587E-05 (159, 7)
23	2.2200E-05 (55, 4)	2.1378E-05 (240, 4)	2.1677E-05 (232, 2)	2.2054E-05 (55, 4)	2.2466E-05 (232, 2)
24	2.3761E-05 (344, 5)	2.1841E-05 (165, 6)	2.2464E-05 (165, 6)	2.1594E-05 (344, 5)	2.0265E-05 (344, 5)
25	1.8713E-05 (141, 4)	1.7596E-05 (303, 5)	1.7573E-05 (303, 5)	1.7108E-05 (303, 5)	1.6409E-05 (303, 5)
26	2.5479E-05 (290, 4)	2.1972E-05 (290, 4)	2.0524E-05 (56, 6)	1.9998E-05 (252, 7)	2.0197E-05 (59, 4)
27	1.8456E-05 (167, 6)	1.8542E-05 (114, 7)	2.1117E-05 (121, 6)	2.1562E-05 (121, 6)	2.1555E-05 (121, 6)
28	1.8725E-05 (64, 6)	1.7705E-05 (84, 5)	1.7071E-05 (269, 6)	1.7225E-05 (269, 6)	1.6996E-05 (269, 6)
29	2.0383E-05 (168, 6)	2.0868E-05 (168, 6)	2.0555E-05 (168, 6)	1.9983E-05 (86, 6)	2.0623E-05 (345, 4)
30	2.0540E-05 (62, 4)	1.9385E-05 (126, 6)	2.0014E-05 (126, 6)	1.9986E-05 (126, 6)	1.9558E-05 (126, 6)
31	1.9788E-05 (126, 4)	1.8421E-05 (135, 4)	1.8476E-05 (135, 4)	1.9277E-05 (90, 7)	2.0255E-05 (90, 7)
32	2.3670E-05 (168, 4)	2.0412E-05 (2, 5)	1.8302E-05 (27, 1)	1.7793E-05 (26, 8)	1.8390E-05 (26, 8)
33	2.1561E-05 (360, 5)	2.1835E-05 (360, 5)	2.1314E-05 (360, 5)	2.0391E-05 (360, 5)	1.9292E-05 (360, 5)
34	2.3889E-05 (331, 5)	2.2076E-05 (281, 4)	1.9697E-05 (61, 8)	1.8234E-05 (61, 8)	1.8721E-05 (294, 2)
35	2.2467E-05 (172, 3)	2.1862E-05 (172, 3)	2.0683E-05 (172, 3)	1.9316E-05 (172, 3)	1.7945E-05 (172, 3)
36	2.8195E-05 (216, 4)	2.5363E-05 (216, 4)	2.4472E-05 (334, 3)	2.4462E-05 (49, 4)	2.4474E-05 (334, 3)

PLANT NAME: KISS. UTILITIES POLLUTANT: SO2 AIR QUALITY UNITS: GM/M**3
YEARLY SECOND MAXIMUM 3-HOUR CONC= 4.3495E-05 DIRECTION= 30 DISTANCE= 1.5 KM DAY=136 TIME PERIOD= 4
YEAR= 77

SECOND HIGHEST 3-HOUR CONCENTRATION AT EACH RECEPTOR

RANGE DIR	0.5 KM	1.0 KM	1.5 KM	2.0 KM	2.5 KM
1	2.5032E-06 (236, 6)	2.1689E-05 (87, 4)	2.5934E-05 (231, 4)	2.6690E-05 (230, 5)	2.6300E-05 (188, 6)
2	7.4448E-07 (229, 4)	2.4861E-05 (248, 5)	2.9308E-05 (248, 5)	2.2957E-05 (248, 5)	1.9666E-05 (230, 5)
3	1.3826E-06 (180, 4)	2.4415E-05 (184, 4)	3.2557E-05 (213, 4)	3.0440E-05 (251, 5)	2.8315E-05 (175, 6)
4	1.9319E-06 (229, 4)	3.1512E-05 (252, 4)	3.7875E-05 (145, 5)	3.3754E-05 (252, 4)	2.7112E-05 (145, 5)
5	1.9328E-06 (180, 4)	2.2806E-05 (176, 4)	2.7609E-05 (177, 4)	2.4704E-05 (144, 4)	2.1724E-05 (282, 5)
6	2.6912E-06 (114, 5)	1.8398E-05 (173, 4)	2.5339E-05 (127, 4)	2.5873E-05 (251, 6)	2.5763E-05 (78, 5)
7	3.5604E-06 (190, 5)	2.6316E-05 (190, 5)	2.5894E-05 (158, 4)	2.7503E-05 (127, 4)	2.8067E-05 (253, 6)
8	1.6407E-06 (169, 4)	2.1530E-05 (190, 5)	2.2537E-05 (176, 5)	2.3148E-05 (176, 5)	2.0341E-05 (176, 5)
9	1.7526E-06 (134, 5)	2.0865E-05 (300, 4)	2.8673E-05 (174, 5)	2.8482E-05 (176, 5)	2.4903E-05 (176, 5)
10	1.4657E-06 (134, 5)	1.3132E-05 (309, 4)	1.8374E-05 (161, 5)	2.3412E-05 (309, 4)	2.2356E-05 (36, 3)
11	1.9658E-06 (187, 4)	1.6982E-05 (256, 5)	2.2245E-05 (127, 6)	3.0477E-05 (127, 6)	3.2298E-05 (127, 6)
12	2.8792E-06 (187, 4)	2.7228E-05 (178, 5)	3.3764E-05 (178, 5)	3.0414E-05 (74, 5)	2.6179E-05 (74, 5)
13	2.9526E-06 (187, 4)	2.4051E-05 (187, 4)	2.7222E-05 (178, 5)	2.5902E-05 (175, 5)	2.4954E-05 (19, 3)
14	2.1753E-06 (187, 4)	2.3042E-05 (173, 5)	2.9669E-05 (117, 4)	2.8312E-05 (117, 4)	2.3678E-05 (117, 4)
15	1.4512E-06 (267, 4)	1.9022E-05 (163, 4)	2.3500E-05 (163, 4)	2.0657E-05 (32, 5)	2.0564E-05 (32, 5)
16	1.9550E-06 (267, 4)	2.4081E-05 (203, 5)	2.5998E-05 (203, 4)	2.3766E-05 (203, 5)	2.0677E-05 (29, 5)
17	1.6122E-06 (184, 5)	2.0561E-05 (203, 5)	2.6348E-05 (98, 5)	2.7491E-05 (315, 4)	2.5668E-05 (98, 5)
18	2.0462E-06 (184, 5)	2.3911E-05 (187, 5)	2.0931E-05 (341, 5)	2.5480E-05 (341, 5)	2.4157E-05 (341, 5)
19	2.1287E-06 (257, 5)	2.9640E-05 (168, 4)	1.4576E-05 (29, 4)	1.7582E-05 (220, 5)	1.6942E-05 (220, 5)
20	1.6865E-06 (186, 4)	2.3317E-05 (99, 5)	2.1682E-05 (154, 4)	2.6652E-05 (30, 4)	2.6329E-05 (30, 4)
21	8.4752E-07 (156, 4)	2.0911E-05 (168, 4)	2.3791E-05 (105, 4)	2.3762E-05 (205, 5)	2.1816E-05 (105, 4)
22	1.3017E-06 (99, 4)	1.9925E-05 (99, 4)	2.1517E-05 (99, 4)	2.1128E-05 (304, 5)	2.3425E-05 (276, 6)
23	1.7393E-06 (101, 5)	2.2109E-05 (142, 5)	3.2808E-05 (100, 4)	3.1060E-05 (133, 4)	2.7802E-05 (293, 5)
24	1.7282E-06 (255, 5)	2.6068E-05 (101, 5)	2.9875E-05 (278, 5)	3.6159E-05 (278, 5)	3.5799E-05 (278, 5)
25	1.6251E-06 (221, 5)	2.9676E-05 (101, 4)	3.7558E-05 (101, 4)	3.4462E-05 (101, 4)	3.2003E-05 (100, 6)
26	1.4261E-06 (221, 5)	2.0902E-05 (238, 5)	2.5196E-05 (243, 4)	2.5574E-05 (218, 4)	2.2925E-05 (218, 4)
27	2.9166E-06 (242, 5)	2.2188E-05 (243, 4)	3.7340E-05 (217, 4)	3.5419E-05 (198, 5)	3.1239E-05 (224, 4)
28	2.9923E-06 (214, 5)	2.1134E-05 (139, 5)	2.2654E-05 (136, 5)	2.0520E-05 (228, 4)	1.8981E-05 (228, 4)
29	2.4715E-06 (217, 5)	2.2405E-05 (140, 5)	2.2945E-05 (136, 4)	2.1518E-05 (121, 4)	2.2032E-05 (227, 5)
30	2.3875E-06 (216, 5)	3.9226E-05 (216, 5)	4.3495E-05 (136, 4)	4.2668E-05 (136, 4)	3.6836E-05 (136, 4)
31	2.6267E-06 (111, 5)	3.2075E-05 (111, 5)	3.9073E-05 (209, 5)	3.0565E-05 (209, 5)	2.7009E-05 (237, 5)
32	1.5917E-06 (209, 5)	2.1025E-05 (229, 4)	2.1509E-05 (313, 5)	2.5656E-05 (313, 5)	2.4424E-05 (313, 5)
33	1.3694E-06 (181, 4)	2.5916E-05 (188, 5)	2.7169E-05 (93, 5)	2.6597E-05 (210, 6)	2.4685E-05 (93, 5)
34	1.3632E-06 (193, 4)	1.9551E-05 (229, 5)	1.9937E-05 (92, 5)	2.5964E-05 (206, 6)	2.7409E-05 (206, 6)
35	1.6560E-06 (265, 4)	1.7833E-05 (265, 5)	2.2409E-05 (189, 5)	2.2099E-05 (215, 5)	1.9902E-05 (250, 4)
36	2.5032E-06 (236, 6)	2.5922E-05 (214, 4)	3.8436E-05 (262, 4)	3.9145E-05 (262, 4)	3.5545E-05 (65, 4)

PLANT NAME: KISS. UTILITIES POLLUTANT: SO2 AIR QUALITY UNITS: GM/M**3
YEARLY SECOND MAXIMUM 3-HOUR CONC= 3.2751E-05 DIRECTION= 24 DISTANCE= 3.0 KM DAY=141 TIME PERIOD= 4
YEAR= 77

SECOND HIGHEST 3-HOUR CONCENTRATION AT EACH RECEPTOR

DIR	RANGE 3.0 KM	3.5 KM	4.0 KM	4.5 KM	5.0 KM
1	2.4036E-05 (188, 6)	2.1050E-05 (188, 6)	1.9295E-05 (65, 6)	1.9506E-05 (65, 6)	1.9293E-05 (65, 6)
2	1.8424E-05 (95, 3)	1.8450E-05 (72, 5)	1.7787E-05 (285, 5)	1.6093E-05 (50, 4)	1.6341E-05 (50, 4)
3	2.6663E-05 (175, 6)	2.3871E-05 (175, 6)	2.2035E-05 (212, 3)	2.0130E-05 (285, 4)	1.7725E-05 (285, 4)
4	2.3810E-05 (157, 6)	2.2286E-05 (157, 6)	2.3312E-05 (157, 8)	2.4462E-05 (148, 5)	2.1906E-05 (148, 5)
5	2.0312E-05 (172, 3)	1.9862E-05 (172, 3)	2.0258E-05 (80, 8)	2.2216E-05 (80, 8)	2.2834E-05 (282, 5)
6	2.4391E-05 (78, 5)	2.2530E-05 (78, 5)	2.0690E-05 (78, 5)	1.8983E-05 (77, 6)	1.7905E-05 (233, 5)
7	2.7707E-05 (3, 5)	2.7182E-05 (3, 5)	2.6263E-05 (3, 5)	2.5142E-05 (3, 5)	2.3934E-05 (3, 5)
8	2.1596E-05 (20, 5)	2.3348E-05 (115, 7)	2.5540E-05 (3, 6)	2.3618E-05 (3, 6)	2.1777E-05 (3, 6)
9	2.5460E-05 (352, 4)	2.5332E-05 (352, 4)	2.4427E-05 (352, 4)	2.5118E-05 (177, 8)	2.6761E-05 (292, 7)
10	2.6554E-05 (36, 3)	2.7127E-05 (20, 6)	2.5499E-05 (20, 6)	2.3721E-05 (20, 6)	2.1968E-05 (20, 6)
11	3.1285E-05 (127, 6)	2.9105E-05 (127, 6)	2.6717E-05 (127, 6)	2.4418E-05 (127, 6)	2.2309E-05 (127, 6)
12	2.4279E-05 (161, 4)	2.1765E-05 (25, 5)	2.0428E-05 (25, 5)	1.8967E-05 (25, 5)	1.7527E-05 (25, 5)
13	2.3495E-05 (352, 5)	2.2300E-05 (352, 5)	2.0768E-05 (352, 5)	1.9174E-05 (352, 5)	1.8372E-05 (66, 5)
14	1.9946E-05 (173, 5)	2.0202E-05 (330, 3)	1.9422E-05 (330, 3)	1.9347E-05 (79, 7)	2.0540E-05 (79, 7)
15	2.0418E-05 (1, 5)	1.9105E-05 (286, 2)	1.9738E-05 (1, 5)	1.9124E-05 (286, 2)	1.8686E-05 (362, 6)
16	1.9324E-05 (29, 5)	2.2883E-05 (305, 1)	2.4081E-05 (96, 1)	2.5976E-05 (96, 1)	2.7142E-05 (96, 1)
17	2.2142E-05 (98, 5)	2.1493E-05 (317, 4)	2.0465E-05 (317, 4)	1.9136E-05 (317, 4)	1.8434E-05 (17, 3)
18	2.2365E-05 (315, 3)	2.1511E-05 (363, 1)	2.3861E-05 (30, 2)	2.6633E-05 (30, 2)	2.8602E-05 (30, 2)
19	1.9495E-05 (41, 4)	2.0415E-05 (41, 4)	2.0434E-05 (41, 4)	1.9936E-05 (41, 4)	1.9408E-05 (8, 4)
20	2.4067E-05 (30, 4)	2.2708E-05 (277, 1)	2.7017E-05 (277, 1)	2.4561E-05 (99, 5)	2.2886E-05 (30, 8)
21	2.0841E-05 (337, 4)	1.9919E-05 (67, 4)	2.0063E-05 (304, 6)	2.2778E-05 (205, 1)	2.5002E-05 (205, 1)
22	2.3638E-05 (304, 5)	2.3698E-05 (276, 6)	2.2421E-05 (276, 6)	2.1014E-05 (242, 2)	2.2107E-05 (62, 1)
23	2.6742E-05 (304, 4)	2.6367E-05 (304, 4)	2.4361E-05 (100, 4)	2.1736E-05 (100, 4)	2.0044E-05 (322, 4)
24	3.2751E-05 (141, 4)	2.7188E-05 (141, 4)	2.2685E-05 (141, 4)	2.0903E-05 (277, 5)	2.0695E-05 (294, 7)
25	3.0299E-05 (219, 4)	2.5377E-05 (219, 4)	2.3473E-05 (219, 3)	2.1770E-05 (219, 3)	2.3921E-05 (69, 2)
26	1.9383E-05 (218, 4)	1.6912E-05 (243, 4)	1.8206E-05 (240, 7)	2.1087E-05 (240, 7)	2.2902E-05 (130, 5)
27	2.7761E-05 (224, 4)	2.8677E-05 (217, 6)	2.8860E-05 (217, 6)	2.8269E-05 (217, 6)	2.7253E-05 (217, 6)
28	1.7565E-05 (325, 5)	1.6800E-05 (120, 7)	1.9290E-05 (120, 7)	2.0494E-05 (120, 7)	2.1444E-05 (250, 7)
29	1.9953E-05 (86, 4)	1.9871E-05 (86, 4)	1.9171E-05 (86, 4)	1.8184E-05 (86, 4)	1.7899E-05 (53, 7)
30	3.0707E-05 (136, 4)	2.7585E-05 (86, 5)	2.6123E-05 (122, 6)	2.5639E-05 (122, 6)	2.4758E-05 (122, 6)
31	2.2546E-05 (237, 5)	1.9031E-05 (112, 4)	1.7458E-05 (121, 6)	1.7267E-05 (246, 3)	1.7178E-05 (246, 3)
32	2.1519E-05 (71, 5)	2.2513E-05 (71, 5)	2.2574E-05 (71, 5)	2.2565E-05 (87, 8)	2.3986E-05 (87, 8)
33	2.2644E-05 (55, 2)	2.1300E-05 (55, 2)	1.9705E-05 (55, 2)	1.7402E-05 (210, 6)	1.6591E-05 (55, 2)
34	2.5479E-05 (206, 6)	2.4733E-05 (113, 4)	2.3691E-05 (113, 4)	2.2357E-05 (113, 4)	2.0937E-05 (113, 4)
35	1.7825E-05 (250, 4)	1.6365E-05 (55, 3)	1.5404E-05 (55, 3)	1.6211E-05 (65, 2)	1.7798E-05 (65, 2)
36	3.0111E-05 (207, 6)	2.9126E-05 (339, 4)	2.7885E-05 (339, 4)	2.6580E-05 (354, 8)	2.8720E-05 (354, 8)

PLANT NAME: KISS. UTILITIES POLLUTANT: SO2 AIR QUALITY UNITS: GM/M**3

YEARLY SECOND MAXIMUM 3-HOUR CONC= 4.2854E-05 DIRECTION= 26 DISTANCE= 1.5 KM DAY=143 TIME PERIOD= 5
YEAR= 78

SECOND HIGHEST 3-HOUR CONCENTRATION AT EACH RECEPTOR

DIR	RANGE 0.5 KM	1.0 KM	1.5 KM	2.0 KM	2.5 KM
1	5.1648E-06 (212, 5)	2.2497E-05 (187, 5)	2.9093E-05 (136, 5)	3.1851E-05 (212, 5)	2.6918E-05 (212, 5)
2	2.2343E-06 (183, 5)	1.9313E-05 (180, 4)	2.7489E-05 (155, 4)	2.9819E-05 (184, 5)	2.9119E-05 (25, 6)
3	2.3189E-06 (187, 5)	1.7707E-05 (98, 4)	2.4374E-05 (119, 4)	2.2907E-05 (119, 4)	1.8728E-05 (136, 4)
4	2.0964E-06 (145, 4)	1.9724E-05 (229, 4)	2.4305E-05 (121, 5)	2.6312E-05 (211, 6)	2.6682E-05 (122, 5)
5	2.0973E-06 (175, 5)	2.0565E-05 (184, 4)	2.6922E-05 (184, 4)	3.1325E-05 (133, 4)	2.7445E-05 (353, 4)
6	1.7755E-06 (97, 5)	2.0722E-05 (134, 5)	2.2095E-05 (135, 5)	2.1677E-05 (56, 5)	2.2009E-05 (69, 6)
7	7.5641E-07 (135, 4)	1.7402E-05 (248, 5)	2.3750E-05 (121, 6)	2.5695E-05 (116, 5)	2.3586E-05 (116, 5)
8	4.6412E-07 (116, 4)	1.7227E-05 (176, 4)	2.1312E-05 (26, 6)	2.5603E-05 (110, 5)	2.2929E-05 (111, 6)
9	3.8900E-06 (116, 5)	2.0905E-05 (116, 5)	2.2886E-05 (134, 5)	2.0817E-05 (86, 4)	1.9404E-05 (52, 7)
10	3.0179E-06 (116, 5)	1.7218E-05 (248, 4)	1.8795E-05 (57, 4)	2.0554E-05 (57, 4)	1.8395E-05 (57, 4)
11	2.2612E-06 (182, 4)	1.9667E-05 (160, 5)	1.5297E-05 (274, 4)	1.5436E-05 (134, 4)	1.4135E-05 (134, 4)
12	1.7984E-06 (160, 5)	2.1732E-05 (99, 4)	2.0519E-05 (280, 5)	2.1714E-05 (279, 4)	2.0702E-05 (53, 1)
13	1.5000E-06 (249, 4)	2.5355E-05 (117, 5)	3.5554E-05 (249, 4)	2.9334E-05 (249, 4)	2.6470E-05 (359, 5)
14	1.9498E-06 (250, 4)	2.3572E-05 (110, 4)	2.8934E-05 (231, 5)	2.6974E-05 (76, 2)	2.9053E-05 (279, 5)
15	1.4571E-06 (249, 4)	1.8464E-05 (254, 4)	2.8911E-05 (110, 4)	2.2474E-05 (81, 4)	1.9305E-05 (58, 5)
16	5.9398E-07 (249, 4)	1.3514E-05 (164, 4)	2.1288E-05 (308, 5)	2.6295E-05 (308, 5)	2.4994E-05 (308, 5)
17	1.5958E-07 (250, 4)	1.0728E-05 (125, 5)	1.7254E-05 (322, 5)	2.1734E-05 (322, 5)	2.1522E-05 (322, 5)
18	2.7378E-07 (175, 4)	1.6499E-05 (125, 5)	2.6581E-05 (324, 4)	3.0915E-05 (324, 4)	2.8884E-05 (281, 4)
19	9.9195E-07 (161, 5)	1.3524E-05 (115, 4)	1.5743E-05 (316, 5)	2.1211E-05 (145, 4)	2.2831E-05 (278, 5)
20	2.0662E-06 (161, 5)	1.6937E-05 (252, 5)	2.2462E-05 (125, 4)	2.4940E-05 (125, 4)	2.3092E-05 (125, 4)
21	2.4329E-06 (161, 5)	2.5966E-05 (145, 5)	3.3499E-05 (258, 4)	3.3805E-05 (258, 4)	2.7931E-05 (145, 5)
22	2.2889E-06 (182, 5)	2.7112E-05 (161, 5)	2.9580E-05 (217, 5)	2.6948E-05 (252, 5)	2.4609E-05 (64, 4)
23	2.1516E-06 (186, 5)	2.3249E-05 (179, 4)	2.7037E-05 (281, 5)	3.0788E-05 (244, 5)	2.9509E-05 (244, 5)
24	2.0280E-06 (99, 5)	2.8478E-05 (130, 5)	2.9906E-05 (106, 5)	2.8157E-05 (240, 6)	2.6527E-05 (77, 5)
25	1.7762E-06 (245, 5)	2.2607E-05 (106, 5)	3.0543E-05 (131, 5)	2.7975E-05 (164, 5)	2.6502E-05 (131, 5)
26	2.2543E-06 (245, 5)	3.1751E-05 (169, 5)	4.2854E-05 (143, 5)	3.8947E-05 (169, 5)	3.4328E-05 (169, 5)
27	2.2177E-06 (202, 5)	2.8420E-05 (93, 5)	3.2305E-05 (140, 5)	3.2711E-05 (131, 4)	2.8332E-05 (131, 4)
28	2.2764E-06 (148, 5)	2.9495E-05 (146, 5)	3.4534E-05 (146, 5)	3.0501E-05 (94, 5)	2.7129E-05 (24, 5)
29	1.9770E-06 (190, 5)	2.2503E-05 (205, 5)	2.6773E-05 (189, 4)	2.8686E-05 (176, 5)	2.4160E-05 (72, 4)
30	1.9495E-06 (150, 4)	2.1339E-05 (218, 4)	2.9943E-05 (189, 4)	2.9983E-05 (226, 6)	2.7987E-05 (218, 4)
31	1.3633E-06 (150, 4)	2.0001E-05 (151, 5)	3.3026E-05 (216, 4)	3.0726E-05 (203, 5)	2.6365E-05 (203, 5)
32	1.8742E-06 (108, 4)	2.4159E-05 (222, 4)	3.1436E-05 (201, 4)	3.2208E-05 (173, 5)	2.6908E-05 (241, 4)
33	2.1394E-06 (207, 5)	3.2360E-05 (108, 4)	3.6622E-05 (207, 5)	3.1504E-05 (100, 5)	3.0092E-05 (100, 5)
34	2.1287E-06 (205, 4)	3.2791E-05 (190, 4)	3.2743E-05 (154, 4)	3.6251E-05 (154, 4)	3.3534E-05 (154, 4)
35	2.6580E-06 (103, 4)	2.9581E-05 (101, 4)	3.9594E-05 (160, 4)	3.8127E-05 (129, 4)	3.1705E-05 (129, 4)
36	8.2591E-06 (103, 4)	2.9682E-05 (103, 5)	3.8400E-05 (25, 7)	4.2462E-05 (103, 4)	3.5821E-05 (103, 4)

PLANT NAME: KISS. UTILITIES POLLUTANT: SO2 AIR QUALITY UNITS: GM/M**3
YEARLY SECOND MAXIMUM 3-HOUR CONC= 3.2959E-05 DIRECTION= 36 DISTANCE= 4.5 KM DAY= 73 TIME PERIOD= 8
YEAR= 78

SECOND HIGHEST 3-HOUR CONCENTRATION AT EACH RECEPTOR

DIR	RANGE 3.0 KM	3.5 KM	4.0 KM	4.5 KM	5.0 KM
1	2.3982E-05 (44, 5)	2.0592E-05 (136, 5)	1.7298E-05 (136, 5)	1.5066E-05 (25, 6)	1.5807E-05 (354, 8)
2	2.7044E-05 (25, 6)	2.4455E-05 (25, 6)	2.2817E-05 (354, 7)	2.1301E-05 (75, 5)	1.9675E-05 (75, 5)
3	1.7658E-05 (97, 4)	1.7062E-05 (133, 7)	1.7941E-05 (133, 7)	1.7808E-05 (73, 6)	1.6806E-05 (73, 6)
4	2.2230E-05 (122, 5)	2.1907E-05 (211, 6)	2.1389E-05 (85, 6)	2.0589E-05 (85, 6)	1.9574E-05 (85, 6)
5	2.4727E-05 (353, 4)	2.1624E-05 (353, 4)	2.0420E-05 (213, 8)	2.1021E-05 (69, 2)	2.1460E-05 (69, 2)
6	2.3454E-05 (134, 5)	2.1266E-05 (134, 5)	1.9253E-05 (134, 5)	1.7883E-05 (110, 6)	1.7734E-05 (110, 6)
7	2.2418E-05 (121, 6)	1.9399E-05 (121, 6)	1.7747E-05 (199, 6)	1.7261E-05 (199, 6)	1.6556E-05 (199, 6)
8	1.9800E-05 (111, 6)	1.6747E-05 (111, 6)	1.4458E-05 (26, 5)	1.3490E-05 (118, 7)	1.4397E-05 (118, 7)
9	1.8664E-05 (13, 8)	1.8027E-05 (86, 4)	1.9417E-05 (86, 2)	2.1359E-05 (86, 2)	2.2680E-05 (86, 2)
10	1.8316E-05 (75, 6)	1.8895E-05 (75, 6)	1.8870E-05 (75, 6)	2.1424E-05 (21, 1)	2.3485E-05 (21, 1)
11	1.3605E-05 (328, 4)	1.4047E-05 (15, 6)	1.5563E-05 (15, 6)	1.6262E-05 (15, 6)	1.6351E-05 (37, 6)
12	1.9720E-05 (280, 5)	2.0777E-05 (14, 8)	2.1511E-05 (14, 8)	2.1561E-05 (14, 8)	2.0772E-05 (53, 1)
13	2.4757E-05 (359, 5)	2.2060E-05 (359, 5)	1.9320E-05 (359, 5)	1.7695E-05 (15, 2)	1.6479E-05 (117, 5)
14	2.4463E-05 (117, 1)	2.7034E-05 (117, 1)	2.5928E-05 (76, 2)	2.3872E-05 (76, 2)	2.1912E-05 (76, 2)
15	1.8211E-05 (359, 4)	1.8188E-05 (306, 8)	2.0319E-05 (305, 8)	2.2507E-05 (305, 8)	2.3892E-05 (306, 8)
16	2.1472E-05 (81, 4)	1.9377E-05 (307, 5)	1.9135E-05 (307, 5)	1.9727E-05 (307, 7)	2.0466E-05 (304, 2)
17	1.9499E-05 (322, 5)	1.9867E-05 (346, 4)	1.7909E-05 (351, 7)	1.9452E-05 (346, 4)	2.0531E-05 (305, 2)
18	2.5507E-05 (324, 4)	2.4083E-05 (304, 6)	2.6519E-05 (3, 8)	2.9294E-05 (3, 8)	2.9696E-05 (4, 2)
19	2.4010E-05 (304, 4)	2.4857E-05 (290, 7)	2.7964E-05 (290, 7)	2.8074E-05 (305, 5)	2.6907E-05 (305, 5)
20	2.0496E-05 (315, 5)	2.0072E-05 (315, 5)	2.1827E-05 (64, 2)	2.0464E-05 (35, 5)	2.1547E-05 (292, 7)
21	2.3179E-05 (243, 5)	2.1826E-05 (243, 5)	2.1539E-05 (362, 5)	2.0767E-05 (305, 6)	2.1596E-05 (305, 6)
22	2.1866E-05 (253, 5)	2.0319E-05 (253, 5)	2.0413E-05 (336, 7)	2.3220E-05 (316, 7)	2.4393E-05 (316, 7)
23	2.5981E-05 (244, 5)	2.2280E-05 (244, 5)	2.4488E-05 (318, 6)	2.6055E-05 (267, 4)	2.3948E-05 (318, 8)
24	2.3880E-05 (262, 3)	2.2362E-05 (240, 6)	1.9948E-05 (295, 4)	1.8819E-05 (262, 3)	1.9933E-05 (60, 8)
25	2.2232E-05 (363, 5)	2.1406E-05 (363, 5)	2.0231E-05 (363, 5)	1.8960E-05 (141, 3)	1.9872E-05 (141, 3)
26	3.0587E-05 (163, 6)	2.6501E-05 (169, 5)	2.9137E-05 (163, 6)	2.7549E-05 (163, 6)	2.5835E-05 (163, 6)
27	3.0051E-05 (171, 6)	2.7463E-05 (169, 6)	2.6918E-05 (171, 6)	2.4419E-05 (171, 6)	2.6418E-05 (169, 6)
28	2.4771E-05 (94, 5)	2.1061E-05 (94, 5)	1.8630E-05 (93, 4)	1.7091E-05 (82, 5)	1.6861E-05 (202, 6)
29	2.0704E-05 (72, 4)	2.1248E-05 (113, 4)	1.9559E-05 (239, 6)	1.6885E-05 (239, 6)	1.4890E-05 (203, 6)
30	2.4241E-05 (150, 6)	2.1224E-05 (158, 6)	1.9370E-05 (83, 6)	1.9072E-05 (83, 6)	1.8869E-05 (7, 7)
31	2.1872E-05 (203, 5)	2.1713E-05 (107, 7)	2.3062E-05 (107, 4)	2.4028E-05 (337, 7)	2.5542E-05 (337, 7)
32	2.3866E-05 (241, 4)	2.2087E-05 (173, 5)	1.8836E-05 (173, 5)	2.0505E-05 (24, 8)	2.0474E-05 (66, 5)
33	2.9254E-05 (19, 4)	2.7821E-05 (19, 4)	2.5983E-05 (19, 4)	2.4066E-05 (19, 4)	2.3982E-05 (124, 6)
34	2.9141E-05 (154, 4)	2.5431E-05 (199, 4)	2.3737E-05 (213, 1)	2.7284E-05 (67, 4)	2.7493E-05 (198, 8)
35	2.9690E-05 (183, 3)	3.0010E-05 (183, 3)	2.5973E-05 (160, 4)	2.2085E-05 (160, 4)	2.0789E-05 (44, 4)
36	3.0738E-05 (103, 4)	2.6631E-05 (103, 4)	3.0475E-05 (73, 8)	3.2959E-05 (73, 8)	3.2505E-05 (25, 7)

COMPOSITE ANNUAL CONCENTRATION TABLE,UG/CU.M

ANNUAL MEAN CONCENTRATION AT EACH RECEPTOR

DIR \ RANGE	0.5 KM	1.0 KM	1.5 KM	2.0 KM	2.5 KM
1	0.	0.	0.	1.	1.
2	0.	0.	0.	0.	0.
3	0.	0.	0.	0.	0.
4	0.	0.	0.	0.	0.
5	0.	0.	0.	0.	0.
6	0.	0.	0.	0.	0.
7	0.	0.	0.	0.	0.
8	0.	0.	0.	0.	0.
9	0.	0.	0.	0.	0.
10	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.
12	0.	0.	0.	0.	0.
13	0.	0.	0.	0.	0.
14	0.	0.	0.	0.	0.
15	0.	0.	0.	0.	0.
16	0.	0.	0.	0.	0.
17	0.	0.	0.	0.	0.
18	0.	0.	0.	1.	1.
19	0.	0.	0.	0.	0.
20	0.	0.	0.	0.	1.
21	0.	0.	0.	0.	0.
22	0.	0.	0.	0.	0.
23	0.	0.	0.	1.	1.
24	0.	0.	0.	1.	1.
25	0.	0.	0.	1.	1.
26	0.	0.	1.	1.	1.
27	0.	0.	1.	1.	1.
28	0.	0.	1.	1.	1.
29	0.	0.	0.	0.	0.
30	0.	0.	0.	1.	1.
31	0.	0.	0.	1.	1.
32	0.	0.	0.	0.	0.
33	0.	0.	0.	0.	0.
34	0.	0.	0.	1.	1.
35	0.	0.	0.	1.	1.
36	0.	0.	1.	1.	1.

COMPOSITE ANNUAL CONCENTRATION TABLE,UG/CU.M

ANNUAL MEAN CONCENTRATION AT EACH RECEPTOR

DIR	RANGE 3.0 KM	3.5 KM	4.0 KM	4.5 KM	5.0 KM
1	1.	0.	0.	0.	0.
2	0.	0.	0.	0.	0.
3	0.	0.	0.	0.	0.
4	0.	0.	0.	0.	0.
5	0.	0.	0.	0.	0.
6	0.	0.	0.	0.	0.
7	0.	0.	0.	0.	0.
8	0.	0.	0.	0.	0.
9	0.	0.	0.	0.	0.
10	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.
12	0.	0.	0.	0.	0.
13	0.	0.	0.	0.	0.
14	0.	0.	0.	0.	0.
15	0.	0.	0.	0.	0.
16	0.	0.	0.	0.	0.
17	0.	0.	1.	1.	1.
18	1.	1.	1.	1.	1.
19	1.	1.	1.	1.	1.
20	1.	1.	1.	1.	1.
21	0.	0.	0.	0.	0.
22	1.	1.	1.	1.	1.
23	1.	1.	1.	1.	1.
24	1.	1.	1.	1.	1.
25	1.	1.	1.	1.	1.
26	1.	1.	1.	1.	1.
27	1.	1.	1.	1.	1.
28	1.	1.	1.	1.	1.
29	0.	0.	0.	0.	0.
30	1.	1.	1.	1.	1.
31	1.	1.	1.	1.	1.
32	0.	0.	0.	0.	0.
33	1.	1.	1.	1.	1.
34	1.	1.	1.	1.	1.
35	1.	1.	1.	1.	1.
36	1.	1.	1.	1.	1.

COMPOSITE HIGHEST,SECOND-HIGHEST 24-HOUR CONCENTRATION TABLE,UG/CU.M

SECOND HIGHEST 24-HOUR CONCENTRATION AT EACH RECEPTOR

DIR \ RANGE	0.5 KM	1.0 KM	1.5 KM	2.0 KM	2.5 KM
1	1.	5.	7.	7.	6.
2	0.	5.	6.	7.	7.
3	0.	4.	5.	6.	5.
4	0.	4.	6.	6.	5.
5	0.	5.	7.	8.	7.
6	0.	5.	5.	6.	6.
7	0.	4.	6.	5.	6.
8	0.	5.	5.	5.	5.
9	1.	6.	7.	7.	8.
10	0.	3.	4.	5.	5.
11	0.	4.	5.	7.	7.
12	0.	6.	6.	6.	6.
13	1.	5.	6.	6.	7.
14	0.	4.	6.	7.	7.
15	0.	4.	5.	5.	5.
16	0.	4.	5.	5.	5.
17	0.	4.	5.	5.	5.
18	0.	4.	7.	9.	11.
19	0.	4.	5.	6.	8.
20	1.	4.	7.	7.	7.
21	0.	4.	5.	6.	7.
22	0.	5.	6.	6.	6.
23	0.	4.	6.	8.	7.
24	0.	5.	6.	8.	9.
25	0.	5.	6.	6.	6.
26	0.	5.	8.	9.	8.
27	0.	5.	8.	10.	10.
28	0.	4.	5.	6.	7.
29	0.	4.	5.	6.	5.
30	0.	6.	9.	9.	8.
31	1.	6.	7.	7.	6.
32	2.	4.	6.	6.	5.
33	1.	5.	6.	6.	7.
34	0.	6.	6.	7.	6.
35	1.	5.	7.	7.	7.
36	1.	6.	9.	10.	9.

COMPOSITE HIGHEST,SECOND-HIGHEST 24-HOUR CONCENTRATION TABLE,UG/CU.M

SECOND HIGHEST 24-HOUR CONCENTRATION AT EACH RECEPTOR

DIR \ RANGE	3.0 KM	3.5 KM	4.0 KM	4.5 KM	5.0 KM
1	5.	5.	5.	5.	5.
2	7.	6.	6.	6.	6.
3	5.	5.	5.	4.	4,
4	5.	6.	6.	5.	5.
5	7.	6.	6.	5.	5.
6	6.	5.	5.	5.	5.
7	6.	5.	5.	5.	5.
8	5.	6.	6.	6.	6.
9	9.	8.	8.	7.	8.
10	5.	5.	5.	6.	5.
11	7.	7.	6.	6.	6.
12	6.	7.	7.	7.	7.
13	8.	8.	7.	7.	7.
14	7.	7.	6.	6.	6.
15	5.	6.	6.	6.	5.
16	6.	7.	7.	7.	7.
17	6.	6.	6.	6.	6.
18	12.	12.	12.	11.	11.
19	9.	9.	9.	9.	9.
20	8.	8.	7.	7.	6.
21	7.	7.	6.	6.	6.
22	6.	6.	6.	6.	6.
23	7.	7.	7.	7.	7.
24	9.	8.	8.	8.	8.
25	7.	7.	7.	7.	7.
26	8.	7.	7.	7.	7.
27	10.	10.	10.	10.	9.
28	6.	6.	7.	7.	7.
29	5.	5.	5.	5.	5.
30	9.	9.	9.	9.	9.
31	6.	5.	5.	6.	6.
32	5.	5.	6.	7.	7.
33	7.	7.	7.	7.	6.
34	6.	6.	6.	6.	6.
35	6.	6.	5.	5.	5.
36	10.	10.	10.	10.	10.

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The following ISCST run refines this area and accounts for the momentum term in the plume rise equation.

COMPOSITE HIGHEST, SECOND-HIGHEST 3-HOUR CONCENTRATION TABLE,UG/CU.M

DIR	RANGE	SECOND HIGHEST 3-HOUR CONCENTRATION AT EACH RECEPTOR 0.5 KM	1.0 KM	1.5 KM	2.0 KM	2.5 KM
1		5.	26.	34.	33.	31.
2		3.	25.	30.	30.	29.
3		2.	26.	33.	30.	28.
4		2.	32.	38.	34.	28.
5		3.	30.	34.	33.	34.
6		3.	24.	31.	32.	32.
7		4.	30.	34.	30.	28.
8		4.	39.	35.	30.	26.
9		7.	36.	42.	34.	27.
10		3.	19.	26.	33.	27.
11		2.	26.	34.	32.	32.
12		3.	29.	34.	30.	27.
13		3.	25.	36.	33.	29.
14		2.	24.	30.	28.	29.
15		2.	24.	29.	26.	23.
16		2.	24.	26.	26.	27.
17		2.	24.	33.	29.	26.
18		2.	29.	32.	39.	39.
19		3.	30.	29.	30.	27.
20		8.	31.	33.	31.	31.
21		3.	26.	33.	34.	31.
22		4.	28.	32.	29.	25.
23		3.	23.	33.	37.	37.
24		2.	28.	30.	36.	36.
25		2.	30.	38.	34.	32.
26		2.	32.	43.	39.	34.
27		3.	28.	37.	35.	31.
28		3.	29.	35.	31.	28.
29		2.	23.	27.	29.	29.
30		2.	39.	43.	43.	37.
31		6.	32.	39.	31.	27.
32		13.	30.	32.	32.	28.
33		5.	32.	37.	32.	30.
34		2.	33.	33.	36.	34.
35		3.	30.	40.	38.	32.
36		8.	30.	38.	42.	36.

COMPOSITE HIGHEST, SECOND-HIGHEST 3-HOUR CONCENTRATION TABLE,UG/CU.M

DIR	RANGE	SECOND HIGHEST 3-HOUR CONCENTRATION AT EACH RECEPTOR 3.0 KM	3.5 KM	4.0 KM	4.5 KM	5.0 KM
1		30.	28.	26.	23.	24.
2		27.	24.	23.	21.	20.
3		27.	24.	22.	20.	18.
4		26.	22.	23.	24.	22.
5		32.	29.	25.	26.	26.
6		29.	26.	24.	22.	20.
7		28.	27.	26.	25.	26.
8		23.	25.	26.	24.	23.
9		25.	25.	24.	26.	27.
10		27.	27.	27.	29.	31.
11		31.	29.	27.	24.	26.
12		26.	24.	23.	24.	25.
13		26.	24.	24.	23.	24.
14		26.	27.	26.	25.	27.
15		21.	20.	20.	23.	24.
16		25.	25.	25.	26.	27.
17		22.	23.	27.	28.	30.
18		36.	33.	32.	31.	33.
19		27.	26.	28.	28.	27.
20		29.	27.	27.	25.	26.
21		30.	27.	25.	23.	25.
22		24.	24.	22.	23.	25.
23		35.	29.	25.	26.	24.
24		33.	27.	24.	24.	22.
25		30.	25.	23.	22.	24.
26		31.	27.	29.	28.	26.
27		30.	29.	29.	28.	27.
28		25.	21.	19.	20.	21.
29		26.	21.	21.	22.	21.
30		31.	28.	26.	26.	27.
31		23.	22.	23.	24.	26.
32		24.	23.	24.	26.	28.
33		29.	28.	26.	24.	24.
34		32.	30.	30.	28.	27.
35		30.	30.	26.	22.	21.
36		31.	29.	30.	33.	33.

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CALCULATE (CONCENTRATION=1,DEPOSITION=2)	ISW(1) = 1
RECEPTOR GRID SYSTEM (RECTANGULAR=1 OR 3, POLAR=2 OR 4)	ISW(2) = 4
DISCRETE RECEPTOR SYSTEM (RECTANGULAR=1,POLAR=2)	ISW(3) = 1
TERRAIN ELEVATIONS ARE READ (YES=1,NO=0)	ISW(4) = 0
CALCULATIONS ARE WRITTEN TO TAPE (YES=1,NO=0)	ISW(5) = 0
LIST ALL INPUT DATA (NO=0,YES=1,MET DATA ALSO=2)	ISW(6) = 1
COMPUTE AVERAGE CONCENTRATION (OR TOTAL DEPOSITION)	
WITH THE FOLLOWING TIME PERIODS:	
HOURLY (YES=1,NO=0)	ISW(7) = 0
2-HOUR (YES=1,NO=0)	ISW(8) = 0
3-HOUR (YES=1,NO=0)	ISW(9) = 0
4-HOUR (YES=1,NO=0)	ISW(10) = 0
6-HOUR (YES=1,NO=0)	ISW(11) = 0
8-HOUR (YES=1,NO=0)	ISW(12) = 0
12-HOUR (YES=1,NO=0)	ISW(13) = 0
24-HOUR (YES=1,NO=0)	ISW(14) = 1
PRINT *N*-DAY TABLE(S) (YES=1,NO=0)	ISW(15) = 0
PRINT THE FOLLOWING TYPES OF TABLES WHOSE TIME PERIODS ARE	
SPECIFIED BY ISW(7) THROUGH ISW(14):	
DAILY TABLES (YES=1,NO=0)	ISW(16) = 1
HIGHEST & SECOND HIGHEST TABLES (YES=1,NO=0)	ISW(17) = 0
MAXIMUM 50 TABLES (YES=1,NO=0)	ISW(18) = 0
METEOROLOGICAL DATA INPUT METHOD (PRE-PROCESSED=1,CARD=2)	ISW(19) = 1
RURAL-URBAN OPTION (RURAL=0,URBAN MODE 1=1,URBAN MODE 2=2)	ISW(20) = 0
WIND PROFILE EXPONENT VALUES (DEFAULTS=1,USER ENTERS=2,3)	ISW(21) = 1
VERTICAL POT. TEMP. GRADIENT VALUES (DEFAULTS=1,USER ENTERS=2,3)	ISW(22) = 1
SCALE EMISSION RATES FOR ALL SOURCES (NO=0,YES>0)	ISW(23) = 0
PROGRAM CALCULATES FINAL PLUME RISE ONLY (YES=1,NO=2)	ISW(24) = 1
PROGRAM ADJUSTS ALL STACK HEIGHTS FOR DOWNWASH (YES=2,NO=1)	ISW(25) = 1
NUMBER OF INPUT SOURCES	NSOURC = 1
NUMBER OF SOURCE GROUPS (=0,ALL SOURCES)	NGROUP = 0
TIME PERIOD INTERVAL TO BE PRINTED (=0,ALL INTERVALS)	IPERD = 0
NUMBER OF X (RANGE) GRID VALUES	NXPNTS = 11
NUMBER OF Y (THETA) GRID VALUES	NYPNTS = 3
NUMBER OF DISCRETE RECEPTORS	NXWYPT = 0
SOURCE EMISSION RATE UNITS CONVERSION FACTOR	TK =.10000E+07
ENTRAINMENT COEFFICIENT FOR UNSTABLE ATMOSPHERE	BETA1 =0.600
ENTRAINMENT COEFFICIENT FOR STABLE ATMOSPHERE	BETA2 =0.600
HEIGHT ABOVE GROUND AT WHICH WIND SPEED WAS MEASURED ZR = 7.00	METERS
LOGICAL UNIT NUMBER OF METEOROLOGICAL DATA	IMET = 9
DECAY COEFFICIENT FOR PHYSICAL OR CHEMICAL DEPLETION DECAY =0.000000E+00	
SURFACE STATION NO.	ISS = 12815
YEAR OF SURFACE DATA	ISY = 74
UPPER AIR STATION NO.	IUS = 12842
YEAR OF UPPER AIR DATA	IUY = 74
ALLOCATED DATA STORAGE	LIMIT = 43500 WORDS
REQUIRED DATA STORAGE FOR THIS PROBLEM RUN	MIMIT = 328 WORDS

*** KISSIMMEE DAY 279/1974 ***

*** METEOROLOGICAL DAYS TO BE PROCESSED ***
(IF=1)

0000000000 0000000000 0000000000 0000000000 0000000000
0000000000 0000000000 0000000000 0000000000 0000000000
0000000000 0000000000 0000000000 0000000000 0000000000
0000000000 0000000000 0000000000 0000000000 0000000000
0000000000 0000000000 0000000000 0000000000 0000000000
0000000000 0000000000 0000000010 0000000000 0000000000
0000000000 0000000000 0000000000 0000000000 0000000000
0000000000 000000

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
(METERS/SEC)

1.54, 3.09, 5.14, 8.23, 10.80,

*** WIND PROFILE EXPONENTS ***

STABILITY CATEGORY	WIND SPEED CATEGORY 1	2	3	4	5	6
A	.10000E+00	.10000E+00	.10000E+00	.10000E+00	.10000E+00	.10000E+00
B	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00
C	.20000E+00	.20000E+00	.20000E+00	.20000E+00	.20000E+00	.20000E+00
D	.25000E+00	.25000E+00	.25000E+00	.25000E+00	.25000E+00	.25000E+00
E	.30000E+00	.30000E+00	.30000E+00	.30000E+00	.30000E+00	.30000E+00
F	.30000E+00	.30000E+00	.30000E+00	.30000E+00	.30000E+00	.30000E+00

*** VERTICAL POTENTIAL TEMPERATURE GRADIENTS ***
(DEGREES KELVIN PER METER)

STABILITY CATEGORY	WIND SPEED CATEGORY 1	2	3	4	5	6
A	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
B	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
C	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
D	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
E	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01
F	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01

*** KISSIMMEE DAY 279/1974 ***

*** RANGES OF POLAR GRID SYSTEM ***
(METERS)

3900., 4000., 4100., 4200., 4300., 4400., 4500., 4600., 4700., 4800.,
4900.,

*** RADIAL ANGLES OF POLAR GRID SYSTEM ***

(DEGREES)

180., 182., 184.,

F

*** KISSIMMEE DAY 279/1974 ***

SOURCE # 1---UNIT 1

*** SOURCE DATA ***

SOURCE NUMBER	TYPE	WAKE	NUMBER PART. CATS.	EMISSION RATE TYPE=0,1 (G/S) TYPE=2 (G/S) *PER M**2	X (M)	Y (M)	BASE ELEV. (M)	HEIGHT (M)	TEMP. TYPE=0 (DEG.K) VERT.DIM. TYPE=1 (M)	EXIT VEL. TYPE=0 (M/S) HORZ.DIM. TYPE=1,2 (M)	DIAM. TYPE=0 (M)	BLDG. HEIGHT TYPE=0 (M)	BLDG. LENGTH TYPE=0 (M)	BLDG. WIDTH TYPE=0 (M)
1	0	0	0	48.900	0.	0.	0.0	9.14	422.0	38.03	2.44	0.00	0.00	0.00

DAILY: 279
24-HR/PD 1
SGROUP# 1
YEAR 1974
*** KISSIMMEE DAY 279/1974 ***

* DAILY 24-HOUR AVERAGE CONCENTRATION (MICROGRAMS/CUBIC METER) *
* ENDING WITH HOUR 24 FOR DAY 279 *
* FROM ALL SOURCES *
* FOR THE RECEPTOR GRID *

* MAXIMUM VALUE EQUALS 10.3 AND OCCURRED AT (4000.0, 182.0) *

DIRECTION / (DEGREES) /	RANGE (METERS) 3900.0	4000.0	4100.0	4200.0	4300.0	4400.0	4500.0	4600.0	4700.0
184.0 /	9.2	9.2	9.2	9.2	9.2	9.2	9.1	9.1	9.0
182.0 /	10.3	10.3	10.3	10.3	10.3	10.3	10.2	10.2	10.1
180.0 /	9.6	9.6	9.6	9.6	9.6	9.5	9.5	9.5	9.4

DAILY: 279
24-HR/PD 1
SGROUP# 1
YEAR 1974
*** KISSIMMEE DAY 279/1974 ***

* DAILY 24-HOUR AVERAGE CONCENTRATION (MICROGRAMS/CUBIC METER) *
* ENDING WITH HOUR 24 FOR DAY 279 *
* FROM ALL SOURCES *
* FOR THE RECEPTOR GRID *

* MAXIMUM VALUE EQUALS 10.3 AND OCCURRED AT (4000.0, 182.0) *

DIRECTION / (DEGREES) /	RANGE (METERS) 4800.0	4900.0
184.0 /	9.0	8.9
182.0 /	10.1	10.0
180.0 /	9.4	9.3

EXISTING AND SURROUNDING SOURCES

PLANT NAME: KISS. UTILITIES POLLUTANT: SO2 AIR QUALITY UNITS: GM/M**3

TAMPA/ORLANDO 1974-1978

	MET FILE STN NO.	MET FILE YR	REQUESTED STN NO.	REQUESTED YR
SURFACE	12815	74	12815	74
UPPER AIR	12842	74	12842	74

PLANT LOCATION: RURAL

ANEMOMETER HEIGHT IS 7.0 METERS

WIND PROFILE EXPONENTS ARE: 0.100, 0.150, 0.200, 0.250, 0.300, 0.300,

NO TAPE OUTPUT

MET DATA WILL NOT BE PRINTED

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DAY-- 1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
      1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
      1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
      1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
      1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
      1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
      1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
      1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
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ALL TABLES, INCLUDING SOURCE CONTRIBUTION, THAT CONTAIN "ANNUAL" IN THE HEADING ARE BASED

ONLY ON THOSE DAYS MARKED BY A "1" IN THE ABOVE TABLE

45

RING DISTANCES(KM)= 0.10 0.30 0.50 0.70 0.90

STACK # 1--COMBUSTION TURBINE
STACK # 2--KISS. UTIL. UNIT#7
STACK # 3--KISS. UTIL. UNITS#8,#9
STACK # 4--KISS. UTIL. UNITS#10,#11
STACK # 5--KISS. UTIL. UNITS#14-#18
STACK # 6--KISS. UTIL. UNITS#19-#20

STACK	MONTH	EMISSION RATE (GMS/SEC)	HEIGHT (METERS)	DIAMETER (METERS)	EXIT VELOCITY (M/SEC)	TEMP (DEG.K)	VOLUMETRIC FLOW (M**3/SEC)
1	ALL	48.9000	9.14	2.44	38.03	422.00	177.83
2	ALL	0.8700	13.11	0.61	16.30	466.50	4.76
3	ALL	3.3600	16.15	0.85	17.60	477.60	9.99
4	ALL	2.2800	7.01	0.76	9.60	466.50	4.35
5	ALL	5.3700	13.41	0.80	8.70	505.40	4.37
6	ALL	2.8900	8.69	0.90	17.20	505.40	10.94

PLANT NAME: KISS. UTILITIES POLLUTANT: SO2 AIR QUALITY UNITS: GM/M**3

MAXIMUM MEAN CONC= 8.0673E-06 DIRECTION= 18 DISTANCE= 0.5 KM

YEAR= 74

ANNUAL MEAN CONCENTRATION AT EACH RECEPTOR

DIR \ RANGE	0.1 KM	0.3 KM	0.5 KM	0.7 KM	0.9 KM
1	3.94047E-07	5.90615E-06	5.73657E-06	4.63632E-06	3.80970E-06
2	3.38612E-07	4.95829E-06	4.99106E-06	4.16915E-06	3.50125E-06
3	2.79438E-07	4.22725E-06	4.32418E-06	3.63989E-06	3.08068E-06
4	3.06107E-07	4.54864E-06	4.58201E-06	3.78769E-06	3.15872E-06
5	3.84323E-07	4.92985E-06	4.86695E-06	4.00239E-06	3.32256E-06
6	3.89023E-07	5.02919E-06	5.05781E-06	4.21517E-06	3.54859E-06
7	3.55545E-07	4.48994E-06	4.35552E-06	3.58128E-06	3.00576E-06
8	3.08707E-07	4.03610E-06	3.94399E-06	3.26037E-06	2.75356E-06
9	2.72489E-07	3.93654E-06	4.00897E-06	3.40032E-06	2.91940E-06
10	2.97951E-07	4.10936E-06	4.16097E-06	3.45498E-06	2.86373E-06
11	3.64990E-07	4.23194E-06	4.13559E-06	3.47492E-06	2.97118E-06
12	4.11647E-07	4.83857E-06	4.86383E-06	4.10994E-06	3.49013E-06
13	3.93164E-07	4.74315E-06	4.68946E-06	3.86901E-06	3.20739E-06
14	3.55423E-07	4.99078E-06	4.99852E-06	4.06316E-06	3.30028E-06
15	2.72299E-07	4.27752E-06	4.45873E-06	3.68416E-06	3.02744E-06
16	2.43630E-07	4.10549E-06	4.14792E-06	3.38093E-06	2.81088E-06
17	2.55312E-07	5.15862E-06	5.44948E-06	4.54596E-06	3.84218E-06
18	2.85053E-07	6.98533E-06	8.06734E-06	7.09297E-06	6.22043E-06
19	2.60797E-07	4.95345E-06	5.43467E-06	4.62669E-06	3.92461E-06
20	2.92621E-07	5.60787E-06	6.39449E-06	5.70653E-06	5.06800E-06
21	3.61073E-07	5.80845E-06	6.15098E-06	5.29959E-06	4.59709E-06
22	4.46503E-07	6.82548E-06	7.17073E-06	6.15646E-06	5.32364E-06
23	4.64749E-07	7.15947E-06	7.37299E-06	6.17726E-06	5.24012E-06
24	4.17053E-07	6.56124E-06	6.74057E-06	5.64486E-06	4.77370E-06
25	3.91513E-07	6.31567E-06	6.76913E-06	5.83319E-06	5.01782E-06
26	4.61743E-07	5.87744E-06	5.94848E-06	4.99577E-06	4.26962E-06
27	4.96765E-07	6.54674E-06	6.81704E-06	5.79479E-06	4.93912E-06
28	4.42227E-07	6.09763E-06	6.29617E-06	5.29121E-06	4.44138E-06
29	4.10104E-07	5.70008E-06	5.85031E-06	4.88917E-06	4.09869E-06
30	4.53198E-07	6.17898E-06	6.45246E-06	5.44689E-06	4.60866E-06
31	5.07914E-07	5.88214E-06	5.90846E-06	4.90066E-06	4.10818E-06
32	5.76243E-07	5.57241E-06	5.51611E-06	4.61172E-06	3.92398E-06
33	5.39704E-07	5.19750E-06	5.01557E-06	4.11082E-06	3.44359E-06
34	4.56214E-07	6.17757E-06	6.32132E-06	5.26540E-06	4.40060E-06
35	4.34996E-07	5.87890E-06	5.87907E-06	4.84566E-06	4.03635E-06
36	4.35477E-07	7.10329E-06	7.43535E-06	6.26296E-06	5.28663E-06

L4c

PLANT NAME: KISS. UTILITIES POLLUTANT: SO2 AIR QUALITY UNITS: GM/M**3
MAXIMUM MEAN CONC= 8.5968E-06 DIRECTION= 36 DISTANCE= 0.3 KM
YEAR= 75

ANNUAL MEAN CONCENTRATION AT EACH RECEPTOR

DIR \ RANGE	0.1 KM	0.3 KM	0.5 KM	0.7 KM	0.9 KM
1	6.79781E-07	7.38675E-06	6.93115E-06	5.51287E-06	4.47713E-06
2	5.63330E-07	6.05201E-06	5.68735E-06	4.55215E-06	3.72380E-06
3	4.62249E-07	4.97501E-06	4.54043E-06	3.59293E-06	2.91864E-06
4	4.49751E-07	5.27746E-06	4.92884E-06	3.95071E-06	3.24983E-06
5	4.55838E-07	5.80844E-06	5.77183E-06	4.79758E-06	4.00116E-06
6	3.99793E-07	4.64941E-06	4.42197E-06	3.59037E-06	2.98893E-06
7	4.01773E-07	4.65934E-06	4.63452E-06	3.85046E-06	3.23751E-06
8	3.52545E-07	4.15923E-06	4.11450E-06	3.35938E-06	2.76783E-06
9	2.86703E-07	3.78406E-06	3.82871E-06	3.20844E-06	2.72926E-06
10	3.07055E-07	3.80642E-06	3.56930E-06	2.83341E-06	2.31878E-06
11	3.97484E-07	5.45477E-06	5.34787E-06	4.38798E-06	3.67494E-06
12	4.77234E-07	6.54095E-06	6.35248E-06	5.13585E-06	4.19772E-06
13	4.96219E-07	6.49938E-06	6.19431E-06	4.98541E-06	4.08682E-06
14	4.44896E-07	5.70798E-06	5.39789E-06	4.26718E-06	3.41814E-06
15	3.44101E-07	4.55705E-06	4.49113E-06	3.66688E-06	3.02479E-06
16	3.18752E-07	4.59380E-06	4.66620E-06	3.90191E-06	3.31504E-06
17	3.19213E-07	4.54505E-06	4.70357E-06	3.99041E-06	3.45945E-06
18	2.97257E-07	5.26420E-06	5.99157E-06	5.33953E-06	4.75003E-06
19	2.43949E-07	4.23069E-06	4.49190E-06	3.80108E-06	3.25010E-06
20	2.60127E-07	5.03683E-06	5.83248E-06	5.26915E-06	4.72391E-06
21	3.38294E-07	5.78597E-06	6.29619E-06	5.47628E-06	4.76250E-06
22	4.34734E-07	6.71577E-06	7.22377E-06	6.30344E-06	5.53587E-06
23	5.34040E-07	8.37973E-06	8.82740E-06	7.59106E-06	6.57341E-06
24	5.37835E-07	7.62684E-06	7.79013E-06	6.58113E-06	5.61766E-06
25	4.27105E-07	6.03848E-06	6.35483E-06	5.48192E-06	4.75325E-06
26	3.94558E-07	5.70239E-06	5.80044E-06	4.84078E-06	4.06799E-06
27	4.80302E-07	7.62871E-06	8.14420E-06	6.97058E-06	5.94764E-06
28	4.79091E-07	6.51153E-06	6.35890E-06	5.15938E-06	4.26611E-06
29	4.31423E-07	5.73424E-06	5.56579E-06	4.55208E-06	3.81537E-06
30	4.44142E-07	6.98012E-06	7.26513E-06	6.10799E-06	5.18262E-06
31	4.40314E-07	5.66177E-06	5.61453E-06	4.67047E-06	3.96274E-06
32	4.65428E-07	5.45786E-06	5.35275E-06	4.46425E-06	3.82610E-06
33	5.90483E-07	6.84287E-06	6.36894E-06	5.04228E-06	4.13260E-06
34	6.76601E-07	7.86456E-06	7.45682E-06	6.01608E-06	4.97327E-06
35	6.65022E-07	7.41602E-06	7.09775E-06	5.71449E-06	4.67814E-06
36	7.20536E-07	8.99684E-06	8.85797E-06	7.24184E-06	6.01854E-06

PLANT NAME: KISS. UTILITIES POLLUTANT: SO2 AIR QUALITY UNITS: GM/M**3

MAXIMUM MEAN CONC= 1.1954E-05 DIRECTION= 18 DISTANCE= 0.5 KM

YEAR= 76

ANNUAL MEAN CONCENTRATION AT EACH RECEPTOR

DIR \ RANGE	0.1 KM	0.3 KM	0.5 KM	0.7 KM	0.9 KM
1	5.36371E-07	6.56214E-06	6.30856E-06	5.09575E-06	4.20890E-06
2	4.66657E-07	5.85672E-06	5.61985E-06	4.50522E-06	3.66570E-06
3	4.35504E-07	4.97493E-06	4.61135E-06	3.66280E-06	2.98261E-06
4	4.16393E-07	4.89415E-06	4.79399E-06	3.91313E-06	3.23694E-06
5	4.60784E-07	5.63178E-06	5.58671E-06	4.59986E-06	3.82943E-06
6	4.37325E-07	5.20889E-06	5.21423E-06	4.34565E-06	3.66637E-06
7	3.36657E-07	4.12823E-06	4.14762E-06	3.44177E-06	2.88984E-06
8	3.24119E-07	4.27021E-06	4.16824E-06	3.32471E-06	2.68014E-06
9	3.64283E-07	5.47009E-06	5.63241E-06	4.67297E-06	3.89797E-06
10	2.66304E-07	4.18429E-06	4.32362E-06	3.62184E-06	3.06638E-06
11	2.38980E-07	4.11635E-06	4.32125E-06	3.64134E-06	3.09536E-06
12	3.20131E-07	5.21439E-06	5.35892E-06	4.46081E-06	3.73309E-06
13	3.80321E-07	6.21767E-06	6.21571E-06	5.00547E-06	4.02968E-06
14	3.68463E-07	6.02888E-06	5.97353E-06	4.83614E-06	3.92478E-06
15	2.91657E-07	5.20589E-06	5.40381E-06	4.48510E-06	3.68666E-06
16	2.39751E-07	5.47122E-06	6.17927E-06	5.35192E-06	4.54270E-06
17	2.68591E-07	6.47820E-06	7.27771E-06	6.25526E-06	5.28901E-06
18	3.51324E-07	1.02792E-05	1.19544E-05	1.04091E-05	8.85606E-06
19	3.68616E-07	7.94089E-06	8.47033E-06	6.98957E-06	5.70349E-06
20	4.41940E-07	7.65187E-06	8.02398E-06	6.70053E-06	5.58237E-06
21	3.98341E-07	6.02229E-06	6.24517E-06	5.31621E-06	4.52079E-06
22	4.37697E-07	6.04053E-06	6.31557E-06	5.39134E-06	4.58747E-06
23	4.46902E-07	6.74641E-06	7.40011E-06	6.47703E-06	5.61754E-06
24	4.21440E-07	6.52155E-06	6.94613E-06	5.95070E-06	5.09737E-06
25	4.21004E-07	5.58363E-06	5.92600E-06	5.12327E-06	4.40913E-06
26	4.36309E-07	5.38983E-06	5.57527E-06	4.74763E-06	4.05029E-06
27	4.62217E-07	6.38667E-06	6.80548E-06	5.86914E-06	5.04956E-06
28	4.58110E-07	5.78438E-06	5.62179E-06	4.55584E-06	3.73020E-06
29	4.44299E-07	6.13521E-06	6.24864E-06	5.17429E-06	4.29438E-06
30	4.47567E-07	6.56674E-06	7.07169E-06	6.14912E-06	5.33549E-06
31	4.60708E-07	6.27882E-06	6.36618E-06	5.24594E-06	4.36714E-06
32	4.90309E-07	6.10071E-06	6.15216E-06	5.07705E-06	4.22159E-06
33	4.54720E-07	5.65983E-06	5.62785E-06	4.59413E-06	3.78104E-06
34	4.87422E-07	6.50987E-06	6.93433E-06	5.89637E-06	4.96645E-06
35	5.13822E-07	5.87155E-06	5.79156E-06	4.78473E-06	4.04295E-06
36	5.86232E-07	8.24868E-06	8.70565E-06	7.39448E-06	6.31519E-06

PLANT NAME: KISS. UTILITIES POLLUTANT: SO2 AIR QUALITY UNITS: GM/M**3
MAXIMUM MEAN CONC= 1.0971E-05 DIRECTION= 36 DISTANCE= 0.5 KM
YEAR= 77

ANNUAL MEAN CONCENTRATION AT EACH RECEPTOR

DIR	RANGE 0.1 KM	0.3 KM	0.5 KM	0.7 KM	0.9 KM
1	6.60364E-07	7.03036E-06	6.47816E-06	5.11062E-06	4.15588E-06
2	4.73056E-07	5.07373E-06	4.94959E-06	4.06614E-06	3.38356E-06
3	4.37215E-07	4.51641E-06	4.25743E-06	3.44315E-06	2.83129E-06
4	4.81250E-07	5.42896E-06	5.27230E-06	4.38400E-06	3.70935E-06
5	5.05303E-07	6.01202E-06	5.94890E-06	4.97407E-06	4.22093E-06
6	5.12505E-07	5.52898E-06	5.49630E-06	4.62879E-06	3.94662E-06
7	4.70529E-07	4.41269E-06	4.25452E-06	3.57204E-06	3.02717E-06
8	3.84555E-07	4.12960E-06	3.92202E-06	3.24059E-06	2.75247E-06
9	3.83214E-07	5.52867E-06	5.64533E-06	4.79159E-06	4.11994E-06
10	3.50218E-07	4.71376E-06	4.50775E-06	3.63022E-06	2.97131E-06
11	3.82204E-07	4.96780E-06	4.70104E-06	3.77159E-06	3.10126E-06
12	4.64455E-07	5.94434E-06	5.78478E-06	4.74561E-06	3.94780E-06
13	4.46692E-07	6.01550E-06	5.82303E-06	4.64213E-06	3.71795E-06
14	4.13753E-07	5.72261E-06	5.76125E-06	4.72454E-06	3.85261E-06
15	3.95630E-07	5.00382E-06	4.70458E-06	3.72577E-06	3.00733E-06
16	3.74050E-07	4.78557E-06	4.61766E-06	3.75089E-06	3.12771E-06
17	3.96302E-07	5.76607E-06	5.84809E-06	4.85830E-06	4.06551E-06
18	3.56653E-07	7.22065E-06	8.19676E-06	7.26041E-06	6.35357E-06
19	2.41538E-07	4.29411E-06	4.59971E-06	3.95247E-06	3.36286E-06
20	2.06474E-07	4.02662E-06	4.52321E-06	4.00548E-06	3.48628E-06
21	2.19971E-07	4.35343E-06	5.10863E-06	4.62095E-06	4.10769E-06
22	2.99022E-07	4.87792E-06	5.44573E-06	4.79461E-06	4.21996E-06
23	4.49116E-07	7.21923E-06	8.02291E-06	7.07358E-06	6.22776E-06
24	4.86376E-07	7.57223E-06	8.18276E-06	7.13464E-06	6.20280E-06
25	4.99085E-07	6.45579E-06	6.63611E-06	5.61236E-06	4.78715E-06
26	5.55523E-07	6.95489E-06	7.00001E-06	5.81558E-06	4.87802E-06
27	6.27273E-07	1.00613E-05	1.06180E-05	8.96957E-06	7.56837E-06
28	5.45054E-07	6.87047E-06	6.77354E-06	5.56011E-06	4.61417E-06
29	5.49674E-07	5.77196E-06	5.49056E-06	4.47087E-06	3.70103E-06
30	6.88761E-07	7.84890E-06	7.72202E-06	6.39144E-06	5.37303E-06
31	6.16712E-07	6.76732E-06	6.59604E-06	5.40611E-06	4.50896E-06
32	4.17553E-07	5.41535E-06	5.40314E-06	4.51515E-06	3.81075E-06
33	3.35306E-07	4.82981E-06	4.78464E-06	3.97480E-06	3.36141E-06
34	3.47662E-07	5.27373E-06	5.41844E-06	4.61709E-06	3.97760E-06
35	4.75889E-07	6.46543E-06	6.46916E-06	5.35214E-06	4.48964E-06
36	7.34848E-07	1.05314E-05	1.09713E-05	9.28678E-06	7.89376E-06

PLANT NAME: KISS. UTILITIES POLLUTANT: SO2 AIR QUALITY UNITS: GM/M**3
MAXIMUM MEAN CONC= 1.1860E-05 DIRECTION= 27 DISTANCE= 0.3 KM
YEAR= 78

ANNUAL MEAN CONCENTRATION AT EACH RECEPTOR

DIR \ RANGE	0.1 KM	0.3 KM	0.5 KM	0.7 KM	0.9 KM
1	5.75149E-07	5.74012E-06	5.37812E-06	4.33423E-06	3.54104E-06
2	4.20699E-07	4.65051E-06	4.40428E-06	3.56444E-06	2.94248E-06
3	3.05409E-07	3.60221E-06	3.40152E-06	2.71728E-06	2.20196E-06
4	2.90489E-07	4.24350E-06	4.40856E-06	3.73804E-06	3.16963E-06
5	2.96538E-07	3.99395E-06	4.06533E-06	3.39168E-06	2.83979E-06
6	2.68659E-07	3.49504E-06	3.49099E-06	2.90325E-06	2.43976E-06
7	1.89820E-07	2.71519E-06	2.68826E-06	2.20138E-06	1.82962E-06
8	1.76940E-07	2.71340E-06	2.61451E-06	2.09708E-06	1.72456E-06
9	2.19363E-07	3.87437E-06	4.19140E-06	3.58536E-06	3.03242E-06
10	1.90819E-07	2.96344E-06	3.16233E-06	2.72441E-06	2.31173E-06
11	1.66316E-07	2.89604E-06	3.13199E-06	2.70198E-06	2.29522E-06
12	2.17629E-07	4.08162E-06	4.27372E-06	3.56134E-06	2.94613E-06
13	2.93916E-07	4.43099E-06	4.38829E-06	3.53303E-06	2.83211E-06
14	3.05918E-07	4.52295E-06	4.45822E-06	3.60200E-06	2.90330E-06
15	2.38992E-07	3.88239E-06	3.99471E-06	3.34921E-06	2.81090E-06
16	1.86407E-07	3.58090E-06	3.92579E-06	3.38218E-06	2.88329E-06
17	1.95432E-07	5.10021E-06	5.97147E-06	5.25145E-06	4.50984E-06
18	2.51123E-07	7.73245E-06	9.19358E-06	8.15119E-06	7.04351E-06
19	2.38700E-07	5.80943E-06	6.34082E-06	5.35988E-06	4.45434E-06
20	3.02429E-07	5.83921E-06	6.28508E-06	5.38318E-06	4.57835E-06
21	4.30742E-07	6.65252E-06	7.03454E-06	6.03577E-06	5.14510E-06
22	5.46370E-07	7.67164E-06	8.10424E-06	6.99715E-06	6.00374E-06
23	6.62207E-07	8.73261E-06	8.70833E-06	7.26831E-06	6.12575E-06
24	7.35318E-07	8.42796E-06	8.13212E-06	6.69650E-06	5.64740E-06
25	7.66580E-07	8.02565E-06	7.60447E-06	6.26247E-06	5.34557E-06
26	9.18440E-07	1.05117E-05	1.01474E-05	8.29143E-06	6.95512E-06
27	9.41646E-07	1.18603E-05	1.15737E-05	9.39321E-06	7.79052E-06
28	7.38468E-07	9.11261E-06	8.76443E-06	7.07938E-06	5.83881E-06
29	6.33076E-07	7.02109E-06	6.45164E-06	5.04734E-06	4.06846E-06
30	6.84272E-07	7.91788E-06	7.89087E-06	6.63374E-06	5.68149E-06
31	6.51723E-07	7.41030E-06	7.28847E-06	6.05604E-06	5.14354E-06
32	5.47414E-07	6.64134E-06	6.68308E-06	5.63047E-06	4.78546E-06
33	5.35542E-07	7.30011E-06	7.60975E-06	6.50360E-06	5.57677E-06
34	6.10588E-07	7.87486E-06	7.95378E-06	6.68306E-06	5.66959E-06
35	7.15434E-07	8.05862E-06	7.63032E-06	6.19825E-06	5.15498E-06
36	7.36866E-07	8.44743E-06	8.20678E-06	6.70484E-06	5.53099E-06

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PLANT NAME: KISS. UTILITIES POLLUTANT: SO2 AIR QUALITY UNITS: GM/M**3

YEARLY SECOND MAXIMUM 24-HOUR CONC= 1.2979E-04 DIRECTION= 18 DISTANCE= 0.5 KM DAY=279

YEAR= 74

SECOND HIGHEST 24-HOUR CONCENTRATION AT EACH RECEPTOR

DIR	RANGE 0.1 KM		0.3 KM		0.5 KM		0.7 KM		0.9 KM	
1	7.1035E-06	(135)	5.3770E-05	(152)	5.3207E-05	(104)	4.2548E-05	(104)	3.3900E-05	(104)
2	6.0889E-06	(228)	4.6043E-05	(38)	3.5015E-05	(143)	3.7239E-05	(38)	3.2257E-05	(230)
3	4.7438E-06	(124)	4.0233E-05	(175)	5.6460E-05	(34)	5.0492E-05	(34)	4.2920E-05	(34)
4	7.0954E-06	(146)	4.8545E-05	(39)	5.0477E-05	(147)	5.2265E-05	(147)	4.9030E-05	(147)
5	8.8534E-06	(125)	5.7316E-05	(39)	5.4513E-05	(80)	4.5176E-05	(147)	3.5765E-05	(174)
6	8.6051E-06	(168)	6.4371E-05	(90)	5.4928E-05	(90)	4.3014E-05	(90)	3.5997E-05	(90)
7	9.3383E-06	(192)	5.5212E-05	(90)	4.6156E-05	(90)	3.6606E-05	(90)	3.1046E-05	(90)
8	7.1279E-06	(192)	6.1500E-05	(168)	4.5374E-05	(168)	4.2132E-05	(146)	3.6382E-05	(132)
9	5.2566E-06	(167)	5.1948E-05	(7)	5.1816E-05	(7)	4.4024E-05	(87)	3.5938E-05	(87)
10	8.1535E-06	(150)	5.3031E-05	(335)	6.1873E-05	(39)	5.6972E-05	(39)	4.7427E-05	(39)
11	1.1018E-05	(99)	6.3351E-05	(351)	7.5019E-05	(99)	5.4954E-05	(99)	4.3048E-05	(99)
12	1.7757E-05	(145)	6.4103E-05	(150)	6.4109E-05	(145)	4.8025E-05	(145)	3.9099E-05	(145)
13	1.4407E-05	(150)	5.5382E-05	(145)	5.3145E-05	(55)	5.1892E-05	(355)	4.6817E-05	(355)
14	1.0220E-05	(163)	5.8565E-05	(280)	6.9610E-05	(280)	5.7405E-05	(280)	4.5068E-05	(350)
15	9.3773E-06	(163)	5.2867E-05	(41)	5.5981E-05	(96)	4.9333E-05	(96)	4.0205E-05	(96)
16	6.0677E-06	(107)	5.7397E-05	(107)	4.6532E-05	(107)	3.9137E-05	(96)	3.2199E-05	(96)
17	5.3872E-06	(72)	6.7367E-05	(107)	7.8474E-05	(311)	6.6288E-05	(57)	5.4184E-05	(332)
18	5.9252E-06	(100)	1.2426E-04	(279)	1.2979E-04	(279)	1.0211E-04	(279)	8.1981E-05	(313)
19	6.1060E-06	(198)	8.0391E-05	(313)	8.8984E-05	(279)	6.9568E-05	(279)	5.6063E-05	(312)
20	5.6821E-06	(100)	6.5231E-05	(276)	6.8451E-05	(348)	6.6955E-05	(348)	5.9085E-05	(348)
21	7.9970E-06	(225)	7.3747E-05	(330)	8.1175E-05	(277)	6.2957E-05	(277)	4.8548E-05	(277)
22	1.2095E-05	(225)	7.2105E-05	(100)	7.6398E-05	(277)	6.1005E-05	(277)	4.9997E-05	(267)
23	1.0799E-05	(67)	7.4726E-05	(171)	8.2070E-05	(295)	6.9224E-05	(295)	5.6662E-05	(295)
24	8.4130E-06	(171)	6.8350E-05	(195)	7.3190E-05	(194)	5.5245E-05	(194)	4.2143E-05	(194)
25	4.7846E-06	(235)	5.3921E-05	(340)	5.8653E-05	(110)	4.4418E-05	(110)	3.4757E-05	(248)
26	6.8101E-06	(172)	5.0880E-05	(300)	4.8680E-05	(365)	4.3101E-05	(302)	3.7964E-05	(302)
27	9.5567E-06	(111)	5.6424E-05	(140)	5.0492E-05	(101)	4.4880E-05	(361)	4.2987E-05	(361)
28	6.9537E-06	(111)	6.1111E-05	(215)	6.4359E-05	(102)	5.4580E-05	(102)	4.3499E-05	(102)
29	8.4741E-06	(139)	5.0361E-05	(102)	6.0495E-05	(139)	5.2385E-05	(102)	4.5760E-05	(102)
30	1.0990E-05	(211)	7.2133E-05	(139)	5.6463E-05	(361)	4.3718E-05	(62)	3.5701E-05	(219)
31	1.0503E-05	(220)	5.8486E-05	(65)	5.2206E-05	(70)	4.2093E-05	(37)	3.7454E-05	(37)
32	1.1591E-05	(135)	6.7081E-05	(134)	6.1750E-05	(248)	5.4750E-05	(248)	4.6846E-05	(216)
33	9.1306E-06	(135)	6.6015E-05	(250)	6.7826E-05	(94)	5.4789E-05	(63)	4.1685E-05	(63)
34	7.3048E-06	(94)	6.3727E-05	(93)	6.5129E-05	(93)	5.1415E-05	(334)	4.0031E-05	(334)
35	7.5730E-06	(188)	4.6493E-05	(94)	5.2099E-05	(175)	4.9719E-05	(176)	4.4708E-05	(95)
36	8.1476E-06	(135)	6.8347E-05	(176)	8.4361E-05	(176)	7.3085E-05	(176)	5.9775E-05	(176)

PLANT NAME: KISS. UTILITIES POLLUTANT: SO2 AIR QUALITY UNITS: GM/M**3
YEARLY SECOND MAXIMUM 24-HOUR CONC= 8.5687E-05 DIRECTION= 18 DISTANCE= 0.5 KM DAY=293
YEAR= 75

SECOND HIGHEST 24-HOUR CONCENTRATION AT EACH RECEPTOR

DIR	RANGE 0.1 KM	0.3 KM	0.5 KM	0.7 KM	0.9 KM
1	1.4183E-05 (167)	7.0473E-05 (167)	6.9188E-05 (331)	5.0975E-05 (119)	4.0120E-05 (20)
2	1.4399E-05 (215)	5.8855E-05 (20)	6.2430E-05 (119)	4.3490E-05 (119)	3.3497E-05 (119)
3	8.3953E-06 (89)	4.4796E-05 (89)	3.9038E-05 (89)	3.1468E-05 (9)	2.5255E-05 (267)
4	7.2991E-06 (203)	4.8354E-05 (82)	4.1090E-05 (50)	3.1337E-05 (66)	2.5871E-05 (66)
5	9.8454E-06 (203)	4.8854E-05 (160)	4.4695E-05 (351)	4.0575E-05 (351)	3.4659E-05 (351)
6	8.9305E-06 (157)	4.9191E-05 (188)	4.0163E-05 (100)	3.1997E-05 (192)	2.6763E-05 (192)
7	1.0128E-05 (110)	6.8747E-05 (158)	6.0451E-05 (178)	4.7989E-05 (325)	4.1427E-05 (325)
8	1.3696E-05 (225)	5.9094E-05 (81)	6.5228E-05 (157)	4.8505E-05 (157)	4.0182E-05 (157)
9	1.0719E-05 (225)	4.6972E-05 (78)	4.8423E-05 (78)	3.9679E-05 (78)	3.4009E-05 (325)
10	8.2741E-06 (129)	5.3053E-05 (78)	5.3294E-05 (124)	4.2219E-05 (124)	3.3418E-05 (124)
11	8.5707E-06 (128)	6.3519E-05 (13)	7.2578E-05 (13)	5.9575E-05 (13)	4.6717E-05 (13)
12	1.2501E-05 (180)	7.4376E-05 (13)	8.2202E-05 (13)	6.8310E-05 (297)	5.8107E-05 (354)
13	1.0391E-05 (180)	7.4819E-05 (67)	8.1376E-05 (317)	6.1636E-05 (317)	4.8373E-05 (298)
14	8.8382E-06 (231)	6.7204E-05 (139)	6.3434E-05 (291)	5.0296E-05 (291)	3.9623E-05 (291)
15	7.9549E-06 (155)	5.9117E-05 (14)	6.4653E-05 (125)	5.3211E-05 (352)	4.2111E-05 (352)
16	8.2176E-06 (102)	5.3496E-05 (95)	6.3405E-05 (353)	5.3451E-05 (353)	4.2269E-05 (353)
17	8.5630E-06 (230)	5.1685E-05 (353)	6.6450E-05 (353)	6.1317E-05 (353)	5.5659E-05 (353)
18	8.5751E-06 (155)	8.0293E-05 (268)	8.5687E-05 (293)	7.1867E-05 (293)	6.2354E-05 (293)
19	4.4800E-06 (163)	5.1181E-05 (353)	6.2998E-05 (353)	5.4066E-05 (64)	4.7143E-05 (5)
20	5.5061E-06 (181)	5.1968E-05 (52)	6.8683E-05 (292)	6.4912E-05 (5)	6.1051E-05 (257)
21	7.5929E-06 (141)	5.7803E-05 (111)	6.0797E-05 (111)	5.4122E-05 (273)	4.4294E-05 (273)
22	9.6530E-06 (182)	5.2749E-05 (285)	5.6453E-05 (2)	4.6748E-05 (5)	4.3022E-05 (5)
23	9.5466E-06 (103)	6.1859E-05 (182)	6.3954E-05 (174)	5.1374E-05 (309)	4.8653E-05 (52)
24	1.0706E-05 (170)	7.4791E-05 (182)	6.9122E-05 (182)	5.1573E-05 (305)	4.2293E-05 (305)
25	9.3623E-06 (103)	5.3601E-05 (144)	5.9679E-05 (323)	4.3793E-05 (181)	3.5076E-05 (251)
26	1.1117E-05 (234)	4.7772E-05 (287)	4.5250E-05 (112)	3.4296E-05 (173)	2.6816E-05 (287)
27	1.2363E-05 (112)	6.1201E-05 (247)	6.5029E-05 (247)	5.2364E-05 (247)	4.3227E-05 (77)
28	8.6324E-06 (214)	7.0737E-05 (288)	6.0239E-05 (288)	4.4025E-05 (222)	3.4999E-05 (222)
29	5.8329E-06 (263)	5.8574E-05 (205)	4.5467E-05 (214)	3.4760E-05 (363)	3.0580E-05 (313)
30	8.0642E-06 (113)	8.3998E-05 (87)	8.0012E-05 (117)	5.9437E-05 (117)	4.6712E-05 (117)
31	6.5571E-06 (114)	4.6869E-05 (117)	5.0669E-05 (104)	4.2991E-05 (104)	3.5485E-05 (104)
32	5.8479E-06 (259)	4.0249E-05 (88)	4.3514E-05 (196)	3.6295E-05 (10)	3.2943E-05 (10)
33	8.5792E-06 (210)	7.9172E-05 (10)	8.0166E-05 (10)	6.8323E-05 (364)	5.5422E-05 (364)
34	8.4170E-06 (210)	7.2261E-05 (194)	7.1572E-05 (266)	5.7204E-05 (266)	4.4844E-05 (48)
35	1.0446E-05 (210)	5.7955E-05 (194)	6.2846E-05 (55)	5.2983E-05 (194)	4.3983E-05 (194)
36	1.1964E-05 (167)	7.1976E-05 (109)	6.5642E-05 (89)	5.9521E-05 (89)	4.9008E-05 (89)

PLANT NAME: KISS. UTILITIES POLLUTANT: SO2 AIR QUALITY UNITS: GM/M**3
YEARLY SECOND MAXIMUM 24-HOUR CONC= 1.3271E-04 DIRECTION= 18 DISTANCE= 0.5 KM DAY=340
YEAR= 76

SECOND HIGHEST 24-HOUR CONCENTRATION AT EACH RECEPTOR

RANGE DIR	0.1 KM	0.3 KM	0.5 KM	0.7 KM	0.9 KM
1	8.3098E-06 (102)	5.0949E-05 (215)	4.8132E-05 (50)	4.1850E-05 (50)	3.4077E-05 (299)
2	7.3163E-06 (187)	6.3095E-05 (187)	5.5306E-05 (363)	4.4913E-05 (363)	3.6071E-05 (363)
3	8.0708E-06 (213)	5.8282E-05 (214)	5.4448E-05 (91)	4.4914E-05 (144)	3.4338E-05 (144)
4	9.6371E-06 (213)	5.5424E-05 (355)	6.8027E-05 (299)	5.8326E-05 (299)	4.6413E-05 (299)
5	8.7906E-06 (95)	6.4796E-05 (117)	6.4606E-05 (145)	5.1845E-05 (145)	4.1983E-05 (69)
6	9.6870E-06 (81)	5.5919E-05 (145)	5.4244E-05 (194)	4.2769E-05 (194)	3.5831E-05 (194)
7	6.1083E-06 (81)	5.2062E-05 (145)	4.4949E-05 (132)	3.7826E-05 (132)	3.6136E-05 (342)
8	8.9896E-06 (198)	5.6925E-05 (195)	5.1139E-05 (122)	3.7831E-05 (197)	3.2137E-05 (198)
9	1.3807E-05 (139)	9.5890E-05 (196)	7.8661E-05 (196)	6.4104E-05 (361)	5.3661E-05 (361)
10	5.0725E-06 (198)	5.9965E-05 (17)	5.4478E-05 (17)	4.4336E-05 (16)	3.8432E-05 (16)
11	4.9108E-06 (93)	5.3945E-05 (198)	6.0822E-05 (326)	5.5393E-05 (326)	4.7006E-05 (326)
12	6.9281E-06 (235)	5.7511E-05 (343)	7.3104E-05 (343)	6.3488E-05 (343)	5.1844E-05 (343)
13	8.5807E-06 (157)	6.3413E-05 (18)	7.5721E-05 (310)	6.8037E-05 (310)	5.6114E-05 (362)
14	9.4328E-06 (157)	7.3565E-05 (295)	6.9076E-05 (295)	5.3461E-05 (295)	4.1555E-05 (295)
15	8.9328E-06 (96)	6.4433E-05 (67)	6.9248E-05 (327)	5.5387E-05 (100)	4.4650E-05 (99)
16	6.3737E-06 (220)	6.2719E-05 (335)	8.3422E-05 (335)	7.2803E-05 (335)	5.8692E-05 (335)
17	4.0767E-06 (124)	6.9647E-05 (77)	7.4648E-05 (336)	6.4756E-05 (19)	5.6626E-05 (19)
18	5.9648E-06 (131)	1.1545E-04 (336)	1.3271E-04 (340)	1.1640E-04 (302)	8.9292E-05 (302)
19	7.7339E-06 (157)	9.7964E-05 (302)	1.0305E-04 (292)	8.5959E-05 (292)	6.9518E-05 (292)
20	1.1644E-05 (140)	8.5134E-05 (318)	9.6916E-05 (318)	7.8382E-05 (318)	6.2376E-05 (292)
21	1.0440E-05 (164)	6.6070E-05 (57)	7.3699E-05 (57)	5.9461E-05 (57)	4.6261E-05 (166)
22	9.2402E-06 (199)	7.0934E-05 (166)	5.6909E-05 (166)	4.8831E-05 (5)	4.1390E-05 (5)
23	9.4675E-06 (242)	7.0092E-05 (130)	8.2172E-05 (130)	6.9835E-05 (231)	5.8310E-05 (231)
24	1.0029E-05 (101)	6.5025E-05 (165)	6.9343E-05 (165)	5.7915E-05 (165)	4.8668E-05 (161)
25	7.9979E-06 (245)	6.5064E-05 (243)	5.2750E-05 (307)	4.4659E-05 (290)	3.6736E-05 (290)
26	7.4226E-06 (126)	7.4210E-05 (278)	6.7715E-05 (278)	5.0703E-05 (278)	3.8484E-05 (278)
27	7.6108E-06 (126)	4.9869E-05 (126)	5.0080E-05 (84)	4.3717E-05 (84)	3.8375E-05 (241)
28	6.2566E-06 (251)	5.4099E-05 (269)	5.0675E-05 (269)	3.9870E-05 (64)	3.0963E-05 (269)
29	7.0738E-06 (108)	6.2186E-05 (127)	5.6129E-05 (72)	4.9917E-05 (345)	4.1384E-05 (346)
30	7.7512E-06 (245)	5.1226E-05 (64)	4.7917E-05 (120)	4.6691E-05 (64)	4.1035E-05 (262)
31	7.3859E-06 (154)	7.1406E-05 (135)	7.3737E-05 (135)	5.9113E-05 (135)	4.8818E-05 (168)
32	8.8453E-06 (192)	5.6184E-05 (168)	5.1765E-05 (168)	4.2531E-05 (169)	3.4515E-05 (169)
33	1.0762E-05 (189)	5.1710E-05 (228)	5.6948E-05 (282)	5.3031E-05 (282)	4.4910E-05 (282)
34	1.0779E-05 (134)	5.9205E-05 (228)	6.6066E-05 (144)	5.8176E-05 (144)	4.9036E-05 (144)
35	9.1676E-06 (134)	5.4291E-05 (228)	6.0637E-05 (172)	4.9932E-05 (48)	4.1176E-05 (137)
36	9.5159E-06 (228)	6.2494E-05 (215)	7.3371E-05 (363)	6.3640E-05 (363)	5.2836E-05 (363)

PLANT NAME: KISS. UTILITIES POLLUTANT: SO2 AIR QUALITY UNITS: GM/M**3
YEARLY SECOND MAXIMUM 24-HOUR CONC= 1.2595E-04 DIRECTION= 18 DISTANCE= 0.5 KM DAY=344
YEAR= 77

SECOND HIGHEST 24-HOUR CONCENTRATION AT EACH RECEPTOR

DIR	RANGE 0.1 KM	0.3 KM	0.5 KM	0.7 KM	0.9 KM
1	1.1054E-05 (236)	7.5769E-05 (207)	6.3959E-05 (339)	4.9802E-05 (339)	3.8267E-05 (65)
2	9.9343E-06 (145)	5.2809E-05 (285)	4.3609E-05 (230)	3.4910E-05 (339)	2.9819E-05 (28)
3	1.0053E-05 (248)	4.9650E-05 (285)	6.2548E-05 (234)	5.8855E-05 (251)	4.7589E-05 (251)
4	1.0073E-05 (252)	6.3370E-05 (145)	5.2598E-05 (148)	3.7887E-05 (148)	3.0592E-05 (157)
5	7.4923E-06 (177)	7.4527E-05 (177)	7.4175E-05 (172)	6.0772E-05 (172)	5.0891E-05 (172)
6	7.8030E-06 (114)	6.0200E-05 (77)	6.4513E-05 (78)	5.6816E-05 (78)	4.8760E-05 (157)
7	9.1548E-06 (114)	5.4247E-05 (3)	5.3964E-05 (3)	4.4033E-05 (299)	4.2266E-05 (299)
8	7.3511E-06 (176)	4.8765E-05 (176)	4.0520E-05 (129)	3.2880E-05 (20)	3.0604E-05 (284)
9	8.3468E-06 (174)	7.2032E-05 (81)	7.6940E-05 (81)	6.6888E-05 (36)	5.4511E-05 (36)
10	5.3014E-06 (174)	4.6928E-05 (7)	6.0303E-05 (7)	5.2646E-05 (7)	4.2749E-05 (7)
11	5.9579E-06 (114)	7.2358E-05 (51)	6.8248E-05 (51)	5.2403E-05 (127)	4.0196E-05 (51)
12	8.5788E-06 (161)	6.3729E-05 (161)	5.3156E-05 (164)	4.2521E-05 (59)	3.6621E-05 (59)
13	8.9486E-06 (178)	6.8777E-05 (330)	6.6750E-05 (330)	5.0629E-05 (330)	3.9082E-05 (21)
14	7.1696E-06 (172)	6.6033E-05 (360)	6.0788E-05 (254)	5.0695E-05 (254)	4.0245E-05 (254)
15	8.7687E-06 (163)	5.4212E-05 (117)	5.6585E-05 (1)	5.0781E-05 (59)	4.0504E-05 (59)
16	1.2818E-05 (163)	6.7232E-05 (96)	7.2463E-05 (341)	6.8868E-05 (305)	5.7491E-05 (315)
17	1.3731E-05 (203)	7.2391E-05 (341)	7.1879E-05 (315)	6.1307E-05 (305)	5.1977E-05 (305)
18	7.2994E-06 (98)	1.0531E-04 (344)	1.2595E-04 (344)	1.0553E-04 (344)	8.3771E-05 (344)
19	4.0865E-06 (104)	5.8040E-05 (40)	6.5032E-05 (40)	5.2231E-05 (40)	4.0120E-05 (40)
20	4.8231E-06 (223)	6.9092E-05 (39)	8.2633E-05 (39)	6.8496E-05 (39)	5.3588E-05 (39)
21	6.2782E-06 (105)	6.4446E-05 (39)	6.8882E-05 (39)	5.6130E-05 (33)	4.6752E-05 (66)
22	6.8668E-06 (142)	5.6580E-05 (304)	6.1737E-05 (304)	5.0229E-05 (304)	3.9727E-05 (304)
23	9.0884E-06 (142)	7.6242E-05 (103)	8.1925E-05 (131)	7.4374E-05 (103)	5.9886E-05 (103)
24	1.1382E-05 (101)	9.0274E-05 (278)	8.7970E-05 (131)	7.6923E-05 (131)	5.9956E-05 (102)
25	1.1183E-05 (101)	6.2250E-05 (255)	6.0185E-05 (132)	4.7493E-05 (218)	3.8421E-05 (218)
26	9.7022E-06 (255)	5.7662E-05 (255)	5.7327E-05 (130)	4.9657E-05 (130)	4.0459E-05 (130)
27	7.8458E-06 (243)	1.0760E-04 (217)	9.3387E-05 (217)	8.2705E-05 (242)	6.8182E-05 (242)
28	8.2594E-06 (109)	5.6668E-05 (222)	6.3928E-05 (222)	5.5094E-05 (222)	4.5535E-05 (222)
29	9.4369E-06 (140)	6.1454E-05 (86)	5.7764E-05 (123)	4.7366E-05 (123)	3.7883E-05 (123)
30	1.4359E-05 (136)	9.7978E-05 (258)	8.1840E-05 (86)	6.7745E-05 (86)	5.6369E-05 (86)
31	1.3583E-05 (112)	5.2512E-05 (229)	5.8176E-05 (192)	4.9666E-05 (192)	4.2094E-05 (246)
32	7.3255E-06 (112)	5.2602E-05 (229)	5.4485E-05 (249)	4.7747E-05 (274)	4.0058E-05 (274)
33	5.6644E-06 (202)	5.2560E-05 (210)	5.4055E-05 (63)	4.7211E-05 (63)	3.9110E-05 (63)
34	5.5291E-06 (207)	5.8548E-05 (206)	5.4472E-05 (92)	4.8572E-05 (153)	4.5890E-05 (153)
35	8.7585E-06 (189)	5.9817E-05 (206)	5.4739E-05 (64)	5.1474E-05 (235)	4.6341E-05 (235)
36	1.4476E-05 (207)	1.0507E-04 (207)	1.1176E-04 (335)	9.7557E-05 (335)	8.4235E-05 (233)

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PLANT NAME: KISS. UTILITIES POLLUTANT: SO2 AIR QUALITY UNITS: GM/M**3
YEARLY SECOND MAXIMUM 24-HOUR CONC= 1.4110E-04 DIRECTION= 18 DISTANCE= 0.5 KM DAY=325
YEAR= 78

SECOND HIGHEST 24-HOUR CONCENTRATION AT EACH RECEPTOR

DIR	RANGE 0.1 KM	0.3 KM	0.5 KM	0.7 KM	0.9 KM
1	1.2993E-05 (187)	5.8147E-05 (184)	4.9428E-05 (247)	4.1446E-05 (75)	3.5919E-05 (75)
2	1.0949E-05 (119)	7.5965E-05 (355)	7.1683E-05 (160)	6.2573E-05 (160)	5.2102E-05 (160)
3	8.4984E-06 (184)	5.8939E-05 (119)	5.0461E-05 (355)	4.2616E-05 (355)	3.5428E-05 (74)
4	8.2345E-06 (184)	6.6618E-05 (334)	7.3615E-05 (334)	5.8467E-05 (135)	4.5030E-05 (135)
5	8.9812E-06 (119)	6.0005E-05 (355)	6.5277E-05 (355)	5.2536E-05 (355)	4.0761E-05 (355)
6	9.6007E-06 (116)	4.7277E-05 (20)	5.5775E-05 (20)	4.6498E-05 (287)	4.1229E-05 (69)
7	5.8379E-06 (250)	4.4962E-05 (111)	5.2546E-05 (353)	4.4998E-05 (50)	3.9784E-05 (13)
8	5.5594E-06 (110)	4.9941E-05 (111)	3.6867E-05 (14)	2.9225E-05 (14)	2.4313E-05 (214)
9	5.6995E-06 (134)	8.0940E-05 (26)	8.7982E-05 (20)	7.6173E-05 (20)	6.9784E-05 (51)
10	5.1915E-06 (183)	4.7406E-05 (9)	5.3282E-05 (14)	4.4347E-05 (14)	3.5211E-05 (14)
11	3.8496E-06 (183)	5.2013E-05 (14)	6.0028E-05 (14)	5.3533E-05 (15)	4.4251E-05 (15)
12	5.5476E-06 (279)	5.5438E-05 (15)	7.3890E-05 (50)	6.7356E-05 (50)	5.6132E-05 (50)
13	1.1504E-05 (249)	6.7990E-05 (279)	6.2434E-05 (10)	6.0701E-05 (313)	5.5523E-05 (313)
14	1.0182E-05 (249)	7.1705E-05 (279)	6.5058E-05 (29)	5.3592E-05 (29)	4.3783E-05 (313)
15	7.6131E-06 (231)	6.4425E-05 (307)	8.0681E-05 (27)	6.2075E-05 (27)	4.7049E-05 (27)
16	5.1758E-06 (81)	4.9366E-05 (81)	5.4143E-05 (346)	4.5988E-05 (346)	3.8196E-05 (346)
17	3.4203E-06 (141)	6.9603E-05 (344)	8.6420E-05 (41)	7.4660E-05 (291)	6.3063E-05 (292)
18	4.3752E-06 (141)	1.1376E-04 (325)	1.4110E-04 (325)	1.2128E-04 (325)	9.8128E-05 (325)
19	3.9972E-06 (81)	7.8723E-05 (35)	9.3993E-05 (36)	8.1120E-05 (36)	6.5894E-05 (36)
20	6.4747E-06 (145)	7.2125E-05 (36)	9.2467E-05 (35)	7.1976E-05 (36)	5.6110E-05 (36)
21	8.2303E-06 (145)	5.8121E-05 (23)	6.2467E-05 (362)	5.2045E-05 (362)	4.9124E-05 (283)
22	9.2035E-06 (186)	7.2541E-05 (235)	6.4087E-05 (363)	6.0492E-05 (271)	5.0095E-05 (277)
23	8.9648E-06 (106)	7.8206E-05 (237)	7.1599E-05 (267)	6.3036E-05 (32)	5.5893E-05 (32)
24	1.0517E-05 (89)	6.7950E-05 (114)	6.3230E-05 (234)	5.3181E-05 (234)	4.2502E-05 (234)
25	9.2131E-06 (143)	7.6352E-05 (363)	8.1398E-05 (147)	6.5083E-05 (147)	5.2589E-05 (147)
26	1.1877E-05 (195)	9.8870E-05 (143)	8.5785E-05 (167)	6.6809E-05 (149)	5.2763E-05 (166)
27	1.1590E-05 (202)	9.2326E-05 (168)	1.0705E-04 (168)	8.7521E-05 (169)	6.8298E-05 (168)
28	1.0322E-05 (146)	8.6194E-05 (24)	8.8332E-05 (24)	6.9104E-05 (24)	5.4108E-05 (202)
29	8.7888E-06 (176)	7.2042E-05 (113)	6.0886E-05 (170)	5.3410E-05 (170)	4.3679E-05 (170)
30	9.8319E-06 (216)	6.6388E-05 (78)	6.2801E-05 (68)	5.2923E-05 (203)	4.0352E-05 (123)
31	9.6997E-06 (151)	7.1070E-05 (123)	7.8301E-05 (84)	6.6451E-05 (84)	5.3222E-05 (84)
32	8.1935E-06 (108)	6.4048E-05 (222)	6.2519E-05 (173)	5.3950E-05 (8)	4.5964E-05 (159)
33	1.0823E-05 (158)	7.7349E-05 (124)	9.5728E-05 (124)	8.3036E-05 (124)	6.7571E-05 (124)
34	9.9005E-06 (191)	7.0326E-05 (128)	7.3235E-05 (210)	6.6957E-05 (210)	6.1150E-05 (198)
35	1.1788E-05 (120)	8.3384E-05 (102)	6.5942E-05 (160)	4.7493E-05 (59)	4.0953E-05 (59)
36	1.2108E-05 (102)	7.5986E-05 (338)	7.5231E-05 (338)	6.0688E-05 (338)	5.0097E-05 (339)

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PLANT NAME: KISS. UTILITIES POLLUTANT: SO2 AIR QUALITY UNITS: GM/M**3
YEARLY SECOND MAXIMUM 3-HOUR CONC= 3.4050E-04 DIRECTION= 18 DISTANCE= 0.3 KM DAY=298 TIME PERIOD= 4
YEAR= 74

SECOND HIGHEST 3-HOUR CONCENTRATION AT EACH RECEPTOR

DIR	RANGE 0.1 KM	0.3 KM	0.5 KM	0.7 KM	0.9 KM
1	5.1734E-05 (196, 4)	2.9919E-04 (135, 4)	2.5985E-04 (334, 8)	2.2872E-04 (334, 8)	1.8501E-04 (334, 8)
2	4.4742E-05 (80, 4)	2.2041E-04 (38, 4)	2.0200E-04 (78, 4)	1.7006E-04 (38, 4)	1.3549E-04 (82, 5)
3	3.1773E-05 (125, 5)	2.1044E-04 (84, 4)	2.2646E-04 (126, 3)	2.1724E-04 (126, 3)	1.8543E-04 (126, 3)
4	4.7737E-05 (146, 5)	2.4805E-04 (143, 6)	3.1528E-04 (39, 2)	2.9924E-04 (143, 6)	2.4398E-04 (143, 6)
5	6.4528E-05 (174, 5)	2.9217E-04 (146, 5)	2.7443E-04 (39, 3)	2.5358E-04 (39, 3)	2.1085E-04 (39, 3)
6	6.3878E-05 (168, 4)	2.5200E-04 (230, 5)	2.4321E-04 (90, 6)	2.0033E-04 (144, 3)	1.7327E-04 (350, 1)
7	5.8700E-05 (151, 4)	2.2093E-04 (90, 5)	2.2125E-04 (163, 3)	1.7903E-04 (163, 3)	1.4615E-04 (168, 3)
8	3.9633E-05 (87, 5)	2.1899E-04 (203, 4)	2.0215E-04 (193, 5)	1.5750E-04 (193, 5)	1.4762E-04 (44, 6)
9	4.1070E-05 (167, 4)	2.1527E-04 (7, 4)	2.1518E-04 (192, 3)	1.7592E-04 (53, 6)	1.4925E-04 (335, 2)
10	5.6486E-05 (163, 5)	2.9686E-04 (113, 6)	2.5972E-04 (99, 5)	1.9484E-04 (39, 6)	1.6355E-04 (39, 6)
11	6.8260E-05 (163, 5)	2.6906E-04 (202, 4)	2.5459E-04 (351, 6)	2.0463E-04 (351, 6)	1.5844E-04 (351, 6)
12	9.7313E-05 (145, 4)	2.5033E-04 (201, 4)	2.1192E-04 (161, 8)	1.9272E-04 (326, 5)	1.5422E-04 (269, 6)
13	6.0249E-05 (163, 4)	2.4118E-04 (96, 5)	2.2168E-04 (196, 6)	1.6676E-04 (40, 2)	1.4661E-04 (281, 2)
14	5.9060E-05 (163, 4)	2.5894E-04 (325, 4)	2.7697E-04 (206, 6)	2.2341E-04 (325, 4)	1.8031E-04 (40, 4)
15	4.5662E-05 (163, 5)	2.3372E-04 (69, 5)	2.3293E-04 (69, 5)	1.7677E-04 (290, 2)	1.5581E-04 (280, 4)
16	4.3561E-05 (196, 5)	2.2007E-04 (72, 4)	1.9904E-04 (352, 4)	1.5845E-04 (338, 5)	1.2178E-04 (352, 4)
17	3.6860E-05 (107, 5)	2.3679E-04 (107, 4)	2.4320E-04 (57, 4)	2.0373E-04 (13, 2)	1.8057E-04 (13, 2)
18	3.5176E-05 (198, 4)	3.4050E-04 (298, 4)	3.2028E-04 (298, 4)	2.5386E-04 (297, 3)	2.0761E-04 (297, 4)
19	3.2185E-05 (100, 5)	2.4144E-04 (108, 3)	2.0350E-04 (313, 6)	1.8330E-04 (72, 7)	1.5316E-04 (108, 3)
20	3.0702E-05 (128, 5)	2.3210E-04 (257, 4)	2.4662E-04 (296, 5)	2.2989E-04 (320, 1)	2.1880E-04 (320, 1)
21	4.6424E-05 (225, 5)	2.6124E-04 (238, 5)	2.3354E-04 (348, 3)	2.0415E-04 (330, 4)	1.6169E-04 (348, 6)
22	6.8516E-05 (100, 4)	2.9249E-04 (100, 4)	2.5107E-04 (258, 5)	1.8917E-04 (277, 7)	1.6384E-04 (252, 3)
23	6.8344E-05 (225, 5)	2.6518E-04 (278, 5)	2.7963E-04 (195, 4)	2.3820E-04 (320, 6)	2.0670E-04 (320, 6)
24	4.1429E-05 (111, 5)	2.2094E-04 (195, 3)	2.1294E-04 (117, 4)	1.8698E-04 (286, 5)	1.6578E-04 (73, 8)
25	2.9893E-05 (235, 5)	2.3950E-04 (235, 5)	2.1343E-04 (235, 5)	1.7065E-04 (73, 6)	1.6520E-04 (18, 6)
26	4.1830E-05 (140, 5)	2.7421E-04 (301, 5)	2.2584E-04 (224, 5)	1.8612E-04 (333, 6)	1.5740E-04 (73, 5)
27	6.1452E-05 (140, 4)	2.5795E-04 (111, 4)	2.0056E-04 (243, 6)	1.9928E-04 (184, 6)	1.8409E-04 (361, 7)
28	4.3714E-05 (246, 4)	2.1793E-04 (133, 5)	2.1577E-04 (264, 6)	1.8782E-04 (149, 6)	1.5587E-04 (149, 6)
29	4.6117E-05 (241, 5)	2.7069E-04 (243, 5)	2.1982E-04 (52, 6)	2.0598E-04 (142, 7)	1.7945E-04 (142, 7)
30	6.5872E-05 (241, 5)	2.5249E-04 (241, 5)	2.3214E-04 (361, 5)	2.1012E-04 (240, 6)	1.7573E-04 (240, 6)
31	6.2600E-05 (220, 4)	2.3929E-04 (52, 4)	2.4165E-04 (70, 6)	2.1398E-04 (137, 4)	1.8140E-04 (137, 4)
32	8.4972E-05 (243, 4)	2.4828E-04 (159, 4)	2.1077E-04 (131, 3)	1.7723E-04 (24, 5)	1.5972E-04 (75, 1)
33	6.8807E-05 (243, 4)	2.5524E-04 (94, 4)	2.1348E-04 (67, 5)	1.5440E-04 (94, 4)	1.4010E-04 (349, 4)
34	3.6102E-05 (94, 5)	2.9445E-04 (94, 5)	2.8544E-04 (132, 1)	2.1375E-04 (186, 4)	1.6379E-04 (53, 1)
35	4.6253E-05 (94, 5)	2.3730E-04 (152, 5)	2.0699E-04 (353, 5)	1.8786E-04 (342, 2)	1.6410E-04 (176, 8)
36	5.3121E-05 (152, 5)	2.5306E-04 (9, 5)	2.8641E-04 (176, 1)	2.4351E-04 (176, 1)	1.9379E-04 (176, 1)

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PLANT NAME: KISS. UTILITIES POLLUTANT: SO2 AIR QUALITY UNITS: GM/M**3
YEARLY SECOND MAXIMUM 3-HOUR CONC= 3.2295E-04 DIRECTION= 25 DISTANCE= 0.3 KM DAY=144 TIME PERIOD= 5
YEAR= 75

SECOND HIGHEST 3-HOUR CONCENTRATION AT EACH RECEPTOR

DIR	RANGE 0.1 KM	0.3 KM	0.5 KM	0.7 KM	0.9 KM
1	7.3279E-05 (215, 5)	2.8351E-04 (119, 5)	2.4981E-04 (119, 6)	1.9505E-04 (119, 6)	1.5003E-04 (119, 6)
2	6.8592E-05 (119, 5)	2.3649E-04 (207, 5)	2.2354E-04 (20, 2)	1.7905E-04 (20, 2)	1.4276E-04 (119, 4)
3	4.6346E-05 (166, 5)	2.5017E-04 (66, 5)	2.6432E-04 (186, 3)	2.3475E-04 (89, 4)	1.8613E-04 (89, 4)
4	4.5547E-05 (203, 4)	2.6689E-04 (188, 4)	2.0325E-04 (83, 6)	1.5771E-04 (93, 2)	1.4227E-04 (311, 3)
5	5.0154E-05 (186, 5)	2.6752E-04 (89, 5)	2.3389E-04 (93, 3)	1.7631E-04 (351, 5)	1.5736E-04 (256, 6)
6	5.9748E-05 (110, 4)	2.3529E-04 (110, 4)	1.9654E-04 (37, 6)	1.5817E-04 (43, 6)	1.2308E-04 (138, 3)
7	7.3350E-05 (110, 4)	2.9616E-04 (73, 5)	2.7373E-04 (150, 4)	2.2376E-04 (73, 5)	1.7253E-04 (73, 5)
8	1.0956E-04 (225, 5)	2.9532E-04 (133, 4)	2.7298E-04 (81, 6)	2.2370E-04 (81, 6)	1.7415E-04 (81, 6)
9	6.3243E-05 (157, 4)	2.5659E-04 (267, 4)	2.1039E-04 (1, 5)	2.0109E-04 (325, 5)	1.5789E-04 (325, 5)
10	5.0991E-05 (129, 4)	2.5753E-04 (138, 5)	2.4583E-04 (124, 6)	1.7635E-04 (186, 6)	1.2871E-04 (123, 7)
11	6.1075E-05 (164, 5)	2.6005E-04 (93, 6)	2.2798E-04 (317, 7)	1.8825E-04 (298, 2)	1.6485E-04 (6, 6)
12	6.8649E-05 (180, 5)	2.6226E-04 (317, 5)	2.8427E-04 (356, 5)	2.4720E-04 (356, 5)	1.9874E-04 (356, 5)
13	5.7386E-05 (128, 4)	3.1935E-04 (317, 4)	2.7755E-04 (105, 6)	2.2954E-04 (317, 4)	1.7479E-04 (317, 4)
14	4.6224E-05 (155, 5)	2.8170E-04 (355, 3)	2.4246E-04 (231, 5)	1.6941E-04 (110, 6)	1.5774E-04 (110, 6)
15	5.2458E-05 (155, 5)	2.4552E-04 (231, 5)	2.2074E-04 (268, 5)	1.9279E-04 (268, 5)	1.5608E-04 (268, 5)
16	4.6098E-05 (96, 5)	2.6226E-04 (102, 4)	2.4942E-04 (94, 3)	2.1535E-04 (94, 3)	1.7075E-04 (353, 1)
17	5.4020E-05 (85, 5)	1.9845E-04 (95, 4)	2.1904E-04 (353, 2)	1.8497E-04 (353, 2)	1.5983E-04 (352, 8)
18	5.9246E-05 (106, 5)	2.3446E-04 (131, 4)	2.3083E-04 (303, 8)	2.4209E-04 (23, 2)	2.4270E-04 (268, 7)
19	3.3953E-05 (163, 5)	2.7844E-04 (303, 4)	2.5805E-04 (5, 3)	2.2198E-04 (303, 4)	1.6843E-04 (303, 4)
20	3.4457E-05 (181, 5)	2.2683E-04 (17, 4)	2.5517E-04 (292, 7)	2.3936E-04 (5, 5)	2.2437E-04 (257, 6)
21	4.6995E-05 (181, 5)	2.7191E-04 (320, 4)	2.3423E-04 (273, 5)	2.1383E-04 (273, 5)	1.7659E-04 (273, 5)
22	4.1374E-05 (145, 5)	2.4930E-04 (285, 5)	2.2316E-04 (321, 4)	1.9542E-04 (305, 8)	1.6782E-04 (17, 7)
23	4.9020E-05 (236, 5)	2.5766E-04 (338, 4)	2.3910E-04 (306, 6)	2.1755E-04 (22, 8)	1.9625E-04 (131, 6)
24	7.6428E-05 (103, 5)	2.9309E-04 (300, 5)	2.7079E-04 (307, 5)	2.1643E-04 (182, 6)	1.7457E-04 (305, 6)
25	6.8530E-05 (103, 5)	3.2295E-04 (144, 5)	2.2921E-04 (239, 6)	1.9414E-04 (181, 6)	1.5925E-04 (359, 1)
26	5.1551E-05 (112, 4)	2.2646E-04 (112, 4)	2.2954E-04 (287, 4)	1.7480E-04 (247, 5)	1.4420E-04 (173, 5)
27	6.0657E-05 (112, 5)	2.8053E-04 (114, 4)	2.2771E-04 (347, 4)	2.1501E-04 (287, 6)	2.0120E-04 (287, 6)
28	5.5050E-05 (143, 5)	2.9326E-04 (197, 5)	2.3466E-04 (126, 6)	1.9714E-04 (98, 7)	1.8047E-04 (126, 6)
29	3.9440E-05 (249, 4)	2.4715E-04 (205, 6)	2.3962E-04 (86, 5)	1.9852E-04 (86, 5)	1.5668E-04 (246, 4)
30	4.3349E-05 (198, 5)	2.7447E-04 (117, 5)	2.7147E-04 (103, 6)	2.1525E-04 (87, 5)	1.6531E-04 (87, 5)
31	4.6286E-05 (144, 4)	1.9932E-04 (340, 4)	2.0649E-04 (19, 4)	1.8318E-04 (19, 4)	1.6001E-04 (19, 4)
32	4.3995E-05 (260, 4)	2.0159E-04 (53, 5)	2.1401E-04 (108, 8)	1.7641E-04 (108, 8)	1.3774E-04 (108, 8)
33	5.3602E-05 (123, 4)	2.4958E-04 (121, 5)	2.5536E-04 (359, 6)	2.1115E-04 (359, 6)	1.6979E-04 (364, 8)
34	5.4048E-05 (210, 5)	2.9866E-04 (8, 4)	2.9094E-04 (194, 3)	2.2764E-04 (83, 3)	1.8323E-04 (83, 3)
35	5.1757E-05 (147, 5)	2.6136E-04 (120, 4)	2.1686E-04 (11, 3)	2.0377E-04 (194, 1)	1.6297E-04 (71, 5)
36	7.0137E-05 (119, 5)	3.1209E-04 (218, 5)	3.0611E-04 (13, 2)	2.3639E-04 (290, 4)	1.8024E-04 (290, 4)

PLANT NAME: KISS. UTILITIES POLLUTANT: SO2 AIR QUALITY UNITS: GM/M**3
YEARLY SECOND MAXIMUM 3-HOUR CONC= 3.2270E-04 DIRECTION= 36 DISTANCE= 0.3 KM DAY=216 TIME PERIOD= 4
YEAR= 76

SECOND HIGHEST 3-HOUR CONCENTRATION AT EACH RECEPTOR

RANGE DIR	0.1 KM	0.3 KM	0.5 KM	0.7 KM	0.9 KM
1	5.0311E-05 (152, 6)	2.2286E-04 (187, 3)	2.0950E-04 (53, 3)	1.7687E-04 (53, 3)	1.4374E-04 (17, 1)
2	3.9693E-05 (182, 4)	2.6630E-04 (187, 4)	2.1336E-04 (68, 5)	1.8064E-04 (363, 8)	1.3839E-04 (363, 8)
3	4.6111E-05 (147, 4)	2.8035E-04 (214, 3)	2.1860E-04 (299, 8)	1.9022E-04 (299, 8)	1.5251E-04 (299, 8)
4	5.8273E-05 (95, 5)	2.3709E-04 (273, 4)	2.3308E-04 (355, 7)	2.1080E-04 (182, 5)	1.7488E-04 (182, 5)
5	5.5637E-05 (117, 5)	2.6061E-04 (145, 2)	2.7885E-04 (258, 4)	2.2642E-04 (145, 2)	1.7681E-04 (198, 8)
6	4.9706E-05 (116, 5)	2.6522E-04 (315, 5)	2.5989E-04 (139, 4)	2.1647E-04 (145, 3)	1.7428E-04 (139, 4)
7	4.2356E-05 (198, 4)	2.4760E-04 (133, 3)	2.4240E-04 (350, 5)	2.0364E-04 (350, 5)	1.6068E-04 (73, 6)
8	5.6627E-05 (198, 4)	2.6299E-04 (122, 6)	2.6207E-04 (197, 3)	1.9435E-04 (132, 7)	1.7740E-04 (132, 7)
9	7.6406E-05 (196, 5)	2.5802E-04 (196, 5)	2.7842E-04 (361, 4)	2.1972E-04 (117, 6)	1.8183E-04 (70, 1)
10	3.9481E-05 (139, 5)	2.5215E-04 (213, 6)	2.4265E-04 (366, 6)	2.1774E-04 (366, 6)	1.7559E-04 (16, 6)
11	3.5093E-05 (221, 4)	2.7210E-04 (275, 5)	2.3409E-04 (275, 5)	2.0096E-04 (366, 8)	1.7224E-04 (17, 6)
12	4.2884E-05 (122, 5)	2.3825E-04 (323, 5)	2.4721E-04 (249, 4)	2.0783E-04 (77, 6)	1.5979E-04 (320, 8)
13	6.4034E-05 (118, 5)	2.4219E-04 (151, 4)	2.4888E-04 (362, 1)	1.9636E-04 (1, 5)	1.5847E-04 (1, 5)
14	5.2409E-05 (118, 5)	2.8594E-04 (309, 5)	2.3724E-04 (18, 2)	1.9510E-04 (18, 2)	1.5186E-04 (18, 2)
15	4.8774E-05 (96, 5)	2.7884E-04 (67, 5)	2.5035E-04 (124, 6)	2.0383E-04 (124, 6)	1.5976E-04 (124, 6)
16	4.3020E-05 (124, 5)	2.5296E-04 (356, 3)	2.5824E-04 (356, 3)	2.3048E-04 (311, 3)	1.9895E-04 (311, 3)
17	3.2155E-05 (225, 4)	2.0894E-04 (114, 3)	2.4611E-04 (19, 8)	2.1758E-04 (19, 8)	1.7632E-04 (19, 8)
18	3.7467E-05 (203, 4)	3.0539E-04 (313, 4)	3.1544E-04 (335, 6)	2.7513E-04 (340, 5)	2.2754E-04 (335, 6)
19	4.4835E-05 (125, 5)	2.4537E-04 (302, 3)	2.4488E-04 (286, 7)	2.1102E-04 (286, 7)	1.7520E-04 (5, 8)
20	6.4119E-05 (140, 4)	3.1162E-04 (100, 5)	3.0738E-04 (286, 5)	2.3743E-04 (321, 7)	1.8655E-04 (321, 7)
21	4.2706E-05 (164, 5)	2.3874E-04 (19, 6)	2.2319E-04 (51, 5)	2.0126E-04 (255, 7)	1.6282E-04 (60, 2)
22	6.7704E-05 (166, 4)	2.5489E-04 (166, 4)	2.3800E-04 (57, 4)	1.9940E-04 (57, 4)	1.6844E-04 (308, 3)
23	4.9937E-05 (199, 6)	2.6069E-04 (118, 6)	3.1444E-04 (232, 2)	2.8652E-04 (344, 6)	2.3655E-04 (344, 6)
24	4.0294E-05 (101, 4)	2.4861E-04 (165, 6)	2.7580E-04 (257, 1)	2.4266E-04 (165, 6)	1.9012E-04 (165, 6)
25	4.8973E-05 (245, 4)	2.2576E-04 (141, 4)	2.0097E-04 (303, 5)	1.8878E-04 (341, 3)	1.5723E-04 (162, 4)
26	4.5816E-05 (268, 5)	2.6987E-04 (290, 4)	2.3610E-04 (240, 6)	2.0482E-04 (240, 6)	1.6171E-04 (59, 4)
27	4.5760E-05 (126, 5)	2.4146E-04 (80, 5)	2.2759E-04 (241, 5)	2.0818E-04 (68, 3)	2.1047E-04 (68, 3)
28	4.5503E-05 (204, 5)	2.3157E-04 (298, 5)	2.2134E-04 (64, 6)	1.8123E-04 (269, 6)	1.4234E-04 (269, 6)
29	4.4903E-05 (245, 5)	2.5609E-04 (279, 4)	2.5184E-04 (279, 4)	1.9728E-04 (345, 4)	1.7564E-04 (290, 8)
30	4.9993E-05 (253, 5)	2.2363E-04 (248, 5)	2.3416E-04 (64, 4)	2.0936E-04 (126, 6)	1.6650E-04 (143, 3)
31	4.6571E-05 (148, 4)	2.4878E-04 (126, 4)	2.4984E-04 (136, 7)	2.4164E-04 (136, 7)	2.0721E-04 (136, 7)
32	5.5543E-05 (148, 4)	2.6254E-04 (168, 4)	2.5515E-04 (169, 4)	2.2378E-04 (169, 4)	1.8060E-04 (169, 4)
33	7.2896E-05 (134, 5)	2.3186E-04 (153, 4)	2.3354E-04 (360, 5)	2.1338E-04 (320, 2)	1.7725E-04 (24, 5)
34	6.4536E-05 (192, 4)	2.2521E-04 (228, 4)	2.4691E-04 (149, 4)	1.9866E-04 (149, 4)	1.7702E-04 (331, 7)
35	5.0343E-05 (102, 4)	2.5150E-04 (102, 4)	2.3660E-04 (48, 6)	2.0171E-04 (48, 6)	1.6047E-04 (48, 6)
36	5.8243E-05 (152, 5)	3.2270E-04 (216, 4)	3.0778E-04 (75, 4)	2.6462E-04 (363, 4)	2.1222E-04 (75, 4)

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PLANT NAME: KISS. UTILITIES POLLUTANT: SO2 AIR QUALITY UNITS: GM/M**3
YEARLY SECOND MAXIMUM 3-HOUR CONC= 3.7183E-04 DIRECTION= 24 DISTANCE= 0.3 KM DAY=278 TIME PERIOD= 5
YEAR= 77

SECOND HIGHEST 3-HOUR CONCENTRATION AT EACH RECEPTOR

DIR	RANGE 0.1 KM	0.3 KM	0.5 KM	0.7 KM	0.9 KM
1	5.6116E-05 (145, 4)	2.7902E-04 (188, 6)	2.2841E-04 (58, 4)	1.8481E-04 (79, 3)	1.5993E-04 (79, 3)
2	6.7441E-05 (248, 5)	2.3121E-04 (285, 5)	2.1347E-04 (72, 5)	1.8719E-04 (43, 8)	1.6300E-04 (43, 8)
3	6.9240E-05 (248, 5)	2.9955E-04 (175, 6)	2.4634E-04 (175, 6)	1.9286E-04 (285, 4)	1.5215E-04 (25, 1)
4	7.1918E-05 (145, 5)	3.2235E-04 (145, 5)	2.6249E-04 (145, 5)	2.0935E-04 (148, 5)	1.7246E-04 (145, 5)
5	5.6177E-05 (180, 4)	2.4806E-04 (231, 5)	2.1150E-04 (231, 5)	1.8999E-04 (115, 1)	1.6757E-04 (282, 5)
6	4.6180E-05 (127, 4)	2.6223E-04 (251, 6)	2.4328E-04 (78, 5)	1.9168E-04 (188, 3)	1.6069E-04 (188, 3)
7	5.5228E-05 (174, 4)	2.8327E-04 (127, 4)	2.9385E-04 (3, 5)	2.3790E-04 (3, 5)	1.8967E-04 (3, 5)
8	4.0051E-05 (174, 5)	2.2685E-04 (176, 5)	2.1862E-04 (3, 6)	1.7951E-04 (146, 4)	1.4851E-04 (146, 4)
9	4.6695E-05 (174, 5)	2.8575E-04 (176, 5)	2.7154E-04 (81, 6)	2.1675E-04 (128, 6)	1.6936E-04 (306, 2)
10	2.9329E-05 (115, 5)	2.4772E-04 (20, 6)	2.3632E-04 (36, 6)	1.9148E-04 (36, 6)	1.4795E-04 (36, 6)
11	4.4251E-05 (178, 5)	3.0659E-04 (51, 5)	2.9967E-04 (128, 3)	2.2785E-04 (127, 6)	1.8115E-04 (76, 1)
12	6.0346E-05 (100, 5)	2.5321E-04 (178, 5)	2.2593E-04 (115, 3)	2.0025E-04 (271, 6)	1.7304E-04 (271, 6)
13	6.9196E-05 (178, 5)	2.5470E-04 (115, 4)	2.2704E-04 (47, 4)	1.9363E-04 (96, 6)	1.6123E-04 (96, 6)
14	5.0811E-05 (173, 5)	2.3271E-04 (117, 4)	2.7231E-04 (360, 1)	2.3250E-04 (360, 1)	1.8498E-04 (360, 1)
15	4.7142E-05 (172, 4)	2.2433E-04 (163, 4)	2.1798E-04 (74, 4)	1.8056E-04 (286, 2)	1.4850E-04 (362, 6)
16	5.9988E-05 (203, 5)	2.2682E-04 (315, 1)	2.4326E-04 (305, 4)	2.0871E-04 (341, 2)	1.6340E-04 (341, 2)
17	5.5319E-05 (203, 4)	2.4912E-04 (98, 5)	2.2015E-04 (66, 6)	1.9024E-04 (66, 6)	1.5641E-04 (2, 1)
18	4.2331E-05 (97, 4)	2.3907E-04 (345, 4)	2.7232E-04 (39, 1)	2.3481E-04 (290, 3)	1.9304E-04 (336, 7)
19	2.8184E-05 (186, 4)	2.0693E-04 (41, 4)	2.2542E-04 (41, 4)	2.1336E-04 (322, 8)	1.7123E-04 (11, 4)
20	3.8585E-05 (223, 5)	2.4713E-04 (154, 4)	2.6183E-04 (12, 6)	2.0139E-04 (99, 5)	1.5920E-04 (99, 5)
21	4.9846E-05 (105, 4)	2.1445E-04 (39, 7)	2.3067E-04 (39, 7)	1.8185E-04 (39, 7)	1.3843E-04 (39, 7)
22	4.4682E-05 (98, 4)	2.4563E-04 (224, 5)	2.3554E-04 (103, 4)	1.7944E-04 (276, 6)	1.4318E-04 (304, 3)
23	4.6083E-05 (142, 5)	2.9914E-04 (100, 4)	2.6288E-04 (303, 6)	2.2083E-04 (322, 4)	1.8448E-04 (261, 6)
24	5.5613E-05 (255, 5)	3.7183E-04 (278, 5)	2.7845E-04 (293, 6)	2.2915E-04 (278, 5)	1.7342E-04 (278, 5)
25	6.7507E-05 (101, 4)	3.1506E-04 (100, 6)	2.6177E-04 (279, 5)	2.2022E-04 (257, 6)	1.9129E-04 (100, 6)
26	4.7322E-05 (255, 5)	2.4256E-04 (222, 5)	2.6668E-04 (245, 5)	2.2838E-04 (245, 5)	1.8198E-04 (245, 5)
27	5.3275E-05 (243, 4)	3.2375E-04 (217, 4)	3.3379E-04 (239, 6)	2.6870E-04 (239, 6)	2.2371E-04 (130, 3)
28	5.6858E-05 (136, 5)	2.2424E-04 (260, 6)	2.5466E-04 (222, 6)	2.0882E-04 (222, 6)	1.8060E-04 (138, 7)
29	5.8802E-05 (227, 5)	2.3507E-04 (227, 5)	2.4713E-04 (281, 6)	1.9913E-04 (112, 6)	1.6840E-04 (123, 3)
30	8.3419E-05 (216, 5)	3.5728E-04 (136, 4)	2.9879E-04 (122, 6)	2.4052E-04 (122, 6)	2.0103E-04 (62, 6)
31	7.2613E-05 (111, 5)	2.7582E-04 (192, 6)	2.5105E-04 (43, 7)	2.4796E-04 (43, 7)	2.1404E-04 (43, 7)
32	4.4067E-05 (209, 5)	2.7989E-04 (313, 5)	2.2726E-04 (237, 5)	2.0352E-04 (334, 3)	1.7271E-04 (334, 3)
33	3.4987E-05 (108, 5)	2.4084E-04 (93, 5)	2.1961E-04 (210, 6)	1.9301E-04 (146, 7)	1.5958E-04 (146, 7)
34	3.8754E-05 (207, 4)	2.6263E-04 (206, 6)	2.6439E-04 (87, 5)	1.9734E-04 (87, 5)	1.5615E-04 (87, 5)
35	4.6971E-05 (183, 5)	2.2530E-04 (250, 4)	2.2804E-04 (114, 3)	1.9427E-04 (63, 4)	1.6807E-04 (114, 1)
36	6.9404E-05 (94, 5)	3.4363E-04 (262, 4)	3.0701E-04 (95, 2)	2.6641E-04 (233, 3)	2.4189E-04 (234, 7)

PLANT NAME: KISS. UTILITIES POLLUTANT: SO2 AIR QUALITY UNITS: GM/M**3
YEARLY SECOND MAXIMUM 3-HOUR CONC= 3.5230E-04 DIRECTION= 26 DISTANCE= 0.3 KM DAY=169 TIME PERIOD= 5
YEAR= 78

SECOND HIGHEST 3-HOUR CONCENTRATION AT EACH RECEPTOR

DIR	RANGE 0.1 KM	0.3 KM	0.5 KM	0.7 KM	0.9 KM
1	6.6106E-05 (212, 5)	2.5501E-04 (212, 5)	2.6051E-04 (335, 1)	2.4540E-04 (335, 1)	2.0619E-04 (335, 1)
2	5.3613E-05 (119, 4)	2.4940E-04 (75, 5)	2.8973E-04 (155, 4)	2.2284E-04 (54, 7)	1.9977E-04 (69, 1)
3	4.7922E-05 (119, 4)	1.9467E-04 (73, 6)	1.9939E-04 (73, 6)	1.6000E-04 (74, 5)	1.2814E-04 (74, 5)
4	4.7858E-05 (119, 5)	2.5490E-04 (122, 5)	2.3940E-04 (334, 4)	2.0788E-04 (334, 4)	1.7055E-04 (334, 4)
5	5.6993E-05 (184, 4)	2.7439E-04 (353, 4)	2.3477E-04 (343, 5)	2.1430E-04 (334, 7)	1.8939E-04 (334, 7)
6	4.3956E-05 (134, 5)	2.3752E-04 (69, 6)	2.3168E-04 (20, 1)	1.8906E-04 (20, 1)	1.6813E-04 (214, 3)
7	3.8841E-05 (111, 5)	2.2344E-04 (121, 6)	2.3659E-04 (50, 8)	2.3944E-04 (353, 5)	1.8889E-04 (353, 5)
8	4.2809E-05 (250, 5)	2.2764E-04 (111, 6)	2.0973E-04 (339, 5)	1.7921E-04 (339, 5)	1.4927E-04 (335, 6)
9	4.8162E-05 (116, 5)	2.2404E-04 (86, 4)	2.2754E-04 (13, 8)	2.1266E-04 (51, 1)	1.7269E-04 (14, 3)
10	3.9568E-05 (116, 5)	2.0531E-04 (20, 4)	2.3217E-04 (20, 4)	1.8307E-04 (9, 3)	1.4040E-04 (9, 3)
11	2.8344E-05 (182, 4)	1.7129E-04 (182, 4)	1.7729E-04 (50, 2)	1.6762E-04 (37, 6)	1.3036E-04 (37, 6)
12	3.6173E-05 (160, 5)	2.3585E-04 (116, 8)	2.7654E-04 (116, 8)	2.3382E-04 (14, 8)	1.8287E-04 (14, 8)
13	5.9944E-05 (117, 5)	3.0898E-04 (249, 4)	2.5681E-04 (117, 5)	1.9014E-04 (63, 6)	1.5951E-04 (313, 5)
14	5.8948E-05 (231, 5)	2.8972E-04 (117, 1)	2.4587E-04 (76, 2)	1.9775E-04 (29, 3)	1.6755E-04 (313, 4)
15	4.6748E-05 (254, 4)	2.2477E-04 (81, 4)	2.1120E-04 (27, 2)	1.9251E-04 (307, 6)	1.5565E-04 (307, 6)
16	3.6044E-05 (110, 4)	2.4378E-04 (308, 5)	2.4917E-04 (361, 6)	2.3201E-04 (361, 6)	1.9425E-04 (361, 6)
17	1.9103E-05 (110, 3)	2.3006E-04 (322, 5)	2.7029E-04 (280, 3)	2.4687E-04 (280, 3)	2.0417E-04 (280, 3)
18	3.3221E-05 (81, 5)	2.9731E-04 (305, 4)	2.8764E-04 (344, 3)	2.8585E-04 (305, 4)	2.2596E-04 (27, 3)
19	2.3529E-05 (125, 5)	2.8846E-04 (304, 4)	2.9766E-04 (304, 4)	2.3588E-04 (304, 4)	1.8282E-04 (304, 4)
20	3.7472E-05 (145, 5)	2.4516E-04 (35, 5)	2.4551E-04 (344, 5)	1.9602E-04 (344, 5)	1.6185E-04 (275, 2)
21	5.9001E-05 (145, 5)	3.0105E-04 (258, 4)	2.4856E-04 (362, 5)	2.0537E-04 (23, 2)	1.7899E-04 (283, 3)
22	6.2553E-05 (252, 5)	2.7577E-04 (252, 5)	2.6737E-04 (269, 6)	2.0921E-04 (269, 6)	1.7126E-04 (2, 6)
23	5.6943E-05 (263, 5)	2.9590E-04 (323, 5)	2.6011E-04 (267, 4)	2.1428E-04 (267, 6)	1.8815E-04 (261, 4)
24	6.4803E-05 (89, 5)	2.7209E-04 (87, 4)	2.5945E-04 (295, 4)	2.1631E-04 (295, 4)	1.7024E-04 (295, 4)
25	5.7597E-05 (106, 4)	2.7463E-04 (310, 4)	2.7647E-04 (243, 6)	2.1771E-04 (147, 3)	1.8659E-04 (48, 3)
26	6.8826E-05 (169, 5)	3.5230E-04 (169, 5)	2.6588E-04 (169, 5)	2.4431E-04 (163, 6)	1.8456E-04 (163, 6)
27	7.6014E-05 (202, 5)	3.2078E-04 (171, 6)	3.1315E-04 (171, 6)	2.6341E-04 (92, 6)	2.1613E-04 (92, 6)
28	7.6093E-05 (146, 5)	2.6946E-04 (94, 5)	2.5582E-04 (202, 6)	2.1371E-04 (202, 6)	1.7684E-04 (24, 5)
29	6.1563E-05 (190, 5)	2.7249E-04 (239, 6)	2.3643E-04 (203, 6)	1.7775E-04 (165, 5)	1.4429E-04 (165, 5)
30	6.1286E-05 (218, 4)	3.0274E-04 (78, 5)	2.6819E-04 (124, 1)	2.4422E-04 (83, 6)	1.9290E-04 (83, 6)
31	5.6769E-05 (216, 4)	2.8690E-04 (218, 4)	2.3227E-04 (123, 8)	1.9637E-04 (96, 6)	1.6961E-04 (174, 6)
32	5.6989E-05 (222, 4)	3.1290E-04 (222, 4)	2.3992E-04 (173, 5)	1.9009E-04 (123, 7)	1.6693E-04 (245, 6)
33	7.3566E-05 (108, 4)	3.0118E-04 (207, 5)	2.6069E-04 (208, 7)	2.3109E-04 (208, 7)	1.8746E-04 (208, 7)
34	6.7138E-05 (101, 4)	3.3713E-04 (199, 4)	2.6211E-04 (199, 3)	2.3169E-04 (210, 4)	1.9746E-04 (198, 4)
35	7.1540E-05 (196, 4)	3.1810E-04 (129, 4)	2.7416E-04 (209, 4)	2.0317E-04 (183, 3)	1.5332E-04 (209, 4)
36	6.2915E-05 (103, 5)	3.4986E-04 (25, 7)	3.0920E-04 (25, 7)	2.2816E-04 (25, 7)	1.8568E-04 (311, 5)

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COMPOSITE ANNUAL CONCENTRATION TABLE,UG/CU.M

ANNUAL MEAN CONCENTRATION AT EACH RECEPTOR

DIR	RANGE	0.1 KM	0.3 KM	0.5 KM	0.7 KM	0.9 KM
1		1.	7.	7.	6.	4.
2		1.	6.	6.	5.	4.
3		0.	5.	5.	4.	3.
4		0.	5.	5.	4.	4.
5		1.	6.	6.	5.	4.
6		1.	6.	5.	5.	4.
7		0.	5.	5.	4.	3.
8		0.	4.	4.	3.	3.
9		0.	6.	6.	5.	4.
10		0.	5.	5.	4.	3.
11		0.	5.	5.	4.	4.
12		0.	7.	6.	5.	4.
13		0.	6.	6.	5.	4.
14		0.	6.	6.	5.	4.
15		0.	5.	5.	4.	4.
16		0.	5.	6.	5.	5.
17		0.	6.	7.	6.	5.
18		0.	10.	12.	10.	9.
19		0.	8.	8.	7.	6.
20		0.	8.	8.	7.	6.
21		0.	7.	7.	6.	5.
22		1.	8.	8.	7.	6.
23		1.	9.	9.	8.	7.
24		1.	8.	8.	7.	6.
25		1.	8.	8.	6.	5.
26		1.	11.	10.	8.	7.
27		1.	12.	12.	9.	8.
28		1.	9.	9.	7.	6.
29		1.	7.	6.	5.	4.
30		1.	8.	8.	7.	6.
31		1.	7.	7.	6.	5.
32		1.	7.	7.	6.	5.
33		1.	7.	8.	7.	6.
34		1.	8.	8.	7.	6.
35		1.	8.	8.	6.	5.
36		1.	11.	11.	9.	8.

COMPOSITE HIGHEST,SECOND-HIGHEST 24-HOUR CONCENTRATION TABLE,UG/CU.M

SECOND HIGHEST 24-HOUR CONCENTRATION AT EACH RECEPTOR

DIR \ RANGE	0.1 KM	0.3 KM	0.5 KM	0.7 KM	0.9 KM
1	14.	76.	69.	51.	40.
2	14.	76.	72.	63.	52.
3	10.	59.	63.	59.	48.
4	10.	67.	74.	58.	49.
5	10.	75.	74.	61.	51.
6	10.	64.	65.	57.	49.
7	10.	69.	60.	48.	42.
8	14.	61.	65.	49.	40.
9	14.	96.	88.	76.	70.
10	8.	60.	62.	57.	47.
11	11.	72.	75.	60.	47.
12	18.	74.	82.	68.	58.
13	14.	75.	81.	68.	56.
14	10.	74.	70.	57.	45.
15	9.	64.	81.	62.	47.
16	13.	67.	83.	73.	59.
17	14.	72.	86.	75.	63.
18	9.	124.	141.	121.	98.
19	8.	98.	103.	86.	70.
20	12.	85.	97.	78.	62.
21	10.	74.	81.	63.	49.
22	12.	73.	76.	61.	50.
23	11.	78.	82.	74.	60.
24	11.	90.	88.	77.	60.
25	11.	76.	81.	65.	53.
26	12.	99.	86.	67.	53.
27	12.	108.	107.	88.	68.
28	10.	86.	88.	69.	54.
29	9.	72.	61.	53.	46.
30	14.	98.	82.	68.	56.
31	14.	71.	78.	66.	53.
32	12.	67.	63.	55.	47.
33	11.	79.	96.	83.	68.
34	11.	72.	73.	67.	61.
35	12.	83.	66.	53.	46.
36	14.	105.	112.	98.	84.

COMPOSITE HIGHEST, SECOND-HIGHEST 3-HOUR CONCENTRATION TABLE,UG/CU.M

	SECOND HIGHEST 3-HOUR CONCENTRATION AT EACH RECEPTOR				
RANGE	0.1 KM	0.3 KM	0.5 KM	0.7 KM	0.9 KM
DIR					
1	73.	299.	261.	245.	206.
2	69.	266.	290.	223.	200.
3	69.	300.	264.	235.	186.
4	72.	322.	315.	299.	244.
5	65.	292.	279.	254.	211.
6	64.	265.	260.	216.	174.
7	73.	296.	294.	239.	190.
8	110.	295.	273.	224.	177.
9	76.	286.	278.	220.	182.
10	56.	297.	260.	218.	176.
11	68.	307.	300.	228.	181.
12	97.	262.	284.	247.	199.
13	69.	319.	278.	230.	175.
14	59.	290.	277.	232.	185.
15	52.	279.	250.	204.	160.
16	60.	262.	258.	232.	199.
17	55.	249.	270.	247.	204.
18	59.	341.	320.	286.	243.
19	45.	288.	298.	236.	183.
20	64.	312.	307.	239.	224.
21	59.	301.	249.	214.	179.
22	69.	292.	267.	209.	171.
23	68.	299.	314.	287.	237.
24	76.	372.	278.	243.	190.
25	69.	323.	276.	220.	191.
26	69.	352.	267.	244.	185.
27	76.	324.	334.	269.	224.
28	76.	293.	256.	214.	181.
29	62.	272.	252.	206.	179.
30	83.	357.	299.	244.	201.
31	73.	287.	251.	248.	214.
32	85.	313.	255.	224.	181.
33	74.	301.	261.	231.	187.
34	67.	337.	291.	232.	197.
35	72.	318.	274.	204.	168.
36	70.	350.	309.	266.	242.

*** KISSIMMEE DAY 325 SO_2 ***

SOURCE # 1---KISS. UTILITIES PT01-04 UNIT #7
SOURCE # 2---KISS. UTILITIES PT01-05,PT01-06 UNITS #8
SOURCE # 3---KISS. UTILITIES PT01-07,PT01-08 UNITS #1
SOURCE # 4---KISS. UTILITIES PT01-11-PT01-15 UNITS #1
SOURCE # 5---KISS. UTILITIES UNITS #19-#20
SOURCE # 6---CITY OF ST. CLOUD PT02-02,PT02-04
SOURCE # 7---CITY OF ST. CLOUD PT02-05,PT02-06
SOURCE # 8---CITY OF ST. CLOUD PT02-07,PT02-08
SOURCE # 11---STOKELY VAN CAMP PT07-01
SOURCE # 12---CW BAILEY PT11-01
SOURCE # 13---FLA POWER COPR PT14-01-PT14-06
SOURCE # 15---DIXIE ASPHALT PT41-01
SOURCE # 16---ST. CLOUD HOSPITAL PT10-02,PT10-03
SOURCE # 17---KISS. UTLITIES COMBUSTION TURBINE

*** SOURCE DATA ***

SOURCE NUMBER	TYPE	WAKE	NUMBER PART. CATS.	EMISSION RATE TYPE=0,1 (G/S) TYPE=2 (G/S) *PER M**2	X (M)	Y (M)	BASE ELEV. (M)	HEIGHT (M)	TEMP. TYPE=0 (DEG.K) VERT.DIM. TYPE=1 (M)	EXIT VEL. TYPE=0 (M/S) HORZ.DIM. TYPE=1,2 (M)	DIAM. TYPE=0 (M)	BLDG. HEIGHT TYPE=0 (M)	BLDG. LENGTH TYPE=0 (M)	BLDG. WIDTH TYPE=0 (M)
1	0	0	0	0.870	460100.	3129300.	0.0	13.11	466.5	16.30	0.61	0.00	0.00	0.00
2	0	0	0	3.360	460100.	3129300.	0.0	16.15	477.6	17.60	0.85	0.00	0.00	0.00
3	0	0	0	2.280	460100.	3129300.	0.0	7.01	466.5	9.60	0.76	0.00	0.00	0.00
4	0	0	0	5.370	460100.	3129300.	0.0	13.41	505.4	8.70	0.80	0.00	0.00	0.00
5	0	0	0	2.890	460100.	3129300.	0.0	8.69	505.4	17.20	0.90	0.00	0.00	0.00
6	0	0	0	4.660	471800.	3124900.	0.0	7.92	727.6	34.70	0.76	0.00	0.00	0.00
7	0	0	0	3.780	471800.	3124900.	0.0	8.53	699.8	1.17	0.64	0.00	0.00	0.00
8	0	0	0	6.550	471800.	3124900.	0.0	11.89	727.6	29.51	1.07	0.00	0.00	0.00
11	0	0	0	2.520	451100.	3125800.	0.0	7.32	513.7	11.50	0.46	0.00	0.00	0.00
12	0	0	0	0.130	470800.	3133800.	0.0	9.45	1005.7	11.60	0.61	0.00	0.00	0.00
13	0	0	0	34.020	446300.	3126000.	0.0	7.92	703.7	18.06	4.24	0.00	0.00	0.00
15	0	0	0	0.260	463200.	3143000.	0.0	7.92	394.3	26.95	1.10	0.00	0.00	0.00
16	0	0	0	0.060	470300.	3124100.	0.0	5.49	505.4	15.00	0.46	0.00	0.00	0.00
17	0	0	0	48.900	460100.	3129300.	0.0	9.14	422.0	38.03	2.44	0.00	0.00	0.00

DAILY: 325 SO2
24-HR/PD 1
SGROUP# 1
YEAR 1978
*** KISSIMMEE DAY 325 ***

* DAILY 24-HOUR AVERAGE CONCENTRATION (MICROGRAMS/CUBIC METER) *
* ENDING WITH HOUR 24 FOR DAY 325 *
* FROM ALL SOURCES *
* FOR THE RECEPTOR GRID *
* MAXIMUM VALUE EQUALS 135.0 AND OCCURRED AT (460100.0, 3128800.0) *

Y-AXIS (METERS) /	X-AXIS (METERS) 459600.0	459700.0	459800.0	459900.0	460000.0	460100.0	460200.0	460300.0	460400.0
3128900.0 /	9.1	9.3	15.4	26.3	13.3	131.8	30.8	11.3	13.1
3128800.0 /	7.1	8.4	37.6	6.4	27.2	135.0	60.2	13.4	10.9
3128700.0 /	5.3	26.3	24.5	2.3	37.4	128.2	80.6	13.2	10.5
3128600.0 /	15.3	31.4	8.7	3.9	42.9	117.8	90.4	17.1	13.0
3128500.0 /	25.9	19.7	2.6	7.1	45.1	106.8	92.8	24.6	12.3
3128400.0 /	24.1	8.8	1.3	10.5	45.4	96.3	90.7	32.1	10.5
3128300.0 /	15.5	3.3	1.6	13.4	44.6	86.9	86.2	37.7	10.7
3128200.0 /	8.1	1.3	2.6	15.8	43.3	78.6	80.9	41.2	12.7
3128100.0 /	3.7	0.8	3.9	17.5	41.9	71.6	75.4	43.2	15.7
3128000.0 /	1.6	0.9	5.2	18.7	40.5	65.6	70.1	44.0	18.6

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*** KISSIMMEE INTERACTION WITH ST. CLOUD DAY 113/78 ***

SOURCE # 1---KISS. UTILITIES PT01-04 UNIT #7
SOURCE # 2---KISS. UTILITIES PT01-05,PT01-06 UNITS #8
SOURCE # 3---KISS. UTILITIES PT01-07,PT01-08 UNITS #1
SOURCE # 4---KISS. UTILITIES PT01-11-PT01-15 UNITS #1
SOURCE # 5---KISS. UTILITIES UNITS #19-#20
SOURCE # 6---KISS. UTLITIES COMBUSTION TURBINE
SOURCE # 7---CITY OF ST. CLOUD PT02-02,PT02-04
SOURCE # 8---CITY OF ST. CLOUD PT02-05,PT02-06
SOURCE # 9---CITY OF ST. CLOUD PT02-07,PT02-08

*** SOURCE DATA ***

SOURCE NUMBER	TYPE	WAKE	NUMBER PART. CATS.	EMISSION RATE TYPE=0,1 (G/S) TYPE=2 (G/S) *PER M**2	X (M)	Y (M)	BASE ELEV. (M)	HEIGHT (M)	TEMP. TYPE=0 (DEG.K) VERT.DIM. TYPE=1 (M)	EXIT VEL. TYPE=0 (M/S) HORZ.DIM. TYPE=1,2 (M)	DIAM. TYPE=0 (M)	BLDG. HEIGHT TYPE=0 (M)	BLDG. LENGTH TYPE=0 (M)	BLDG. WIDTH TYPE=0 (M)
1	0	0	0	0.870	0.	0.	0.0	13.11	466.5	16.30	0.61	0.00	0.00	0.00
2	0	0	0	3.360	0.	0.	0.0	16.15	477.6	17.60	0.85	0.00	0.00	0.00
3	0	0	0	2.280	0.	0.	0.0	7.01	466.5	9.60	0.76	0.00	0.00	0.00
4	0	0	0	5.370	0.	0.	0.0	13.41	505.4	8.70	0.80	0.00	0.00	0.00
5	0	0	0	2.890	0.	0.	0.0	8.69	505.4	17.20	0.90	0.00	0.00	0.00
6	0	0	0	48.900	0.	0.	0.0	9.14	422.0	38.03	2.44	0.00	0.00	0.00
7	0	0	0	4.660	-4400.	11700.	0.0	7.92	727.6	34.70	0.76	0.00	0.00	0.00
8	0	0	0	3.780	-4400.	11700.	0.0	8.53	699.8	1.17	0.64	0.00	0.00	0.00
9	0	0	0	6.550	-4400.	11700.	0.0	11.89	727.6	29.51	1.07	0.00	0.00	0.00

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DAILY: 113
24-HR/PD 1
SGROUP# 3
YEAR 1978
*** KISSIMMEE INTERACTION WITH ST. CLOUD DAY 113/78 ***

* DAILY 24-HOUR AVERAGE CONCENTRATION (MICROGRAMS/CUBIC METER) *
* ENDING WITH HOUR 24 FOR DAY 113 *
* FROM SOURCES: 1, -9,
* FOR THE RECEPTOR GRID *

* MAXIMUM VALUE EQUALS 75.8 AND OCCURRED AT (500.0, 290.0) *

DIRECTION / (DEGREES) /	RANGE (METERS) 100.0	300.0	500.0	700.0	900.0
295.0 /	4.1	42.6	43.4	35.0	27.8
290.0 /	4.4	68.0	75.8	63.9	51.8
285.0 /	3.0	64.1	70.0	56.6	44.0

*** KISSIMMEE INTERACTION WITH FPC DAY 158/75 ***

SOURCE # 1---KISS. UTILITIES PT01-04 UNIT #7
SOURCE # 2---KISS. UTILITIES PT01-05,PT01-06 UNITS #8
SOURCE # 3---KISS. UTILITIES PT01-07,PT01-08 UNITS #1
SOURCE # 4---KISS. UTILITIES PT01-11-PT01-15 UNITS #1
SOURCE # 5---KISS. UTILITIES UNITS #19-#20
SOURCE # 6---KISS. UTLITIES COMBUSTION TURBINE
SOURCE # 7---FLA POWER COPR PT14-01-PT14-06

*** SOURCE DATA ***

SOURCE NUMBER	TYPE	WAKE	NUMBER PART. CATS.	EMISSION RATE TYPE=0,1 (G/S) TYPE=2 (G/S) *PER M**2	X (M)	Y (M)	BASE ELEV. (M)	HEIGHT (M)	TEMP. TYPE=0 (DEG.K) VERT.DIM. TYPE=1 (M)	EXIT VEL. TYPE=0 (M/S) HORZ.DIM. TYPE=1,2 (M)	DIAM. TYPE=0 (M)	BLDG. HEIGHT TYPE=0 (M)	BLDG. LENGTH TYPE=0 (M)	BLDG. WIDTH TYPE=0 (M)
1	0	0	0	0.870	0.	0.	0.0	13.11	466.5	16.30	0.61	0.00	0.00	0.00
2	0	0	0	3.360	0.	0.	0.0	16.15	477.6	17.60	0.85	0.00	0.00	0.00
3	0	0	0	2.280	0.	0.	0.0	7.01	466.5	9.60	0.76	0.00	0.00	0.00
4	0	0	0	5.370	0.	0.	0.0	13.41	505.4	8.70	0.80	0.00	0.00	0.00
5	0	0	0	2.890	0.	0.	0.0	8.69	505.4	17.20	0.90	0.00	0.00	0.00
6	0	0	0	48.900	0.	0.	0.0	9.14	422.0	38.03	2.44	0.00	0.00	0.00
7	0	0	0	34.020	-13800.	-3300.	0.0	7.92	703.7	18.06	4.24	0.00	0.00	0.00

DAILY: 158
24-HR/PD 1
SGROUP# 3
YEAR 1975
*** KISSIMMEE INTERACTION WITH FPC DAY 158/75 ***

* DAILY 24-HOUR AVERAGE CONCENTRATION (MICROGRAMS/CUBIC METER) *
* ENDING WITH HOUR 24 FOR DAY 158 *
* FROM SOURCES: 1, -7,
* FOR THE RECEPTOR GRID *

* MAXIMUM VALUE EQUALS 69.3 AND OCCURRED AT (500.0, 70.0) *

DIRECTION / (DEGREES) /	RANGE (METERS) 100.0	300.0	500.0	700.0	900.0
80.0 /	5.4	41.5	38.7	29.9	23.3
75.0 /	8.4	64.0	62.3	50.0	40.0
70.0 /	9.3	65.8	69.3	60.0	51.7
65.0 /	7.6	42.7	47.0	43.7	40.7

*** KISSIMMEE DAY 325 TSP ***

SOURCE # 1---KISS. UTILITIES PT01-04 UNIT #7
SOURCE # 2---KISS. UTILITIES PT01-05,PT01-06 UNITS #8
SOURCE # 3---KISS. UTILITIES PT01-07,PT01-08 UNITS #1
SOURCE # 4---KISS. UTILITIES PT01-11-PT01-15 UNITS #1
SOURCE # 5---KISS. UTILITIES UNITS #19-#20
SOURCE # 6---KISS. UTLITIES COMBUSTION TURBINE
SOURCE # 7---CITY OF ST. CLOUD PT02-02,PT02-04
SOURCE # 8---CITY OF ST. CLOUD PT02-05,PT02-06
SOURCE # 9---CITY OF ST. CLOUD PT02-07,PT02-08
SOURCE # 10---FLA. DEPT. OF AGRIC. PT05-01
SOURCE # 11---KISS. COMMUNITY HOSP. PT06-01
SOURCE # 12---STOKELY VAN CAMP PT07-01
SOURCE # 13---CW BAILEY PT11-01
SOURCE # 14---FLA POWER COPR PT14-01-PT14-06
SOURCE # 15---OWENS ILL PT32-01,PT32-02
SOURCE # 16---DIXIE ASPHALT PT41-01
SOURCE # 17---GOULD BATTERY PT56-01
SOURCE # 18---GOULD BATTERY PT56-03
SOURCE # 19---GOULD BATTERY PT56-05
SOURCE # 20---ST. CLOUD HOSPITAL PT10-02,PT10-03

*** SOURCE DATA ***

SOURCE NUMBER	TYPE	WAKE	NUMBER PART. CATS.	EMISSION RATE TYPE=0,1 (G/S) TYPE=2 (G/S) *PER M**2	X (M)	Y (M)	BASE ELEV. (M)	HEIGHT (M)	TEMP. TYPE=0 (DEG.K) VERT.DIM. TYPE=1 (M)	EXIT VEL. TYPE=0 (M/S) HORZ.DIM. TYPE=1,2 (M)	DIAM. TYPE=0 (M)	BLDG. HEIGHT TYPE=0 (M)	BLDG. LENGTH TYPE=0 (M)	BLDG. WIDTH TYPE=0 (M)
1	0	0	0	0.520	460100.	3129300.	0.0	13.11	466.5	16.30	0.61	0.00	0.00	0.00
2	0	0	0	2.010	460100.	3129300.	0.0	16.15	477.6	17.60	0.85	0.00	0.00	0.00
3	0	0	0	1.360	460100.	3129300.	0.0	7.01	466.5	9.60	0.76	0.00	0.00	0.00
4	0	0	0	3.210	460100.	3129300.	0.0	13.41	505.4	8.70	0.80	0.00	0.00	0.00
5	0	0	0	1.730	460100.	3129300.	0.0	8.69	505.4	17.20	0.90	0.00	0.00	0.00
6	0	0	0	1.980	460100.	3129300.	0.0	9.14	422.0	38.03	2.44	0.00	0.00	0.00
7	0	0	0	2.820	471800.	3124900.	0.0	7.92	727.6	34.70	0.76	0.00	0.00	0.00
8	0	0	0	2.270	471800.	3124900.	0.0	8.53	699.8	1.17	0.64	0.00	0.00	0.00
9	0	0	0	3.780	471800.	3124900.	0.0	11.89	727.6	29.51	1.07	0.00	0.00	0.00
10	0	0	0	0.190	456700.	3133400.	0.0	9.14	727.6	5.47	0.55	0.00	0.00	0.00
11	0	0	0	0.190	459900.	3130300.	0.0	7.62	755.4	13.78	0.40	0.00	0.00	0.00
12	0	0	0	0.130	451100.	3125800.	0.0	7.32	513.7	11.50	0.46	0.00	0.00	0.00
13	0	0	0	0.320	470800.	3133800.	0.0	9.45	1005.7	11.60	0.61	0.00	0.00	0.00
14	0	0	0	40.900	446300.	3126000.	0.0	7.92	703.7	18.06	4.24	0.00	0.00	0.00
15	0	0	0	1.500	460700.	3142000.	0.0	9.14	299.8	4.17	0.91	0.00	0.00	0.00
16	0	0	0	1.440	463200.	3143000.	0.0	7.92	394.3	26.95	1.10	0.00	0.00	0.00
17	0	0	0	0.170	460400.	3142600.	0.0	7.01	301.5	18.52	0.98	0.00	0.00	0.00

*** KISSIMMEE DAY 325 TSP ***

*** SOURCE DATA ***

SOURCE NUMBER	TYPE	WAKE	NUMBER PART. CATS.	EMISSION RATE TYPE=0,1 (G/S) TYPE=2 (G/S) *PER M**2	X (M)	Y (M)	BASE ELEV. (M)	HEIGHT (M)	TEMP. TYPE=0 (DEG.K) VERT.DIM. TYPE=1 (M)	EXIT VEL. TYPE=0 (M/S) HORZ.DIM. TYPE=1,2 (M)	DIAM. TYPE=0 (M)	BLDG. HEIGHT TYPE=0 (M)	BLDG. LENGTH TYPE=0 (M)	BLDG. WIDTH TYPE=0 (M)
18	0	0	0	0.140	460400.	3142600.	0.0	4.57	294.3	15.00	0.30	0.00	0.00	0.00
19	0	0	0	0.060	460400.	3142600.	0.0	9.14	305.4	13.95	0.76	0.00	0.00	0.00
20	0	0	0	0.060	470300.	3124100.	0.0	5.49	505.4	15.00	0.46	0.00	0.00	0.00

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DAILY: 325
24-HR/PD 1
SGROUP# 1
YEAR 1978
*** KISSIMMEE DAY 325 TSP ***

* DAILY 24-HOUR AVERAGE CONCENTRATION (MICROGRAMS/CUBIC METER) *
* ENDING WITH HOUR 24 FOR DAY 325 *
* FROM ALL SOURCES *
* FOR THE RECEPTOR GRID *

* MAXIMUM VALUE EQUALS 81.7 AND OCCURRED AT (460100.0, 3128800.0) *

Y-AXIS (METERS) /	X-AXIS (METERS) 459600.0	459700.0	459800.0	459900.0	460000.0	460100.0	460200.0	460300.0	460400.0
3129400.0 /	0.3	0.5	1.2	2.3	2.2	1.0	0.6	0.6	0.5
3129300.0 /	0.3	0.5	1.1	2.0	2.0	1.1	0.6	0.6	0.5
3129200.0 /	0.3	0.6	1.1	2.5	4.4	1.6	1.0	0.6	0.6
3129100.0 /	0.4	1.2	6.0	9.6	7.1	27.8	3.7	3.0	0.6
3129000.0 /	2.1	6.8	8.3	17.5	3.6	64.8	5.7	9.4	3.1
3128900.0 /	5.8	6.2	10.2	17.1	9.4	79.9	19.1	7.3	8.3
3128800.0 /	4.6	5.6	23.4	5.1	17.6	81.7	36.7	8.5	7.0
3128700.0 /	3.6	16.3	15.6	2.6	23.6	77.6	48.9	8.4	6.8
3128600.0 /	9.6	19.4	6.1	3.4	26.8	71.4	54.8	10.8	8.2
3128500.0 /	15.9	12.4	2.4	5.3	28.1	64.8	56.2	15.3	7.8

DAILY: 325
24-HR/PD 1
SGROUP# 1
YEAR 1978
*** KISSIMMEE DAY 325 TSP ***

* DAILY 24-HOUR AVERAGE CONCENTRATION (MICROGRAMS/CUBIC METER) *
* ENDING WITH HOUR 24 FOR DAY 325 *
* FROM ALL SOURCES *
* FOR THE RECEPTOR GRID *

* MAXIMUM VALUE EQUALS 81.7 AND OCCURRED AT (460100.0, 3126800.0) *

Y-AXIS (METERS)	X-AXIS (METERS) 460500.0
3129400.0	0.5
3129300.0	0.5
3129200.0	0.5
3129100.0	0.5
3129000.0	0.6
3128900.0	2.5
3128800.0	6.1
3128700.0	6.3
3128600.0	5.0
3128500.0	5.6

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LONG-TERM MODELS

- ISCLT INPUT DATA -

NUMBER OF SOURCES = 14
NUMBER OF X AXIS GRID SYSTEM POINTS = 10
NUMBER OF Y AXIS GRID SYSTEM POINTS = 10
NUMBER OF SPECIAL POINTS = 0
NUMBER OF SEASONS = 1
NUMBER OF WIND SPEED CLASSES = 6
NUMBER OF STABILITY CLASSES = 5
NUMBER OF WIND DIRECTION CLASSES = 16
FILE NUMBER OF DATA FILE USED FOR REPORTS = 1
THE PROGRAM IS RUN IN RURAL MODE
CONCENTRATION (DEPOSITION) UNITS CONVERSION FACTOR =0.10000000E+07
ACCELERATION OF GRAVITY (METERS/SEC**2) = 9.800
HEIGHT OF MEASUREMENT OF WIND SPEED (METERS) = 10.000
ENTRAINMENT PARAMETER FOR UNSTABLE CONDITIONS = 0.600
ENTRAINMENT PARAMETER FOR STABLE CONDITIONS = 0.600
CORRECTION ANGLE FOR GRID SYSTEM VERSUS DIRECTION DATA NORTH (DEGREES) = 0.000
DECAY COEFFICIENT =0.00000000E+00
PROGRAM OPTION SWITCHES = 1, 1, 1, 0, 0, 3, 2, 2, 3, 0, 0, 0, 0,-1,-1, 0, 0, 1, 0, 0,
ALL SOURCES ARE USED TO FORM SOURCE COMBINATION 1
DISTANCE X AXIS GRID SYSTEM POINTS (METERS)= 455600.00, 456600.00, 457600.00, 458600.00, 459600.00, 460600.00,
461600.00, 462600.00, 463600.00, 464600.00,
DISTANCE Y AXIS GRID SYSTEM POINTS (METERS)= 3124800.00, 3125800.00, 3126800.00, 3127800.00, 3128800.00, 3129800.00,
3130800.00, 3131800.00, 3132800.00, 3133800.00,

- AMBIENT AIR TEMPERATURE (DEGREES KELVIN) -

	STABILITY CATEGORY 1	STABILITY CATEGORY 2	STABILITY CATEGORY 3	STABILITY CATEGORY 4	STABILITY CATEGORY 5	STABILITY CATEGORY 6
SEASON 1	300.0000	300.0000	300.0000	295.0000	290.0000	

- MIXING LAYER HEIGHT (METERS) -

SEASON 1

	WIND SPEED CATEGORY 1	WIND SPEED CATEGORY 2	WIND SPEED CATEGORY 3	WIND SPEED CATEGORY 4	WIND SPEED CATEGORY 5	WIND SPEED CATEGORY 6
STABILITY CATEGORY 1	0.213800E+04	0.213800E+04	0.213800E+04	0.213800E+04	0.213800E+04	0.213800E+04
STABILITY CATEGORY 2	0.142500E+04	0.142500E+04	0.142500E+04	0.142500E+04	0.142500E+04	0.142500E+04
STABILITY CATEGORY 3	0.142500E+04	0.142500E+04	0.142500E+04	0.142500E+04	0.142500E+04	0.142500E+04
STABILITY CATEGORY 4	0.142500E+04	0.142500E+04	0.142500E+04	0.142500E+04	0.142500E+04	0.142500E+04
STABILITY CATEGORY 5	0.100000E+05	0.100000E+05	0.100000E+05	0.100000E+05	0.100000E+05	0.100000E+05

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- ISCLT INPUT DATA (CONT.) -

- FREQUENCY OF OCCURRENCE OF WIND SPEED, DIRECTION AND STABILITY -

SEASON 1

STABILITY CATEGORY 1

DIRECTION (DEGREES)	WIND SPEED CATEGORY 1 (0.7500MPS)	WIND SPEED CATEGORY 2 (2.5000MPS)	WIND SPEED CATEGORY 3 (4.3000MPS)	WIND SPEED CATEGORY 4 (6.8000MPS)	WIND SPEED CATEGORY 5 (9.5000MPS)	WIND SPEED CATEGORY 6 (12.5000MPS)
0.000	0.00025400	0.00047900	0.00000000	0.00000000	0.00000000	0.00000000
22.500	0.00021800	0.00043400	0.00000000	0.00000000	0.00000000	0.00000000
45.000	0.00020300	0.00063900	0.00000000	0.00000000	0.00000000	0.00000000
67.500	0.00013300	0.00027400	0.00000000	0.00000000	0.00000000	0.00000000
90.000	0.00042800	0.00068500	0.00000000	0.00000000	0.00000000	0.00000000
112.500	0.00019200	0.00029700	0.00000000	0.00000000	0.00000000	0.00000000
135.000	0.00011500	0.00031900	0.00000000	0.00000000	0.00000000	0.00000000
157.500	0.00021200	0.00054800	0.00000000	0.00000000	0.00000000	0.00000000
180.000	0.00023500	0.00052500	0.00000000	0.00000000	0.00000000	0.00000000
202.500	0.00020100	0.00034200	0.00000000	0.00000000	0.00000000	0.00000000
225.000	0.00019100	0.00043400	0.00000000	0.00000000	0.00000000	0.00000000
247.500	0.00018700	0.00041100	0.00000000	0.00000000	0.00000000	0.00000000
270.000	0.00025500	0.00034200	0.00000000	0.00000000	0.00000000	0.00000000
292.500	0.00014500	0.00047900	0.00000000	0.00000000	0.00000000	0.00000000
315.000	0.00019200	0.00029700	0.00000000	0.00000000	0.00000000	0.00000000
337.500	0.00012500	0.00022800	0.00000000	0.00000000	0.00000000	0.00000000

SEASON 1

STABILITY CATEGORY 2

DIRECTION (DEGREES)	WIND SPEED CATEGORY 1 (0.7500MPS)	WIND SPEED CATEGORY 2 (2.5000MPS)	WIND SPEED CATEGORY 3 (4.3000MPS)	WIND SPEED CATEGORY 4 (6.8000MPS)	WIND SPEED CATEGORY 5 (9.5000MPS)	WIND SPEED CATEGORY 6 (12.5000MPS)
0.000	0.00107600	0.00219099	0.00152900	0.00000000	0.00000000	0.00000000
22.500	0.00093100	0.00125500	0.00079900	0.00000000	0.00000000	0.00000000
45.000	0.00083000	0.00187100	0.00152900	0.00000000	0.00000000	0.00000000
67.500	0.00097400	0.00139200	0.00143800	0.00000000	0.00000000	0.00000000
90.000	0.00113100	0.00262399	0.00250999	0.00000000	0.00000000	0.00000000
112.500	0.00083300	0.00209899	0.00127800	0.00000000	0.00000000	0.00000000
135.000	0.00078200	0.00230499	0.00171100	0.00000000	0.00000000	0.00000000
157.500	0.00088300	0.00148300	0.00180300	0.00000000	0.00000000	0.00000000
180.000	0.00092300	0.00301199	0.00260099	0.00000000	0.00000000	0.00000000
202.500	0.00056600	0.00162000	0.00127800	0.00000000	0.00000000	0.00000000
225.000	0.00067500	0.00166600	0.00120900	0.00000000	0.00000000	0.00000000
247.500	0.00057700	0.00150600	0.00136900	0.00000000	0.00000000	0.00000000
270.000	0.00065700	0.00152900	0.00116400	0.00000000	0.00000000	0.00000000
292.500	0.00072900	0.00148300	0.00111800	0.00000000	0.00000000	0.00000000
315.000	0.00077200	0.00182500	0.00136900	0.00000000	0.00000000	0.00000000
337.500	0.00050600	0.00155200	0.00095800	0.00000000	0.00000000	0.00000000

- ISCLT INPUT DATA (CONT.) -

- FREQUENCY OF OCCURRENCE OF WIND SPEED, DIRECTION AND STABILITY -

SEASON 1

STABILITY CATEGORY 3

DIRECTION (DEGREES)	WIND SPEED CATEGORY 1 (0.7500MPS)	WIND SPEED CATEGORY 2 (2.5000MPS)	WIND SPEED CATEGORY 3 (4.3000MPS)	WIND SPEED CATEGORY 4 (6.8000MPS)	WIND SPEED CATEGORY 5 (9.5000MPS)	WIND SPEED CATEGORY 6 (12.5000MPS)
0.000	0.00043200	0.00273799	0.00620698	0.00063900	0.00000000	0.00000000
22.500	0.00046900	0.00225899	0.00428999	0.00045600	0.00006800	0.00000000
45.000	0.00056700	0.00321699	0.00570499	0.00095800	0.00000000	0.00000000
67.500	0.00044300	0.00287499	0.00590998	0.00118700	0.00002300	0.00000000
90.000	0.00056600	0.00351399	0.00928698	0.00230499	0.00002300	0.00000000
112.500	0.00032500	0.00198499	0.00463199	0.00132300	0.00000000	0.00000000
135.000	0.00049400	0.00225899	0.00472299	0.00086700	0.00000000	0.00000000
157.500	0.00029200	0.00219099	0.00492899	0.00089000	0.00002300	0.00000000
180.000	0.00039700	0.00292099	0.00883098	0.00175700	0.00016000	0.00000000
202.500	0.00027200	0.00162000	0.00381099	0.00066200	0.00002300	0.00000000
225.000	0.00025700	0.00173400	0.00321699	0.00079900	0.00002300	0.00000000
247.500	0.00023400	0.00143800	0.00294399	0.00057000	0.00004600	0.00000000
270.000	0.00024600	0.00159700	0.00369699	0.00079900	0.00013700	0.00000000
292.500	0.00018800	0.00116400	0.00323999	0.00063900	0.00002300	0.00000000
315.000	0.00023500	0.00146000	0.00442699	0.00098100	0.00002300	0.00000000
337.500	0.00022000	0.00157400	0.00381099	0.00018300	0.00000000	0.00000000

SEASON 1

STABILITY CATEGORY 4

DIRECTION (DEGREES)	WIND SPEED CATEGORY 1 (0.7500MPS)	WIND SPEED CATEGORY 2 (2.5000MPS)	WIND SPEED CATEGORY 3 (4.3000MPS)	WIND SPEED CATEGORY 4 (6.8000MPS)	WIND SPEED CATEGORY 5 (9.5000MPS)	WIND SPEED CATEGORY 6 (12.5000MPS)
0.000	0.00092300	0.00419899	0.01868795	0.01702296	0.00157400	0.00004600
22.500	0.00067500	0.00417599	0.00949297	0.00981198	0.00127800	0.00018300
45.000	0.00096000	0.00529399	0.01106697	0.00969798	0.00061600	0.00004600
67.500	0.00096100	0.00467799	0.00985797	0.00775798	0.00029700	0.00004600
90.000	0.00104400	0.00572699	0.01572196	0.01266397	0.00038800	0.00000000
112.500	0.00069900	0.00323999	0.00937798	0.00828298	0.00022800	0.00000000
135.000	0.00049900	0.00319499	0.00873998	0.00570499	0.00031900	0.00004600
157.500	0.00050800	0.00330899	0.00853398	0.00835198	0.00105000	0.00004600
180.000	0.00093600	0.00467799	0.01435296	0.01375997	0.00237299	0.00013700
202.500	0.00030700	0.00200799	0.00543099	0.00488299	0.00093600	0.00009100
225.000	0.00070500	0.00237299	0.00705098	0.00654898	0.00102700	0.00022800
247.500	0.00041400	0.00273799	0.00584199	0.00451799	0.00102700	0.00018300
270.000	0.00057600	0.00292099	0.00775798	0.00928698	0.00175700	0.00025100
292.500	0.00045700	0.00234999	0.00574999	0.00748398	0.00152900	0.00022800
315.000	0.00046000	0.00207599	0.00508899	0.00830598	0.00109500	0.00002300
337.500	0.00048800	0.00212199	0.00593298	0.00618398	0.00034200	0.00009100

- ISCLT INPUT DATA (CONT.) -

- FREQUENCY OF OCCURRENCE OF WIND SPEED, DIRECTION AND STABILITY -

SEASON 1

STABILITY CATEGORY 5

DIRECTION (DEGREES)	WIND SPEED CATEGORY 1 (0.7500MPS)	WIND SPEED CATEGORY 2 (2.5000MPS)	WIND SPEED CATEGORY 3 (4.3000MPS)	WIND SPEED CATEGORY 4 (6.8000MPS)	WIND SPEED CATEGORY 5 (9.5000MPS)	WIND SPEED CATEGORY 6 (12.5000MPS)
0.000	0.01233297	0.02523693	0.01181997	0.00000000	0.00000000	0.00000000
22.500	0.01131597	0.02078795	0.00419899	0.00000000	0.00000000	0.00000000
45.000	0.01238997	0.02598993	0.00387899	0.00000000	0.00000000	0.00000000
67.500	0.01144697	0.02149495	0.00394799	0.00000000	0.00000000	0.00000000
90.000	0.01342797	0.02619594	0.00563599	0.00000000	0.00000000	0.00000000
112.500	0.00845298	0.01332597	0.00385599	0.00000000	0.00000000	0.00000000
135.000	0.00765898	0.01197997	0.00308099	0.00000000	0.00000000	0.00000000
157.500	0.00710998	0.01327997	0.00178000	0.00000000	0.00000000	0.00000000
180.000	0.01033097	0.02067395	0.00333199	0.00000000	0.00000000	0.00000000
202.500	0.00326299	0.00625198	0.00116400	0.00000000	0.00000000	0.00000000
225.000	0.00367199	0.00821498	0.00212199	0.00000000	0.00000000	0.00000000
247.500	0.00448799	0.00823698	0.00209899	0.00000000	0.00000000	0.00000000
270.000	0.00535199	0.01081597	0.00570499	0.00000000	0.00000000	0.00000000
292.500	0.00445199	0.00853398	0.00444999	0.00000000	0.00000000	0.00000000
315.000	0.00192800	0.00342299	0.00292099	0.00000000	0.00000000	0.00000000
337.500	0.00329399	0.00679998	0.00435799	0.00000000	0.00000000	0.00000000

- VERTICAL POTENTIAL TEMPERATURE GRADIENT (DEGREES KELVIN/METER) -

	WIND SPEED CATEGORY 1	WIND SPEED CATEGORY 2	WIND SPEED CATEGORY 3	WIND SPEED CATEGORY 4	WIND SPEED CATEGORY 5	WIND SPEED CATEGORY 6
STABILITY CATEGORY	10.000000E+000	0.000000E+000	0.000000E+000	0.000000E+000	0.000000E+000	0.000000E+00
STABILITY CATEGORY	20.000000E+000	0.000000E+000	0.000000E+000	0.000000E+000	0.000000E+000	0.000000E+00
STABILITY CATEGORY	30.000000E+000	0.000000E+000	0.000000E+000	0.000000E+000	0.000000E+000	0.000000E+00
STABILITY CATEGORY	40.000000E+000	0.000000E+000	0.000000E+000	0.000000E+000	0.000000E+000	0.000000E+00
STABILITY CATEGORY	50.200000E-010	0.200000E-010	0.200000E-010	0.200000E-010	0.200000E-010	0.200000E-01

- WIND PROFILE POWER LAW EXPONENTS -

	WIND SPEED CATEGORY 1	WIND SPEED CATEGORY 2	WIND SPEED CATEGORY 3	WIND SPEED CATEGORY 4	WIND SPEED CATEGORY 5	WIND SPEED CATEGORY 6
STABILITY CATEGORY	10.100000E+000	0.100000E+000	0.100000E+000	0.100000E+000	0.100000E+000	0.100000E+00
STABILITY CATEGORY	20.150000E+000	0.150000E+000	0.150000E+000	0.150000E+000	0.150000E+000	0.150000E+00
STABILITY CATEGORY	30.200000E+000	0.200000E+000	0.200000E+000	0.200000E+000	0.200000E+000	0.200000E+00
STABILITY CATEGORY	40.250000E+000	0.250000E+000	0.250000E+000	0.250000E+000	0.250000E+000	0.250000E+00
STABILITY CATEGORY	50.300000E+000	0.300000E+000	0.300000E+000	0.300000E+000	0.300000E+000	0.300000E+00

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202.500	0.00326299	0.00625198	0.00116400	0.00000000	0.00000000	0.00000000
225.000	0.00367199	0.00821498	0.00212199	0.00000000	0.00000000	0.00000000
247.500	0.00448799	0.00823698	0.00209899	0.00000000	0.00000000	0.00000000
270.000	0.00535199	0.01081597	0.00570499	0.00000000	0.00000000	0.00000000
292.500	0.00445199	0.00853398	0.00444999	0.00000000	0.00000000	0.00000000
315.000	0.00192800	0.00342299	0.00292099	0.00000000	0.00000000	0.00000000
337.500	0.00329399	0.00679998	0.00435799	0.00000000	0.00000000	0.00000000

0 - VERTICAL POTENTIAL TEMPERATURE GRADIENT (DEGREES KELVIN/METER) -

	WIND SPEED CATEGORY 1	WIND SPEED CATEGORY 2	WIND SPEED CATEGORY 3	WIND SPEED CATEGORY 4	WIND SPEED CATEGORY 5	WIND SPEED CATEGORY 6
STABILITY CATEGORY 1	0.000000E+00	0.000000E+00	0.000000E+00	0.000000E+00	0.000000E+00	0.000000E+00
STABILITY CATEGORY 2	0.000000E+00	0.000000E+00	0.000000E+00	0.000000E+00	0.000000E+00	0.000000E+00
STABILITY CATEGORY 3	0.000000E+00	0.000000E+00	0.000000E+00	0.000000E+00	0.000000E+00	0.000000E+00
STABILITY CATEGORY 4	0.000000E+00	0.000000E+00	0.000000E+00	0.000000E+00	0.000000E+00	0.000000E+00
STABILITY CATEGORY 5	0.200000E-01	0.200000E-01	0.200000E-01	0.200000E-01	0.200000E-01	0.200000E-01

0 - WIND PROFILE POWER LAW EXPONENTS -

	WIND SPEED CATEGORY 1	WIND SPEED CATEGORY 2	WIND SPEED CATEGORY 3	WIND SPEED CATEGORY 4	WIND SPEED CATEGORY 5	WIND SPEED CATEGORY 6
STABILITY CATEGORY 1	0.100000E+00	0.100000E+00	0.100000E+00	0.100000E+00	0.100000E+00	0.100000E+00
STABILITY CATEGORY 2	0.150000E+00	0.150000E+00	0.150000E+00	0.150000E+00	0.150000E+00	0.150000E+00
STABILITY CATEGORY 3	0.200000E+00	0.200000E+00	0.200000E+00	0.200000E+00	0.200000E+00	0.200000E+00
STABILITY CATEGORY 4	0.250000E+00	0.250000E+00	0.250000E+00	0.250000E+00	0.250000E+00	0.250000E+00
STABILITY CATEGORY 5	0.300000E+00	0.300000E+00	0.300000E+00	0.300000E+00	0.300000E+00	0.300000E+00

ORLANDO UTILITIES PT 33-01 - PT 33-03 - SOURCE INPUT DATA -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV- ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		2	STACK	463300.00	3159000.00	34.40	0.00	GAS EXIT TEMP (DEG K)= 422.00, GAS EXIT VEL. (M/SEC)= 10.16, STACK DIAMETER (M)= 2.440, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0

- SOURCE STRENGTHS (GRAMS PER SEC)

SEASON 1	SEASON 2	SEASON 3	SEASON 4
3.22000E+00			

KISSIMMEE UTILITIES PT01-04 - SOURCE INPUT DATA (CONT.) -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV- ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		5	STACK	460100.00	3129300.00	13.11	0.00	GAS EXIT TEMP (DEG K)= 466.50, GAS EXIT VEL. (M/SEC)= 16.30, STACK DIAMETER (M)= 0.610, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0

- SOURCE STRENGTHS (GRAMS PER SEC)

SEASON 1 SEASON 2 SEASON 3 SEASON 4
4.46000E+00

KISSIMMEE UTILITIES PT01-05, PT01-06 - SOURCE INPUT DATA (CONT.) -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV- ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		6	STACK	460100.00	3129300.00	16.15	0.00	GAS EXIT TEMP (DEG K)= 477.60, GAS EXIT VEL. (M/SEC)= 17.60, STACK DIAMETER (M)= 0.850, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0

- SOURCE STRENGTHS (GRAMS PER SEC)

SEASON 1 SEASON 2 SEASON 3 SEASON 4
1.70900E+01

KISSIMMEE UTILITIES PT01-07, PT01-08 - SOURCE INPUT DATA (CONT.) -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV- ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		7	STACK	460100.00	3129300.00	7.01	0.00	GAS EXIT TEMP (DEG K)= 466.50, GAS EXIT VEL. (M/SEC)= 9.60, STACK DIAMETER (M)= 0.760, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0

- SOURCE STRENGTHS (GRAMS PER SEC)

SEASON 1 SEASON 2 SEASON 3 SEASON 4
1.05800E+01

KISSIMMEE UTILITIES PT01-11 - 01-15 - SOURCE INPUT DATA (CONT.) -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV- ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		8	STACK	460100.00	3129300.00	13.41	0.00	GAS EXIT TEMP (DEG K)= 505.40, GAS EXIT VEL. (M/SEC)= 8.70, STACK DIAMETER (M)= 0.800, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0

- SOURCE STRENGTHS (GRAMS PER SEC)

SEASON 1 SEASON 2 SEASON 3 SEASON 4
1.13400E+01

- SOURCE INPUT DATA (CONT.) -

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KISSIMMEE UTILITIES UNITS #19 and #20

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV- ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		9	STACK	460100.00	3129300.00	8.69	0.00	GAS EXIT TEMP (DEG K)= 505.40, GAS EXIT VEL. (M/SEC)= 17.20, STACK DIAMETER (M)= 0.900, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0 - SOURCE STRENGTHS (GRAMS PER SEC) - SEASON 1 SEASON 2 SEASON 3 SEASON 4 1.46600E+01

CITY OF ST. CLOUD PT02-02, PT02-04

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV- ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		10	STACK	471800.00	3124900.00	7.92	0.00	GAS EXIT TEMP (DEG K)= 727.60, GAS EXIT VEL. (M/SEC)= 34.70, STACK DIAMETER (M)= 0.760, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0 - SOURCE STRENGTHS (GRAMS PER SEC) - SEASON 1 SEASON 2 SEASON 3 SEASON 4 3.90500E+01

CITY OF ST. CLOUD PT02-05, PT02-06

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV- ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		11	STACK	471800.00	3124900.00	8.53	0.00	GAS EXIT TEMP (DEG K)= 699.80, GAS EXIT VEL. (M/SEC)= 1.17, STACK DIAMETER (M)= 0.640, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0 - SOURCE STRENGTHS (GRAMS PER SEC) - SEASON 1 SEASON 2 SEASON 3 SEASON 4 3.16800E+01

CITY OF ST CLOUD PT02-07, PT02-08

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV- ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		12	STACK	471800.00	3124900.00	11.89	0.00	GAS EXIT TEMP (DEG K)= 727.60, GAS EXIT VEL. (M/SEC)= 29.51, STACK DIAMETER (M)= 1.070, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF

ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0
- SOURCE STRENGTHS (GRAMS PER SEC)
SEASON 1 SEASON 2 SEASON 3 SEASON 4
5.48900E+01

Florida Power Corp PT 14-01 thru 14-06

- SOURCE INPUT DATA (CONT.) -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV-ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		15	STACK	446300.00	3126000.00	7.92	0.00	GAS EXIT TEMP (DEG K)= 703.70, GAS EXIT VEL. (M/SEC)= 18.06, STACK DIAMETER (M)= 4.240, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0

- SOURCE STRENGTHS (GRAMS PER SEC)
SEASON 1 SEASON 2 SEASON 3 SEASON 4
8.23300E+01

KISSIMMEE UTILITIES -- NON COMBUSTION TURBINE

- SOURCE INPUT DATA (CONT.) -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV-ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		18	STACK	460100.00	3129300.00	9.14	0.00	GAS EXIT TEMP (DEG K)= 422.00, GAS EXIT VEL. (M/SEC)= 38.03, STACK DIAMETER (M)= 2.440, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0

- SOURCE STRENGTHS (GRAMS PER SEC)
SEASON 1 SEASON 2 SEASON 3 SEASON 4
3.85000E+01

SOUTHERN FAULT PT 39-01

- SOURCE INPUT DATA (CONT.) -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV-ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		41	STACK	462900.00	3153300.00	16.20	0.00	GAS EXIT TEMP (DEG K)= 388.70, GAS EXIT VEL. (M/SEC)= 15.63, STACK DIAMETER (M)= 1.460, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0

- SOURCE STRENGTHS (GRAMS PER SEC)
SEASON 1 SEASON 2 SEASON 3 SEASON 4
1.27000E+00

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Coca Cola PT 23-02

- SOURCE INPUT DATA (CONT.) -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV- ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		57	STACK	421300.00	3103600.00	17.40	0.00	GAS EXIT TEMP (DEG K)= 547.00, GAS EXIT VEL. (M/SEC)= 15.24, STACK DIAMETER (M)= 1.830, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0

- SOURCE STRENGTHS (GRAMS PER SEC) -

SEASON 1	SEASON 2	SEASON 3	SEASON 4
2.07000E+00			

CITY OF ORLANDO INCINERATORS PT 61-01 - 61-08

- SOURCE INPUT DATA (CONT.) -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV- ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		100	STACK	456300.00	3152700.00	11.60	0.00	GAS EXIT TEMP (DEG K)= 922.00, GAS EXIT VEL. (M/SEC)= 12.50, STACK DIAMETER (M)= 1.130, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0

- SOURCE STRENGTHS (GRAMS PER SEC) -

SEASON 1	SEASON 2	SEASON 3	SEASON 4
3.22000E+00			

8 W

** ANNUAL GROUND LEVEL CONCENTRATION (MICROGRAMS PER CUBIC METER) FROM ALL SOURCES COMBINED **

- GRID SYSTEM RECEPTORS -
- X AXIS (DISTANCE, METERS) -

Y AXIS (DISTANCE, METERS)	455600.000	456600.000	457600.000	458600.000	459600.000	460600.000	461600.000	462600.000	463600.000
	- CONCENTRATION -								
3133800.000	7.203840	7.964563	8.739365	10.094641	12.641409	11.831429	7.906047	6.718377	6.766826
3132800.000	8.158581	9.024574	10.281042	11.513060	15.680794	14.248495	7.985918	8.064526	7.872984
3131800.000	9.220030	10.622097	12.266405	14.717760	20.462940	17.504848	10.435093	10.003328	9.036943
3130800.000	11.287207	12.482058	15.444592	19.514755	27.810764	19.813309	14.907787	11.940344	10.217138
3129800.000	15.011848	18.458504	23.717342	30.883835	41.979912	32.367508	19.995598	15.218042	12.624662
3128800.000	16.168568	20.197514	26.816319	38.308418	68.864471	27.363506	21.915806	16.040699	13.286333
3127800.000	14.496395	17.129650	22.702099	32.408699	38.785179	24.626392	13.384481	13.274551	12.466822
3126800.000	13.851397	16.693878	20.721905	23.239521	28.532719	23.279018	12.975653	11.292343	11.945793
3125800.000	13.539406	15.729925	17.290092	18.354015	22.694443	20.341648	12.536428	12.001600	11.948391
3124800.000	12.916681	13.981201	14.924110	16.399517	19.236763	18.162243	13.646818	12.377136	12.907539

- GRID SYSTEM RECEPTORS -
- X AXIS (DISTANCE, METERS) -

Y AXIS (DISTANCE, METERS)	464600.000
	- CONCENTRATION -
3133800.000	6.747674
3132800.000	7.515856
3131800.000	8.364370
3130800.000	9.566696
3129800.000	11.270599
3128800.000	11.962540
3127800.000	11.676460
3126800.000	12.386490
3125800.000	13.252758
3124800.000	13.973961

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202.500	0.00326299	0.00625198	0.00116400	0.00000000	0.00000000	0.00000000
225.000	0.00367199	0.00821498	0.00212199	0.00000000	0.00000000	0.00000000
247.500	0.00448799	0.00823698	0.00209899	0.00000000	0.00000000	0.00000000
270.000	0.00535199	0.01081597	0.00570499	0.00000000	0.00000000	0.00000000
292.500	0.00445199	0.00853398	0.00444999	0.00000000	0.00000000	0.00000000
315.000	0.00192800	0.00342299	0.00292099	0.00000000	0.00000000	0.00000000
337.500	0.00329399	0.00679998	0.00435799	0.00000000	0.00000000	0.00000000

0 - VERTICAL POTENTIAL TEMPERATURE GRADIENT (DEGREES KELVIN/METER) -

	WIND SPEED CATEGORY 1	WIND SPEED CATEGORY 2	WIND SPEED CATEGORY 3	WIND SPEED CATEGORY 4	WIND SPEED CATEGORY 5	WIND SPEED CATEGORY 6
STABILITY CATEGORY 1	0.000000E+00	0.000000E+00	0.000000E+00	0.000000E+00	0.000000E+00	0.000000E+00
STABILITY CATEGORY 2	0.000000E+00	0.000000E+00	0.000000E+00	0.000000E+00	0.000000E+00	0.000000E+00
STABILITY CATEGORY 3	0.000000E+00	0.000000E+00	0.000000E+00	0.000000E+00	0.000000E+00	0.000000E+00
STABILITY CATEGORY 4	0.000000E+00	0.000000E+00	0.000000E+00	0.000000E+00	0.000000E+00	0.000000E+00
STABILITY CATEGORY 5	0.200000E-01	0.200000E-01	0.200000E-01	0.200000E-01	0.200000E-01	0.200000E-01

0 - WIND PROFILE POWER LAW EXPONENTS -

	WIND SPEED CATEGORY 1	WIND SPEED CATEGORY 2	WIND SPEED CATEGORY 3	WIND SPEED CATEGORY 4	WIND SPEED CATEGORY 5	WIND SPEED CATEGORY 6
STABILITY CATEGORY 1	0.100000E+00	0.100000E+00	0.100000E+00	0.100000E+00	0.100000E+00	0.100000E+00
STABILITY CATEGORY 2	0.150000E+00	0.150000E+00	0.150000E+00	0.150000E+00	0.150000E+00	0.150000E+00
STABILITY CATEGORY 3	0.200000E+00	0.200000E+00	0.200000E+00	0.200000E+00	0.200000E+00	0.200000E+00
STABILITY CATEGORY 4	0.250000E+00	0.250000E+00	0.250000E+00	0.250000E+00	0.250000E+00	0.250000E+00
STABILITY CATEGORY 5	0.300000E+00	0.300000E+00	0.300000E+00	0.300000E+00	0.300000E+00	0.300000E+00

ORLANDO UTILITIES PT 33-01 - 33-03 - SOURCE INPUT DATA -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV-ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		1	STACK	463300.00	3159000.00	34.40	0.00	GAS EXIT TEMP (DEG K)= 422.00, GAS EXIT VEL. (M/SEC)= 17.00, STACK DIAMETER (M)= 1.830, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0

- SOURCE STRENGTHS (GRAMS PER SEC) -

SEASON 1	SEASON 2	SEASON 3	SEASON 4
2.25000E+00			

ORLANDO UTILITIES PT 33-04 - SOURCE INPUT DATA (CONT.) -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV-ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		2	STACK	463300.00	3159000.00	34.40	0.00	GAS EXIT TEMP (DEG K)= 422.00, GAS EXIT VEL. (M/SEC)= 10.16, STACK DIAMETER (M)= 2.440, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0

- SOURCE STRENGTHS (GRAMS PER SEC) -

89

SEASON 1 SEASON 2 SEASON 3 SEASON 4
2.85000E+00

STANDARD SAND SILICA PT14-01

- SOURCE INPUT DATA (CONT.) -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV-ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		3	STACK	441500.00	3118200.00	9.10	0.00	GAS EXIT TEMP (DEG K)= 380.40, GAS EXIT VEL. (M/SEC)= 24.13, STACK DIAMETER (M)= 0.430, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0

- SOURCE STRENGTHS (GRAMS PER SEC) -

SEASON 1 SEASON 2 SEASON 3 SEASON 4
1.04000E+00

STANDARD SAND SILICA PT14-02

- SOURCE INPUT DATA (CONT.) -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV-ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		4	STACK	441500.00	3118200.00	9.10	0.00	GAS EXIT TEMP (DEG K)= 350.90, GAS EXIT VEL. (M/SEC)= 26.55, STACK DIAMETER (M)= 1.400, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0

- SOURCE STRENGTHS (GRAMS PER SEC) -

SEASON 1 SEASON 2 SEASON 3 SEASON 4
1.04000E+00

KISSIMMEE UTILITIES PT35-01-3803

- SOURCE INPUT DATA (CONT.) -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV-ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		5	STACK	460100.00	3129300.00	13.11	0.00	GAS EXIT TEMP (DEG K)= 466.50, GAS EXIT VEL. (M/SEC)= 16.30, STACK DIAMETER (M)= 0.610, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0

- SOURCE STRENGTHS (GRAMS PER SEC) -

SEASON 1 SEASON 2 SEASON 3 SEASON 4
5.30000E-01

- SOURCE INPUT DATA (CONT.) -

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KISSIMMEE UTILITIES PT01-05, PT01-06

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV- ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		6	STACK	460100.00	3129300.00	16.15	0.00	GAS EXIT TEMP (DEG K)= 477.60, GAS EXIT VEL. (M/SEC)= 17.60, STACK DIAMETER (M)= 0.850, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0 - SOURCE STRENGTHS (GRAMS PER SEC SEASON 1 SEASON 2 SEASON 3 SEASON 4 2.02000E+00) -

KISSIMMEE UTILITIES PT01-07, PT01-08 - SOURCE INPUT DATA (CONT.) -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV- ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		7	STACK	460100.00	3129300.00	7.01	0.00	GAS EXIT TEMP (DEG K)= 466.50, GAS EXIT VEL. (M/SEC)= 9.60, STACK DIAMETER (M)= 0.760, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0 - SOURCE STRENGTHS (GRAMS PER SEC SEASON 1 SEASON 2 SEASON 3 SEASON 4 1.36000E+00) -

KISSIMMEE UTILITIES PT 01-11-01-15 - SOURCE INPUT DATA (CONT.) -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV- ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		8	STACK	460100.00	3129300.00	13.41	0.00	GAS EXIT TEMP (DEG K)= 505.40, GAS EXIT VEL. (M/SEC)= 8.70, STACK DIAMETER (M)= 0.800, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0 - SOURCE STRENGTHS (GRAMS PER SEC SEASON 1 SEASON 2 SEASON 3 SEASON 4 3.15000E+00) -

KISSIMMEE UTILITIES UNITS #19 and #20 - SOURCE INPUT DATA (CONT.) -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV- ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		9	STACK	460100.00	3129300.00	8.69	0.00	GAS EXIT TEMP (DEG K)= 505.40, GAS EXIT VEL. (M/SEC)= 17.20, STACK DIAMETER (M)= 0.900, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF

ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0
- SOURCE STRENGTHS (GRAMS PER SEC)
SEASON 1 SEASON 2 SEASON 3 SEASON 4
1.74000E+00

CITY OF ST. CLOUD PT02-02, PT02-04 - SOURCE INPUT DATA (CONT.) -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV- ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		10	STACK	471800.00	3124900.00	7.92	0.00	GAS EXIT TEMP (DEG K)= 727.60, GAS EXIT VEL. (M/SEC)= 34.70, STACK DIAMETER (M)= 0.760, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0 - SOURCE STRENGTHS (GRAMS PER SEC) SEASON 1 SEASON 2 SEASON 3 SEASON 4 2.82000E+00

CITY OF ST. CLOUD PT02-05, PT02-06 - SOURCE INPUT DATA (CONT.) -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV- ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		11	STACK	471800.00	3124900.00	8.53	0.00	GAS EXIT TEMP (DEG K)= 699.80, GAS EXIT VEL. (M/SEC)= 1.17, STACK DIAMETER (M)= 0.640, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0 - SOURCE STRENGTHS (GRAMS PER SEC) SEASON 1 SEASON 2 SEASON 3 SEASON 4 2.27000E+00

CITY OF ST. CLOUD PT02-07, PT02-08 - SOURCE INPUT DATA (CONT.) -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV- ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		12	STACK	471800.00	3124900.00	11.89	0.00	GAS EXIT TEMP (DEG K)= 727.60, GAS EXIT VEL. (M/SEC)= 29.51, STACK DIAMETER (M)= 1.070, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0 - SOURCE STRENGTHS (GRAMS PER SEC) SEASON 1 SEASON 2 SEASON 3 SEASON 4 3.78000E+00

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STOKELY VAN CAMP PT07-01

- SOURCE INPUT DATA (CONT.) -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV-ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		13	STACK	451100.00	3125800.00	7.32	0.00	GAS EXIT TEMP (DEG K)= 513.70, GAS EXIT VEL. (M/SEC)= 11.50, STACK DIAMETER (M)= 0.460, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0 - SOURCE STRENGTHS (GRAMS PER SEC) - SEASON 1 SEASON 2 SEASON 3 SEASON 4 1.30000E-01

C W DAILEY PT 11-01

- SOURCE INPUT DATA (CONT.) -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV-ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		14	STACK	470800.00	3133800.00	9.45	0.00	GAS EXIT TEMP (DEG K)=1005.70, GAS EXIT VEL. (M/SEC)= 11.60, STACK DIAMETER (M)= 0.610, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0 - SOURCE STRENGTHS (GRAMS PER SEC) - SEASON 1 SEASON 2 SEASON 3 SEASON 4 3.20000E-01

FLA. POWER CORP. PT14-01 - 14-06

- SOURCE INPUT DATA (CONT.) -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV-ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		15	STACK	446300.00	3126000.00	7.92	0.00	GAS EXIT TEMP (DEG K)= 703.70, GAS EXIT VEL. (M/SEC)= 18.06, STACK DIAMETER (M)= 4.240, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0 - SOURCE STRENGTHS (GRAMS PER SEC) - SEASON 1 SEASON 2 SEASON 3 SEASON 4 4.09000E+01

DIXIE ASPHALT PT 41-01

- SOURCE INPUT DATA (CONT.) -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV-ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -

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X 16 STACK 463200.00 3143000.00 7.92 0.00 GAS EXIT TEMP (DEG K)= 394.30, GAS EXIT VEL. (M/SEC)= 26.95,
STACK DIAMETER (M)= 1.100, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF
ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0
- SOURCE STRENGTHS (GRAMS PER SEC) -
SEASON 1 SEASON 2 SEASON 3 SEASON 4
1.44000E+00

- SOURCE INPUT DATA (CONT.) -

ST CLOUD HOSPITAL PT 10-02, PT10-03

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV- ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		17	STACK	470300.00	3124100.00	5.49	0.00	GAS EXIT TEMP (DEG K)= 505.40, GAS EXIT VEL. (M/SEC)= 15.00, STACK DIAMETER (M)= 0.460, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0 - SOURCE STRENGTHS (GRAMS PER SEC) - SEASON 1 SEASON 2 SEASON 3 SEASON 4 6.00000E-02

KILLIMMEE UTILITIES NEW COMBUSTION TURBINE

- SOURCE INPUT DATA (CONT.) -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV- ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		18	STACK	460100.00	3129300.00	9.14	0.00	GAS EXIT TEMP (DEG K)= 422.00, GAS EXIT VEL. (M/SEC)= 38.03, STACK DIAMETER (M)= 2.440, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0 - SOURCE STRENGTHS (GRAMS PER SEC) - SEASON 1 SEASON 2 SEASON 3 SEASON 4 1.98000E+00

FLA DEPT AGRICULTURE PT05-01

- SOURCE INPUT DATA (CONT.) -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV- ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		19	STACK	458700.00	3133400.00	9.14	0.00	GAS EXIT TEMP (DEG K)= 727.60, GAS EXIT VEL. (M/SEC)= 5.47, STACK DIAMETER (M)= 0.550, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0 - SOURCE STRENGTHS (GRAMS PER SEC) - SEASON 1 SEASON 2 SEASON 3 SEASON 4 1.90000E-01

KISSIMMEE COMMUNITY HOSPITAL PT06-01 - SOURCE INPUT DATA (CONT.) -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV- ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		20	STACK	459900.00	3130300.00	7.62	0.00	GAS EXIT TEMP (DEG K)= 744.50, GAS EXIT VEL. (M/SEC)= 13.78, STACK DIAMETER (M)= 0.400, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0

- SOURCE STRENGTHS (GRAMS PER SEC) -

SEASON 1	SEASON 2	SEASON 3	SEASON 4
1.90000E-01			

OWENS ILLINOIS PT32-01, PT32-02 - SOURCE INPUT DATA (CONT.) -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV- ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		21	STACK	460700.00	3142000.00	9.14	0.00	GAS EXIT TEMP (DEG K)= 299.80, GAS EXIT VEL. (M/SEC)= 4.17, STACK DIAMETER (M)= 0.910, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0

- SOURCE STRENGTHS (GRAMS PER SEC) -

SEASON 1	SEASON 2	SEASON 3	SEASON 4
1.50000E+00			

GOULD BATTERY PT56-01 - SOURCE INPUT DATA (CONT.) -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV- ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		22	STACK	460400.00	3142600.00	7.01	0.00	GAS EXIT TEMP (DEG K)= 301.50, GAS EXIT VEL. (M/SEC)= 18.52, STACK DIAMETER (M)= 0.980, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0

- SOURCE STRENGTHS (GRAMS PER SEC) -

SEASON 1	SEASON 2	SEASON 3	SEASON 4
1.70000E-01			

GOULD BATTERY PT56-03 - SOURCE INPUT DATA (CONT.) -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV- ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -

1**** ISCLT ************* ISCLT -- ANNUAL TSP PAGE 0011

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D E                                                    (M)  /
---------------------------------------------------------------------------------------------------------------------------
X       23  STACK   460400.00  3142600.00   4.57    0.00 GAS EXIT TEMP (DEG K)= 294.30, GAS EXIT VEL. (M/SEC)= 15.00,
                                                         STACK DIAMETER (M)= 0.300, HEIGHT OF ASSO. BLDG. (M)=  0.00, WIDTH OF
                                                         ASSO. BLDG. (M)=   0.00, WAKE EFFECTS FLAG = 0
                                                               - SOURCE STRENGTHS ( GRAMS PER SEC                        ) -
                                                                    SEASON 1     SEASON 2     SEASON 3     SEASON 4
                                                                   1.40000E-01
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1**** ISCLT ************* ISCLT -- ANNUAL TSP ******** PAGE 28 ****

GOULD BATTERY PT56-05

- SOURCE INPUT DATA (CONT.) -

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C T SOURCE SOURCE      X           Y       EMISSION  BASE /
A A NUMBER  TYPE  COORDINATE  COORDINATE   HEIGHT   ELEV- /                 - SOURCE DETAILS DEPENDING ON TYPE -
R P                   (M)         (M)        (M)    ATION /
D E                                                    (M)  /
---------------------------------------------------------------------------------------------------------------------------
X       24  STACK   460400.00  3142600.00   9.14    0.00 GAS EXIT TEMP (DEG K)= 305.40, GAS EXIT VEL. (M/SEC)= 13.95,
                                                         STACK DIAMETER (M)= 0.760, HEIGHT OF ASSO. BLDG. (M)=  0.00, WIDTH OF
                                                         ASSO. BLDG. (M)=   0.00, WAKE EFFECTS FLAG = 0
                                                               - SOURCE STRENGTHS ( GRAMS PER SEC                        ) -
                                                                    SEASON 1     SEASON 2     SEASON 3     SEASON 4
                                                                   6.00000E-02
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1**** ISCLT ************* ISCLT -- ANNUAL TSP ******** PAGE 29 ****

FLA. MIN & MAT'LS PT11-01

- SOURCE INPUT DATA (CONT.) -

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C T SOURCE SOURCE      X           Y       EMISSION  BASE /
A A NUMBER  TYPE  COORDINATE  COORDINATE   HEIGHT   ELEV- /                 - SOURCE DETAILS DEPENDING ON TYPE -
R P                   (M)         (M)        (M)    ATION /
D E                                                    (M)  /
---------------------------------------------------------------------------------------------------------------------------
X       25  STACK   462000.00  3149000.00  12.20    0.00 GAS EXIT TEMP (DEG K)= 299.80, GAS EXIT VEL. (M/SEC)=  0.32,
                                                         STACK DIAMETER (M)= 1.220, HEIGHT OF ASSO. BLDG. (M)=  0.00, WIDTH OF
                                                         ASSO. BLDG. (M)=   0.00, WAKE EFFECTS FLAG = 0
                                                               - SOURCE STRENGTHS ( GRAMS PER SEC                        ) -
                                                                    SEASON 1     SEASON 2     SEASON 3     SEASON 4
                                                                   1.04000E+00
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1**** ISCLT ************* ISCLT -- ANNUAL TSP ******** PAGE 30 ****

FLA. MIN. & MAT'LS PT 12-01

- SOURCE INPUT DATA (CONT.) -

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C T SOURCE SOURCE      X           Y       EMISSION  BASE /
A A NUMBER  TYPE  COORDINATE  COORDINATE   HEIGHT   ELEV- /                 - SOURCE DETAILS DEPENDING ON TYPE -
R P                   (M)         (M)        (M)    ATION /
D E                                                    (M)  /
---------------------------------------------------------------------------------------------------------------------------
X       26  STACK   444500.00  3160000.00  10.10    0.00 GAS EXIT TEMP (DEG K)= 299.80, GAS EXIT VEL. (M/SEC)=  0.24,
                                                         STACK DIAMETER (M)= 1.100, HEIGHT OF ASSO. BLDG. (M)=  0.00, WIDTH OF
                                                         ASSO. BLDG. (M)=   0.00, WAKE EFFECTS FLAG = 0
                                                               - SOURCE STRENGTHS ( GRAMS PER SEC                        ) -
                                                                    SEASON 1     SEASON 2     SEASON 3     SEASON 4
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8.60000E-01

INLAND MAT'LS PT20-01

- SOURCE INPUT DATA (CONT.) -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV-ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		27	STACK	459900.00	3160900.00	16.20	0.00	GAS EXIT TEMP (DEG K)= 299.80, GAS EXIT VEL. (M/SEC)= 1.57, STACK DIAMETER (M)= 0.370, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0 - SOURCE STRENGTHS (GRAMS PER SEC) - SEASON 1 SEASON 2 SEASON 3 SEASON 4 7.50000E-01

ORLANDO PAVING PT21-01

- SOURCE INPUT DATA (CONT.) -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV-ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		28	STACK	453900.00	3160700.00	12.80	0.00	GAS EXIT TEMP (DEG K)= 331.50, GAS EXIT VEL. (M/SEC)= 8.55, STACK DIAMETER (M)= 2.260, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0 - SOURCE STRENGTHS (GRAMS PER SEC) - SEASON 1 SEASON 2 SEASON 3 SEASON 4 1.04000E+00

KISSAM ROCK IND PT23-01

- SOURCE INPUT DATA (CONT.) -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV-ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		29	STACK	461300.00	3157900.00	18.30	0.00	GAS EXIT TEMP (DEG K)= 299.80, GAS EXIT VEL. (M/SEC)= 1.34, STACK DIAMETER (M)= 0.400, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0 - SOURCE STRENGTHS (GRAMS PER SEC) - SEASON 1 SEASON 2 SEASON 3 SEASON 4 1.24000E+00

FLA ROCK IND PT24-01

- SOURCE INPUT DATA (CONT.) -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE	Y COORDINATE	EMISSION HEIGHT	BASE ELEV-

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A R D	A P E	NUMBER	TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV- ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		30	STACK	459200.00	3174200.00	3.70	0.00	GAS EXIT TEMP (DEG K)= 299.80, GAS EXIT VEL. (M/SEC)= 17.35, STACK DIAMETER (M)= 0.580, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0 - SOURCE STRENGTHS (GRAMS PER SEC) - SEASON 1 SEASON 2 SEASON 3 SEASON 4 1.24000E+00

FLA ROCK IND PT24-02, PT 24-03

- SOURCE INPUT DATA (CONT.) -

A R D	A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV- ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		31	STACK	459200.00	3174200.00	16.80	0.00	GAS EXIT TEMP (DEG K)= 299.80, GAS EXIT VEL. (M/SEC)= 35.07, STACK DIAMETER (M)= 0.090, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0 - SOURCE STRENGTHS (GRAMS PER SEC) - SEASON 1 SEASON 2 SEASON 3 SEASON 4 2.48000E+00

RINKER MAT'LS PT25-01

- SOURCE INPUT DATA (CONT.) -

A R D	A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV- ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		32	STACK	458300.00	3165000.00	3.40	0.00	GAS EXIT TEMP (DEG K)= 297.00, GAS EXIT VEL. (M/SEC)= 43.12, STACK DIAMETER (M)= 0.370, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0 - SOURCE STRENGTHS (GRAMS PER SEC) - SEASON 1 SEASON 2 SEASON 3 SEASON 4 1.44000E+00

RINKER MATLS PT25-02

- SOURCE INPUT DATA (CONT.) -

A R D	A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV- ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		33	STACK	458300.00	3165000.00	28.90	0.00	GAS EXIT TEMP (DEG K)= 299.80, GAS EXIT VEL. (M/SEC)= 0.11, STACK DIAMETER (M)= 1.220, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0

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- SOURCE STRENGTHS (GRAMS PER SEC) -
SEASON 1 SEASON 2 SEASON 3 SEASON 4
1.15000E+00

LONG STAR PT27-01

- SOURCE INPUT DATA (CONT.) -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV-ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		34	STACK	462600.00	3154200.00	14.60	0.00	GAS EXIT TEMP (DEG K)= 299.80, GAS EXIT VEL. (M/SEC)= 0.52, STACK DIAMETER (M)= 0.910, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0

- SOURCE STRENGTHS (GRAMS PER SEC) -
SEASON 1 SEASON 2 SEASON 3 SEASON 4
9.50000E-01

ORLANDO PAVING PT31-01

- SOURCE INPUT DATA (CONT.) -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV-ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		35	STACK	465300.00	3145900.00	9.10	0.00	GAS EXIT TEMP (DEG K)= 644.30, GAS EXIT VEL. (M/SEC)= 5.75, STACK DIAMETER (M)= 0.460, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0

- SOURCE STRENGTHS (GRAMS PER SEC) -
SEASON 1 SEASON 2 SEASON 3 SEASON 4
1.21000E+00

RINKER MATLS PT 86-01

- SOURCE INPUT DATA (CONT.) -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV-ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		36	STACK	470700.00	3163900.00	2.70	0.00	GAS EXIT TEMP (DEG K)= 299.80, GAS EXIT VEL. (M/SEC)= 4.22, STACK DIAMETER (M)= 1.070, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0

- SOURCE STRENGTHS (GRAMS PER SEC) -
SEASON 1 SEASON 2 SEASON 3 SEASON 4
1.15000E+00

- SOURCE INPUT DATA (CONT.) -

RINKER MAT'LS PT37-01

C A R D	T A P	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV- ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		37	STACK	462500.00	3154300.00	20.40	0.00	GAS EXIT TEMP (DEG K)= 298.20, GAS EXIT VEL. (M/SEC)= 0.13, STACK DIAMETER (M)= 4.850, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0 - SOURCE STRENGTHS (GRAMS PER SEC) - SEASON 1 SEASON 2 SEASON 3 SEASON 4 1.32000E+00

RINKER MAT'LS PT 37-02 - SOURCE INPUT DATA (CONT.) -

C A R D	T A P	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV- ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		38	STACK	462500.00	3154300.00	20.40	0.00	GAS EXIT TEMP (DEG K)= 297.00, GAS EXIT VEL. (M/SEC)= 0.17, STACK DIAMETER (M)= 1.340, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0 - SOURCE STRENGTHS (GRAMS PER SEC) - SEASON 1 SEASON 2 SEASON 3 SEASON 4 1.32000E+00

RINKER MAT'LS PT 38-02 - SOURCE INPUT DATA (CONT.) -

C A R D	T A P	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV- ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		39	STACK	450600.00	3145500.00	15.20	0.00	GAS EXIT TEMP (DEG K)= 299.80, GAS EXIT VEL. (M/SEC)= 0.24, STACK DIAMETER (M)= 4.180, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0 - SOURCE STRENGTHS (GRAMS PER SEC) - SEASON 1 SEASON 2 SEASON 3 SEASON 4 1.76000E+00

RINKER MAT'LS PT 38-03, PT 38-04 - SOURCE INPUT DATA (CONT.) -

C A R D	T A P	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV- ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		40	STACK	450600.00	3145500.00	26.50	0.00	GAS EXIT TEMP (DEG K)= 299.80, GAS EXIT VEL. (M/SEC)= 0.02,

STACK DIAMETER (M)= 4.390, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF
ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0
- SOURCE STRENGTHS (GRAMS PER SEC) -
SEASON 1 SEASON 2 SEASON 3 SEASON 4
2.88000E+00

SOUTHERN FRUIT PT 39-01

- SOURCE INPUT DATA (CONT.) -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV- ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		41	STACK	462900.00	3153300.00	16.20	0.00	GAS EXIT TEMP (DEG K)= 388.70, GAS EXIT VEL. (M/SEC)= 15.63,

STACK DIAMETER (M)= 1.460, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF
ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0
- SOURCE STRENGTHS (GRAMS PER SEC) -
SEASON 1 SEASON 2 SEASON 3 SEASON 4
1.58000E+00

CARNS CONCRETE PIPE PT 50-01

- SOURCE INPUT DATA (CONT.) -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV- ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		42	STACK	454600.00	3167800.00	15.20	0.00	GAS EXIT TEMP (DEG K)= 297.00, GAS EXIT VEL. (M/SEC)= 0.59,

STACK DIAMETER (M)= 1.520, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF
ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0
- SOURCE STRENGTHS (GRAMS PER SEC) -
SEASON 1 SEASON 2 SEASON 3 SEASON 4
9.50000E-01

WINTER GARDEN CITRUS PT 53-01, PT 53-02

- SOURCE INPUT DATA (CONT.) -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV- ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		43	STACK	443800.00	3159600.00	24.40	0.00	GAS EXIT TEMP (DEG K)= 338.70, GAS EXIT VEL. (M/SEC)= 8.08,

STACK DIAMETER (M)= 1.190, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF
ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0
- SOURCE STRENGTHS (GRAMS PER SEC) -
SEASON 1 SEASON 2 SEASON 3 SEASON 4
2.48000E+00

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WINTER GARDEN CITRUS PT53-06, PT53-12

- SOURCE INPUT DATA (CONT.) -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV-ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		44	STACK	443800.00	3159600.00	15.20	0.00	GAS EXIT TEMP (DEG K)= 308.20, GAS EXIT VEL. (M/SEC)= 17.85, STACK DIAMETER (M)= 1.160, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0

- SOURCE STRENGTHS (GRAMS PER SEC)

SEASON 1	SEASON 2	SEASON 3	SEASON 4
2.54000E+00			

WINTER GARDEN CITRUS PT53-14

- SOURCE INPUT DATA (CONT.) -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV-ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		45	STACK	443800.00	3159600.00	24.40	0.00	GAS EXIT TEMP (DEG K)= 340.40, GAS EXIT VEL. (M/SEC)= 17.11, STACK DIAMETER (M)= 0.820, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0

- SOURCE STRENGTHS (GRAMS PER SEC)

SEASON 1	SEASON 2	SEASON 3	SEASON 4
3.17000E+00			

A1 Block PT58-01

- SOURCE INPUT DATA (CONT.) -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV-ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		46	STACK	462500.00	3155000.00	16.80	0.00	GAS EXIT TEMP (DEG K)= 299.80, GAS EXIT VEL. (M/SEC)= 0.20, STACK DIAMETER (M)= 1.220, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0

- SOURCE STRENGTHS (GRAMS PER SEC)

SEASON 1	SEASON 2	SEASON 3	SEASON 4
1.87000E+00			

A1 BLOCK PT58-02

- SOURCE INPUT DATA (CONT.) -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV-ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -

89

X 47 STACK 462500.00 3155000.00 16.80 0.00 GAS EXIT TEMP (DEG K)= 299.80, GAS EXIT VEL. (M/SEC)= 0.30,
STACK DIAMETER (M)= 1.220, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF
ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0
- SOURCE STRENGTHS (GRAMS PER SEC) -
SEASON 1 SEASON 2 SEASON 3 SEASON 4
2.16000E+00

MEDUSA CEMENT PT59-01

- SOURCE INPUT DATA (CONT.) -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV- ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		48	STACK	462600.00	3154400.00.	11.30	0.00	GAS EXIT TEMP (DEG K)= 299.80, GAS EXIT VEL. (M/SEC)= 19.40, STACK DIAMETER (M)= 0.300, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0 - SOURCE STRENGTHS (GRAMS PER SEC) - SEASON 1 SEASON 2 SEASON 3 SEASON 4 1.12000E+00

MEDUSA CEMENT PT59-02

- SOURCE INPUT DATA (CONT.) -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV- ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		49	STACK	462600.00	3154400.00	0.60	0.00	GAS EXIT TEMP (DEG K)= 299.80, GAS EXIT VEL. (M/SEC)= 10.78, STACK DIAMETER (M)= 0.090, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0 - SOURCE STRENGTHS (GRAMS PER SEC) - SEASON 1 SEASON 2 SEASON 3 SEASON 4 8.60000E-01

FLA. ROCK IND PT71-02, PT71-01

- SOURCE INPUT DATA (CONT.) -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV- ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		50	STACK	463000.00	3145500.00	16.80	0.00	GAS EXIT TEMP (DEG K)= 299.80, GAS EXIT VEL. (M/SEC)= 1.62, STACK DIAMETER (M)= 0.370, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0 - SOURCE STRENGTHS (GRAMS PER SEC) - SEASON 1 SEASON 2 SEASON 3 SEASON 4 1.96000E+00

99

FLA. ROCK IND PT71-05

- SOURCE INPUT DATA (CONT.) -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV- ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		51	STACK	463000.00	3145500.00	16.80	0.00	GAS EXIT TEMP (DEG K)= 299.80, GAS EXIT VEL. (M/SEC)= 1.62, STACK DIAMETER (M)= 0.370, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0

- SOURCE STRENGTHS (GRAMS PER SEC) -

SEASON 1	SEASON 2	SEASON 3	SEASON 4
1.12000E+00			

STANDARD SAND SILICA PT14-03

- SOURCE INPUT DATA (CONT.) -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV- ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		52	STACK	441500.00	3118200.00	25.90	0.00	GAS EXIT TEMP (DEG K)= 377.60, GAS EXIT VEL. (M/SEC)= 26.94, STACK DIAMETER (M)= 0.490, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0

- SOURCE STRENGTHS (GRAMS PER SEC) -

SEASON 1	SEASON 2	SEASON 3	SEASON 4
1.76000E+00			

STANDARD SAND SILICA PT14-04

- SOURCE INPUT DATA (CONT.) -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV- ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		53	STACK	441500.00	3118200.00	25.90	0.00	GAS EXIT TEMP (DEG K)= 314.80, GAS EXIT VEL. (M/SEC)= 8.85, STACK DIAMETER (M)= 1.220, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0

- SOURCE STRENGTHS (GRAMS PER SEC) -

SEASON 1	SEASON 2	SEASON 3	SEASON 4
8.10000E-01			

SWIFT AGRICHEM PT17-01

- SOURCE INPUT DATA (CONT.) -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE	Y COORDINATE	EMISSION HEIGHT	BASE ELEV-	- SOURCE DETAILS DEPENDING ON TYPE -

```
R P                    (M)          (M)          (M)   ATION /
D E                                                      (M) /
----------------------------------------------------------------------------------------------------------------------------
X        54  STACK   427900.00  3097400.00  10.10      0.00 GAS EXIT TEMP (DEG K)= 297.00, GAS EXIT VEL. (M/SEC)=  6.61,
                                                            STACK DIAMETER (M)= 0.550, HEIGHT OF ASSO. BLDG. (M)=  0.00, WIDTH OF
                                                            ASSO. BLDG. (M)=    0.00, WAKE EFFECTS FLAG = 0
                                                                - SOURCE STRENGTHS ( GRAMS PER SEC                        ) -
                                                                      SEASON 1      SEASON 2      SEASON 3      SEASON 4
                                                                     9.50000E-01
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- SOURCE INPUT DATA (CONT.) -

SWIFT AGRICHEM PT 17-04

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C T SOURCE SOURCE      X            Y        EMISSION  BASE /
A A NUMBER  TYPE  COORDINATE   COORDINATE    HEIGHT   ELEV- /               - SOURCE DETAILS DEPENDING ON TYPE -
R P                    (M)          (M)          (M)   ATION /
D E                                                      (M) /
----------------------------------------------------------------------------------------------------------------------------
X        55  STACK   427900.00  3097400.00  10.10      0.00 GAS EXIT TEMP (DEG K)= 294.30, GAS EXIT VEL. (M/SEC)= 17.64,
                                                            STACK DIAMETER (M)= 0.340, HEIGHT OF ASSO. BLDG. (M)=  0.00, WIDTH OF
                                                            ASSO. BLDG. (M)=    0.00, WAKE EFFECTS FLAG = 0
                                                                - SOURCE STRENGTHS ( GRAMS PER SEC                        ) -
                                                                      SEASON 1      SEASON 2      SEASON 3      SEASON 4
                                                                     8.90000E-01
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- SOURCE INPUT DATA (CONT.) -

COCA COLA PT23-01

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C T SOURCE SOURCE      X            Y        EMISSION  BASE /
A A NUMBER  TYPE  COORDINATE   COORDINATE    HEIGHT   ELEV- /               - SOURCE DETAILS DEPENDING ON TYPE -
R P                    (M)          (M)          (M)   ATION /
D E                                                      (M) /
----------------------------------------------------------------------------------------------------------------------------
X        56  STACK   421300.00  3103600.00  28.30      0.00 GAS EXIT TEMP (DEG K)= 333.20, GAS EXIT VEL. (M/SEC)= 16.84,
                                                            STACK DIAMETER (M)= 1.070, HEIGHT OF ASSO. BLDG. (M)=  0.00, WIDTH OF
                                                            ASSO. BLDG. (M)=    0.00, WAKE EFFECTS FLAG = 0
                                                                - SOURCE STRENGTHS ( GRAMS PER SEC                        ) -
                                                                      SEASON 1      SEASON 2      SEASON 3      SEASON 4
                                                                     1.56000E+00
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- SOURCE INPUT DATA (CONT.) -

COCA COLA PT23-02

```
C T SOURCE SOURCE      X            Y        EMISSION  BASE /
A A NUMBER  TYPE  COORDINATE   COORDINATE    HEIGHT   ELEV- /               - SOURCE DETAILS DEPENDING ON TYPE -
R P                    (M)          (M)          (M)   ATION /
D E                                                      (M) /
----------------------------------------------------------------------------------------------------------------------------
X        57  STACK   421300.00  3103600.00  17.40      0.00 GAS EXIT TEMP (DEG K)= 547.00, GAS EXIT VEL. (M/SEC)= 15.24,
                                                            STACK DIAMETER (M)= 1.830, HEIGHT OF ASSO. BLDG. (M)=  0.00, WIDTH OF
                                                            ASSO. BLDG. (M)=    0.00, WAKE EFFECTS FLAG = 0
                                                                - SOURCE STRENGTHS ( GRAMS PER SEC                        ) -
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101

SEASON 1 SEASON 2 SEASON 3 SEASON 4
1.04000E+00

- SOURCE INPUT DATA (CONT.) -

COCA COLA PT23-03

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV- ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		58	STACK	421300.00	3103600.00	30.50	0.00	GAS EXIT TEMP (DEG K)= 334.80, GAS EXIT VEL. (M/SEC)= 15.16, STACK DIAMETER (M)= 0.980, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0

- SOURCE STRENGTHS (GRAMS PER SEC) -

SEASON 1 SEASON 2 SEASON 3 SEASON 4
9.50000E-01

BORDO CITRUS PT33-01

- SOURCE INPUT DATA (CONT.) -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV- ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		59	STACK	438000.00	3109000.00	14.60	0.00	GAS EXIT TEMP (DEG K)= 349.80, GAS EXIT VEL. (M/SEC)= 8.41, STACK DIAMETER (M)= 1.680, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0

- SOURCE STRENGTHS (GRAMS PER SEC) -

SEASON 1 SEASON 2 SEASON 3 SEASON 4
1.30000E+00

BORDO CITRUS PT33-02

- SOURCE INPUT DATA (CONT.) -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV- ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		60	STACK	438000.00	3109000.00	14.60	0.00	GAS EXIT TEMP (DEG K)= 349.80, GAS EXIT VEL. (M/SEC)= 8.41, STACK DIAMETER (M)= 1.680, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0

- SOURCE STRENGTHS (GRAMS PER SEC) -

SEASON 1 SEASON 2 SEASON 3 SEASON 4
1.56000E+00

- SOURCE INPUT DATA (CONT.) -

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ADAMS PACKING PT37-01

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV- ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		61	STACK	421700.00	3104200.00	28.00	0.00	GAS EXIT TEMP (DEG K)= 347.00, GAS EXIT VEL. (M/SEC)= 7.20, STACK DIAMETER (M)= 1.430, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0 - SOURCE STRENGTHS (GRAMS PER SEC) - SEASON 1 SEASON 2 SEASON 3 SEASON 4 9.80000E-01

HOLLY HILL FRUIT PT61-04 - SOURCE INPUT DATA (CONT.) -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV- ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		62	STACK	441000.00	3115400.00	18.00	0.00	GAS EXIT TEMP (DEG K)= 344.30, GAS EXIT VEL. (M/SEC)= 18.98, STACK DIAMETER (M)= 0.850, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0 - SOURCE STRENGTHS (GRAMS PER SEC) - SEASON 1 SEASON 2 SEASON 3 SEASON 4 2.22000E+00

MASASPHALT PT82-01 - SOURCE INPUT DATA (CONT.) -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV- ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		65	STACK	423100.00	3101500.00	12.20	0.00	GAS EXIT TEMP (DEG K)= 335.90, GAS EXIT VEL. (M/SEC)= 2.58, STACK DIAMETER (M)= 3.670, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0 - SOURCE STRENGTHS (GRAMS PER SEC) - SEASON 1 SEASON 2 SEASON 3 SEASON 4 1.41000E+00

KISSAM CONCRETE PT05-01 - SOURCE INPUT DATA (CONT.) -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV- ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		64	STACK	465100.00	3170400.00	18.30	0.00	GAS EXIT TEMP (DEG K)= 299.80, GAS EXIT VEL. (M/SEC)= 2.26, STACK DIAMETER (M)= 0.300, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF

ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0
- SOURCE STRENGTHS (GRAMS PER SEC) -
SEASON 1 SEASON 2 SEASON 3 SEASON 4
1.09000E+00

COCA-COLA PT 06-01

- SOURCE INPUT DATA (CONT.) -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV- ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		65	STACK	459400.00	3170500.00	25.90	0.00	GAS EXIT TEMP (DEG K)= 346.50, GAS EXIT VEL. (M/SEC)= 10.00, STACK DIAMETER (M)= 0.330, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0 - SOURCE STRENGTHS (GRAMS PER SEC) - SEASON 1 SEASON 2 SEASON 3 SEASON 4 1.38000E+00

ALCOMA PACKING PT 01-05

- SOURCE INPUT DATA (CONT.) -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV- ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		66	STACK	451600.00	3085500.00	27.10	0.00	GAS EXIT TEMP (DEG K)= 333.20, GAS EXIT VEL. (M/SEC)= 10.30, STACK DIAMETER (M)= 0.970, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0 - SOURCE STRENGTHS (GRAMS PER SEC) - SEASON 1 SEASON 2 SEASON 3 SEASON 4 1.84000E+00

OWENS ILL PT 07-01

- SOURCE INPUT DATA (CONT.) -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV- ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		67	STACK	423400.00	3102800.00	22.90	0.00	GAS EXIT TEMP (DEG K)= 616.50, GAS EXIT VEL. (M/SEC)= 10.20, STACK DIAMETER (M)= 0.910, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0 - SOURCE STRENGTHS (GRAMS PER SEC) - SEASON 1 SEASON 2 SEASON 3 SEASON 4 1.35000E+00

401

OWENS ILL PT07-02

- SOURCE INPUT DATA (CONT.) -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV- ATION (M)	/ - SOURCE DETAILS DEPENDING ON TYPE -
X		68	STACK	423400.00	3102800.00	30.50	0.00	GAS EXIT TEMP (DEG K)= 667.60, GAS EXIT VEL. (M/SEC)= 8.74, STACK DIAMETER (M)= 0.910, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0

- SOURCE STRENGTHS (GRAMS PER SEC) -

SEASON 1	SEASON 2	SEASON 3	SEASON 4
1.32000E+00			

105

Page 106 was removed intentionally.

** ANNUAL GROUND LEVEL CONCENTRATION (MICROGRAMS PER CUBIC METER) FROM ALL SOURCES COMBINED **

- GRID SYSTEM RECEPTORS -
- X AXIS (DISTANCE, METERS) -

Y AXIS (DISTANCE, METERS)	455600.000	456600.000	457600.000	458600.000	459600.000	460600.000	461600.000	462600.000	463600.000
	- CONCENTRATION -								
3133800.000	2.245856	2.427762	2.680215	3.378129	3.260363	3.045914	2.366919	2.121501	2.001059
3132800.000	2.341279	2.533473	2.906910	3.611741	3.649281	3.339121	2.293711	2.234515	2.087627
3131800.000	2.444424	2.698689	3.045435	3.561871	4.352484	3.759547	2.598719	2.452543	2.192334
3130800.000	2.707517	2.926487	3.466785	4.242141	5.697381	4.196010	3.252588	2.695564	2.307661
3129800.000	3.205897	3.776152	4.698115	6.039921	8.169916	6.169805	4.028359	3.135576	2.599305
3128800.000	3.332613	3.975383	5.088609	7.076319	12.141668	5.159636	4.198111	3.176387	2.621487
3127800.000	3.044877	3.453615	4.352426	5.928562	7.002213	4.597054	2.691142	2.605469	2.385247
3126800.000	2.914648	3.329578	3.938472	4.337887	5.140557	4.224217	2.512691	2.164910	2.155696
3125800.000	2.824025	3.117635	3.327342	3.462462	4.072254	3.628188	2.336672	2.154866	2.013765
3124800.000	2.653468	2.774981	2.877188	3.055317	3.417007	3.175718	2.403286	2.101062	2.034462

- GRID SYSTEM RECEPTORS -
- X AXIS (DISTANCE, METERS) -

Y AXIS (DISTANCE, METERS)	464600.000
	- CONCENTRATION -
3133800.000	1.856926
3132800.000	1.899871
3131800.000	1.962985
3130800.000	2.076941
3129800.000	2.257932
3128800.000	2.285676
3127800.000	2.162861
3126800.000	2.095856
3125800.000	2.051329
3124800.000	2.010640

202.500	0.00326299	0.00625198	0.00116400	0.00000000	0.00000000	0.00000000
225.000	0.00367199	0.00821498	0.00212199	0.00000000	0.00000000	0.00000000
247.500	0.00448799	0.00823698	0.00209899	0.00000000	0.00000000	0.00000000
270.000	0.00535199	0.01081597	0.00570499	0.00000000	0.00000000	0.00000000
292.500	0.00445199	0.00853398	0.00444999	0.00000000	0.00000000	0.00000000
315.000	0.00192600	0.00342299	0.00292099	0.00000000	0.00000000	0.00000000
337.500	0.00329399	0.00679998	0.00435799	0.00000000	0.00000000	0.00000000

0 - VERTICAL POTENTIAL TEMPERATURE GRADIENT (DEGREES KELVIN/METER) -

	WIND SPEED CATEGORY 1	WIND SPEED CATEGORY 2	WIND SPEED CATEGORY 3	WIND SPEED CATEGORY 4	WIND SPEED CATEGORY 5	WIND SPEED CATEGORY 6
STABILITY CATEGORY 1	0.000000E+00	0.000000E+00	0.000000E+00	0.000000E+00	0.000000E+00	0.000000E+00
STABILITY CATEGORY 2	0.000000E+00	0.000000E+00	0.000000E+00	0.000000E+00	0.000000E+00	0.000000E+00
STABILITY CATEGORY 3	0.000000E+00	0.000000E+00	0.000000E+00	0.000000E+00	0.000000E+00	0.000000E+00
STABILITY CATEGORY 4	0.000000E+00	0.000000E+00	0.000000E+00	0.000000E+00	0.000000E+00	0.000000E+00
STABILITY CATEGORY 5	0.200000E-01	0.200000E-01	0.200000E-01	0.200000E-01	0.200000E-01	0.200000E-01

0 - WIND PROFILE POWER LAW EXPONENTS -

	WIND SPEED CATEGORY 1	WIND SPEED CATEGORY 2	WIND SPEED CATEGORY 3	WIND SPEED CATEGORY 4	WIND SPEED CATEGORY 5	WIND SPEED CATEGORY 6
STABILITY CATEGORY 1	0.100000E+00	0.100000E+00	0.100000E+00	0.100000E+00	0.100000E+00	0.100000E+00
STABILITY CATEGORY 2	0.150000E+00	0.150000E+00	0.150000E+00	0.150000E+00	0.150000E+00	0.150000E+00
STABILITY CATEGORY 3	0.200000E+00	0.200000E+00	0.200000E+00	0.200000E+00	0.200000E+00	0.200000E+00
STABILITY CATEGORY 4	0.250000E+00	0.250000E+00	0.250000E+00	0.250000E+00	0.250000E+00	0.250000E+00
STABILITY CATEGORY 5	0.300000E+00	0.300000E+00	0.300000E+00	0.300000E+00	0.300000E+00	0.300000E+00

ORLANDO UTILITIES PT 3301 - 33-03 - SOURCE INPUT DATA -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV- ATION (M)	/ - SOURCE DETAILS DEPENDING ON TYPE -
X		1	STACK	463300.00	3159000.00	34.40	0.00	GAS EXIT TEMP (DEG K)= 422.00, GAS EXIT VEL. (M/SEC)= 17.00, STACK DIAMETER (M)= 1.830, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0

- SOURCE STRENGTHS (GRAMS PER SEC)

SEASON 1	SEASON 2	SEASON 3	SEASON 4
6.30000E+01			

ORLANDO UTILITIES PT 33-04, PT 33-05 - SOURCE INPUT DATA (CONT.) -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV- ATION (M)	/ - SOURCE DETAILS DEPENDING ON TYPE -
X		2	STACK	463300.00	3159000.00	34.40	0.00	GAS EXIT TEMP (DEG K)= 422.00, GAS EXIT VEL. (M/SEC)= 10.16, STACK DIAMETER (M)= 2.440, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0

- SOURCE STRENGTHS (GRAMS PER SEC) -

801

SEASON 1 SEASON 2 SEASON 3 SEASON 4
7.86500E+01

- SOURCE INPUT DATA (CONT.) -

ORLANDO UTILITIES PT 53-06

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV-ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		3	STACK	463300.00	3159000.00	33.20	0.00	GAS EXIT TEMP (DEG K)= 727.60, GAS EXIT VEL. (M/SEC)= 13.02, STACK DIAMETER (M)= 2.900, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0

- SOURCE STRENGTHS (GRAMS PER SEC) -

SEASON 1 SEASON 2 SEASON 3 SEASON 4
8.00000E+00

- SOURCE INPUT DATA (CONT.) -

STANDARD SAND SILICA PT 14-04

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV-ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		4	STACK	441500.00	3118200.00	25.90	0.00	GAS EXIT TEMP (DEG K)= 314.80, GAS EXIT VEL. (M/SEC)= 8.85, STACK DIAMETER (M)= 1.220, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0

- SOURCE STRENGTHS (GRAMS PER SEC) -

SEASON 1 SEASON 2 SEASON 3 SEASON 4
6.90000E+00

- SOURCE INPUT DATA (CONT.) -

KISSIMMEE UTILITIES PT 01-04

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV-ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		5	STACK	460100.00	3129300.00	13.11	0.00	GAS EXIT TEMP (DEG K)= 466.50, GAS EXIT VEL. (M/SEC)= 16.30, STACK DIAMETER (M)= 0.610, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0

- SOURCE STRENGTHS (GRAMS PER SEC) -

SEASON 1 SEASON 2 SEASON 3 SEASON 4
8.70000E-01

- SOURCE INPUT DATA (CONT.) -

KISSIMMEE UTILITIES PT01-03, PT01-04

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV- ATION (M)	/ - SOURCE DETAILS DEPENDING ON TYPE -
X		6	STACK	460100.00	3129300.00	16.15	0.00	GAS EXIT TEMP (DEG K)= 477.60, GAS EXIT VEL. (M/SEC)= 17.60, STACK DIAMETER (M)= 0.850, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0 - SOURCE STRENGTHS (GRAMS PER SEC) - SEASON 1 SEASON 2 SEASON 3 SEASON 4 3.36000E+00

KISSIMMEE UTILITIES PT01-07, PT01-08 - SOURCE INPUT DATA (CONT.) -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV- ATION (M)	/ - SOURCE DETAILS DEPENDING ON TYPE -
X		7	STACK	460100.00	3129300.00	7.01	0.00	GAS EXIT TEMP (DEG K)= 466.50, GAS EXIT VEL. (M/SEC)= 9.60, STACK DIAMETER (M)= 0.760, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0 - SOURCE STRENGTHS (GRAMS PER SEC) - SEASON 1 SEASON 2 SEASON 3 SEASON 4 2.28000E+00

KISSIMMEE UTILITIES PT01-11 - 01-15 - SOURCE INPUT DATA (CONT.) -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV- ATION (M)	/ - SOURCE DETAILS DEPENDING ON TYPE -
X		8	STACK	460100.00	3129300.00	13.41	0.00	GAS EXIT TEMP (DEG K)= 505.40, GAS EXIT VEL. (M/SEC)= 8.70, STACK DIAMETER (M)= 0.800, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0 - SOURCE STRENGTHS (GRAMS PER SEC) - SEASON 1 SEASON 2 SEASON 3 SEASON 4 5.37000E+00

KISSIMMEE UTILITIES UNITS #19 and #20 - SOURCE INPUT DATA (CONT.) -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV- ATION (M)	/ - SOURCE DETAILS DEPENDING ON TYPE -
X		9	STACK	460100.00	3129300.00	8.69	0.00	GAS EXIT TEMP (DEG K)= 505.40, GAS EXIT VEL. (M/SEC)= 17.20, STACK DIAMETER (M)= 0.900, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF

110

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City, State, ZIP+4: Kissimmee, FL 34742-3219

PS Form 3800, January 2001 — See Reverse for Instructions

SENDER: *COMPLETE THIS SECTION*

- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

A. K. Sharma, P.E.
Director of Power Supply
Kissimmee Utility Authority
PO Box 423219
Kissimmee, FL 34742-3219

COMPLETE THIS SECTION ON DELIVERY

A. Received by *(Please Print Clearly)*: H. Bolivar — B. Date of Delivery:

C. Signature: x H. Bolivar ☐ Agent ☐ Addressee

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

KISSIMMEE FL OAK STREET STA OCT 16 2002 USPS

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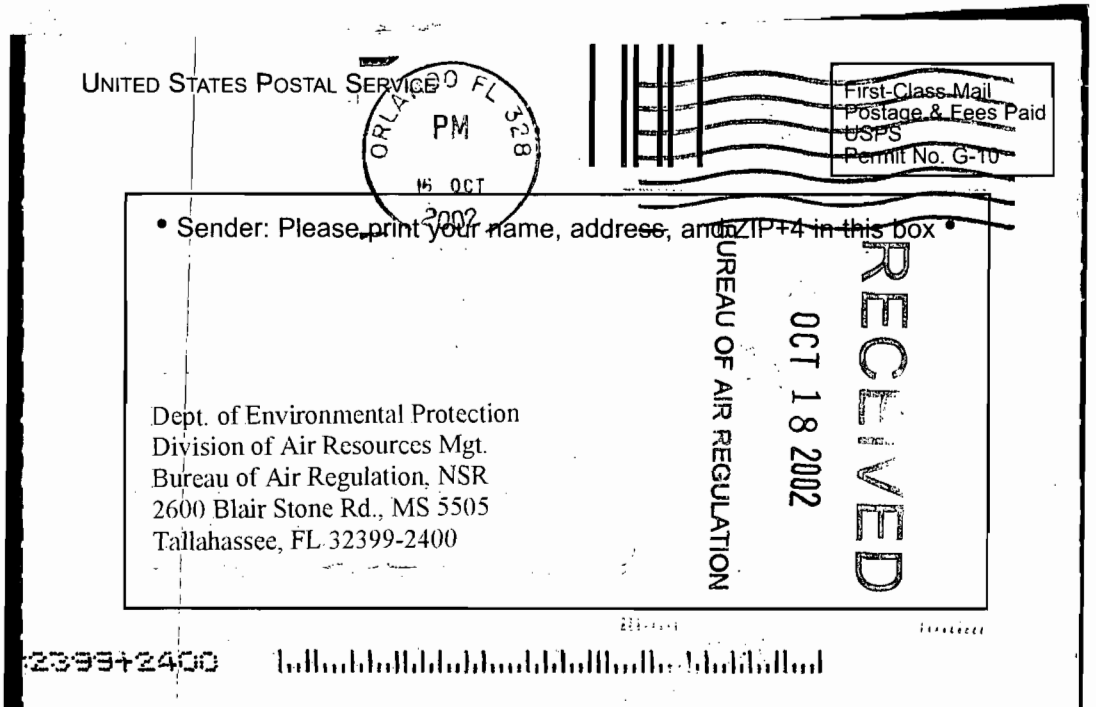
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ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0
- SOURCE STRENGTHS (GRAMS PER SEC) -
SEASON 1 SEASON 2 SEASON 3 SEASON 4
2.89000E+00

City of St. Cloud PT02-03, 02-04

- SOURCE INPUT DATA (CONT.) -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV- ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		10	STACK	471800.00	3124900.00	7.92	0.00	GAS EXIT TEMP (DEG K)= 727.60, GAS EXIT VEL. (M/SEC)= 34.70, STACK DIAMETER (M)= 0.760, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0 - SOURCE STRENGTHS (GRAMS PER SEC) - SEASON 1 SEASON 2 SEASON 3 SEASON 4 4.66000E+00

City of St. Cloud PT02-05, PT02-06

- SOURCE INPUT DATA (CONT.) -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV- ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		11	STACK	471800.00	3124900.00	8.53	0.00	GAS EXIT TEMP (DEG K)= 699.80, GAS EXIT VEL. (M/SEC)= 1.17, STACK DIAMETER (M)= 0.640, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0 - SOURCE STRENGTHS (GRAMS PER SEC) - SEASON 1 SEASON 2 SEASON 3 SEASON 4 3.78000E+00

City of St Cloud PT02-07, PT02-08

- SOURCE INPUT DATA (CONT.) -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV- ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		12	STACK	471800.00	3124900.00	11.89	0.00	GAS EXIT TEMP (DEG K)= 727.60, GAS EXIT VEL. (M/SEC)= 29.51, STACK DIAMETER (M)= 1.070, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0 - SOURCE STRENGTHS (GRAMS PER SEC) - SEASON 1 SEASON 2 SEASON 3 SEASON 4 6.55000E+00

STOKELY VAN CAMP PT07-01

- SOURCE INPUT DATA (CONT.) -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV- ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		13	STACK	451100.00	3125800.00	7.32	0.00	GAS EXIT TEMP (DEG K)= 513.70, GAS EXIT VEL. (M/SEC)= 11.50, STACK DIAMETER (M)= 0.460, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0

- SOURCE STRENGTHS (GRAMS PER SEC) -

SEASON 1	SEASON 2	SEASON 3	SEASON 4
2.52000E+00			

C W BAILEY PT11-01

- SOURCE INPUT DATA (CONT.) -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV- ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		14	STACK	470800.00	3133800.00	9.45	0.00	GAS EXIT TEMP (DEG K)=1005.70, GAS EXIT VEL. (M/SEC)= 11.60, STACK DIAMETER (M)= 0.610, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0

- SOURCE STRENGTHS (GRAMS PER SEC) -

SEASON 1	SEASON 2	SEASON 3	SEASON 4
1.30000E-01			

FLA. POWER CORP. PT14-01 - 14-06

- SOURCE INPUT DATA (CONT.) -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV- ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		15	STACK	446300.00	3126000.00	7.92	0.00	GAS EXIT TEMP (DEG K)= 703.70, GAS EXIT VEL. (M/SEC)= 18.06, STACK DIAMETER (M)= 4.240, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0

- SOURCE STRENGTHS (GRAMS PER SEC) -

SEASON 1	SEASON 2	SEASON 3	SEASON 4
3.40200E+01			

DIXIE ASPHALT PT41-01

- SOURCE INPUT DATA (CONT.) -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV- ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -

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DIXIE ASPHALT PT 41-01

X 16 STACK 463200.00 3143000.00 7.92 0.00 GAS EXIT TEMP (DEG K)= 394.30, GAS EXIT VEL. (M/SEC)= 26.55,
STACK DIAMETER (M)= 1.100, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF
ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0
- SOURCE STRENGTHS (GRAMS PER SEC) -
SEASON 1 SEASON 2 SEASON 3 SEASON 4
2.60000E-01

ST CLOUD HOSPITAL PT 10-02, PT10-03

- SOURCE INPUT DATA (CONT.) -

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV- ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		17	STACK	470300.00	3124100.00	5.49	0.00	GAS EXIT TEMP (DEG K)= 505.40, GAS EXIT VEL. (M/SEC)= 15.00, STACK DIAMETER (M)= 0.460, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0 - SOURCE STRENGTHS (GRAMS PER SEC) - SEASON 1 SEASON 2 SEASON 3 SEASON 4 6.00000E-02

- SOURCE INPUT DATA (CONT.) -

KISSIMMEE UTILITIES NEW COMBUSTION TURBINE

C A R D	T A P E	SOURCE NUMBER	SOURCE TYPE	X COORDINATE (M)	Y COORDINATE (M)	EMISSION HEIGHT (M)	BASE ELEV- ATION (M)	- SOURCE DETAILS DEPENDING ON TYPE -
X		18	STACK	460100.00	3129300.00	9.14	0.00	GAS EXIT TEMP (DEG K)= 422.00, GAS EXIT VEL. (M/SEC)= 38.03, STACK DIAMETER (M)= 2.440, HEIGHT OF ASSO. BLDG. (M)= 0.00, WIDTH OF ASSO. BLDG. (M)= 0.00, WAKE EFFECTS FLAG = 0 - SOURCE STRENGTHS (GRAMS PER SEC) - SEASON 1 SEASON 2 SEASON 3 SEASON 4 4.89000E+01

** ANNUAL GROUND LEVEL CONCENTRATION (MICROGRAMS PER CUBIC METER) FROM ALL SOURCES COMBINED **

- GRID SYSTEM RECEPTORS -
- X AXIS (DISTANCE, METERS) -

Y AXIS (DISTANCE, METERS)	455600.000	456600.000	457600.000	458600.000	459600.000	460600.000	461600.000	462600.000	463600.000
	- CONCENTRATION -								
3133800.000	3.674304	3.908367	4.148832	4.581690	5.418777	5.192412	3.960702	3.612009	3.603863
3132800.000	3.694543	4.140950	4.487364	4.829161	6.097342	5.690645	3.811295	3.866843	3.803264
3131800.000	4.159456	4.528245	4.958326	5.588191	7.217253	6.386456	4.363052	4.287263	3.972458
3130800.000	4.721351	4.993611	5.755788	6.814646	8.997168	6.773283	5.457381	4.663729	4.153190
3129800.000	5.818188	6.675803	7.994432	9.787376	12.650610	9.974773	6.710643	5.492033	4.780505
3128800.000	6.107369	7.094499	8.752081	11.702003	19.907223	8.427357	7.125950	5.651487	4.876876
3127800.000	5.516002	6.109768	7.509365	10.043007	11.655142	7.712202	4.715505	4.693777	4.440250
3126800.000	5.324643	5.993368	6.990936	7.513328	8.966705	7.454960	4.466377	3.947322	4.012264
3125800.000	5.264185	5.748311	6.012345	6.168860	7.439410	6.682451	4.208803	3.932830	3.730122
3124800.000	5.022981	5.160911	5.284714	5.628808	6.481002	6.049376	4.440091	3.853153	3.763406

- GRID SYSTEM RECEPTORS -
- X AXIS (DISTANCE, METERS) -

Y AXIS (DISTANCE, METERS)	464600.000
	- CONCENTRATION -
3133800.000	3.444981
3132800.000	3.529097
3131800.000	3.631041
3130800.000	3.849765
3129800.000	4.272913
3128800.000	4.356063
3127800.000	4.096053
3126800.000	3.935273
3125800.000	3.811047
3124800.000	3.700760

Department of
Environmental Protection

Jeb Bush
Governor

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

David B. Struhs
Secretary

October 10, 2002

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

A.K. (Ben) Sharma, P.E.
Director of Power Supply
Kissimmee Utility Authority
Post Office Box 423219
Kissimmee, Florida 34742-3219

Re: Authorization to Conduct Pollutant Testing and Parameter Measurements for the Development of a Predictive Emissions Monitoring System (PEMS) Protocol
Kissimmee Utility Authority Cane Island Power Park, Unit 1

Dear Mr. Sharma:

The Department has reviewed the protocol for the installation of the PEMS monitoring program to predict NO_X, CO, and O_2 emissions at the Kissimmee Utility Authority Cane Island Power Park, Unit 1 (LM6000 Power Plant), located in Kissimmee, Osceola County (see attached). The purpose of the testing protocol is to run the power plant through various operational phases in order to collect the data necessary to fine tune the GE Cycle Deck emissions model. The Department understands the PEMS installation and testing is part of an EPA-sponsored evaluation project to determine feasibility, accuracy, and appropriate QA/QC for PEMS systems on gas turbines.

Paragraph 403.061(16), Florida Statutes (F.S.), authorizes the Department to encourage voluntary cooperation by persons in order to achieve the purposes of the state environmental control act. Paragraph 403.061(18), F.S., authorizes the Department to encourage and conduct studies, investigations, and research relating to the causes and the control of pollution. Rule 62-210.700(5), Florida Administrative Code (F.A.C.), authorizes the Department to consider variation in industrial equipment and make allowances for excess emissions that provide reasonable and practical regulatory controls consistent with public interest.

In accordance with the provisions of Paragraphs 403.061(16) and (18), F.S., and Rule 62-210.700(5), F.A.C., you are hereby authorized to conduct the PEMS monitoring program protocol at the Kissimmee Utility Authority Cane Island Power Park, Unit 1. This protocol will require Kissimmee Utility Authority to vary the Unit 1 load levels as well as the water-to-fuel

ratio in order to establish a wide range of operational settings; some of these settings might result in short-term temporary periods of excess emissions. The data gathered at these operational settings will allow the calibration of the PEMS model to evaluate the emissions performance of Unit 1. The pollutants and parameters to be measured and monitored will include nitrogen oxides, oxygen, carbon monoxide, percent water vapor, unit load, water-to-fuel ratio, fuel flow, excess air, flue gas temperature, and other unit specific parameters that are needed for the computer model.

The authorization to implement the PEMS installation protocol shall be subject to the following conditions:

1. Unless waived, the permittee shall notify the Department's Central District Office and the Bureau of Air Regulation at least 10 days prior to commencement of the PEMS installation protocol. A written report shall be submitted to these offices within 60 days upon completion of the protocol.
2. The PEMS installation protocol will occur over a period not to exceed 10 days between October 15 and December 15, 2002. If additional time is needed, the permittee shall provide the Department with documentation of the progress accomplished to date and shall identify what is left to be done to complete the testing and measurements or monitoring.
3. The release of objectionable odors pursuant to Rule 62-296.320(2), F.A.C., is not authorized for this activity.
4. The PEMS installation protocol shall immediately cease upon the occurrence of a valid environmental complaint by a citizen or other party, or a nuisance or danger to the public health or welfare. The protocol shall not resume until appropriate measures to correct the problem have been implemented.
5. This Department action is just to authorize the performance testing, parameter measurements, monitoring, and other activities performed pursuant to and outlined in the PEMS installation protocol.
6. Complete documentation of the activity shall be kept on file for at least five years.
7. The Department shall be notified in writing on the date of the completion of the PEMS installation protocol. If after work hours, notification shall occur the next work day.
8. The permittee shall notify the Department if any substantive changes or revisions to the PEMS installation protocol are made.

The Department has relied on conversations with representatives of EPA, Kissimmee Utility Authority, and The Cadmus Group, Inc. in authorizing this activity. This authorization will take effect immediately unless a timely petition for an administrative hearing is filed pursuant to Sections 120.569 and 120.57, Florida Statutes (F.S.). The procedures for petitioning for a hearing are set forth below.

A person whose substantial interests are affected by this authorization may petition for an administrative proceeding (hearing) under Sections 120.569 and 120.57, F.S. The petition must contain the information set forth below and must be filed (received) in the Office of General Counsel of the Department at 3900 Commonwealth Boulevard, Mail Station #35, Tallahassee, Florida, 32399-3000. Petitions filed by the permittee or any of the parties listed below must be filed within twenty-one days of receipt of this authorization. Petitions filed by any persons other than those entitled to written notice under Section 120.60(3), F.S., must be filed within twenty-one days of receipt of this authorization. Under Section 120.60(3), F.S., however, any person who asked the Department for notice of agency action may file a petition within twenty-one days of receipt of that notice. A petitioner shall mail a copy of the petition to the permittee at the address indicated above at the time of filing. The failure of any person to file a petition within the appropriate time period shall constitute a waiver of that person's right to request an administrative determination (hearing) under Sections 120.569 and 120.57, F.S., or to intervene in this proceeding and participate as a party to it. Any subsequent intervention will be only at the approval of the presiding officer upon the filing of a motion in compliance with Rule 28-106.205, F.A.C.

A petition that disputes the material facts on which the Department's action is based must contain the following information: (a) The name and address of each agency affected and each agency's file or identification number, if known; (b) The name, address, and telephone number of the petitioner, the name, address, and telephone number of the petitioner's representative, if any, which shall be the address for service purposes during the course of the proceeding; and an explanation of how the petitioner's substantial interests will be affected by the agency determination; (c) A statement of how and when petitioner received notice of the agency action or proposed action; (d) A statement of all disputed issues of material fact; if there are none, the petition must so indicate; (e) A concise statement of the ultimate facts alleged, as well as the rules and statutes which entitle the petitioner to relief; and (f) A demand for relief.

A petition that does not dispute the material facts upon which the Department's action is based shall state that no such facts are in dispute and otherwise shall contain the same information as set forth above, as required by Rule 28-106.301, F.A.C.

Because the administrative hearing process is designed to formulate final agency action, the filing of a petition means that the Department's final action may be different from the position taken by it in this notice. Persons whose substantial interests will be affected by any such final decision of the Department regarding this authorization have the right to petition to become a party to the proceeding, in accordance with the requirements set forth above. Mediation is not available in this proceeding.

Any party to this authorization has the right to seek judicial review of it under Section 120.68, F.S., by filing a Notice of Appeal under Rule 9.110 of the Florida Rules of Appellate Procedure with the Clerk of the Department of Environmental Protection in the Office of General Counsel, Mail Station #35, 3900 Commonwealth Boulevard, Tallahassee, Florida, 32399-3000, and by filing a copy of the Notice of Appeal accompanied by the applicable filing fees with the appropriate District Court of Appeal. The notice must be filed within thirty days after this authorization is filed with the Clerk of the Department.

A copy of this authorization and accompanying materials related to the agency action are available for public inspection during normal business hours, 8:00 a.m. to 5:00 p.m., Monday through Friday, except legal holidays, at the Department of Environmental Protection, Division of Air Resources Management, Suite 23, Magnolia Courtyard, 111 South Magnolia Drive, Tallahassee, Florida 32301.

Sincerely,

Howard L. Rhodes, Director,
Division of Air Resources
Management

HLR/gpd

Enclosure

cc: Kay Prince, EPA Region 4
Errin Pichard, DEP - BAMMS
Scott Sheplak, DEP - BAR
Leonard Kozlov, DEP - CD

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

November 19, 1981

0970001 - NA - AC
PSD - FL - 087
Pats # 4946521

Mr. Jack T. Danforth
Kissimmee Utilities
P. O. Box 1608
Kissimmee, Florida 32741

Dear Mr. Danforth:

Enclosed is Permit Number AC 49-46521, dated November 25, 1981, to Kissimmee Utilities which is issued pursuant to Section 403, Florida Statutes.

Acceptance of the permit constitutes notice and agreement that the Department will periodically review this permit for compliance, including site inspection where applicable, and may initiate enforcement actions for violation of the conditions and requirements thereof.

Sincerely,

for Steve Smallwood, Chief
Bureau of Air Quality Management

SS/bjm

cc: South Florida Subdistrict Office

Federal Permit finalized and sent to EPA for review and issuance of Authority to Construct on January 11, 1982

Tim Powell

Final Determination

Kissimmee Utilities

Osceola County

49.9 MW Combined Cycle Gas Turbine

Application Number:

AC 49-46521

Florida Department of Environmental Regulation

Bureau of Air Quality Management

Central Air Permitting

November 25, 1981

Kissimmee Utilities

Construction Permit

Kissimmee Utilities' application for permit to construct a 49.9 MW Combined Cycle Gas Turbine has been reviewed by the Bureau of Air Quality Management. Public notice of the Department's Intent to Issue the construction permit was published in the Orlando Sentinel Star on October 28, 1981. Copies of the preliminary determination have been available for public inspection at the Department's South Florida Subdistrict Office in Port St. Lucie, Kissimmee Public Library and the Bureau of Air Quality Management in Tallahassee.

The only comments received were from the applicant. They requested that Specific Condition No. 9 be modified to more nearly reflect the requirements of 40 CFR, Part 60, Subpart GG, Section 60.334 on which it is based. Specifically, they request 1) the requirement for determining the fuel heating value be deleted, 2) the option for developing a custom sampling schedule based on substantiating data be included and 3) the provision for sampling only on each occasion that fuel is transferred to bulk storage be included.

The Department considered the comments indicated above and modified specific condition No. 9 as follows:

> Sulfur and nitrogen content of the fuel being fired in the gas turbine shall be determined and recorded as specified in the NSPS for Gas Turbines 40 CFR 60, Subpart GG, Section 60.334. The records of fuel oil usage will be kept by the company, available for regulatory agency's inspection, for a two year period.

Regarding comment No. 2, the waiver of compliance test requirements may be accomplished in accordance with section 17-2.23(2)(c)FAC. Therefore, this option is available to the applicant and no change to the specific conditions is required.

The final action by the Department shall be to issue the permit.

STATE OF FLORIDA
DEPARTMENT OF
ENVIRONMENTAL REGULATION

CONSTRUCTION
PERMIT

NO. AC 49-46521

49.9 MW Combined Cycle Combustion Gas Turbine

DATE OF ISSUANCE

December 25, 1981

Victoria J. Tschinkel
Secretary

DATE OF EXPIRATION

January 30, 1983

DER FORM PERM 11-42

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301

BOB GRAHAM
GOVERNOR
Victoria J. Tschinkel
SECRETARY

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

APPLICANT: Kissimmee Utilities
P. O. Box 1608
Kissimmee, Florida 32741

PERMIT/CERTIFICATION
NO. AC 49-46521

COUNTY: Osceola

PROJECT: 49.9 MW Combined Cycle Gas Turbine

This permit is issued under the provisions of Chapter 403, Florida Statutes, and Chapter 17-2 and 17-4, Florida Administrative Code. The above named applicant, hereinafter called Permittee, is hereby authorized to perform the work or operate the facility shown on the approved drawing(s), plans, documents, and specifications attached hereto and made a part hereof and specifically described as follows:

For the construction of a 49.9 MW combined cycle combustion gas turbine to be located at Kissimmee Utilities Power plant on 112 Ruby Street, City of Kissimmee, Osceola County, Florida. The UTM coordinates of the proposed plant are 460.1 Km East and 3129.3 Km North.

Construction shall be in accordance with the attached permit application, plans, documents and drawings except as otherwise noted on page 3 and 5, Specific Conditions.

Attachments:

1. Application to Construct Air Pollution Sources, DER Form 17-1.122(16) received on August 31, 1981.

2. BACT determination, dated October 5, 1981.

PERMIT NO.: AC 49-46521
APPLICANT: Kissimmee Utilities

GENERAL CONDITIONS:

1. The terms, conditions, requirements, limitations, and restrictions set forth herein are "Permit Conditions:, and as such are binding upon the permittee and enforceable pursuant to the authority of Section 403.161(1), Florida Statutes. Permittee is hereby placed on notice that the department will review this permit periodically and may initiate court action for any violation of the "Permit Conditions" by the permittee, its agents, employees, servants or representatives.

2. This permit is valid only for the specific processes and operations indicated in the attached drawings or exhibits. Any unauthorized deviation from the approved drawings, exhibits, specifications, or conditions of this permit shall constitute grounds for revocation and enforcement action by the department.

3. If, for any reason, the permittee does not comply with or will be unable to comply with any condition or limitation specified in this permit, the permittee shall immediately notify and provide the department with the following information: (a) a description of and cause of non-compliance; and (b) the period of non-compliance, including exact dates and times; or, if not corrected, the anticipated time the non-compliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the non-compliance. The permittee shall be responsible for any and all damages which may result and may be subject to enforcement action by the department for penalties or revocation of this permit.

4. As provided in subsection 403.087(6), Florida Statutes, the issuance of this permit does not convey any vested rights or any exclusive privileges. Nor does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations.

5. This permit is required to be posted in a conspicuous location at the work site or source during the entire period of construction or operation.

6. In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data and other information relating to the construction or operation of this permitted source, which are submitted to the department, may be used by the department as evidence in any enforcement case arising under the Florida Statutes or department rules, except where such use is proscribed by Section 403.111, F.S.

7. In the case of an operation permit, permittee agrees to comply with changes in department rules and Florida Statutes after a reasonable time for compliance, provided, however, the permittee does not waive any other rights granted by Florida Statutes or department rules.

8. This permit does not relieve the permittee from liability for harm or injury to human health or welfare, animal, plant, or aquatic life or property and penalities therefore caused by the construction or operation of this permitted source, nor does it allow the permittee to cause pollution in contravention of Florida Statutes and department rules, except where specifically authorized by an order from the department granting a variance or exception from department rules or state statutes.

9. This permit is not transferable. Upon sale or legal transfer of the property or facility covered by this permit, the permittee shall notify the department within thirty (30) days. The new owner must apply for a permit transfer within thirty (30) days. The permittee shall be liable for any non-compliance of the permitted source until the transferee applies for and receives a transfer of permit.

10. The permittee, by acceptance of this permit, specifically agrees to allow access to permitted source at reasonable times by department personnel presenting credentials for the purposes of inspection and testing to determine compliance with this permit and department rules.

11. This permit does not indicate a waiver of or approval of any other department permit that may be required for other aspects of the total project.

12. This permit conveys no title to land or water, nor constitutes state recognition or acknowledgement of title, and does not constitute authority for the reclamation of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the state. Only the Trustees of the Internal Improvement Trust Fund may express state opinion as to title.

13. This permit also constitutes:

[X] Determination of Best Available Control Technology (BACT)
[X] Determination of Prevention of Significant Deterioration (PSD)
[ ] Certification of Compliance with State Water Quality Standards (Section 401, PL 92-500)

PERMIT NO.: AC 49-46521
APPLICANT: Kissimmee Utilities

SPECIFIC CONDITIONS:

1. The new source shall be constructed in accordance with the capacities and specifications stated in the application.

2. The maximum emission rates for the 49.9 MW combined cycle gas turbine shall not exceed the emission limits listed in Table 2 of the preliminary determination.

3. The plant shall be allowed to operate continuously (8736 hours per year).

4. The source shall be allowed to use either natural gas or No. 2 fuel oil.

5. Maximum sulfur (S) content in the oil shall not exceed 0.8 percent S by weight.

6. Maximum No. 2 fuel oil consumption shall be 78 barrels/hr.

7. Before this construction permit expires, the 49.9 MW combined cycle gas turbine will be tested for particulate matter, sulfur dioxide, VE, carbon monoxide and nitrogen oxides. Except as provided under 40 CFR 60.8(b), the performance tests shall be in accordance with the provisions of the following reference methods in Appendix A of 40 CFR 60.

   a. Method 1. Sample and Velocity Traverses

   b. Method 2. Volumetric Flow Rate

   c. Method 3. Gas Analysis

   d. Reference method 5 must be used to determine the initial compliance status of the unit with respect to the PM standard. Thereafter visible emissions may be used unless 10% opacity is exceeded. In that case compliance must be demonstrated by method 5. Compliance with the opacity limitation will be determined by reference method 9.

   e. Compliance with the sulfur dioxide emission limits will be determined by reference method 20 or by calculations based on fuel analysis (ASTM D2880-77 and 01072-70) for sulfur content.

   f. Compliance with carbon monoxide emission limits will be determined by reference method 10.

   g. Compliance with volatile organic compound emission limits will be assumed provided the CO allowable emission rate is achieved; specific VOC compliance testing is not required.

h. Compliance with the allowable emissions limits for nitrogen oxides shall be conducted using EPA reference method 20 subpart GG Section 60.335.

During performance tests to determine compliance with the proposed standard, measured NO_x emission at 15 percent oxygen will be adjusted to ISO ambient atmospheric conditions by the following correction factor:

$$NO_x = (NO_{x\ obs}) \left(\frac{P_{ref}}{P_{obs}}\right)^{0.5} e^{19\,(H_{obs} - 0.00633)} \left(\frac{TAMB}{288^{\circ}K}\right)^{1.53}$$

where:

NO_x = Emissions of NO_x at 15 percent oxygen and ISO standard ambient conditions.

$NO_{x_{obs}}$ = Measured NO_x emission at 15 percent oxygen, ppmv.

P_{ref} = Reference combustor inlet absolute pressure at 101.3 kilopascals (1 atmosphere) ambient pressure.

P_{obs} = Measured combustor inlet absolute pressure at test ambient pressure.

H_{obs} = Specific humidity of ambient air at test.

e = Transcendental constant (2.718)

T_{AMB} = Temperature of ambient air at test.

Test results will be the average of 3 valid runs. The Department will be notified 30 days in advance of the compliance test. The test will be conducted at permitted capacity $\pm$10%.

8. A continuous monitoring system shall be installed to monitor and record the fuel consumption and the ratio of water to fuel being fired in the turbine.

9. Sulfur and nitrogen content of the fuel being fired in the gas turbine shall be determined and recorded as specified in the NSPS for Gas Turbines 40 CFR 60, Subpart GG, Section 60.334. The records of fuel oil usage will be kept by the company, available for regulatory agency's inspection, for a two year period.

PERMIT NO.: AC 49-46521
APPLICANT: Kissimmee Utilities

10. The applicant shall comply with all requirements of 40 CFR 60, Subpart GG, Standards of Performance for stationary gas turbines.

11. Reasonable precautions to prevent fugitive particulate emissions during construction such as coating or spraying roads and construction sites used by contractors will be taken by the applicant.

12. The applicant shall report any delays in construction and completion of this unit to the Department's South Florida Subdistrict Office.

13. The applicant will demonstrate compliance with the conditions of the construction permit, and submit a complete application for an operating permit to the Department's South Florida Subdistrict Office prior to 90 days of the expiration date of the construction permit. The applicant may continue to operate in compliance with all terms of the construction permit until its expiration date or issuance of an operating permit.

14. Upon obtaining an operating permit, the applicant will be required to submit periodic test reports on the actual operation and emissions of the facility. These reports will give the data specified in 40 CFR 60.334.

15. The source shall comply with the provisions and requirements of the attached general conditions.

16. Stack sampling facilities will include the eyebolt and angle described in Chapter 17-2.23, FAC.

Expiration Date: January 30, 1983

Issued this 25 day of November, 1981.

_____ Pages Attached.

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

Victoria J. Tschinkel
Signature

Final Determination

Kissimmee Utilities

49.9 MW Combined Cycle Gas Turbine

Federal Permit Number:

PSD-FL-087

Florida Department of Environmental Regulation

Bureau of Air Quality Management

Central Air Permitting

January 11, 1982

Table of Contents

I. SYNOPSIS OF APPLICATION

A. Name and Address of Applicant

Kissimmee Utilities
P. O. Box 1608
Kissimmee, Florida 32741

B. Source Location

The proposed source is located at 112 Ruby Street in the City of Kissimmee, in Osceola County, Florida. The UTM coordinates are: Zone 17-460.1 Km East and 3,129.3 Km North.

C. Project Description

The applicant proposes to install and operate a combined cycle combustion gas turbine, with a total net generating capacity of 46.5 megawatts (MW) and a gross generating capacity of 49.9 MW. The turbine will be fired with natural gas. No. 2 fuel oil, having a maximum sulfur content of 0.8 percent, will be used as a standby fuel. The maximum heat input will be 441.7 MMBTU/hr (LHV).

Kissimmee Utilities (KU) currently operates 12 diesel generating units with a total output rated at 26.8 MW at this site.

II. APPLICABILITY

A. Federal Regulations

The proposed project is subject to preconstruction review under federal Prevention of Significant Deterioration (PSD) regulations, Section 52.21 of Title 40 of the Code of Federal Regulations as amended in the Federal Register of August 7, 1980 (45 CFR 52.21). Specifically, Kissimmee Utilities' combined cycle combustion gas turbine is a major stationary source (40 CFR 52.21(b)(1)) located in an area currently designated as attainment in accordance with 40 CFR 81.310 for all criteria pollutants regulated under the Clean Air Act (CAA).

The proposed source will be a major modification (40 CFR 52.21(b)(2)) for particulate matter (PM), sulfur dioxide (SO_2), nitrogen oxides (NO_x), Beryllium (Be), volatile organic compounds (VOC), and carbon monoxide (CO). Emissions of PM, SO_2, NO_x, Be, VOC and CO will increase above the significant criteria set in the PSD regulations. Therefore, the proposed project is subject to PSD review for these pollutants.

This review consists of a determination of Best Available Control Technology (BACT) and unless otherwise exempted, an analysis of the air quality impact of the increased emissions. No air quality impact analysis is required for ozone, even though there will be a significant increase in VOC emissions, because this increase is less than 100 tons per year. The review also includes an analysis of the project's impacts on soils, vegetation and visibility along with air quality impacts resulting from associated commercial, residential and industrial growth.

The proposed project is also subject to the provisions of the federal New Source Performance Standard (NSPS) for gas turbines, 40 CFR 60, Subpart GG.

B. State Regulations

The proposed project is subject to preconstruction review under the provisions of Chapter 403, Florida Statutes, and Chapter 17-2, Florida Administrative Code. Specifically, the proposed source is a major emitting facility for NO_x and SO_2 as defined in Chapter 17-2 because the potential emissions of each pollutant exceed 250 tons per year. The source is located in the area of influence of the Orange County ozone nonattainment area.

This project is subject to the provisions of Subsection 17-2.04(6), Prevention of Significant Deterioration (PSD) review, which requires the use of Best Available Control Technology (BACT). The source is also subject to the provisions of the federal New Source Performance Standards (NSPS) for gas turbines, 40 CFR 60, Subpart GG. This NSPS has been adopted by reference in Section 17-2.21.

The proposed source is exempt from the provisions of Section 17-2.17, New Source Review for Nonattainment Areas, by Section 17-2.17(1)(c)2.a.

III. SOURCE IMPACT ANALYSIS

A. Emissions Limitations

The operation of the proposed combined cycle gas turbine, will produce emissions of particulate matter (PM), sulfur dioxide (SO_2), nitrogen oxides (NO_x), beryllium (Be), Mercury (Hg), carbon monoxide (CO) and volatile organic compounds (VOC) to the atmosphere.

Table 1 summarizes potential to emit of all pollutants regulated under the Act which are affected by the proposed source.

Best Available Control Technology (BACT) has been determined for NO_x, SO_2, PM, VOC, Be and CO. The emission limiting standards selected as BACT and made a condition of the permit are listed in Table 2. Justification for the standards selected is included in Technical Appendix A.

The permitted emissions, including those determined as BACT, are in compliance with New Source Performance Standard (NSPS) requirements of 40 CFR 60, Subpart GG.

B. Air Quality Impacts

An air quality impacts analysis has been performed to evaluate the impact of the proposed project on ambient concentrations of NO_x, SO_2, PM, CO and Be. Dispersion modeling was used to evaluate the impacts.

Results of the analysis provide reasonable assurance that the project, as described in this permit and subject to the conditions herein, will not lead to any violation of National Ambient Air Quality Standards or PSD increments. Details of the analysis are discussed in the Technical Appendix B.

Table 1

SUMMARY OF EMISSIONS

(tons per year)

Pollutant	Potential Emissions[a]				Significance Level[e]
	Fuel Oil No. 2 - Fired		Natural Gas - Fired		
	(Before Control)	(After Control)	(Before Control)	(After Control)	
NO_x[b]	2,580	1,340	2,480	1,290	40
SO_2[c]	1,700	1,700	21	21	40
PM	69	69	30	30	25
VOC	74	74	82	82	40
CO	207	207	227	227	100
Mercury[d]	0.002	0.002	0.02	0.02	0.1
Beryllium[d]	0.0006	0.0006	-		0.0004

(a) Potential emissions in accordance with state and federal definitions as estimated by the applicant.

(b) A 48 percent emission reduction is expected with the proposed water injection technique.

(c) Assumed natural gas has 0.01 percent sulfur content. Fuel oil calculations based on total conversion of 0.8 percent sulfur in fuel oil to sulfur dioxide.

(d) Emissions calculated based on emissions factors from Stationary Conventional Combustion Processes, EPA, -450/2-80-074.

(e) 40 CFR 52.21(b)(23).

Table 2

ALLOWABLE EMISSION LIMITS

49.9 MW Combined Cycle Combustion Turbine

Pollutant	Standard	Gas Turbine[a]	Gas Turbine and Boiler[b]	Basis
NO_x[a]	0.0075 $(\frac{14.4}{Y})$ + F	129 PPM at 15 percent oxygen on a dry basis	250 lb/hr	NSPS, BACT
SO_2	0.8 percent S by weight 0.015 percent by volume at 15 percent oxygen on a dry basis	0.8 percent S by weight	388 lb/hr	NSPS, BACT
PM	20% Opacity	-	16 lb/hr	BACT, Chapter 17-2
VOC	-	-	19 lb/hr	BACT
CO	-	-	52 lb/hr	BACT
Mercury (Hg)	-	-	0.0004 lb/hr	Estimated by Applicant
Beryllium (Be)	-	-	0.000145 lb/hr	BACT

(a) The allowable NO_x emission rate for the gas turbine was determined by the following formula:

$STD = 0.0075 (\frac{14.4}{Y}) + F$ where:

STD = allowable NO_x emissions (percent by volume at 15 percent oxygen and on a dry basis).

Y = manufacturer's rated heat rate at manufacturer's rated load (kilojoules per watt hour) or, actual measured heat rate based on lower heating value of fuel as measured at actual peak load for the facility. The value of Y shall not exceed 14.4 kilojoules per watt hour. The efficiency factor must be based on the gas turbine efficiency itself, not the overall efficiency of the gas turbine combined with other equipment.

F = NO_x emission allowance for fuel-bound nitrogen as follows:

Fuel-bound nitrogen (Percent by weight)	F (NO_x percent by volume)
$N \leq 0.015$	0
$0.015 < N \leq 0.1$	0.04(N)
$0.1 < N \leq 0.25$	0.04+0.0067(N-0.1)
$N > 0.25$	0.005

where: N = the nitrogen content of the fuel (percent by weight)

(b) Emission rates based on continuous firing of 100 percent fuel oil No. 2 as estimated by the applicant.

C. Additional Impact Analysis

An additional impacts analysis has been performed to assess (1) the impact of the proposed project on soils, vegetation, and visibility and (2) any air quality impacts resulting from associated commercial, residential, or industrial growth. No adverse impacts are expected; details of the analysis are discussed in Technical Appendix C.

IV. CONCLUSIONS

Based on review of the data submitted by Kissimmee Utilities for the installation and operation of a 49.9 MW combined cycle gas turbine, the FDER concludes that compliance with all applicable federal and state air quality regulations will be achieved provided certain specific conditions are met. The NSPS emission limits for NO_x, SO_2, and the permitted emissions limits of 0.0004 lb/hr for Hg, 0.000145 lb/hr, for Be, 16 lb/hr for PM, 19 lb/hr for VOC and 52 lb/hr for CO have been determined to be Best Available Control Technology (BACT) for this source. The impact of the emissions from the 49.9 MW combined cycle gas turbine will not cause or contribute to a violation of any ambient air quality standard or PSD increment. Appendix D includes the proposed general and specific conditions in the Federal Permit (PSD-FL-087).

TECHNICAL APPENDIX A

FEDERAL BACT ANALYSIS

The applicant is required, under the provisions of 40 CFR 52.21, as revised August 7, 1980 (45 FR 52676), to apply BACT to all criteria and noncriteria pollutants emitted in significant levels. BACT is determined for each pollutant on a case-by-case review taking into account energy, environmental and economic impacts.

The applicant has proposed BACT for each applicable pollutant and has presented justification for the standards selected. The Department of Environmental Regulation (DER) has reviewed and accepted the technology and emission limits proposed as BACT. The federal PSD permit shall include these limits or any more stringent emission standards that are imposed by the State of Florida. These limits are summarized in Table 2. A discussion of the BACT for each pollutant follows:

PM Control

The BACT limitation proposed for particulate matter (PM), 16 lb/hr, is based upon emission for Stationary Gas Turbines AP-42.

Particulate emissions from stationary gas turbines depend on the ash content of the fuel which are minimal for the proposed fuels. The applicant has reported an ash percentage of less than 0.1 in the fuel oil analysis. Therefore, FDER feels that the applicant proposed 0.0362 lb/MMBTU (16 lb/hr) emission limit for PM is reasonable as BACT.

Carbon Monoxide and Hydrocarbon Control

The applicant proposes emissions levels for carbon monoxide (CO) and volatile organic compounds (VOC) based on emission estimates from Stationary Gas Turbines AP-42.

CO and HC emissions are function of combustion efficiency. The higher the percentage of peak load at which a turbine operates, the more efficient the combustion of the fuel.

HC and CO emissions from stationary gas turbines operating at peak load are relatively low. Gas turbines normally operate at 80 to 100 percent of peak load with HC emission averaging less than 50 ppm and CO emission averaging less than 500 ppm concentration at 15 percent oxygen.

Based on the above facts, FDER agrees that emission limits of 0.1177 lb/MMBTU (52 lb/hr) for CO and 0.043 lb/MMBTU (19 lb/hr) for VOC constitute BACT for the proposed source.

SO_2 Control

The applicant proposes an emission limit of 388 lb SO_2/hr and 0.8 percent sulfur content in the fuel oil. The basis of this proposed emission limit is found in the AP-42 emission factors for Stationary Gas Turbines and NSPS for Gas Turbines.

SO_2 emissions from stationary gas turbines depend on the sulfur content of the fuel since nearly 100 percent of the sulfur is converted to SO_2 during the combustion process. Due to the high volumes of exhaust gases, the cost of flue gas desulfurization (FGD) is considered unreasonable. Therefore, FDER concurs with the applicant NSPS selection of low sulfur oil (0.8%S), and of 0.015 percent SO_2 by volume at 15 percent O_2, on a dry basis as BACT for the proposed source.

NO_x Control

The applicant proposes to control NO_x with a wet control technique (water injection) and limiting the maximum fuel-bound nitrogen content to 0.25 percent.

Total NO_x emissions from any combustion source, including stationary gas turbines, are a function of both thermal NO_x and organic NO_x formation. Thermal NO_x is formed by a high temperature reaction between nitrogen and oxygen from the combustion air. Organic NO_x, however, is formed by the oxidation of fuel-bound nitrogen during combustion.

NO_x formation within a turbine generally increases exponentially with increased pressure and temperature. High efficiency turbines, therefore, generally discharge gases with higher NO_x concentrations than low efficiency turbines. Since the

relative fuel consumption of gas turbines varies linearly with efficiency, an adjustment factor was selected (NSPS) that permitted increased NO_x emissions for the efficient turbines.

Gas turbines with waste heat recovery (combined cycle gas turbine) have a higher overall efficiency than the gas turbine alone. The application of the efficiency adjustment factor to the entire system would permit greater NO_x emission. The efficiency adjustment factor in the selected NSPS must be based on the gas turbine efficiency itself, not the overall efficiency of a gas turbine combined with other equipment. This consideration is discussed at length in the preamble to the selected NSPS for stationary gas turbines.

Based on the above facts, the KU gas turbine would actually be allowed an emission rate of 129 PPM due to the efficiency adjustment factor, which is an increase of the nominal 75 PPM NO_x emission by 5.64%. Therefore, FDER determines that the selected NSPS emission limit of 129 PPM or 0.0075 $\frac{(14)}{y}$ + F at 15% oxygen on a dry basis (see formula, Table 2) is BACT for this source when using No. 2 fuel oil containing 0.25 percent nitrogen.

Beryllium Control

The applicant proposes an emission limit of 0.00015 lb/hr for beryllium based on the emission factor from Stationary Combustion Processes (EPA 450/2-80-074).

Since beryllium emissions from gas turbines were not selected for control by standards of performance and there is not an applicable National Emission Standards for Hazardous Air Pollutants (NESHAP) for beryllium emission from gas turbines, FDER accepts the applicant's proposed 3.4×10^{-7} lb/MMBTU as BACT for this source.

Best Available Control Technology (BACT) Determination

Kissimmee Utilities

Osceola County

Kissimmee Utilities, Kissimmee, Florida, plans to increase their existing electric generating capability by an additional 49.9 gross megawatts. The proposed supplementary-fired combined cycle gas turbine system is composed of one 400 million Btu/hr heat input gas turbine (30.9 megawatt gross output) from which the exhaust gases discharge into a waste heat boiler. The steam produced will operate two steam turbines each producing 9.5 megawatt gross output. The boiler has a 41.7 million Btu per hour supplemental heat source to generate additional steam.

The system will fire natural gas with No. 2 oil as stand-by fuel. Hourly fuel consumption at maximum firing will be 0.491 million cubic feet or gas or 78 barrels of oil. The system is scheduled to operate 8,760 hours per year.

BACT Determination Requested by the Applicant:

Pollutant	Emission Limit
NO_x	NSPS % by volume = 0.0075 (14.4/Y) + F Y = heat rate at peak load (kJ/watt-hr) F = fuel-bound nitrogen allowance
SO_2	0.8% maximum fuel sulfur content

Date of Receipt of a BACT Application:

August 13, 1981

Date of Publication in the Florida Administrative Weekly:

September 4, 1981

Review Group Members:

There have been no significant technology improvements since the promulgation of the applicable NSPS to justify a formal review group. Comments were obtained from the New Source Review Section and the Air Modeling Section.

BACT Determination by DER:

Pollutant	Emission Limit
NO_x	NSPS Subpart GG, subsection 60.332(a)(1).
SO_2	No. 2 fuel oil with sulfur content not to exceed 0.8%.
Visible Emissions	Maximum 20% opacity.

Justification of DER Determination:

Nitric oxides produced by the combustion of fuel in the gas turbine are formed by the combination of nitrogen and oxygen in the combustion air. NO_x is also formed from the reaction of the nitrogen in the fuel with the oxygen in the combustion air. Formation of the latter NO_x will be minimized by the applicant's use of natural gas or distillate oil as fuel, both of which have low nitrogen content.

NO_x formation is extremely sensitive to flame temperature, therefore injecting water or steam into the gas turbine reaction zone will reduce production of NO_x. The use of the wet control technique to reduce NO_x emissions to or below the NSPS limits is determined to be BACT.

The SO_2 emissions from the gas turbine are strictly a function of the fuel sulfur content. Flue gas desulfurization systems are economically unattractive compared to the cost of low sulfur fuels. The firing of natural gas or No. 2 oil containing a maximum of 0.8% sulfur is determined as BACT.

The reduction of NO_x emissions results in an increase in CO emissions. CO emissions are considered to be a local problem since CO readily reacts to form CO_2. NO_x emissions, however, are linked to the formation of photochemical oxidants and are subject to long range transport. As a result of this trade-off, no emission limit for CO is specified in this determination.

Test methods for NO_x emissions are per NSPS, Subpart GG. Oil analysis by the applicant's fuel supplier or natural gas consumption records can be used to determine compliance with SO_2 emission limit. Compliance with the opacity limitation will be determined in accordance with 40 CFR 60, Appendix A; Method 9.

Details of the Analysis May be Obtained by Contacting:

Edward Palagyi, BACT Coordinator
Department of Environmental Regulation
Bureau of Air Quality Management
2600 Blair Stone Road
Tallahassee, Florida 32301

Recommended By:

Steve Smallwood, Chief, BAQM

Date:

10/2/81

Approved:

Victoria Tschinkel, Secretary

Date:

10/5/81

SS:caa

APPENDIX B

AIR QUALITY IMPACT ANALYSIS

A. Summary

The State PSD review for PM and SO_2 requires an air quality impact analysis which includes a PSD increment analysis and a Florida Ambient Air Quality Standards (FAAQS) analysis. The State PSD increment and FAAQS analyses depend on air quality modeling carried out in accordance with FDER-approved methods.

The air quality impact analysis required under federal PSD review for PM, SO_2, CO, NO_x, and Beryllium (Be) includes:

- o An analysis of existing air quality;
- o A PSD increment analysis (for PM and SO_2 only);
- o A National Ambient Air Quality Standards (NAAQS) analysis; and,
- o An analysis of impact on soils, vegetation and visibility and growth-related air quality impacts.

The analysis of existing air quality may require preconstruction monitoring; the PSD and NAAQS analyses depend on air quality modeling carried out in accordance with EPA-approved methods. Federal PSD review also requires a good engineering practice (GEP) stack height evaluation.

Based on these required State and federal air quality impact analyses, FDER has reasonable assurance that the KU modification, as described in this permit and subject to the conditions of approval proposed herein, will not cause or contribute to a violation of any State or federal PSD increment or ambient air quality standard. A discussion of the required analyses follows.

B. Discussion

1. Modeling Methodology

Two FDER and EPA-approved dispersion models were used in the State and federal air quality impact analyses. These were the Single-Source (CRSTER) and Industrial Source Complex (ISC) models.

These models were used to determine the maximum predicted annual concentrations and to identify the absolute worst-case short-term meteorological conditions which would affect emissions from KU after the proposed modification is completed. They were also used to identify days on which meteorological conditions produced worst-case short-term KU impacts in the vicinity of the facility with interacting sources located directly upwind.

The maximum short-term impacts due to emissions from KU and all major interacting sources were analyzed using a refined grid spacing of 0.1 to 0.2 kilometers between receptors and only the days on which worst-case meteorological conditions occurred.

Since worst-case impacts for each pollutant subject to analysis occur under different fuel burning conditions, modeling and analysis for each of these pollutants was performed using the worst-case fuel.

The surface meteorological data used in the models were National Weather Service data collected at Orlando, Florida during the period 1974-78. Upper air meteorological data used in the models were collected during the same time period at Tampa, Florida.

Final stack parameters and emission rates used in evaluating the proposed KU modification are contained in Tables B-1 and B-2.

Table B-1

Stack Parameters for Kissimmee Utilities - Baseline Case

Emissions Unit	Stack Height (m)	Stack Diameter (m)	Exit Velocity (m/s)	Exit Temperature (K)	Emission Rate (g/sec) SO_2	PM
Unit #7	13.11	.61	16.30	466.50	.87	.52
Units #8,#9	16.15	.85	17.60	477.60	3.36	2.01
Units #10,#11	7.01	.76	9.60	466.50	2.28	1.36
Units #14-#18	13.41	.80	8.70	505.40	5.37	3.21
Units #19,#20	8.69	.90	17.20	505.40	2.89	1.73

Table B-2

Stack Parameters for Kissimmee Utilities - Projected Case

Emissions Unit	Stack Height (m)	Stack Diameter (m)	Exit Velocity (m/s)	Exit Temperature (K)	Emission Rate (g/sec) SO_2	PM	NO_x	CO
Unit #7	13.11	.61	16.30	466.50	.87	.52	4.46	.79
Units #8,#9	16.15	.85	17.60	477.60	3.36	2.01	17.10	3.16
Units #10,#11	7.01	.76	9.60	466.50	2.28	1.36	10.58	2.12
Units #14-#18	13.41	.80	8.70	505.40	5.37	3.21	11.34	5.45
Units #19,#20	8.69	.90	17.20	505.40	2.89	1.73	14.66	2.64
Combustion Turbine	9.14	2.44	38.03	422.00	48.9	1.98	30.70	6.53

2. Analysis of Existing Air Quality

In order to evaluate existing air quality in the area of a proposed project, FDER may require a period of continuous preconstruction monitoring for any pollutant subject to PSD review. An exemption from this requirement may be obtained if the net emissions increase of the pollutant from the modification would cause an air quality impact less than a certain de minimus level as defined in 40 CFR 52.21(i)(8). Based on the modeling results shown in the following table, this exemption is applicable to the proposed modification for all of the pollutants subject to PSD review. Therefore, no preconstruction monitoring has been required.

Projected Air Quality Impacts From Combustion Turbine

Pollutant	Averaging Time	Projected Impact (ug/m^3)	De Minimus Level (ug/m^3)
SO_2	24-hour	10	13
TSP	24-hour	< 1	10
NO_x	24-hour	6	14
CO	8-hour	< 6	575
Be	24-hour	< 0.0005	.0005

There are no FDER or EPA-approved TSP, SO_2, NO_x, or CO monitors within 25 kilometers of the KU facility. Since the KU facility is located in a remote area with respect to non-specified sources, FDER has assumed the following pollutant background values: 0 ug/m^3 for CO, 20 ug/m^3 for SO_2 and NO_x, 40 ug/m^3 for TSP. These background values are used for all

averaging times and are consistent with EPA monitoring guidelines. FDER assumed no background value for the non-criteria pollutant, Be.

3. PSD Increment Analysis

Both the State and federal PSD increment analyses pertain to PM and SO_2 for which maximum allowable increases (increments) are defined. The proposed KU modification will be located in an area where the Class II increments apply. The nearest Class I area is more than 100 kilometers away from the proposed site.

The predicted maximum TSP and SO_2 increment consumption is the same in both the State and federal PSD increment analyses. Increment consumption at KU is affected by the construction of the combustion turbine alone.

As shown in the following table, modeling results predict that the maximum TSP and SO_2 increment consumption will not exceed allowable increments. The highest, second-highest short-term predicted concentrations are given in the table since five years of meteorological data were used in the modeling.

Maximum Increment Consumption

(ug/m^3)

State and Federal

	Averaging Time		
Pollutant	3-hour	24-hour	Annual
SO_2: Maximum KU Impact	44	10	< 1
SO_2: Allowable Class II Increment	512	91	20
PM: Maximum KU Impact	NA	< 1	< 1
PM: Allowable Class II Increment	NA	37	19

There are other increment consuming sources within the vicinity of KU. Even though these sources consume increment in the area around KU, this consumption is very small. The combined impacts of these sources and KU in the interacting directions are less than the maximum increment consumed by KU only.

The nearest Class I area is Chassahowitza National Wilderness Area which is 125 kilometers away from KU. At this distance, it can be assumed that no Class I increment will be consumed as a result of emissions from KU.

4. Ambient Air Quality Standards Analysis

Both State and federal PSD regulations require the permit applicant to demonstrate that, given existing air quality in an area, a proposed emissions increase subject to PSD review will not cause or contribute to any violation of ambient air quality standards. For the proposed project at KU, an ambient air quality standards analysis is required for PM, SO_2, CO, NO_x, and Be.

As shown in the following table, modeling results predict that maximum ground-level concentrations for each of these pollutants will be below both the FAAQS and NAAQS. The highest, second-highest short-term predicted values are given in this table since five years of meteorological data were used in the modeling.

Pollutant	Averaging Time	Projected Air Quality* (ug/m^3)	NAAQS (ug/m^3)	FAAQS (ug/m^3)
SO_2	annual	40	80	60
	24-hour	155	365	260
	3-hour	392	1300	1300
TSP	annual	52	75	60
	24-hour	121	150	150
NO_2	annual	89	100	100
CO	8-hour	< 500	10,000	10,000
	1-hour	< 1000	40,000	40,000
Be	24-hour	< 0.0005**	N/A	N/A

*Includes background concentrations of 40 ug/m^3 for annual and 24-hour TSP, 20 ug/m^3 for SO_2 for all averaging times, and 20 ug/m^3 for NO_2.

** Air quality impact calculated for the proposed modification only.

Modeling was also performed to evaluate the impacts of interactions of emissions from other sources with those from KU. Maximum contributions from surrounding sources are very small compared to maximum ground-level concentrations from KU and they occur in non-critical directions. Therefore, no violations are predicted to occur due to interacting sources.

5. Good Engineering Practice Stack Height Evaluation

The stack height proposed for the KU combustion turbine is less than the Good Engineering Practice (GEP) stack height of 65 meters for stacks uninfluenced by structures or terrain. A building downwash analysis was not performed since the new stack will not be within the area of influence of any structure with the potential to cause downwash conditions.

APPENDIX C

ANALYSIS OF IMPACT ON SOILS, VEGETATION AND VISIBILITY AND GROWTH-RELATED AIR QUALITY IMPACTS

The maximum impact of the proposed modification, as demonstrated through the air quality analysis, will be below the national secondary air quality standards for PM and SO_2. These standards were established to protect public welfare related values. Also, the maximum impact of the proposed modification on NO_2, CO, and Be concentrations will be insignificant. Therefore, no adverse effects on soils, vegetation and visibility is expected.

There will be no increase in the number of employees at this site due to the project. Therefore no secondary residential, commercial or industrial growth which will adversely affect air quality in the area is expected.

APPENDIX D

SPECIFIC CONDITIONS

FDER proposes a final determination of approval with conditions for the project (construction of a 49.9 MW combined cycle gas turbine) requested by Kissimmee Utilities in the complete permit applications submitted on August 13, 1981 (federal application) and August 31, 1981 (state application).

Special conditions listed in the State permit AC 49-46521, are adopted as special conditions for the federal permit, PSD-FL-087, for this source.

The attached General Conditions (federal) are also made a part of the proposed federal permit PSD-FL-087.

GENERAL CONDITIONS

1. The permittee shall notify the permitting authority in writing of the beginning of construction of the permitted source within 30 days of such action and the estimated date of start-up of operation.

2. The permittee shall notify the permitting authority in writing of the actual start-up of the permitted source within 30 days of such action and the estimated date of demonstration of compliance as required in the specific conditions.

3. Each emission point for which an emission test method is established in this permit shall be tested in order to determine compliance with the emission limitation contained herein within sixty (60) days of achieving the maximum production rate, but in no event later than 180 days after initial start-up of the permitted source. The permittee shall notify the permitting authority of the scheduled date of compliance testing at least thirty (30) days in advance of such test. Compliance test results shall be submitted to the permitting authority within forty-five (45) days after the complete testing. The permittee shall provide (1) sampling ports adequate for test methods applicable to such facility, (2) safe sampling platforms, (3) safe access to sampling platforms, and (4) utilities for sampling and testing equipment.

4. The permittee shall retain records of all information resulting from monitoring activities and information indicating operating parameters as specifed in the specific conditions of this permit for a minimum of two (2) years from the date of recording.

5. If, for any reason, the permittee does not comply with or will not be able to comply with the emission limitations specified in this permit, the permittee shall provide the permitting authority with the following information in writing within five (5) days of such conditions:

   (a) description of noncomplying emission(s),

   (b) cause of noncompliance,

   (c) anticipated time the noncompliance is expected to continue or, if corrected, the duration of the period of noncompliance,

   (d) steps taken by the permittee to reduce and eliminate the noncomplying emission,

   and

   (e) steps taken by the permittee to prevent recurrence of the noncomplying emission.

Failure to provide the above information when appropriate shall constitute a violationof the terms and conditions of this permit. Submittal of this report does not constitute a waiver of the emission limitations contained within this permit.

6. Any change in the information submitted in the application regarding facility emissions or changes in the quantity or quality of materials processed that will result in new or increases emissions must be reported to the permitting authority. If appropriate, modifications to the permit may then be made by the permitting authority to reflect any necessary changes in the permit conditions. In no case are any new or increased emissions allowed that will cause violation of the emission limitations specified herein.

7. In the event of any change in control or ownership of the source described in the permit, the permittee shall notify the succeeding owner of the existence of this permit by letter and forward a copy of such letter to the permitting authority.

8. The permittee shall allow representatives of the State environmental control agency or representatives of the Environmental Protection Agency, upon the presentation of credentials:

   (a) to enter upon the permittee's premises, or other premises under the control of the permittee, where an air pollutant source is located or in which any records are required to be kept under the terms and conditions of the permit;

   (b) to have access to any copy at reasonable times any records required to be kept under the terms and conditions of this permit, or the Act;

   (c) to inspect at reasonable times any monitoring equipment or monitoring methods required in this permit;

   (d) to sample at reasonable times any emission of pollutants;

   and

   (e) to perform at reasonable times an operation and maintenance inspection of the permitted source.

9. All correspondence required to be submitted by this permit to the permitting agency shall be mailed to:

   Chief, Air Facilities Branch
   Air and Hazardous Materials Division
   U. S. Environmental Protection Agency
   Region IV
   345 Courtland Street
   Atlanta, Georgia 30308

10. The conditions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

The emission of any pollutant more frequently or at a level in excess of that authorized by this permit constitute a violation of the terms and conditions of this permit.

P16 7682502

RECEIPT FOR CERTIFIED MAIL

NO INSURANCE COVERAGE PROVIDED—
NOT FOR INTERNATIONAL MAIL
(See Reverse)

SENT TO
Jack T. Danforth

STREET AND NO.
P.O. Box 1608

P.O., STATE AND ZIP CODE
Kissimmee, FL 32741

POSTAGE			$
CONSULT POSTMASTER FOR FEES	CERTIFIED FEE		¢
	OPTIONAL SERVICES	SPECIAL DELIVERY	¢
		RESTRICTED DELIVERY	¢
		RETURN RECEIPT SERVICE — SHOW TO WHOM AND DATE DELIVERED	¢
		RETURN RECEIPT SERVICE — SHOW TO WHOM, DATE AND ADDRESS OF DELIVERY	¢
		RETURN RECEIPT SERVICE — SHOW TO WHOM AND DATE DELIVERED WITH RESTRICTED DELIVERY	¢
		RETURN RECEIPT SERVICE — SHOW TO WHOM, DATE AND ADDRESS OF DELIVERY WITH RESTRICTED DELIVERY	¢
TOTAL POSTAGE AND FEES			$

POSTMARK OR DATE
10-27-81

800, Apr. 1976