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FINAL

ENVIRONMENTAL INFORMATION VOLUME SOUTHERN COMPANY SERVICES CHIYODA THOROUGHBRED-121 FLUE GAS DESULFURIZATION PROJECT AT PLANT YATES NEWNAN, GEORGIA

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31 August 1989

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1.0 INTRODUCTION

Section 1 contains the following information: (a) background information on the Chiyoda Thoroughbred-121 (CT-121) project; (b) a description of the organization of this report; and (c) a summary of the potential environmental, health, safety, and socioeconomic impacts of the project.

1.1 Background

In February 1988, the U.S. Department of Energy (DOE) issued a Program Opportunity Notice to solicit proposals for cost-shared Innovative Clean Coal Technology (ICCT) projects. The primary objective of the ICCT program is to fund projects that can potentially demonstrate cost-effective technologies capable of being commercialized that can achieve significant reductions in sulfur dioxide (SO_2) and nitrogen oxide (NO_x) emissions from coal-burning electric power plants.

One of the projects selected for entitlement to ICCT funding is the Chiyoda Thoroughbred-121 (CT-121) flue gas desulfurization process that will be demonstrated at Plant Yates near Newnan, Georgia. The project is offered for demonstration by Southern Company Services, Inc. (SCS). SCS is the engineering services branch of the Southern electric system, which consists of SCS and five operating companies serving a four-state area (Alabama, Georgia, Mississippi, and Florida).

This document is a self-contained Environmental Information Volume (EIV) for the CT-121 demonstration project. It has been prepared by SCS for DOE to facilitate that agency's compliance with the National Environmental Policy Act of 1969 (NEPA). The EIV has been prepared in accordance with the Council on Environmental Quality's NEPA regulations at 40 CFR Parts 1500-1508; DOE's guidelines for compliance with NEPA (initially published in the Federal Register on March 28, 1980, and amended in 1982, 1983, and 1987); the ICCT Program Opportunity Notice (February 22, 1988); and the Environmental Guidance

Manual for ICCT Program Selectees, DOE Pittsburgh Energy Technology Center (October 1988).

The EIV is organized as follows: Section 1 is the introduction; Section 2 describes the CT-121 demonstration project; Section 3 describes the environmental, health, safety, and socioeconomic aspects of the existing power plant; Section 4 identifies and evaluates the effects of the project on these areas; Section 5 discusses the federal, state, and local regulatory implications of conducting the demonstration project; and Section 6 presents the qualifications of the individuals who prepared this document. Section 7 is a compilation of references and regulatory agency contacts.

1.2 Summary of Impacts

The positive effects of implementing the CT-121 demonstration project include an estimated 90 percent reduction in SO_2 emissions from Unit 1 of Plant Yates; halogen and trace element emissions will also decrease. Modeling analyses of predicted changes in ground-level concentrations of selected contaminants at the plant indicate that the smaller plume rise and shorter stack height associated with the new stack for Unit 1 produces slight increases in annual ground-level concentrations of sulfur dioxide and particulate matter in spite of the reduced SO_2 and PM emissions. The increases are insignificant, however, in relation to the annual average National Ambient Air Quality Standards (NAAQS). The modeling exercise also shows a slight decrease in the maximum 3-hour and 24-hour SO_2 concentration associated with the project and a slight decrease in the 24-hour particulate levels associated with the project.

Low levels of sulfuric acid mist in the flue gas from Unit 1 may produce a visible plume during the demonstration program, depending on atmospheric conditions. Regular surveys will be conducted in the locale of the plant to verify the absence of ecological damage from acid mist emissions.

The local economy should be benefited slightly during the construction phase since approximately 120 construction workers will be hired.

No unusual health and safety risks are expected during construction and operation.

Existing resource requirements, such as fuel and process water, will remain the same or will only increase slightly as a result of the project. Limestone will be a new resource requirement; however, the requisite 23,000 tons per year can be readily supplied by regional quarries.

The main impact of the project will be the generation of a new solid waste in the form of gypsum and a gypsum/fly ash mixture. These by-product materials will be managed on site in a separate, lined stacking area, which will be permitted under the state solid waste landfill regulations. The impact on local ground water is expected to be insignificant because of the relatively benign nature of the by-product, the site's favorable hydrogeologic conditions, and a synthetic or low-permeability clay liner that will be installed beneath the gypsum and gypsum/fly ash stacking areas. Ground-water monitoring wells are also planned to ensure the integrity of the liner. A leachate collection system will be installed as an additional measure to prevent ground-water contamination.

The by-product gypsum and gypsum/ash mixture from the CT-121 process have the same potential uses as natural gypsum; i.e., wallboard, cement, and agricultural applications. A waste characterization study will be conducted for both the gypsum and gypsum-fly ash mixture produced during the demonstration program. One primary objective of this study will be to evaluate the potential for commercial use of CT-121 by-products.

2.0 THE PROPOSED ACTION AND ITS ALTERNATIVES

This section provides the following information: (a) an overview of the technology and of the implementation of the project at Plant Yates; (b) a brief orientation to the plant's current operations; (c) a summary of project resource requirements and environmental effects; and (d) a discussion of why this site was chosen.

2.1 The Proposed Action

SCS proposes to demonstrate the use of the CT-121 flue gas desulfurization (FGD) process as a way of reducing sulfur dioxide (SO_2) emissions from pulverized coal utility boilers that use medium-sulfur U.S. coal.

The CT-121 process is a second-generation FGD process that was developed by Chiyoda Corporation of Tokyo, Japan in the late 1970s. The process uses an absorber (the jet bubbling reactor) to combine conventional limestone FGD chemistry, forced oxidation, and gypsum crystallization in one vessel. This process has been used in Japan and has demonstrated several benefits over conventional limestone FGD processes. The design approaches that make this demonstration project innovative include: (a) use of fiberglass reinforced plastic (FRP) for the flue gas duct and reactor vessels; (b) elimination of flue gas reheat; (c) elimination of the need for spare absorbers; and (d) simultaneous SO_2 and particulate removal.

The proposed demonstration project will evaluate the economic and environmental impacts of the technology on a coal-fired power plant using medium-sulfur coal. The flue gas from Unit 1 at Georgia Power Company's Plant Yates will be treated by the CT-121 process and then emitted through a temporary stack. Solid wastes from the process (gypsum) will be managed on site. The project design and construction phase will take approximately 26 months, while startup and operation will take approximately 24 months. The test equipment may be dismantled and removed from the site at the conclusion of the project; however, if the project proves technically practicable, SCS may maintain the equipment for further testing. Continued testing in the gypsum stacking area will occur for some period of time after conclusion of the project; revegetation studies will be conducted on the stacks with and without topsoil.

2.1.1 Site Description

2.1.1.1 Site Location

The CT-121 project will be undertaken at Plant Yates, an existing Georgia Power Company plant located in Coweta County in west central Georgia. Plant Yates is approximately 40 miles south-southwest of Atlanta Hartsfield International Airport (see Figure 2-1). The plant site consists of 2,333 total acres. Plant Yates lies along the eastern bank of the Chattahoochee River on U.S. Alternate Route 27 between the cities of Carrollton and Newnan. Map coordinates are 33°28'27" N Latitude and 84°53'30" W Longitude.

Land use in the vicinity of the plant is primarily rural and scattered residential in nature. Commercial and light industrial (textile) facilities are situated within a five-mile radius of the plant in the small towns of Whitesburg and Sargent.

2.1.1.2 Existing Plant Operation

Plant Yates, established in 1950, serves as a tie-in to the Georgia Power Company system to provide power, as needed, throughout the state. Approximately 450 employees work at the site. The plant currently has seven generating units in operation; each boiler was manufactured by Combustion Engineering, while General Electric manufactured each generator. The entire plant has a total nameplate capacity of 1,250,000 kW. Figure 2-2 presents a general site arrangement of the plant.

Units 1 through 5 (operational since the 1950s) are located in one building that features a common 825-foot stack for venting emissions from all

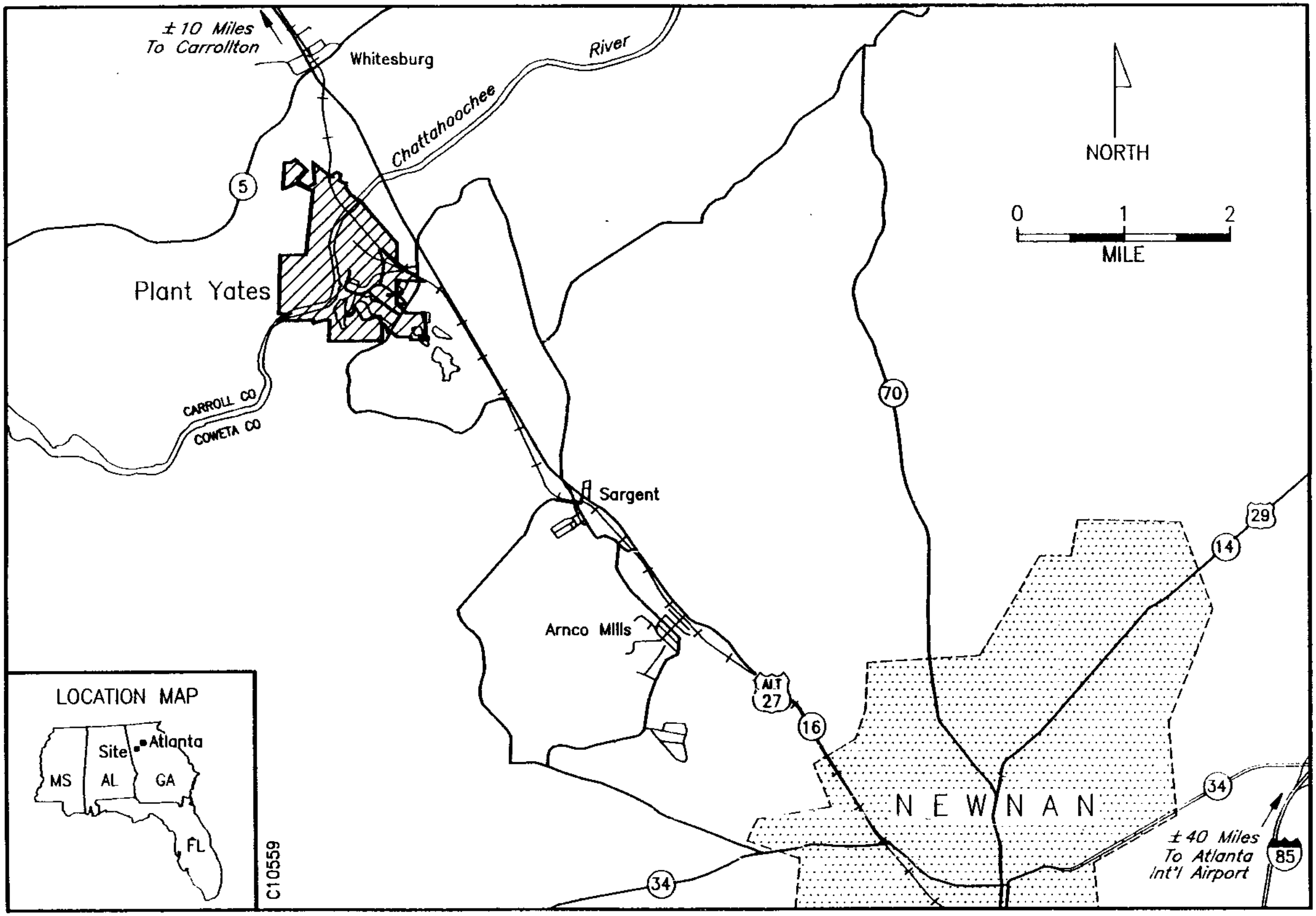


Figure 2-1. Location Map: Plant Yates

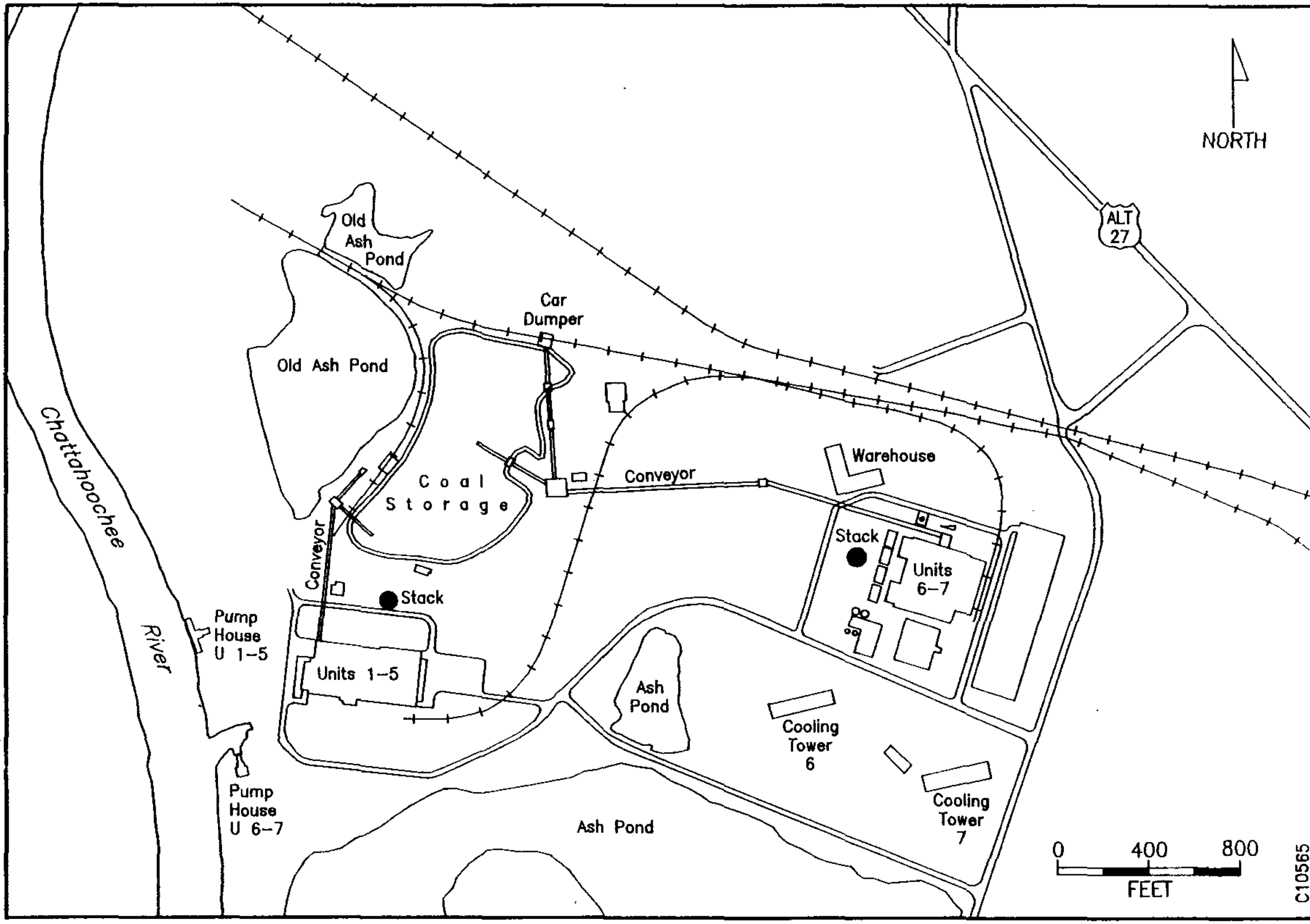


Figure 2-2. Plant Yates Site Layout

five units. These units, which use water from the Chattahoochee River in a once-through cooling water system, are operated as intermediate load units. Units 6 and 7, operational since 1974, are housed in a separate building from Units 1 through 5. These newer units are operated as base load units. A common 800-foot stack is used to vent process emissions from Units 6 and 7; mechanical draft cooling towers are also used. All Plant Yates' units are equipped with electrostatic precipitators.

Plant Yates uses coal primarily supplied through Georgia Power Company's Pride Transloader coal distribution system on the Tennessee River in northern Alabama. Coal from the Pride Transloader distribution system is typically a 50-50 blend of Arch Mineral and Old Ben coals from the Illinois Basin. Coal burn analyses during the first ten months of 1988 indicate an average coal sulfur content of 2.04 percent. (The target coal sulfur content for the demonstration project will be 2.5%.) Blending occurs at the Pride facility as coal is conveyed to one of three dedicated 97-car trains destined for Plant Yates.

Plant Yates' coal handling facilities (including storage) encompasses some 15 acres. A maximum of approximately 900,000 tons of coal can be stockpiled at the site. Total plant coal consumption ranged from 2.6 to 3.0 million tons per year from 1982 through 1987. Typical annual fuel consumption for Unit 1 (which will supply flue gas to the demonstration project) ranged from 137,000 to 230,000 tons per year from 1983 through 1987.

Raw water for process needs is drawn from the Chattahoochee River at two intake structures (one for Units 1 through 5 and the other for Units 6 and 7) on the western edge of the plant. In 1988, the facility diverted an average volume of 481 million gallons per day (MGD) of surface water. Approximately 628 MGD of process water is discharged via a permitted outfall on the western side of the plant to the Chattahoochee River. There are four water wells on site for potable water purposes.

Solid waste, in the form of bottom ash and fly ash, is generated at approximately 35,000 tons and 140,000 tons per year, respectively. The ash is sluiced to a series of wet disposal ponds. Some ash is continually removed from the ponds and either sold for off-site uses or disposed of in an on-site permitted ash landfill.

Primary access to the site is via U.S. Alternate Route 27 (north-south) that connects the cities of Carrollton and Newnan. A Norfolk Southern railroad line traverses the northwest to southeast boundary of the physical plant. No pipelines are used by the plant for securing fuel or water from off-site sources. The plant is located in a rural setting approximately 10 miles northwest of the City of Newnan. Land uses within a five-mile radius of the plant include agricultural and scattered residential areas.

2.1.2 Engineering Description of the Proposed Action

2.1.2.1 Description of Project

The CT-121 flue gas desulfurization project will be constructed and operated to treat the entire flue gas stream from Unit 1 (100 MW), which is a relatively small percentage (12%) of the total flue gas generated at the plant. The following paragraphs detail the key features of the project. For ease of reference, Figure 2-3 provides a process flow diagram, while Figure 2-4 shows the proposed layout of the project elements at Plant Yates.

Reactant (Limestone) Feed System

A reactant feed system will be constructed and implemented to prepare limestone for use in the sulfur dioxide (SO_2) removal system. The proposed reactant area is depicted in Figure 2-4.

Limestone from available suppliers will be transported into Plant Yates by truck and/or rail, and delivered to a 30-day storage pile. The limestone storage area runoff will be collected and piped to the waste gypsum

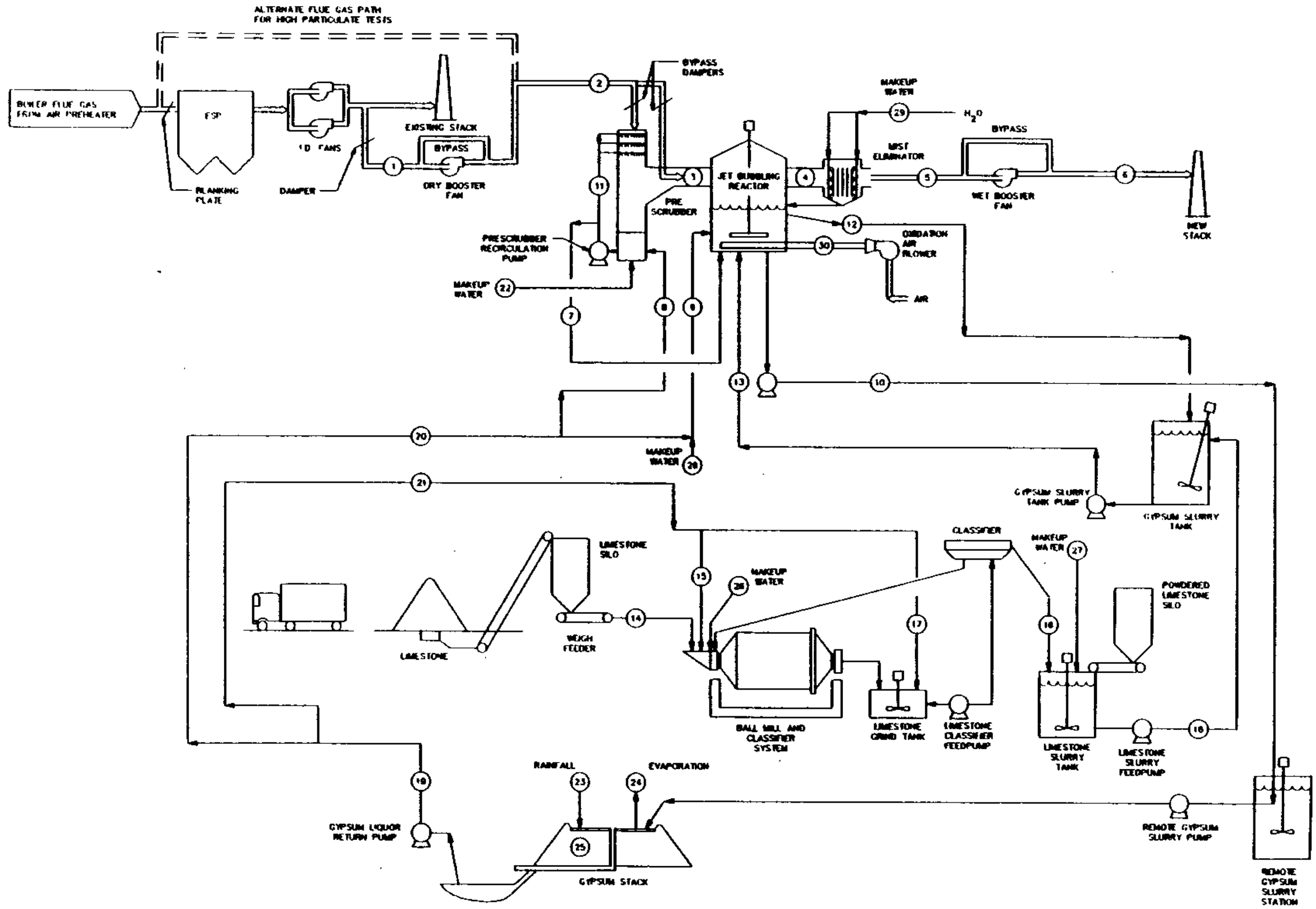


Figure 2-3. Flow Diagram: CT-121 Process (100 MW Project)

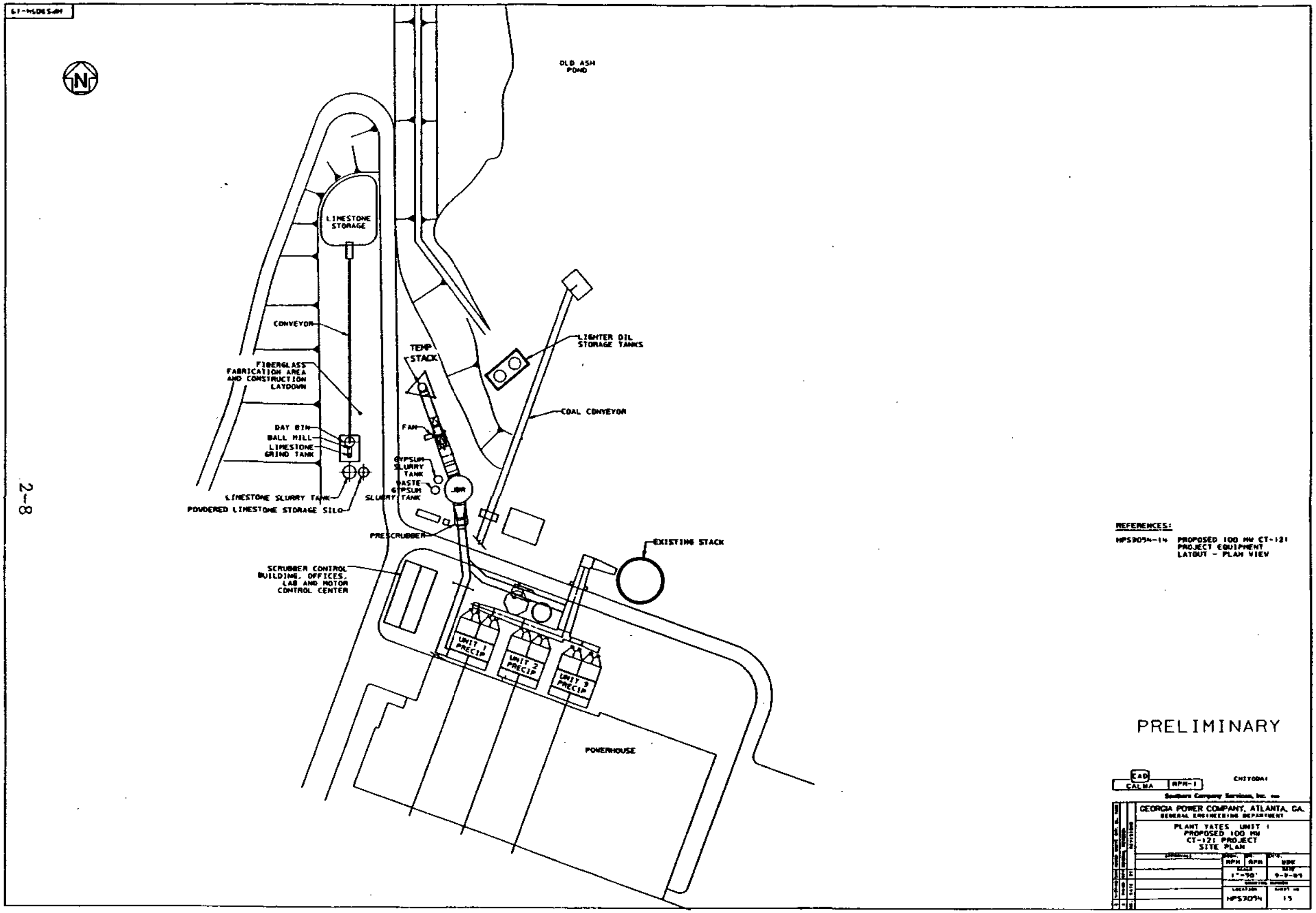


Figure 2-4. Plant Yates CT-121 Proposed Layout

tank. As limestone is needed in the process, it will be bulldozed into a below-grade, 20-ton capacity carbon steel load hopper. The hopper will feed the limestone to a 365-foot long inclined and covered conveyor belt, which will deliver the material to a 50-foot tall carbon steel, day storage silo. From the silo, limestone will be conveyed in a covered conveyor to a wet ball mill. The ball mill is a horizontal, carbon-steel cylinder that will grind the 3/4-inch limestone rock small enough that 90 percent will pass through a 200-mesh sieve.

The mill product will then be pumped to hydrocyclones--located on top of a 50,000 gallon, carbon steel limestone slurry feed tank--for size classification. The classifier underflow (containing larger limestone particles) will be routed to the ball mill for further grinding while the overflow will flow into the slurry tank. The slurry will then be pumped into the SO_2 removal reactor (the jet bubbling reactor described below), as required to maintain the desired pH. An 18-inch wide by 1-foot deep concrete trench will be located at grade around the ball mill to collect stormwater or reactant spills, if any. Appropriate containment structures will also be placed around all process equipment. Any spills or runoff will be routed to the gypsum stacking area via the waste gypsum tank.

Sulfur Dioxide Removal

The jet bubbling reactor (JBR) is the key element of the CT-121 process. The JBR used at Plant Yates will be a 42-foot tall by 42-foot diameter fiberglass, agitated tank that will be located in the area indicated in Figure 2-4. A schematic of the JBR is shown in Figure 2-5.

A prescrubber is included as part of the process unit. The process is designed to operate with or without the prescrubber in service. The prescrubber will be bypassed, for example, during the high-particulate loading test program. Thus, either untreated or precooled flue gas from Unit 1 will enter the JBR in a plenum chamber. The gas will then be forced into the jet bubbling (froth) zone of the tank. After bubbling through the limestone

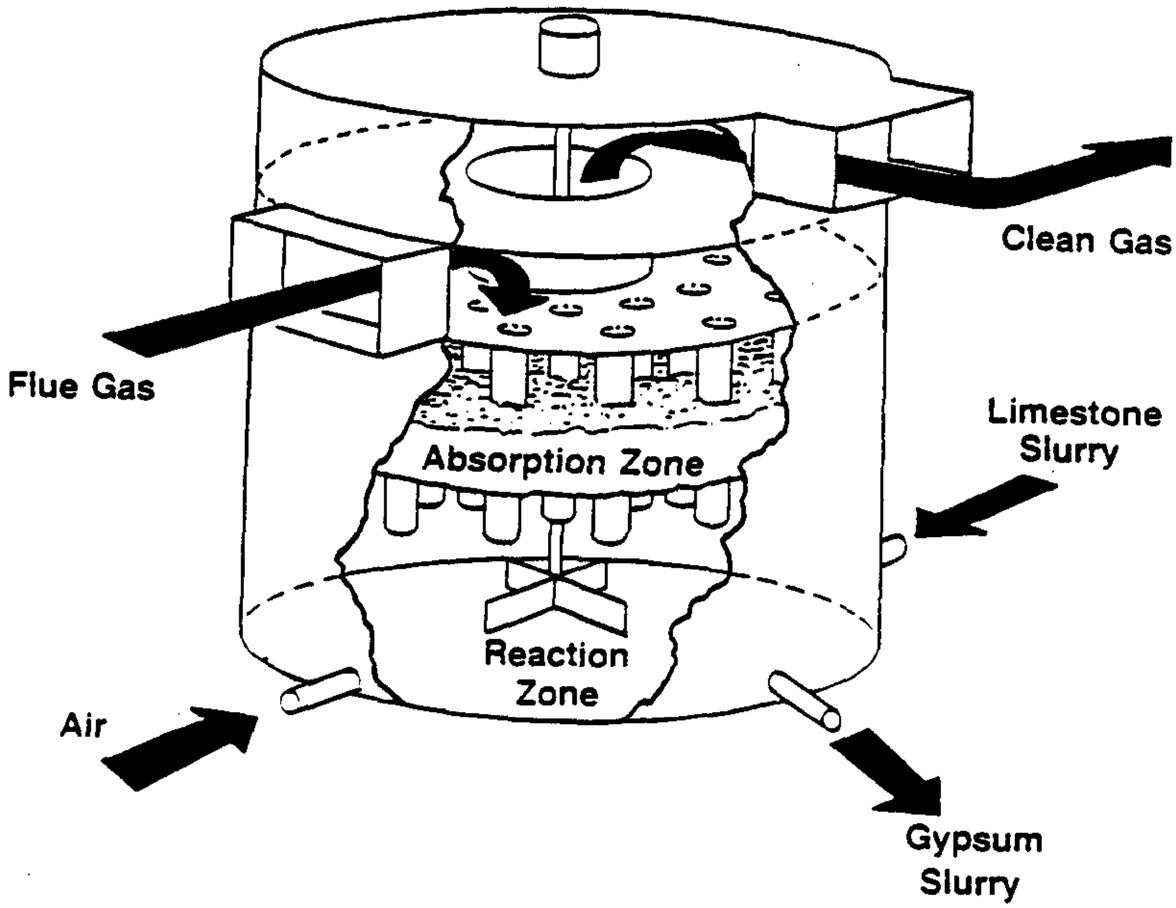


Figure 2-5. Schematic of Jet Bubbling Reactor

slurry, the gas will flow upward through the risers. Injected air will oxidize the absorbed SO_2 to form sulfate, which will react with the limestone to form gypsum. Most of the entrained liquid in the gas will disengage from the stream in a second plenum, and the cleaned gas will exit the JBR through a mist eliminator to the temporary stack. Slurry density in the tank will be controlled by pumping slurry from the bottom of the JBR to a remote gypsum slurry (surge) station and then to the gypsum stacks.

Flue Gas Handling System

The Plant Yates Unit 1 flue gas handling system will be designed to allow several different modes of operation. Tests with low [with electrostatic precipitator (ESP) in service] and high (without ESP in service) particulate loading, and with and without a prescrubber, will be conducted. The purpose of operating without the ESP and/or prescrubber will be to assess the efficiency of the JBR as a particulate collection device. When the prescrubber is used, blowdown from the prescrubber will be pumped directly to the JBR. During operation without the prescrubber, gas saturation will occur in the transition duct at the JBR inlet.

Regardless of the variable operating conditions, the cleaned gas will pass from the mist eliminator to a temporary, 250-foot tall fiberglass-lined chimney. The location of the temporary stack is depicted in Figure 2-4.

Solids Disposal

As the JBR slurry exceeds a prescribed density, the underflow will be pumped approximately 2,540 feet via pipeline to an 8-acre gypsum stacking area. The location of the solids disposal area in relation to the JBR area is depicted in Figure 2-6. Although there will be one solids management area, there will actually be two separate stacking areas: one 3-acre area for the stacking of pure gypsum and a 5-acre area for the stacking of the gypsum/fly ash solids (when the ESP is not in operation). The gypsum slurry will be pumped to a central location in the stack area. Supernatant liquor and

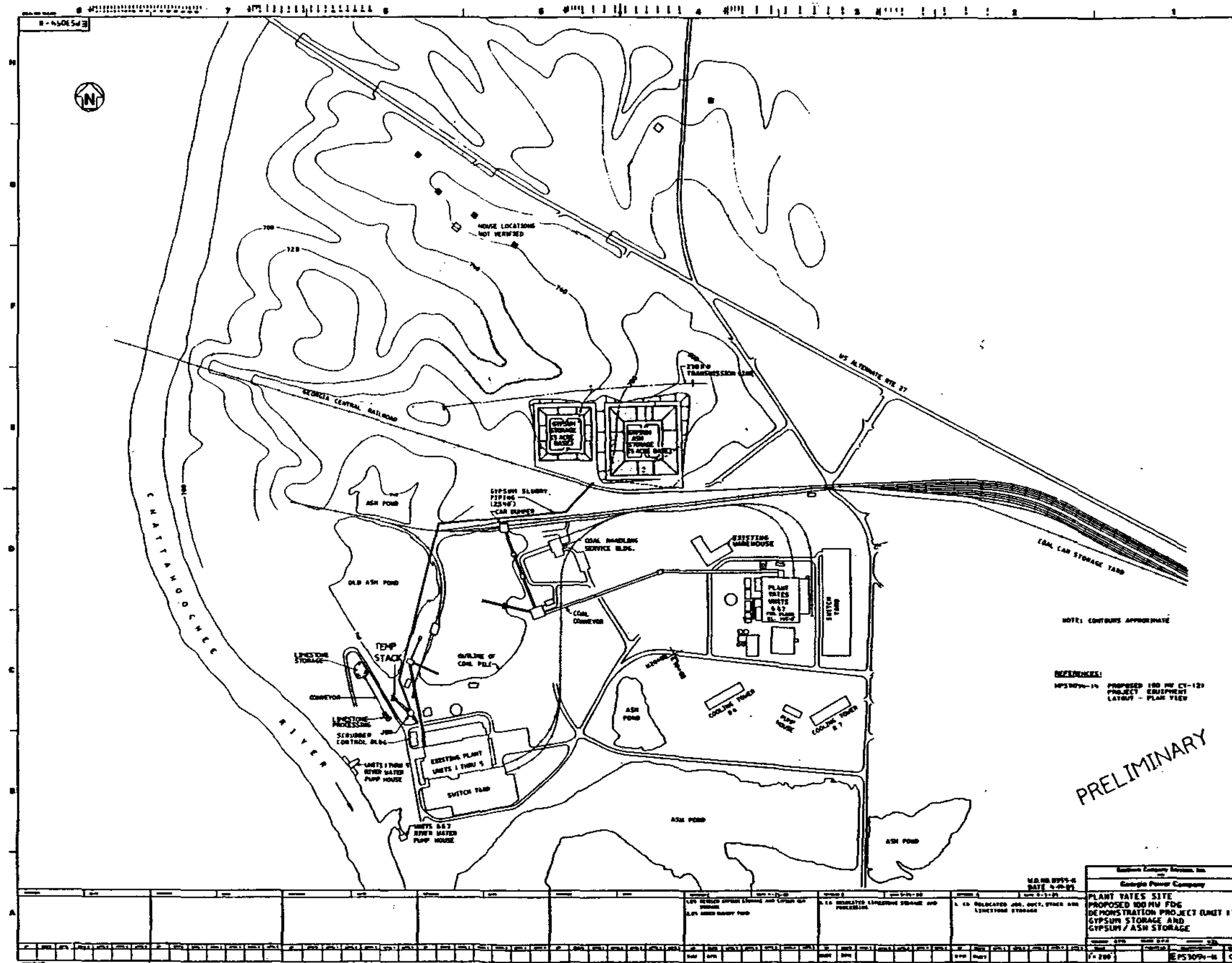


Figure 2-6. Location of the Solids Disposal Area in Relation to the JBR Area

accumulated rainfall in the disposal area will be collected for reuse in the process. After the inner area of a stack is filled with solids, a dragline will be used to stack the dewatered material and to elevate the perimeter dike. The process will be repeated as additional gypsum is added to the stacking area.

2.1.2.2 Description of Installation, Operation, and Decommissioning Activities

Construction Phase

After the 6-month preliminary design phase, the project sponsors anticipate that construction necessary for the CT-121 demonstration project will occur within a 22-month timeframe. During this time period, the following activities will take place: (a) erection of the fiberglass manufacturing equipment; (b) on-site construction of the fiberglass JBR; (c) earthwork for the process area and waste management area; (d) installation of a synthetic liner or low permeability clay liner and leachate collection system beneath the gypsum and gypsum/ash stacking areas; and (e) erection of the demonstration project equipment and control room facilities.

Operation Phase

Subsequent operation of the CT-121 will span an approximately 24-month period. During this time, continuous process evaluation (including of environmental parameters) will be conducted. Process evaluation will encompass collection of data to more completely describe and define the process chemistry, SO_2 removal, particulate removal, equipment components, corrosion potential, fiberglass use, wet chimney use, and project economics. The test phases and estimated timeframes for each are summarized as follows:

Test Period	Operating Duration (months)	Major Test Items	Flue Gas Source	Prescrubber In-Service
1	3	Startup, baseline	After ESP	Yes
2	6	Baseline w/o prescrubber	After ESP	No
3	6	High particulate test baseline	Before ESP	Yes
4	9	High particulate test w/o prescrubber	Before ESP	No

Decommissioning Phase

Decommissioning of the project will last approximately four months. During this period, process equipment, such as the JBR, reactant storage and feed system, and the temporary stack, will be dismantled and either salvaged or reused. The solids management area will be most likely closed by grading and planting vegetation over the closed area. Capping of the stacking area will also be considered depending on the results of the ground-water monitoring program and requirements of the solid waste permit. There will also be some additional periods of ground-water monitoring after the stacks are decommissioned.

2.1.2.3 Project Source Terms

Project source terms are resource requirements of the project, as well as environmental residuals generated by the project; both of these components define the impacts of the project. Project source terms include, but are not limited to: land, labor, and fuel requirements, solid waste production, air emissions, and effluent discharges. When project source items are applied to the existing environment (characterized in Section 3), the environmental impacts of the project can be identified and quantified (Section 4).

Resource Requirements

Since the CT-121 project will be implemented at an existing power plant, project resource requirements, such as manpower, land, utilities, and fuel, are already available and are in place. These resource requirements are summarized in Table 2-1.

The use of limestone will be a new resource requirement at Plant Yates. Project sponsors anticipate that over the 2-year operating period for the demonstration project, 23,300 tons of limestone will be used per year, or a total of 46,600 tons over the life of the project. Limestone will be purchased from one or more of the numerous quarries in the region, transported by rail and/or truck to Plant Yates, and stockpiled and managed on existing plant property.

Estimated coal requirements for Unit 1 during the CT-121 demonstration project are 260,000 tons per year. However, this amount does not represent an increase in the amount of coal that Unit 1 would otherwise require. The project will use a blend of fully-washed (2.5% sulfur target) coals from two Illinois vendors currently used as coal suppliers. The coal will be delivered and handled in the customary way. It will be transported to Plant Yates by the existing Norfolk Southern railway line from Georgia Power's Pride Transloader in northern Alabama.

A slight increase in process water requirements will occur during the operating period. The incremental increase is estimated to be 0.087 gal/MMBtu of feed coal or 140-150 gpm. Over the life of the project, this quantity would be 46 million gallons a year.

With respect to labor needs, the design, management, environmental, and regulatory compliance work will be carried out by existing SCS and Georgia Power employees. Approximately 120 construction workers will be needed at the peak of the 20-month construction period.

During the operation phase, local contractors will supply labor for gypsum stacking. A dragline operator will be needed for one 8-hour shift per day. Approximately 15 persons will be needed to operate the CT-121 unit

TABLE 2-1. CT-121 PROJECT RESOURCE REQUIREMENTS

Resource	Plant Requirements w/o Project	CT-121 Additional Requirements
Limestone	0	23,300 tons per year
Coal (Unit 1)	260,000 tons per year	0
Water		
Cooling	606 MGD	0.0
Process (Makeup)	22 MGD	0.14 MGD
Labor		
Construction	0	120
Operating	--	2 to 4
Power	Not quantified; typically estimated to be 3% of plant capacity	10.6×10^6 kWh
Land	--	13 acres

around the clock, seven days a week. These operating personnel will be drawn from existing staff at Plant Yates.

Decommissioning will require approximately 50 workers over a four-month period.

With respect to land requirements, the CT-121 process equipment area (including the reactant receiving area) will encompass approximately 5 acres, and the gypsum stacking area will require 8 acres. These additional 13 acres needed for the demonstration project are readily available at Plant Yates.

Additional process power requirements for the demonstration project will total 10.6 million kilowatt hours per year. This additional service demand is well within the capacity of the system to supply.

Construction, operation, and decommissioning of CT-121 will not necessitate the construction and operation of any new off-site facilities such as roads, rail, docks, pipelines, waste disposal facilities, or water intake/ discharges.

Environmental Residuals

The primary positive environmental effect of the project will be the reduction in SO_2 and particulate matter (PM) emissions from Unit 1 and, in addition, similar reductions in halogens (fluoride and chloride). To a lesser extent, reductions in trace element emissions are expected. Other impacts potentially associated with air emission source terms may result from the use of a wet scrubbing system in general: (a) acidic liquid fallout from the stack plume; and (b) a visible plume due to low levels of acid mist in the stack gas. However, the CT-121 ductwork and chimney will be designed to eliminate liquid carry-over and subsequent liquid fallout from the stack.

The other environmental source term associated with the project is the generation of a solid waste in the form of gypsum. As explained in

Section 4, potentially affected media from on-site gypsum management include ground water, surface water, and air. The characteristics of the by-product gypsum will be studied in the demonstration program to evaluate its possible commercial use.

2.1.2.4 Potential Environmental, Health, Safety, and Socioeconomic (EHSS) Receptors

Environmental, health, safety, and socioeconomic (EHSS) receptors are people, places, and environmental media that could be adversely or positively affected by the project. Examples of potential EHSS receptors for any type of project include: plant and project workers (i.e., occupational safety and health issues); nearby residents (adverse health effects, nuisance factors); area population (jobs, economic stimuli, increased demand for public services); distant populations (downwind effect of emission changes); local ecology (statutorily protected as well as unprotected plants or animals); agricultural plants and animals; public recreational areas or scenic values (accessibility and enjoyment); and potential health effects and nuisance factors affecting adjacent commercial or institutional areas (campuses, shopping centers).

Based on an evaluation of potential EHSS receptors and on the identification of project source terms (Section 2.1.2.3), the issues associated with potential EHSS receptors for this project are:

- Economic stimulus to the local economy from construction and operation of the project.

- Potential adverse effects on surface-water and ground-water quality by operation of the on-site gypsum management area.

- Effects on ambient, ground-level air pollutant concentrations due to reductions in emissions of particulate matter, halogens, and trace elements. Air quality modeling analyses indicate that annual ground-level concentrations of particulate matter associated with the project will increase slightly during the project. However, the change in the maximum concentration is insignificant in relation to NAAQS. The short-term particulate concentration is predicted to decrease during the project.

- Effects on ambient ground-level air pollutant concentrations due to a reduction in SO_2 emissions. Air quality modeling analyses indicate that the change in the maximum annual ground-level SO_2 concentration is evidenced by a slight increase. However, the increase is insignificant in relation to NAAQS. The 3-hour and 24-hour SO_2 concentrations are predicted to decrease as a result of the project.

- Two potential stack plume impacts associated with wet scrubbing systems, such as CT-121. Acidic liquid condensation and fall-out (and potential detriment to local vegetation) may occur from the plume when a wet FGD system is operated without flue gas reheat. The CT-121 may, however, be a more favorable scrubbing system for minimizing this potential impact. In addition, the duct and chimney systems will be designed to minimize or eliminate potential fallout. The second potential localized air quality and aesthetics impact may result from low concentrations of sulfuric acid mist in the plume.

These issues are addressed in detail in Section 4 (Consequences of the Project) of this Environmental Information Volume.

2.2 Alternatives

2.2.1 No Action Alternative

One primary goal of the DOE Innovative Clean Coal Technology program is to demonstrate the benefits of sulfur dioxide emission reductions through the use of innovative flue gas desulfurization processes on medium-sulfur, coal-fired boilers. The "no action" alternative, not demonstrating CT-121, would significantly limit the options for demonstrating SO_2/PM reductions through the use of innovative flue gas desulfurization processes.

2.2.2 Alternative Sites

The base of alternative locations for the CT-121 project was the range of 29 existing SCS operating company fossil-fuel generating stations in Alabama, Georgia, Mississippi, and Florida. Georgia Power's Plant Yates was chosen for a number of technical, economic, environmental, and regulatory reasons. Unit 1 at Plant Yates is a 100 MW unit, which was deemed large enough to achieve meaningful technical results for a commercial-scale demonstration test, but not too large to render the project cost-prohibitive. The unit is already authorized to burn up to 3 percent sulfur coal. The permit that will be required for on-site gypsum management should be readily secured with no adverse effect on the project schedule.

The elements of the affected project will not be situated in a floodplain or wetlands area, so Executive Order compliance issues are not triggered. Further, Unit 1 is situated so there is ample space for the reactant system, the JBR and temporary stack, and the gypsum management area near the unit. Geologic features at the site--soil horizon and unweathered rock mass that exhibit low permeabilities--make selection of Plant Yates favorable from a siting perspective since the gypsum by-product will be managed on site. All of these factors weighed in favor of selecting Plant Yates as the site of the demonstration project.

2.2.3 Alternative Source Term Considerations

The specific design, construction, and operating decisions relating to the CT-121 project at Plant Yates have resulted in several potential impacts of the project. These decisions include:

- Construction of a new 250-foot tall stack to exhaust the treated flue gas from Unit 1;

- On-site management of gypsum from the JBR, rather than transport for off-site disposal;

- Construction of the gypsum stacking area with a liner; and

- On-site construction of the JBR, rather than off-site fabrication.

The flue gas from Unit 1 is currently exhausted through as 825-foot stack which is also shared with Units 2-5. The decision to construct a new emission source (a new stack) was based on two considerations:

(1) The project goal of demonstrating the feasibility of using fiberglass-reinforced plastic as a stack (liner) construction material to prevent corrosion; and

(2) The ability to separately monitor the emissions from Unit 1.

These considerations are believed to outweigh the disadvantage of a modest permitting effort and the loss of some resources (fiberglass, etc.) associated with the construction of the new stack. The decision to build the stack to a height of 250 feet was based on the practical considerations. A stack of a height comparable to the existing stacks (800+ feet high) was not needed for the relatively low volume of CT-121 flue gas containing only small levels of SO_2. In addition, "good engineering practices," as described in 40 CFR Sec. 51.100 (ii), suggests that new stacks should be generally shorter (200-250 feet high).

A gypsum and/or gypsum/ash by-product will be generated during the project. This waste will be managed on-site in a stacking area. The primary purpose of on-site waste management is to demonstrate the feasibility of the stacking technique as a waste management system for CT-121 by-product gypsum. The only previously-reported demonstration of CT-121 sludge stacking was conducted at Plant Scholz in Florida, and that project was of a much smaller scale. Thus, the Yates project will provide a commercial-scale demonstration of this sludge management technique. An additional consideration was the limited availability of off-site disposal facilities in the area of Plant Yates. On-site management avoids the environmental impacts of transporting the CT-121 over public thoroughfares to relatively distant disposal sites.

The JBR will be constructed on site over and 8-10 week period. Due to the use of solvents as part of the construction of the fiberglass-reinforced plastic (FRP) JBR, some on-site storage of chemicals will be necessary, and some organic solvent emissions will occur. On-site construction of the JBR is necessary, however, due to the large size of the vessel (42' tall x 42' in diameter). However, the temporary nature of the construction activities will minimize the impacts of the emissions.

3.0 EXISTING ENVIRONMENT

Relevant environmental, socioeconomic, and cultural features of the existing plant site and surrounding area are described in this section.

3.1 Atmospheric Resources

3.1.1 Local Climate

Plant Yates is located in the west central area of the Piedmont Plateau, near the southern end of the Appalachian Mountain Range. The plant's location with respect to the Atlantic Ocean and the Gulf of Mexico results in a moderate summer and winter climate. Summers are warm but not excessively hot; winters are not severe. Measurable snowfall occurs during less than one-half of the winter and is relatively insignificant. Table 3-1 summarizes temperature and precipitation data for the closest station (Newnan). Figure 3-1 presents a wind rose for Atlanta, Georgia, which is located approximately 40 miles north-northwest of Plant Yates.

3.1.2 Ambient Air Quality

Plant Yates is in the Metropolitan Atlanta Intrastate Air Quality Control Region (AQCR). This area is in attainment under the National Ambient Air Quality Standards (NAAQS) for the following criteria pollutants: sulfur dioxide, nitrogen dioxide, particulate matter, carbon monoxide, and lead. The Plant Yates site area also meets state ambient limits for these pollutants based on ambient air monitoring data from state stations operated from 1982 through 1985. The Atlanta AQCR (predominantly the City of Atlanta area) has been designated a nonattainment area for ozone. However, except for a small quantity of hydrocarbons emitted during the construction phase (on-site fabrication of the fiberglass JBR), precursor hydrocarbons will not be emitted by the proposed demonstration project.

TABLE 3-1. NEWNAN TEMPERATURE AND PRECIPITATION DATA (1951 THROUGH 1980)

Month	Temperature Average Daily F° Maximum	Temperature Average Daily F° Minimum	Precipitation Average Monthly Total (inches)	Precipitation Average Monthly Snowfall (inches)	Precipitation Average No. of Days with +1.0 inches
January	54.2	33.0	5.30	0.3	2
February	59.0	35.0	4.64	0.3	1
March	66.9	41.7	6.08	0.1	2
April	76.4	49.9	4.88	0.0	1
May	82.7	57.5	4.44	0.0	1
June	88.0	63.9	3.94	0.0	1
July	90.2	67.0	4.67	0.0	1
August	89.8	66.3	3.70	0.0	1
September	84.5	61.8	3.22	0.0	1
October	75.2	50.1	2.78	0.0	1
November	64.9	41.0	3.57	0.0	1
December	56.8	35.2	4.51	0.0	1
Year	74.1	50.2	4.31	0.058	1.2

Source: Climates of the States. Gale Research Company, Book Tower, Detroit, Michigan, 1985, p. 239.

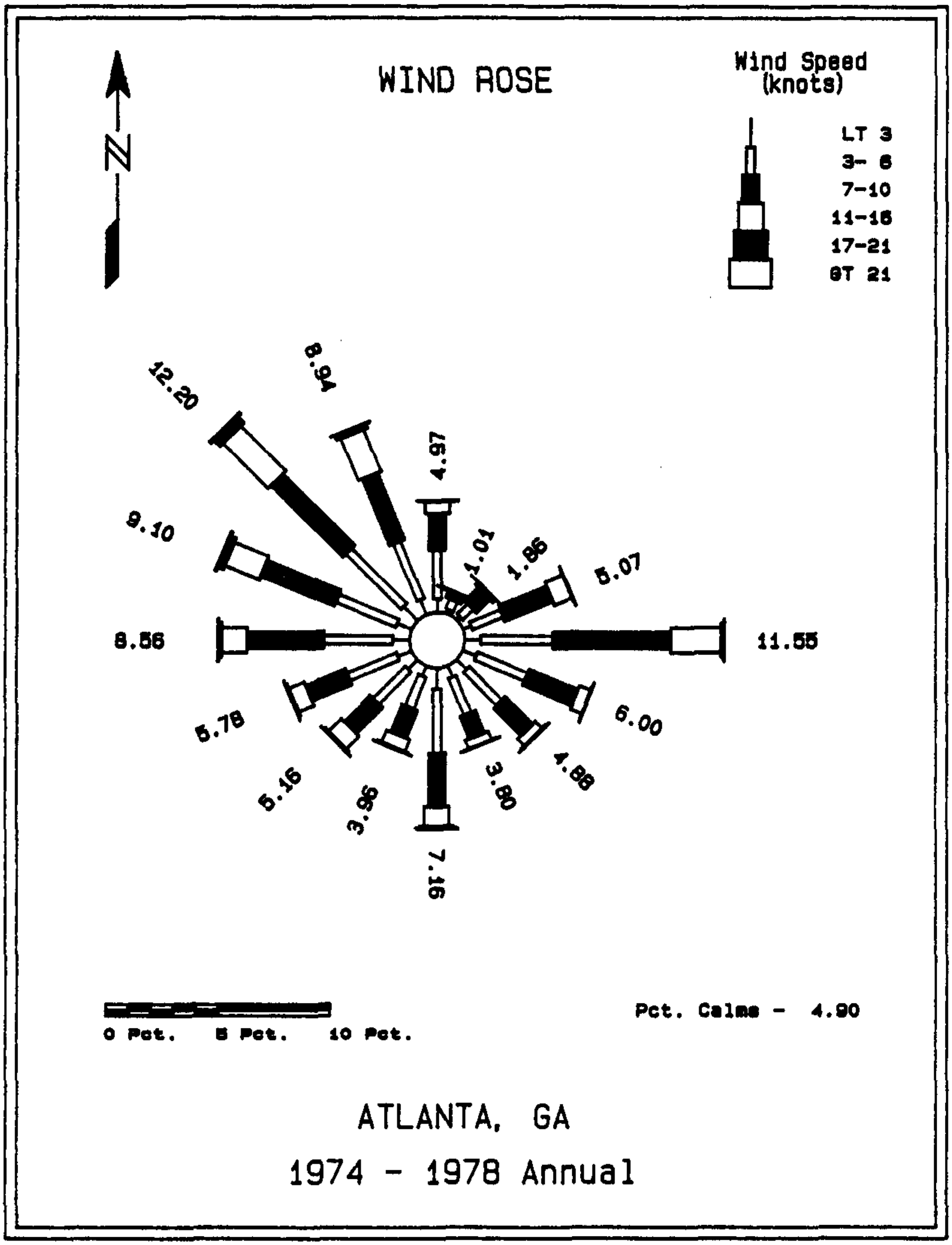


Figure 3-1. Wind Rose: Atlanta, Georgia (1974-1978 Annual)

The air quality monitoring data most closely associated with Plant Yates comes from an ambient air monitoring station near Newnan (12 miles southeast of the plant), which was established by the Georgia Department of Natural Resources (DNR) and operated from 1982 through 1985. Table 3-2 presents the federal and state standards (and associated averaging times) for each of the criteria pollutants. Also, the table shows the highest concentrations of particulates and SO_2 measured during 1985 at the Newnan location. These concentrations were well within the allowable federal and state standards.

3.2 Land Resources

3.2.1 Topography

Plant Yates is located in the northwestern Midland Zone of the Piedmont Physiographic Province in an area featuring rolling to steep hills. The terrain at Plant Yates is gently rolling with elevations ranging from 700 to 800 feet. The upland soils that are weathered from the granite, gneiss, and mica schist are from the Pacolet-Wedowee Association. The lowland soils in the north part of the Plant and along the river contain alluvial sediment, are more gently sloping, and contain more loam. These soils are low in natural fertility and organic matter, but they have good crop potential with proper management; they also exhibit low-to-moderate shrink/swell potential. The soils are described in more detail in the following section.

3.2.2 Soils

The soils in the vicinity of Plant Yates are residual, i.e., they developed in place from weathering of the underlying bedrock. The soil Conservation Service (SCS) describes two soil series in the Plant Yates area: The Cecil series (CeC, and CeD on the soils map), and the Pacolet series (PgE2 on the soils map).

TABLE 3-2. FEDERAL AND GEORGIA AIR QUALITY STANDARDS AND LOCAL MONITORING RESULTS

Pollutant	Averaging Times	Standard		Highest[a,b] Concentration (Newnan Station)
		Federal	Georgia	
Sulfur Dioxide	3 hour	1,300 ug/m^3[c]	1,300 ug/m^3	608 ug/m^3[d]
	24 hour	365 ug/m^3	365 ug/m^3	165 ug/m^3[d]
	Annual	80 ug/m^3	80 ug/m^3	24 ug/m^3[d]
Nitrogen Dioxide	Annual	100 ug/m^3	100 ug/m^3	53 ug/m^3[e]
Ozone	1 hour	235 ug/m^3	235 ug/m^3	331 ug/m^3[f]
Carbon Monoxide	1 hour	40,000 ug/m^3	40,000 ug/m^3	13,560 ug/m^3[g]
	8 hour	10,000 ug/m^3	10,000 ug/m^3	8,280 ug/m^3[h]
Particulates (below 10 microns)	24 hour	150 ug/m^3	150 ug/m^3	86 ug/m^3[d]
	Annual	50 ug/m^3	50 ug/m^3	39 ug/m^3[d]
Lead	Quarterly	1.5 ug/m^3	1.5 ug/m^3	0.08 ug/m^3[i]

[a]Source: 1985 Air Pollution Measurements of the Georgia Air Quality Surveillance Network, Environmental Pollution Division, Air Protection Branch, Georgia Department of Natural Resources.

[b]Source: 1987 Air Pollution Measurements of the Georgia Air Quality Surveillance Network, Environmental Protection Division, Air Protection Branch, Georgia Department of Natural Resources.

[c]Secondary standard.

[d]Newnan Station, Newnan, Georgia (1985).

[e]Georgia Tech Power Substation, Atlanta, Georgia (1987).

[f]S. DeKalb College, Decatur, Georgia (1987).

[g]Brookwood, Atlanta, Georgia (1987).

[h]DeKalb Tech, Clarkston, Georgia (1987).

[i]Georgia Tech Placement Center, Atlanta, Georgia (1987).

Cecil Series

The Cecil series is characterized by a deep, well-drained, moderately permeable soil, formed on material from granite, gneiss, and mica schist bedrock. The soil is described as a sandy loam, which is clayey and kaolinitic. It has a moderate rate of water transmission and its available water capacity is medium. Because the soils are clayey, they have an infiltration rate that is a limiting factor for septic tank systems.

A typical Cecil series profile is described by the SCS as:

0- 5"	reddish-brown sandy loam.
5-26"	friable; acidic; few pebbles.
26-43"	red clay; firm.
43-53"	red clay loam; friable; mica flakes.
53-72"	mottled red to reddish brown weathered gneiss with sandy clay loam; friable.

Soil borings from the Plant Yates area indicate that the weathered bedrock is not found until depths of 7 to 63 feet, giving much thicker soils than the typical Cecil soils.

Pacolet Series

This series is commonly found in the same landscapes as the Cecil series. It is also a deep, well-drained, moderately permeable soil that has formed in place on granites, gneisses, and mica schists. The Pacolet series has the same moderate water capacity and transmission as the Cecil series, and is also called a clayey, kaolinitic soil. Infiltration rates are slow, and this is a limiting factor for septic systems.

A typical Pacolet soil profile is described by the SCS as:

0- 2"	weak, friable sandy clay loam.
2- 5"	weak, friable, yellowish-red sandy clay loam.
5-19"	red clay; firm; common mica flakes.
19-28"	yellow-red clay loam; friable; common mica flakes.
28-60"	saprolite that crushes easily to sandy loam; many mica flakes.

Again, soil borings in the area show that the soil thicknesses may be as much as 7 to 63 feet, but these borings are not detailed, making it difficult to associate with a particular series.

The unconsolidated material overlying the bedrock appears to be all saprolite, which is a residual clay, silt, or sand that contains the original bedrocks relict features, and soils as described above. Available soil borings are not detailed enough to show if any alluvial material occurs beneath the site. Blow counts used during sampling, however, indicate that it is probably mostly saprolite, and the fact that the soil is very micaceous supports this contention.

3.2.3 Geology

Plant Yates is located in the southern Piedmont region of Georgia, immediately south of the Brevard Fault Zone. None of the plant property actually lies on the Brevard Zone, an inactive fault. High-grade crystalline metamorphic rocks underlie the plant site; typical rock types include mica schist, biotite gneiss, and amphibolite. The bedrock of mica schists, granitic gneisses, and quartzites lies at depths ranging from 12 to 87 feet.

The Georgia Geologic Survey recognizes three map units in the vicinity of the plant: (a) the Senoia Formation that features garnet-biotite muscovite schist interlayered with fine-grained amphibolite, local thin layers of spessartine quartzite (possibly iron formation), sillimanite schist and biotite gneiss; (b) an unnamed biotite gneiss and mica schist unit; and (c) an unnamed intercalated biotite gneiss, amphibolite, and mica schist. The

Georgia Geologic Survey mapped the unnamed biotite gneiss and mica schist unit at the surface beneath the proposed demonstration project. Any of these three geologic units, however, could occur at depth beneath the facility.

3.3 Water Resources

3.3.1 Surface Water

Plant Yates is located along the Chattahoochee River, which supplies most of the water used at the plant. The headwaters of the Chattahoochee River are located in the mountains of north Georgia. The river then flows in a southwestern direction across the mountain and Piedmont sections of the state. The Chattahoochee supplies water for approximately one-third of Georgia's population, primarily in the metropolitan Atlanta area. The river drains an area of 4,450 square miles.

There are few other surface water bodies in the Plant Yates area. Several small ash ponds or basins are located on site, and one small pond is located approximately one-half mile to the northeast. These sites may possibly be impacted by ground water coming from the site but more study is needed to determine if this will occur.

The Chattahoochee River is classified for fishing use under the Georgia water quality standards. According to the 1988 Georgia water quality report to the U.S. EPA, this segment is meeting state water quality standards. Information on the interaction of the Chattahoochee River and the ground water in the area is not available. However, an examination of a topographic map and knowledge of the hydrogeologic conditions in the area reveals that the ground water in the area probably flows towards and discharge into the river.

3.3.2 Ground Water

Ground water in the area accumulates in the residual soils, saprolite, and fractured bedrock zones, as is typical of Piedmont ground water. The water table, which fluctuates with seasonal precipitation, lies about 10-28 feet below the surface. Flow is expected to follow the topography toward the Chattahoochee River. However, to secure water in sufficient quantities for potable water needs, the plant has drilled four operating deep wells (approximately 500 feet deep). Based on monitoring data compiled from the wells currently in use, the quality can be characterized as suitable for drinking water after chlorination. There are relatively high concentrations of iron and manganese in the water, which is attributable to the subsurface rock features.

3.4 Ecological Conditions

The flora and fauna that typify the general area surrounding Plant Yates can be grouped into the six habitat categories described below in terms of the dominant trees and associated fauna. These categories were developed by Mr. W. J. Candler, a biologist on the staff of Georgia Power Company. Mr. Candler, a 12-year employee of Georgia Power, has lived approximately 20 miles from the plant most of his life. He received a B.S. in Wildlife Management from Auburn University in 1976.

None of the described habitats includes unique ecological or sensitive communities or habitats. The upland hardwoods are dominated by beech, red oak, white oak, and hickory at the over-story level, with dogwood, black gum, sourwood, red maple, viburnum, and wild grape at the lower-story level. The associated fauna are deer, squirrels, songbirds, turkeys, and various reptiles.

Bottomland hardwoods are dominated by beech, water oak, river birch, elm, sycamore, and tulip poplar at the over-story level, with red maple, willow, blue beech, buttonbush, and greenbriar at the lower-story level. The associated fauna are deer, squirrels, songbirds, turkeys, owls, raccoons, beavers, reptiles, and amphibians.

The pinewoods are dominated exclusively by loblolly and shortleaf pines at the over-story level, with dogwood, sweetgum, sourwood, honeysuckle, elm, hardwood seedlings, and grape at the lower-story level. Few fauna are found in those areas where pure pine stands exist.

The mixed pine-hardwoods are dominated by loblolly and shortleaf pines, sweetgum, white oak, post oak, red oak, tulip poplar, blackgum, and hickory at the over-story level, with honeysuckle, greenbriar, viburnum, broomsedge, and wild grape at the lower-story level. The associated fauna are deer, squirrels, small rodents, quail, and songbirds.

Fields and abandoned farmland are largely open space, with pines, bramble, plum, persimmon, sumac, and sweetgum trees. The grasses are lespedeza, aster, goldenrod, and broomsedge. The associated fauna are deer, squirrels, small rodents, songbirds, rabbits, foxes, and hawks.

Around ponds, the dominant cover is similar to that of the upland and bottomland hardwoods. At the under-story level are buttonbushes, cattails, and rushes. The associated fauna are songbirds, furbearers, waterfowl, deer, reptiles, and amphibians.

On February 15, 1989, Mr. Candler conducted a field survey of an area of the plant that includes the proposed gypsum stacking area. As depicted in Figure 3-2, the field survey covered an area south and east of the 230 KV transmission line, west of the plant entrance road, and north of the Norfolk Southern railway line through the plant. The area totals approximately 43 acres with 33 acres of pines, 9 acres of old field (previously cleared) and a firing range, and 1 acre of mixed hardwoods (water oak, red oak, hickory, red maple, cherry, sweetgum, and poplar). With respect to the proposed stacking area specifically, approximately one-half will be located on the old field and

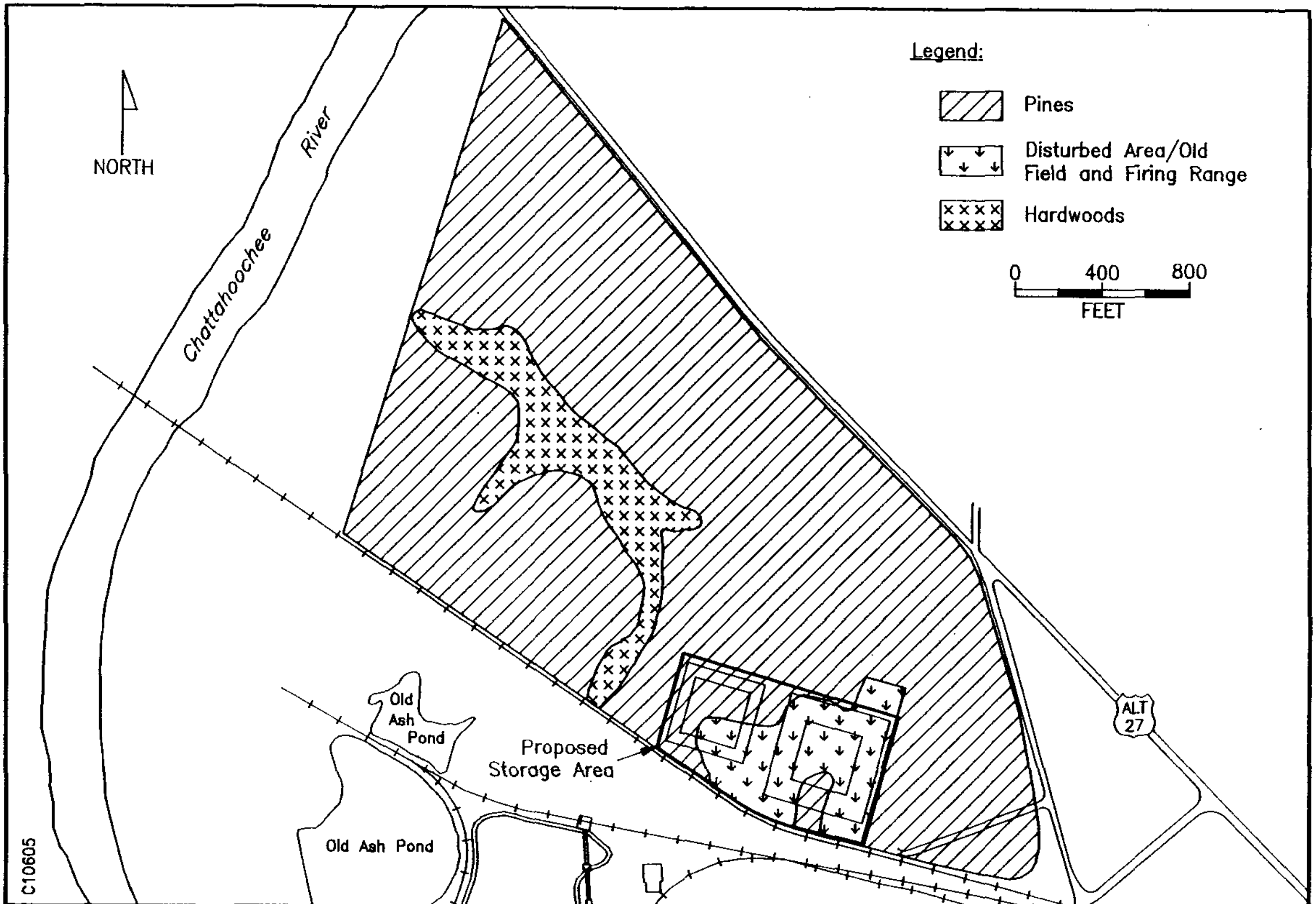


Figure 3-2. Field Survey Area (Ecological Habitat Characterization)

firing range, which is disturbed property. The remainder of the acreage is predominantly pinewoods where few fauna exist.

Mr. Candler also researched the Georgia Department of Natural Resources Natural Heritage Inventory. According to the Inventory, none of the plant or animal species described above, in the general area characterization and the site-specific survey, is designated as endangered or threatened under the federal or Georgia Endangered Species Act.

3.5 Socioeconomic Resources

Plant Yates is located in Coweta County, Georgia. The county seat is the City of Newnan. Coweta County's population in 1980 was 39,268, which is expected to increase to 47,358 in 1990. The county's per capita income in 1984 was $11,275 compared with $12,726 for the national average. The latest county unemployment rate (November 1988) was 3.9 percent; 898 people were estimated as unemployed at that time. Most of the employers in the area are represented by commercial and retail establishments and government entities. Approximately 70 industries are located in the county, many of them in the Shenandoah Industrial Park near the City of Newnan. Industrial activities include metal fabricating, consumer and business product manufacturing, and distribution centers.

3.6 Aesthetic/Cultural Resources

3.6.1 Archaeological/Historical Resources

Since site construction activities (gypsum stacking, limestone storage, and processing areas) will disturb approximately 13 acres of land, Georgia Power Company's cultural resource staff conducted a Phase I cultural resource survey in December 1988 to assess the site's existing archaeological/historical properties. The staff's report appears in Appendix A.

To summarize the findings in that report, the Phase I survey consisted of: (a) a literature review of available studies at the Georgia State Historic Preservation Office (SHPO); and (b) an on-site reconnaissance of the areas potentially affected by the project. The literature review revealed that various archaeological properties have been located in the area surrounding the plant site, but that no formal resource inventory of the plant itself has been previously undertaken. No cultural properties currently listed on the National Register of Historic Places are located within the plant site. The on-site reconnaissance identified one historic, domestic cultural property (i.e., evidence of a residence from dishes, a refuse site, and a privy) located in the proposed gypsum stacking area. Other lands within the proposed facility locations exhibit significant, previous land disturbance.

3.6.2 Native American Resources

According to the Public Information Division of the National Bureau of Indian Affairs, there are no federally-recognized Native American tribes in the State of Georgia; therefore, there are no current tribal practices at or near the proposed project.

3.6.3 Scenic or Visual Resources

According to the Public Information Division of the Georgia Department of Highways, there is no state program for designating and listing scenic highways or vistas. Neither Coweta nor Carroll counties, nor local communities in the vicinity of Plant Yates have established programs for designating and listing scenic highways or vistas. The stretch of the Chattahoochee River along which Plant Yates is located has not been designated as a national scenic waterway under the National Wild and Scenic Rivers Act, according to the National Park Service, U.S. Department of Interior.

There are no state parks or recreational areas adjacent to the plant. The nearest state parks are: (a) John Tanner State Park near the City of Carrollton, which is approximately 20 miles northeast of the plant and (b) Warm Springs State Park at the City of Warm Springs, which is approximately 30 miles south, southeast of the plant. Carroll County owns and operates the MacIntosh Preserve, a nature area, approximately 15 miles west of the plant. The cities of Newnan and Carrollton have municipal recreational parks.

3.7 Energy and Materials Resources

3.7.1 On-Site Resource Uses

3.7.1.1 Coal

Plant Yates burns primarily 2.0 percent sulfur bituminous coal. (Unit 1 will burn a target of 2.5 percent sulfur coal during the demonstration project.) From 1983 through 1987, Unit 1 consumed approximately 137,000 to 230,000 tons of coal per year. Total plant consumption during the same time period ranged from 2.5 million to 3.0 million tons per year. The average coal composition is presented in Table 3-3.

The majority of fuel used at Plant Yates is supplied through Georgia Power Company's Pride Transloader coal distribution system, located on the Tennessee River in north Alabama. Pride coal is ordinarily a 50-50 blend of Arch Mineral and Old Ben coals, both of which are supplied from the Illinois Basin under long-term contracts. Arch Mineral coal is shipped out of Captain Mine, Illinois, and Old Ben coal originates from several southern Illinois mines. The coals are shipped separately from mine to barge via rail. From transfer point to Pride, the coals move independently by barge and are off-loaded upon arrival and placed in separate storage piles. The coal is blended as it is loaded in the outbound unit trains. Thus, a 50-50 blend is the result of simultaneously drawing equal amounts of coal from both stockpiles and conveying them to the train loadout. From Pride, the coal is moved in one of the three dedicated 97-car Pride trains to Plant Yates.

TABLE 3-3. AVERAGE COAL COMPOSITION

Parameter	Result: As Burned	Result: Dry Basis
Moisture (%)	9.2	--
Ash (%)	10.3	11.33
Fixed Carbon (%)	46	51
Volatiles (%)	34	38
Sulfur (%)	2.04	2.26
Btu Content (Btu/lb)	11,894	14,772
Carbon (%)	65	73
Hydrogen (%)	4.4	4.9
Nitrogen (%)	1.2	1.3
Chlorine (%)	0.25	0.28

Source: Georgia Power Company, Coal Burn Analysis Report for January-October 1988, and data from Georgia Power Company, Fuel Services Division.

Coal storage and handling facilities encompass 15 acres, 12 of which consist of the coal storage area. A maximum of 900,000 tons of coal can be stockpiled on site.

3.7.1.2 Water

Raw water is diverted from the Chattahoochee River to Plant Yates for process needs. The quantity of water diverted to the facility in 1988 averaged 481 million gallons a day (MGD). The plant's water appropriation permit authorizes diversion of up to 666 MGD from the river. In addition, four on-site water wells supply potable water to the plant. There are no quantitative withdrawal limits pertaining to these wells in the facility's state water well permit.

3.7.1.3 Power

Since this industrial facility is a power plant, internal power needs are supplied by on-site power generation.

3.7.2 Potential Off-Site Competitors for Resources

According to the Newnan Chamber of Commerce, there are no plans pending for the construction of any major energy or chemical complexes in Carroll or Coweta counties.

4.0 CONSEQUENCES OF THE PROJECT

This section presents a comprehensive analysis of anticipated environmental, health, safety, and socioeconomic impacts of the demonstration project.

4.1 Atmospheric Impacts

4.1.1 Operations Phase

4.1.1.1 Conventional Power Plant Pollutants

The primary air quality impact associated with the project will be a reduction in SO_2 emissions resulting from CT-121 treatment of Unit 1 flue gas. Table 4-1 shows the quantitative emission impact expected to be associated with operation of the CT-121 process.

SO_2 emission estimates for the demonstration project were derived using the following assumptions: (a) coal used during the CT-121 evaluation will contain a target of 2.5 percent sulfur, and (b) sulfur removal efficiency of the CT-121 system will average at least 90 percent. The latter assumption is justified by results achieved at other CT-121 demonstration projects. The SO_2 removal efficiency of the CT-121 process is a function of the pH of the scrubbing solution and the gas-side pressure drop in the jet bubbling reactor (JBR). The 23 MW CT-121 prototype evaluation at Plant Scholz (a Gulf Power Company plant in Sneads, Florida), testing at the Abbott power plant in Illinois, and commercial operations in Japan have shown that a SO_2 removal efficiency of 90 percent is easily achievable (Ref. 1 and 2).

In the context of total plant emissions, the SO_2 percentage reduction is small, since the remaining six units in the plant will not have similar SO_2 controls. Estimated SO_2 emissions from the existing Plant Yates, assuming that 2.5 percent sulfur is burned, are 140,000 tons/yr. This value assumes a capacity factor of 65 percent for all the Plant Yates units.

TABLE 4-1. ESTIMATED EMISSIONS FROM EXISTING UNIT AND DEMONSTRATION PROGRAM

Parameter	Existing 100 MW Unit		Chiyoda Thoroughbred 121 Particulate Loading				Reduction (%)
			Low		High		
	lb/hr	lb/MMBtu	lb/hr	lb/MMBtu	lb/hr	lb/MMBtu	
Air Emissions							
SO_2	5500	4.54	550	0.45	550	0.45	90
NO_x (as NO_2)	1452	1.2	1452	1.2	1452	1.2	NC
Particulate Matter	127	0.105	36	0.03	36	0.03	72
Chloride	98	0.081	7.8	0.0065	7.8	0.0065	92
Fluoride	6.7	0.0055	0.5	0.004	0.5	0.0004	92
Arsenic	0.82	6.8x10-4	0.5	0.0004	0.5	0.0004	39
Beryllium	0.10	8.1x10-5	<0.0006	<5.0x10-7	<0.0006	<5x10-7	99
Lead	0.68	5.6x10-4	0.005	4x10-6	0.005	4x10-6	99
Mercury	0.02	1.6x10-5	0.02	1.6x10-5	0.02	1.6x10-5	NC

NC = No Change.

Source: Southern Company Services, Inc. 100 MW Demonstration of Innovative Applications of Technology for Costs Reductions to the Chiyoda Thoroughbred-121 Flue Gas Desulfurization Process on High-Sulfur, Coal-Fired Boilers, Technical Proposal to U.S. Department of Energy, Volume II, p. II.3-39.

(Actual capacity factors are lower.) During the demonstration project, the total plant SO_2 emissions will decrease to about 126,000 tons/yr, a reduction of approximately 10 percent. Although there will be some variation in the mode of operation over the two-year test period, the SO_2 emission rate should be relatively constant over the life of the demonstration project.

Particulate emissions have been measured at several demonstration and commercial Chiyoda Thoroughbred-121 units at a number of locations. Summaries of typical particulate removal performance tests are given in Table 4-2. In all but one case (Toyama), the electrostatic precipitators were either absent or out of service at the time of the testing. Prescrubbers, both venturi and nonventuri types, were included in all the processes, primarily to reduce the chloride content of the gas entering the JBR.

Significant removal of particulates was effected in the prescrubbers. However, these devices are most effective in removing the larger particulates (Ref. 1). The JBR has been shown to be more efficient than the prescrubber (venturi) in removing the smaller particles (Ref. 1) and also very effective in removing larger (1-10 u) particles (Ref. 3) as well. No prescrubber was used at Kusajima (Ref. 3), an oil-fired plant, and the overall particulate removal efficiency in the JBR was approximately 75 percent. This removal efficiency was achieved in spite of a relatively low inlet particulate loading (compared to typical coal-fired plants) of 10.7 mg/Nm^3 (dry) and a high proportion of submicron particles. The estimated particulate loading in the flue gas to the CT-121 unit will range from 11-12 g/Nm^3 (high particulate loading without prescrubbing, wet basis) to 0.08 g/Nm^3 (for low particulate loading case, wet basis).

The prescrubber at Plant Yates will not be a venturi type (a spray column will be used), and in two of the four proposed test periods, the prescrubber will not be in service. (The Hokuriku Electric CT-121 process at Kusajima operates without a prescrubber.) The most demanding test of the particulate removal performance of the JBR will occur during Test Period 4, when neither the ESP nor the prescrubber will be in service.

TABLE 4-2. CT-121 PROCESS, PARTICULATE EMISSIONS

Plant	Date	Fuel	ESP	Particulate Loading (lbs/MMBtu) Inlet	Outlet	Percentage Reduction
Scholz	05/08/79	Coal	Off	6.25	--	99.3
Scholz	05/09/79	Coal	Off	6.08	--	99.3
Scholz	05/10/79	Coal	Off	--	0.029	34.5
Scholz	05/11/79	Coal	Off	--	0.024	--
Scholz	05/12/79	Coal	Off	4.31	0.024	99.4
Scholz	05/13/79	Coal	Off	7.24	0.029	99.6
Mitsubishi	--	Oil	None	0.15	0.023	84.7
Toyama	--	Coal	Yes	0.08	0.006	92.5
Nippon Mining	--	Asphalt	None	0.15	0.029	80.7

Source: (Ref. 1).

Design material balances indicate that the particulate loading in the inlet to the JBR will range from 0.1 lb/MMBtu during the low-fly ash loading Test Period 1 (ESP and prescrubber) to 11.6 lb/MMBtu during the high-fly ash loading Test Period 4 (no ESP, no prescrubber). Table 4-2 indicates that the combination of prescrubber and JBR leads to particulate emission rates of 0.02-0.03 lb/MMBtu, and these emission levels appear to be relatively independent of inlet particulate loading. Removal efficiencies of 99.5 percent and above are indicated for the higher inlet loadings. From these results and the results of other tests discussed above, a particulate emission rate of 0.03 lb/MMBtu, or 36 lb/hr is estimated for all test conditions.

The air quality effects of the demonstration project were evaluated with conservative air quality screening models. During the demonstration project, the ground-level SO_2 and particulate matter concentrations from Units 1 through 5 will change since the volume of flue gas in the Units 1 through 5 stack will be reduced and cause a reduction in plume rise for the remaining emissions. In addition, a new 250-foot stack will be used to exhaust the treated flue gas from Unit 1. With respect to ground-level air quality, the reduction in the SO_2 and particulate matter content of the treated flue gas will tend to compensate for the reduction in plume rise for the Units 2 through 5 emissions and the decreased stack height for Unit 1 emissions.

An air quality analysis of annual average concentrations was undertaken for Plant Yates using the U.S. EPA Industrial Source Complex--Long Term Model (ISCLT). The parameters summarized in Table 4-3 were used for SO_2. Detailed air modeling results are provided in Appendix D. The model results indicate that the maximum annual ground-level SO_2 concentration during the demonstration project (Units 1 through 5) is estimated to increase by 0.35 ug/m^3 (from 1.32 ug/m^3 to 1.67 ug/m^3), and that the location of this maximum is 6 kilometers (km) from the stack. (This number was derived by adjusting the modeled number, 0.70 ug/m^3, by the units' 1986-1987 average capacity.) This increase is insignificant when compared to the annual average National Ambient Air Quality Standards (NAAQS) for SO_2 of 80 ug/m^3. The maximum annual ground-level SO_2 concentration associated with treated emissions from the new

TABLE 4-3. AIR QUALITY MODELING ANALYSIS: SO_2 ANNUAL AVERAGE

Plant:	Yates
Model Applied:	ISCLT
Pollutant Modeled:	SO_2--annual average
Modeling Scenario:	The new Unit 1 stack is input with a velocity of 14 meters/second and an SO_2 emission rate of 69.4 grams/second. Units 2-5 are input with a new velocity of 23 meters/second and an SO_2 emission rate of 3121 grams/second.

Stack Parameters:	Unit 1	Units 2-5	(Predemonstration) Units 1-5
X Coordinate (UTM)	690.60	690.70	694.70
Y Coordinate (UTM)	3704.48	3704.39	3704.39
Emission Height (meters)	76.20	251.46	251.46
Gas Exit Temperature (°K)	338.81	412.80	412.80
Gas Exit Velocity (meters/sec)	14.00	23.00	28.10
Stack Diameter (meters)	3.96	7.07	7.07
Emission Rate (grams/sec)	69.40	3121.00	3815.00

Meteorology:	
Ambient Air Temperature	289.48° Kelvin
Mixing Height Layer	1542 Meters
Wind Rose	Atlanta, Georgia: Station 13874 January 1959-December 1963

Modeling Results:	
Change in the Maximum Annual Ground-Level SO_2 Concentration	0.70 micrograms/cubic meter increase
Change in the Maximum Annual Ground-Level SO_2 Concentration (adjusted for 1986-1987 Units 1-5 average capacity of 49%)	0.35 micrograms/cubic meter increase

Source: Southern Company Services, Environmental Assessment Department, Research and Environmental Affairs.

Unit 1 stack alone (unadjusted for capacity factor) is modeled to be 1.11 ug/m^3 (0.55 ug/m^3 when adjusted for a 1986-1987 capacity factor of 49%) at 4.5 km from the stack [the model results indicate that the corresponding Units 2 through 5 concentration (adjusted for capacity factor) at this location is less than 1 ug/m^3].

To evaluate short-term ambient SO_2 concentrations, an air quality modeling analysis, using the conservative U.S. EPA screening model PTPLU (UNAMAP Version 5), was used. Since the PTPLU model estimates the maximum concentration (and its location) only for individual stacks, the U.S. EPA PTMTP multi-source model was applied to those worst-case meteorological conditions that produced the highest concentrations in PTPLU. For additional conservatism, all stacks were assumed to be collocated. The 1-hour average predicted concentrations from PTMTP were adjusted to 3-hour and 24-hour concentrations using factors of 0.9 and 0.4, respectively.

Maximum ambient short-term SO_2 concentrations for Plant Yates were estimated using the parameters given in Table 4-4. The PTMTP results indicate that, during the demonstration project, the maximum 3-hour and 24-hour ground-level SO_2 concentrations from Units 1 through 5 are predicted to decrease by 102 ug/m^3 (from 720 ug/m^3 to 618 ug/m^3) and 45 ug/m^3 (from 320 ug/m^3 to 275 ug/m^3), respectively. The location of these maximum concentrations will move slightly closer to the stack, from 1.3 km to 1.2 km. The maximum 3-hour and 24-hour ground-level SO_2 concentrations from the treated emissions from the new Unit 1 stack alone are modeled to be 100 ug/m^3 and 44 ug/m^3, respectively, at 0.7 km from the stack (the model results indicate that the corresponding Units 2 through 5 concentrations at this location are less than 3 ug/m^3).

For annual average ground-level concentrations of particulate matter, the parameters summarized in Table 4-5 were used. The model results indicate that the maximum annual particulate matter concentration during the demonstration project (Units 1 through 5) will increase by 0.03 ug/m^3 (from 0.07 ug/m^3 to 0.10 ug/m^3), and the location of this maximum is 6 km from the stack. (This number was derived by adjusting the modeled number, 0.05 ug/m^3,

TABLE 4-4. AIR QUALITY MODELING ANALYSIS: SO_2 SHORT-TERM AVERAGES

Plant:	Yates
Model Applied:	PTPLU/PTMTP
Pollutant Modeled:	SO_2--short-term average
Modeling Scenario:	Stack parameters for Units 1-5 are input into the model with an SO_2 emission rate of 3815 grams/second. Unit 1 is input with a velocity of 14 meters/second and an SO_2 emission rate of 69.4 grams/second. Units 2-5 are input with a new velocity of 23 meters/second and a new emission rate of 3121 grams/second.

Stack Parameters:	Unit 1	Units 2-5	(Predemonstration) Units 1-5
Emission Height (meters)	76.20	251.46	251.46
Gas Exit Temperature (°K)	338.81	412.80	412.80
Gas Exit Velocity (meters/sec)	14.00	23.00	28.10
Stack Diameter (meters)	3.96	7.07	7.07
Emission Rate (grams/sec)	69.40	3121.00	3815.00

Meteorology:

Ambient Air Temperature	289.48° Kelvin
Worst-Case Stability Class and Windspeed	

Modeling Results:

Change in Maximum 3-Hour Average	102 micrograms/cubic meter decrease
Change in Maximum 24-Hour Average	45 micrograms/cubic meter decrease

Source: Southern Company Services, Environmental Assessment Department, Research and Environmental Affairs.

TABLE 4-5. AIR QUALITY MODELING ANALYSIS: PARTICULATE MATTER--ANNUAL AVERAGE

Plant:	Yates		
Model Applied:	ISCLT		
Pollutant Modeled:	Particulate Matter--annual average		
Modeling Scenario:	Unit 1 stack is input with a velocity of 14 meters/second and a 100% load particulate matter emission rate of 4.6 grams/second. Units 2-5 are input with a new velocity of 23 meters/second and a 100% load particulate emission rate of 164.8 grams/second.		
Stack Parameters:	Unit 1	Units 2-5	(Predemonstration) Units 1-5
X Coordinate (UTM)	694.60	694.70	694.70
Y Coordinate (UTM)	3704.48	3704.39	3704.39
Emission Height (meters)	76.20	251.46	251.46
Gas Exit Temperature (°K)	338.81	412.80	412.80
Gas Exit Velocity (meters/sec)	14.00	23.00	28.10
Stack Diameter (meters)	3.96	7.07	7.07
Emission Rate (grams/sec)	4.6	164.8	201.4
Meteorology:			
Ambient Air Temperature	289.48° Kelvin		
Mixing Height Layer	1542 Meters		
Wind Rose	Atlanta, Georgia: Station 13874 January 1959-December 1963		
Modeling Results:			
Change in the Maximum Annual Ground-Level Particulate Matter Concentration	0.05 micrograms/cubic meter increase		
Change in the Maximum Annual Ground-Level Particulate Matter Concentration (adjusted for 1986-1987 Units 1-5 average capacity of 49%)	0.03 micrograms/cubic meter increase		

Source: Southern Company Services, Environmental Assessment Department, Research and Environmental Affairs.

by the units' 1986-1987 average capacity.) This increase is insignificant when compared to the annual average NAAQS for particulate matter of 75 ug/m^3. The maximum annual ground-level particulate matter concentration from the treated emissions from the new Unit 1 stack alone is modeled to be 0.07 ug/m^3 (0.04 ug/m^3 when adjusted for a 1986-1987 annual capacity factor of 49%) at 4.5 km from the stack [the model results indicate that the corresponding Units 2 through 5 concentrations (adjusted) at this location are less than 0.1 ug/m^3].

For short-term particulate matter concentrations, the air quality modeling was undertaken with the parameters identified in Table 4-6. During the demonstration project, the maximum 24-hour average particulate matter concentration (Units 1 through 5) is predicted to decrease by 2 ug/m^3 (from 17 ug/m^3 to 15 ug/m^3), and to move slightly farther from the stack, from 1.2 km to 1.3 km. The maximum 24-hour average particulate matter concentration from the new stack for Unit 1 is predicted to be 2.7 ug/m^3 at 0.7 km from the stack (the model results indicate that the corresponding Units 2 though 5 concentration at this location is less than 0.1 ug/m^3).

In summary, the model results indicate that the worst-case 3-hour, 24-hour, and annual average SO_2 concentrations, and the worst-case 24-hour and annual average particulate matter concentrations will decrease during operation of the demonstration project. Maximum background levels of SO_2 measured at the Newnan Station were 608 ug/m^3, 165 ug/m^3, and 24 ug/m^3 for the 3-hour, 24-hour, and annual averages, respectively. The maximum background levels of particulate matter were 86 ug/m^3 and 39 ug/m^3 for the 24-hour and annual averages, respectively. Therefore, the ability of the plant to attain NAAQS will not be adversely affected.

<u>NO_x emissions</u> are not predicted as being impacted by the CT-121 process.

The atmospheric emissions of <u>halogen and trace elements</u> depend heavily on the concentrations of these species in the coal, as well as the

TABLE 4-6. AIR QUALITY MODELING ANALYSIS: PARTICULATE MATTER--SHORT-TERM AVERAGES

Plant:	Yates		
Model Applied:	PTPLU/PTMTP		
Pollutant Modeled:	Particulate Matter--short-term average		
Modeling Scenario:	Unit 1 is input with a velocity of 14 meters/second and a 100% load particulate matter emission rate of 4.6 grams/second. Units 2-5 are input with a new velocity of 23 meters/second and a 100% load particulate matter emission rate of 164.8 grams/second.		
Stack Parameters:	Unit 1	Units 2-5	(Predemonstration) Units 1-5
Emission Height (meters)	76.20	251.46	251.46
Gas Exit Temperature (°K)	338.81	412.80	412.80
Gas Exit Velocity (meters/sec)	14.00	23.00	28.10
Stack Diameter (meters)	3.96	7.07	7.07
Change in Emission Rate (grams/sec)	4.6	164.8	201.4
Meteorology:			
Ambient Air Temperature	289.48° Kelvin		
Worst-Case Stability Class and Windspeed			
Modeling Results:			
Change in Maximum 24-Hour Average	2 micrograms/cubic meter decrease		

Source: Southern Company Services, Environmental Assessment Department, Research and Environmental Affairs.

control systems present in the plant. Estimates of chloride and fluoride emissions from Plant Yates were based on the same factors used to estimate emissions of these species from the reference and proposed commercial plants in the ICCT proposal.

Chloride emissions from the CT-121 process were estimated from results obtained during the prototype testing at Plant Scholz (Ref. 1). The chloride removal efficiency expected from the demonstration program (92%) is assumed to be equivalent to that measured during the Plant Scholz tests. Fluoride emissions were not measured during the Plant Scholz tests; the removal efficiency was assumed to be equal to the chloride removal efficiency since both are quite soluble in aqueous solutions.

The CT-121 system's removal effectiveness for trace elements was assessed during the Plant Scholz demonstration. Samples of the inlet and outlet flue gas were collected for analysis. Since the majority of trace elements are present in the fly ash particulate matter (rather than the flue ga), sampling was performed: (a) with high particulate loading in the gas entering the system; and (b) after particulate sizing and concentration tests were completed to allow the scrubbing system to reach a steady-state with regard to elemental distribution (Ref. 1). A 99 percent removal efficiency was demonstrated for 10 trace metals (calcium, magnesium, titanium, chromium, copper, lead, nickel, vanadium, beryllium, and zinc) (Ref. 1). Approximately 90 percent of four volatile metals was removed (arsenic, antimony, cadmium, and selenium) (Ref. 1). In the same study, 50 to 70 percent of the mercury was removed by the CT-121 process.

4.1.1.2 Fugitive Emissions

Low levels of fugitive particulate emissions could potentially be generated during the operational phase of the CT-121 demonstration project, although, as described below, measures will be taken to minimize such emissions. Potential sources of these fugitive emissions include the gypsum stacking area and the limestone receiving, storage, and processing areas.

Limestone will be transported to Plant Yates by enclosed trucks and/or rail cars. The material will be stored in a pile in a storage area of approximately 0.2 acres in size. As needed, limestone will be transferred by covered conveyor to an enclosed working silo, and then conveyed in another covered conveyor from the silo to a ball mill for grinding. The working silo will be equipped with a baghouse. In the ball mill, the limestone will be ground wet to form a slurry with water, and this slurry will then be added to the CT-121 process as needed. Approximately 110 tons (as received) of limestone will be used daily during normal operation.

Particulate emissions can occur from the storage area, during conveying, and from the working silo. Directly applicable emission factors are not available, so particulate emission factors from similar operations were used to estimate particulate emissions.

The limestone received at Plant Yates will be sized to approximately 3/4 inches in diameter. Particulate emission factors for sand and gravel storage piles and coal storage piles are 13 and 38 lb/day-acre, respectively (Ref. 4). Using the higher emission factor gives an uncontrolled particulate emission rate of approximately 10 lb/day.

Particulate emissions from the working silo should be minimal. An emission factor of 0.001 lb/ton is given in AP-42 (Ref. 4) for crushers/hammermills that are used in lime manufacture and that are equipped with baghouses. This factor would indicate a particulate emission rate of about 0.1 lb/day. The emissions from the working silo should be even lower.

A factor of 0.00034 lb/ton has been determined for the emission of particulates during the covered conveying of crushed stone (Ref. 4). Thus, the emission of particulates during the covered conveying of limestone is assumed to be negligible.

The wet grinding of limestone in a ball mill should not generate a significant amount of particulate emissions. An emission factor of 0.0108 lb/ton was found for the wet grinding of stone and sand. The use of this factor gives an estimated particulate emission rate of 1.2 lb/day for the wet grinding of limestone. The total uncontrolled emissions of limestone particulates are, thus, estimated to be approximately 10 to 12 lb/day. If necessary, mitigation measures, such as spraying storage piles with water to minimize dusting, will reduce fugitive particulate emissions to even lower levels.

Gypsum by-product will be transported as a slurry by enclosed pipeline to the stacking area. During some of the test periods, fly ash will be incorporated with the gypsum. The gypsum and gypsum/fly ash mixture will be stored in separate, but adjacent stacks. At the stacking area, the solids will be allowed to settle and will then be stacked using a dragline. Further dewatering, settling, and drying will then occur. Since the material is initially wet (then crusts over), no fugitive dust is expected.

The only study of this stacking technique as applied to gypsum was conducted by the Electric Power Research Institute (EPRI) (Ref. 5). This study showed that the gypsum stacks from the CT-121 process developed a thin, hard crust. This crust was the apparent result of the dissolution of gypsum crystals from rainfall, and subsequent recrystallization and drying. The sides of the stacks were essentially free of erosion from rainfall. The study found that fugitive dust emissions were not a problem, and dust mitigation measures, such as wetting the gypsum stacks, should not be needed.

Based upon the results of the EPRI study, fugitive dust emissions from the gypsum and gypsum-fly ash stacks at the demonstration project are assumed to be negligible.

4.1.1.3 Noise

The additional limestone transport vehicles and equipment needed for the demonstration project will contribute to the noise level in the area. However, these sources are expected to be insignificant, particularly since they will be located and operated in the existing power plant. Additionally, the nearest off-site receptors are approximately 1 mile away, so no off-site noise impacts will occur.

4.1.1.4 Potential Plume Impacts Associated With Scrubbing Systems

Utilization of scrubbing systems in general may impact the composition and characteristics of stack plumes. Two potential effects are possible from operating a wet FGD process: (a) localized acidic liquid fallout from the stack plume and (b) a visible plume caused by sulfuric acid mist in the flue gas. Both of these potential impacts involve acidic liquid; however, as explained below, the liquid is generated by two different phenomena, with differing impacts. These potential impacts are associated with wet scrubbing systems in general, one of which is the CT-121 process. Therefore, the phenomena are not uniquely the result of utilization of CT-121 and, as explained below, the CT-121 may even function as a better FGD process for minimizing at least localized acidic liquid fallout.

Acidic liquid that may fall out locally from the stack plume is due to the carry-over of liquid from the mist eliminators and/or the entrainment of water which has condensed on the ductwork and chimney liner. This impact is associated with operation without flue gas reheat. Residual SO_2 in the flue gas is absorbed in the condensed liquid, resulting in an acidic liquid with a low pH. The acidic liquid can cause equipment corrosion problems. It can also produce localized acid liquid fallout if the droplets entrained in the flue gas exiting the stack are large enough to fall from the plume before they can evaporate.

The potential for localized acidic liquid fallout can be eliminated through proper design of the mist eliminators, ductwork, and chimney liner, including the use of properly placed collectors in the ductwork and chimney liner. Indeed, carry-over from the CT-121 process should be even less than from other wet FGD processes. Compared to these other processes, the CT-121 process reduces the number of liquid droplets in the ductwork downstream of the mist eliminator because of both the lower gas velocity in the gas-liquid contact zone and the better reliability of the mist eliminator.

Entrainment of liquid from the ductwork and chimney liner should not be a problem, either. As a result of a 1982 study, the Electric Power Research Institute (EPRI) developed guidelines for the design and operation of wet chimneys to eliminate liquid fallout from plumes. New York State Electric and Gas Company used these guidelines during construction of its Somerset Station. The Somerset plant has been operational since 1984 and has not experienced liquid fallout during its operation. The EPRI design specifications, as well as improvements that have been made since 1984, will be incorporated into the duct and chimney design for the CT-121 unit at Plant Yates. Based on the success of the Somerset Station, acidic liquid fallout should not be present at the demonstration program. SCS will, nevertheless, implement a vegetation study at the plant to inspect for potential damage to flora. Additionally, the use of fiberglass construction for the ductwork and chimney liner will eliminate corrosion of these elements.

Acid mist in a plume has the potential for producing varying levels of opacity. The acid mist is due to the in-furnace oxidation of a small amount of the SO_2 produced during coal combustion. The SO_2 is oxidized to sulfur trioxide (SO_3), which combines with water vapor to form sulfuric acid (H_2SO_4) when the flue gas temperature is reduced below the acid dewpoint.

The Georgia opacity limits, Section 391-3-1-.02 (2)(b) impose a statewide limit of not greater than 40 percent. The temperature of the flue gas from the CT-121 process will be in the range of 120 to 130°F (slightly lower as it actually exits the stack), and the gas will be saturated with water at this temperature. As the gas leaves the stack, water will condense immediately (if it has not already condensed in the stack), forming the attached steam plume. This initial steam plume (which is not subject to opacity regulations) will dissipate, and may leave a plume characterized by fine particle light scattering (caused by fly ash and sulfuric acid mist). Dilution, deposition, and agglomeration will eventually cause this plume to disperse.

In the following discussion, opacity models are described, some measured opacities are presented, and the existing flue gas opacity at Plant Yates is reported and discussed. Conclusions regarding the potential at Plant Yates for the development of plume opacities which are above the state limit are provided at the end of this discussion.

Opacity Prediction from Existing Models

The prediction of the opacity of the plume from the Plant Yates CT-121 Process is very uncertain. There are opacity models available, but the accuracies of the available models are not well defined. In addition, some of the parameters which are required in the model cannot be specified with assurance for the proposed CT-121 unit at Plant Yates.

The opacity of a plume is dependent on a number of factors, including the particulate concentration (fly ash and sulfuric acid concentrations), particulate size distribution, stack temperature, and atmospheric conditions. Particles with diameters in the range of 0.2 to 1.0 um are particularly effective in obscuring the visible light. Particles with a diameter of 0.5 um have the highest light extinction efficiency. Thus, two critical parameters necessary for the estimation of plume opacities are the sulfuric acid concentration and the particle size distribution.

The current particle size distribution in the flue gas from Unit 1 at Plant Yates is not known. At any rate, the size distribution from the proposed CT-121 unit may be somewhat modified from that in the current flue gas, since some ash particulate matter may be removed in the CT-121 process. In the absence of particle size distribution data at Plant Yates, the particle size distribution being emitted from prototype CT-121 units at Plant Abbott (Ref. 2) and Plant Scholz (Ref. 1) were used to develop estimates for use in the predictive models. The outlet gas stream from the CT-121 unit at Plant Abbott contained approximately 50 percent of the particulates of less than 0.5 um in diameter and about 80 percent less than 1.0 um. At Plant Scholz, the comparable distribution was 20 percent less than 0.5 um and 50 percent less than 1.0 um in diameter. The fine particle mode was 0.5 um and 1.5 um at Plants Abbott and Scholz, respectively. Thus, the size distributions of the particulate matter from the CT-121 units at Plants Scholz and Abbott were in the range having medium-to-high light extinction efficiencies.

The estimated particulate loading from the CT-121 unit at Plant Yates is approximately 26 mg/m^3. Applying the particle size distributions found at Plants Abbott and Scholz, the loading for particulates of less than 0.5 um would be in the range of 5 to 13 mg/m^3, and from 13 to 21 mg/m^3 for particulates of less than 1.0 um.

Sulfuric acid mist particulates are generally in the size ranges that have high light-extinction efficiencies. Thus, the sulfuric acid concentration in the flue gas is one of the important parameters in estimating the plume opacity. However, the prediction of this parameter is quite uncertain. The amount of SO_3 formed during combustion is primarily a function of the combustion process in a particular boiler, i.e., air/fuel ratio, fuel composition, temperature, time at temperature, and the presence/absence of a catalyst (vanadium, for example). Based upon field studies conducted at a 30 MW CT-121 demonstration project in the midwest, approximately one percent of the SO_2 initially present in the flue gas may oxidize to SO_3 (Ref. 2). Under this assumption, a coal containing 2.5 percent sulfur (such as that planned for the demonstration project at Plant Yates) would produce an estimated sulfuric acid concentration of up to 20 ppmv in the gas leaving the stack. This is in agreement with an estimated sulfuric acid concentration range of 14-28 ppmv of SO_3 predicted for combustion of a 2 percent sulfur coal with 25 percent excess air (Ref. 6).

EPA (Ref. 7) provides an estimate of 0.7 percent of the sulfur present in bituminous/sub-bituminous coals being converted to SO_3 during combustion. This would be equivalent to a concentration of approximately 14 ppmv in the stack gas.

A generalized relationship describing the effect of sulfuric acid mist on opacity was developed by Radian Corporation (Ref. 8). This relationship, shown in Figure 4-1 was developed by (a) assuming that plume opacity was produced by sulfuric acid mist aerosols of 1 um or less in diameter, (b) assuming a typical particle size distribution for these aerosols, and (c) using these parameters in an opacity or light transmission model. At sulfuric acid concentrations of 20 ppmv, for example, the relationship predicts that the estimated opacity of the plume would be 55-60 percent. Conversely, a plume opacity of 20 percent would indicate a sulfuric acid concentration of about 4-5 ppmv. There could, however, be some additional factors that may produce a lower opacity than predicted by this relationship. For example, the particle size and size distribution could be significantly different from the modeled parameters.

We have used some information provided in an article by Damle, et al (Ref. 9) to provide additional rough estimates of the opacity range which might be anticipated for the CT-121 unit. This article discusses "detached" plumes resulting from condensation of sulfuric acid after the flue gas has been emitted from the stack. According to the article, the model, as well as some visual observations, indicate that the "peak" opacity occurs within 1-2 seconds after leaving the stack. A flue gas temperature of about 400°F was assumed for the model.

Damle, et al conducted some modeling using the "detached" plume model, and provided some results in their article. They used average stack and ambient conditions in their base case, and then conducted some parametric modeling to determine the effects of particle size distribution and sulfuric acid concentrations on the peak opacity. For a sulfuric acid concentration of 20 ppmv, a particulate loading of 13 to 21 mg/m^3 (<1 um), and with the particle size distribution seen at Plants Abbott and Scholz, the predicted peak opacity of the detached plume would be in the range of 30 to 55%, according to the Damle model.

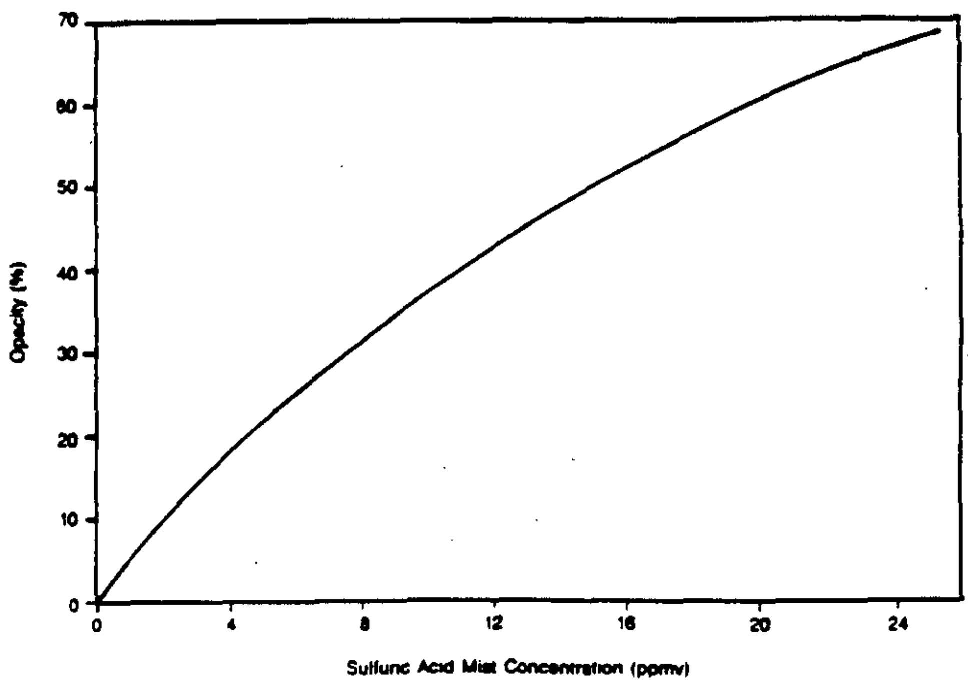


Figure 4-1. Relationship Between Opacity and Sulfuric Acid Mist Concentrations

Measured Opacity Levels at Coal-Fired Plants

On the other hand, some measured levels of sulfuric acid in flue gases from pulverized coal power plants have been considerably lower than the concentrations predicted from the sulfur levels in the coal. As summarized in Table 4-7, measured sulfuric acid levels of 2-15 ppmv have been found in the flue gases from the combustion of coals containing 2-3.5 percent sulfur. Those flue gases listed in Table 4-7, which have associated stack temperatures, were subjected to flue gas scrubbing.

As discussed in the above paragraphs, the predicted opacity, estimated with existing mathematical models, from the Plant Yates demonstration project varies between 30 and 60 percent. Some field measurements, however, seem to indicate plume opacity levels that are substantially lower than predicted from the sulfur levels in the coals being burned. As summarized in Table 4-7, measured opacities of 5 to 50 percent (only one source reported opacities above 35 percent) have been found in flue gases from some combustion units burning coals containing 2-5 percent sulfur (Ref. 8).

The variability of sulfuric acid levels and measured opacities illustrates the high level of uncertainty associated with the prediction of plume opacities from generalized models (and estimated parameters).

Existing Opacity at Plant Yates

Because of the difficulties and uncertainties involved in predicting opacities from theoretical models, existing opacity measurement data can be very useful. Data from an operating combustion source can provide a valuable, and probably the most reliable, basis for estimating opacities from the same source operating at different conditions.

The existing plume at Plant Yates is not wet, so a detached plume would be expected there, and the Damle model would be the most applicable in defining the plume opacity. The most important parameters in this model are

TABLE 4-7. SUMMARY OF MEASURED PLUME OPACITIES

Sulfur in Coal, %	Measured Sulfuric Acid Concentration, ppmv	Observed Plume Opacity, %	Stack Temperature, °F	Reference
NA	8-11	20-30	NA	3
5	NA	24-29	NA	3
2-3.5	6-9	35	180	4
2.8-3.4	5-15	30	155	6
2.5-3.1	2-3	10-50	118	6
2.1-2.4	4	5->20	120	6

the ash particle concentration and size distribution (particularly the submicron fraction) in the plume, and the condensable vapor (sulfuric acid) concentration in the stack gas. Also important are the meteorological conditions at the site.

Units 1 through 5 at Plant Yates currently burn coal with sulfur levels of 1.6-2.3 percent sulfur, with an average sulfur content of about 2.0 percent. Under these conditions, the in-stack opacity is measured at 10-15 percent. Since the flue gas is above the sulfuric acid dew point at the point of opacity measurement, the measured opacity level is primarily due to fly ash particulates. Of more importance, however, is the absence of an observed detached plume at Plant Yates. This absence indicates a low level of sulfuric acid mist in the plume and a correspondingly low concentration of SO_3 in the flue gas in the stack. Thus, the actual levels of sulfuric acid present in the Plant Yates flue gas appear to be significantly lower than the estimated sulfuric acid levels used in the opacity models.

Conclusions

In the proposed demonstration program, the existing Unit 1 boiler at Plant Yates will be unmodified, and the targeted sulfur content of the coal will only be about 2.5 percent, compared to the average sulfur level of 2 percent in the coal currently being burned. Thus, the sulfuric acid levels (and the associated plume opacity) in the flue gas from the CT-121 unit at Plant Yates should be approximately the same as the low levels present in the current flue gas from Plant Yates.

The opacity may even be somewhat lower than that currently experienced at Plant Yates, since the CT-121 plume will be saturated with water, creating a visible steam plume. The steam plume could have some additional effects that would mitigate the plume opacity. Fine sulfuric acid mist particles could coalesce on the water particles, increasing their size, and thus reducing the concentration of those particles with the greatest light extinction frequency.

In summary, the opacity of the current plume at Plant Yates is only 10-15 percent, due primarily to fly ash. Although plume opacities predicted from existing mathematical models are in the range of 30 to 60 percent, there are large uncertainties associated with these models, the parameters used in the models, and the predicted opacities. There is a high probability that the actual opacity from the proposed CT-121 unit at Plant Yates will be no greater than the current opacity of 10-15 percent, and it could even be slightly less.

In addition, the temporary construction and operating permit issued by the Air Quality Division of the Georgia Department of Natural Resources (DNR) will contain opacity limits. It is fully expect that these opacity limits will be met. If the opacity limits are not met, Georgia Power Company will undertake appropriate mitigation measures to ensure compliance, as required by the DNR.

4.1.2 Construction Phase

The potential for air emission impacts during the construction stage will be limited to fugitive emissions from general construction activities and emissions from on-site manufacturing of the jet bubbling reactor. Small amounts of NO_x, hydrocarbons, and CO will be generated by the construction vehicles and by trucks transporting equipment and supplies. These emissions will be quite low and insignificant compared to emissions from the existing plant and vehicles in the vicinity.

Fugitive emissions from general construction activities may result from putting equipment in place, increased vehicular traffic on internal roads, and construction of the stacking area. Since the acreage involved in the demonstration project (13 acres) is quite limited, particularly in the context of the entire plant (2,333 acres), the air quality impact, if any, of fugitive emissions would be slight. In any event, the state's "no nuisance" requirements will require implementation of reasonable precautions to minimize or prevent airborne particulates. Management practices, such as covering trucks and wetting roads, may be employed to prevent or minimize the generation of fugitive emissions.

Ershigs, Inc., a national fiberglass contractor, will manufacture the jet bubbling reactor on site. The stack will be manufactured off site, transported to Plant Yates, and then assembled on site. The duct will also be manufactured off site. Construction of the JBR is expected to last approximately 8 to 10 weeks. Ershigs' personnel will assemble and form the molds on site and then spray a combination of fiberglass, resin (styrene-based), and catalyst (methyl ethyl ketone peroxide) on the molds to produce the equipment.

According to AP-42 (Ref. 4), the only significant volatile organic compound emissions from fabrication operations using fiberglass-reinforced plastic (FRP) are the monomer (usually styrene) associated with the resin and the solvent (usually acetone) used to clean equipment. Preliminary design estimates indicate that the FRP in the JBR will weigh about 400,000-500,000 pounds. A monomer content of 43 wt% in the resin was assumed, and 11 percent of the monomer was assumed to be emitted (Ref. 4). Under these conditions, total styrene emissions will be approximately 6 to 8 tons over the duration of the fabrication period (approximately 8-10 weeks). It was also assumed, for estimating worst-case emissions, that 1,000-2,000 pounds of acetone will be needed for cleaning purposes, and that 20 percent of this material will be vaporized. Therefore, the total VOC emissions from the on-site FRP equipment fabrication are estimated to be between 6 and 8 tons for the construction period.

4.2 Land Impacts

The CT-121 project will require utilization of the following acreage at Plant Yates: (a) 5 acres for the JBR, reactant receiving/feed system, and the temporary stack adjacent to Unit 1; and (b) 8 acres for the gypsum stacking area. In addition, a pipeline of approximately 2,540 feet in length will be installed to transport gypsum slurry from the JBR to the stacking area and a pipeline of approximately 2,000 feet in length will direct stacking area overflow, if any, to the ash pond. The 13-acre area that will be utilized for the demonstration project is readily available at the existing plant site. Approximately 5 acres of this total have already been disturbed or were primarily used for other purposes. The infrastructure requirements to support the project--river, rail, road, coal handling--already exist at Plant Yates; no modifications will be required and no additional land will be needed.

4.3 Surface-Water Quality Impacts

4.3.1 Construction Activities

General construction activities can potentially impact water quality through nonpoint source contributions of silts, sediments, and small amounts of oil and grease to surface water runoff. Nonpoint source pollution relating to CT-121 construction activities are expected to be minimal because of the small area of land that will be affected and the lack of any significant land surface disturbance activities. The state erosion and sedimentation statute requires a permit for "land-disturbing" activities and utilization of runoff controls. Although public utilities, such as Georgia Power Company, are expressly exempt from this program, the utility conforms, to the extent possible, with the conservation practices set forth in the program. Therefore, during the construction phase, silt control measures will be utilized to the extent practicable.

4.3.2 Operation

Most of the wastewater and wastewater sources within the Plant Yates boundaries will be unaffected by the demonstration project. There will be no increase in the quantity of coal being used, so the amount of stored coal (averaging a maximum of 900,000 tons in a storage area of approximately 12 acres) and associated coal pile runoff should be unchanged.

Since no additional coal will be used, the quantity of ash produced and the required volume of ash sluice water will be unaffected by the demonstration program (except for the reduction of fly ash from Unit 1 during the last two test phases). The composition of the ash and the associated ash-sluice water will also remain consistent with that of current operations.

Since the demonstration project is a net consumer of water, the only potential impact on surface water would be a result of runoff from the limestone storage area, process area wash water and runoff, and/or overflow from the gypsum stacking area. Runoff from the limestone storage area will occur during periods of significant rainfall. This runoff, which will be routed to the gypsum stack via the gypsum tank, can be expected to have a high solids content and also have elevated levels of alkalinity (up to 60 ppm). Limestone is composed primarily of $CaCO_3$ (95-97%) with small amounts of $MgCO_3$ and inerts. Thus, both the solids content and alkalinity of the runoff will primarily consist of $CaCO_3$. Moreover, the limestone storage area is only approximately 0.2 acres, so any runoff from this area should be relatively small in volume, and may even be diluted with other plant runoff.

Wash water, spills, and runoff water from the process area should have generally the same relative composition as the runoff from the limestone storage area. The process area runoff, which is routed to the gypsum stack, however, will likely be more dilute than the limestone storage area runoff.

The water that accumulates in the gypsum stacking area as a result of gypsum dewatering (and rainfall) will be recycled to the process. Table 4-8 presents an estimated composition of the return water associated with the low-particulate gypsum (Ref. 1). A comparable composition of the same water stream from the high-particulate tests has not been estimated. Test data have not been found for similar gypsum/fly ash process water streams.

The CT-121 process is a net consumer of water, and in the demonstration program, approximately 150 gpm (approximately 46 x 10^6 gallons/year) of makeup water is required in the process (at design conditions). No routine process blowdown stream is anticipated. The only potential overflow from the stacking area would occur as a result of a very heavy rainfall (since the

TABLE 4-8. GYPSUM STACK RETURN WATER ANALYSIS FOR CT-121: SCHOLZ POWER PLANT TEST

	Average (ppm)
Major Constituents:	
Calcium	0.13[a]
Magnesium	650
Chloride	1,900
Sulfate	900
Trace Elements:	
Arsenic	0.15
Beryllium	0.021
Cadmium	<0.002[b]
Chromium	0.22
Copper	<0.005[b]
Mercury	0.015
Nickel	0.94
Lead	<0.002[b]
Antimony	0.011
Selenium	0.20
Silver	0.07
Titanium	0.065
Thallium	<0.001[b]
Vanadium	1.1
Zinc	0.67

[a]Percent by weight.

[b]Element may or may not have been detected. If detected, concentration was less than detection limit for quantifiable value.

Source: (Ref. 1).

stacking area will be designed to accommodate rainfall from a 10-year, 24-hour rain event). In the case of an exceptional storm event, any overflow will be routed to the existing ash pond. Thus, it is extremely unlikely that any process water from the gypsum stacking area will impact surface water in the vicinity of Plant Yates.

In summary, there should be no changes in the composition, volume, and location of the final plant wastewater discharge as a result of the demonstration program.

4.4 Ecological Impacts

The CT-121 demonstration project will be located and operated (over a two-year period) at an existing power plant. The total acreage required for the project is 13 acres. Based upon a review of the Georgia Natural Resources Heritage Inventory, there are no federal or state endangered or threatened species or unique or rare ecological habitats at the plant. Further, of the 13 acres required for the project, 5 acres are already in a disturbed condition. The disturbed property consists primarily of a firing range. Over half of the stacking area will be situated on the range. The rest of the area to be disturbed primarily consists of pinewoods, where few fauna are located. For all of these reasons, minimal ecological impacts are anticipated as a result of the project.

4.5 Socioeconomic Impacts

The CT-121 project should result in a slightly positive impact on the local economy due to the need for additional labor. Construction of the demonstration project is anticipated to require approximately 120 workers at the height of activity. The labor-pool geographical source for these temporary workers is expected to be Coweta and/or Carroll counties. Engineering and construction supervision services will draw upon existing staff of SCS and Georgia Power Company, as well as a number of support contractors.

During operation of the project, approximately 15 employees will be utilized to operate the demonstration process. These workers are expected to be drawn from existing Plant Yates' staff. In addition, 2 site engineers from SCS' Birmingham office will be relocated for the demonstration project. A contract employee will be utilized to operate the dragline for the stacking area.

The additional workers needed for construction and operation are expected to be readily available from the local area. Thus there are no significant, adverse impacts expected in relation to area housing or local public services, such as fire protection or road maintenance.

4.6 Aesthetic/Cultural Resource Impacts

Since the demonstration project will be undertaken at an existing industrial facility and there are no applicable local, state, or federal aesthetic protection requirements, there are no impacts expected on aesthetic resources.

Georgia Power Company's Phase I inventory of the site (Appendix A) identified one cultural property and the potential for additional resources. A Phase II study, consisting of shovel cuts and formal excavation units, was conducted in February 1989. This study revealed a mixed archaeological and stratigraphic context at the house site domicile and an area west of the domicile. The majority of the artifacts recovered from the domicile date from the 1940s and 1950s. Interpretation of courthouse documents suggest that this was a tenant house, and not a house occupied by the landowner. Other cultural features examined include a root cellar depression, privy, and a well. No artifacts were recovered from these areas.

Based on this information, it is the opinion of the Georgia Power Company archaeological staff that this property does not meet the 50-year age eligibility requirement established by the National Historic Preservation Act of 1966 (Sec. 106). The results of this survey and the recommendations have been discussed with the Georgia SHPO in Atlanta. A SHPO staff representative has orally agreed with these findings and the conclusion that the property is not eligible for listing in the National Register of Historic Places.

4.7 Energy and Materials Resources

Plant Yates' Unit 1 will annually consume approximately 260,000 tons of coal, 23,300 tons of limestone, 46 million gallons of process water, and 10.6 million kWh of power during the demonstration project. Except for the limestone, these quantities of resources represent little to no changes in the quantity of resources that would be required for operation of Unit 1.

There are sufficient water resources to supply the incremental requirements of the CT-121 project. In 1988, Plant Yates diverted an average volume of approximately 481 MGD from the Chattahoochee River. The maximum incremental increase in water use attributable to the demonstration project is 0.14 MGD. Plant Yates' state water appropriation permit authorizes the diversion of a maximum of 666 MGD, so the incremental increase is well within the allowable diversion volume.

An abundant supply of crushed limestone is available at competitive prices in Georgia and Alabama to satisfy project needs. Because of the proximity of these sources to Plant Yates, there will be sufficient limestone resources at competitive prices. Sources located along the Norfolk Southern Railway, which serves Plant Yates, may be selected to avoid transshipment. Crushed limestone sells for between $4 and $5 per ton (f.o.b. quarry). Table 4-9 shows the typical chemical analyses of the stone that could be supplied by quarries in Alabama and Georgia and the approximate freight costs for delivering the material to Plant Yates. Figure 4-2 shows locations of quarries relative to Plant Yates.

TABLE 4-9. ACTIVE CARBONATE QUARRIES

Quarry Name	$CaCO_3$	$MgCO_3$	Inerts	Freight Rates[a]	Transportation	Geological Formation
<u>Alabama:</u>						
Vulcan, Glencoe Q.	96.9	1.1	1.8	$ 9.00/ton	Truck	Newala Limestone
Vulcan, Calera Q.	90.0	8.0	2.0	12.00/ton	Rail[b]	Newala Limestone
Allied Products, Roberta Q.	97.0	2.0	1.0	12.00/ton	Rail[b]	Newala Limestone
Georgia Marble, Sylacauga	97.0	2.0	1.0	9.00/ton	Rail[b]	Marble
Thompson-Weinman, Sylacauga	97.0	2.0	1.0	9.00/ton	Rail[b]	Marble
Moretti-Harrah, Sylacauga	97.0	2.0	1.0	9.00/ton	Rail[b]	Marble
Vulcan, Childersburg Q.	87.0	9.0	4.0	10.00/ton	Truck	Newala Limestone
<u>Georgia:</u>						
Florida Rock, Rome Q.	93.5	4.2	2.3	$ 7.50/ton	Truck/Rail[c]	Tuscumbia Limestone
Patton Rock, Patton Quarry	95.0	2.0	3.0	12.50/ton	Truck	Monteagle Limestone
Georgia Marble, White Stone Mix	95.0	2.0	3.0	7.50/ton	Truck/Rail[d]	Marble
Georgia Calcium Products, NY Mine	95.0	2.0	3.0	8.50/ton	Truck	Marble
Georgia Marble, Mine #5	95.0	2.0	3.0	8.50/ton	Truck	Marble
Medusa Cement Clinchfield Q.	<——Variable	——>		12.00/ton	Rail[b]	Ocala Group

[a]Approximations that may vary slightly.

[b]Norfolk-Southern Railroad.

[c]Central of Georgia Railroad.

[d]L&N Railroad.

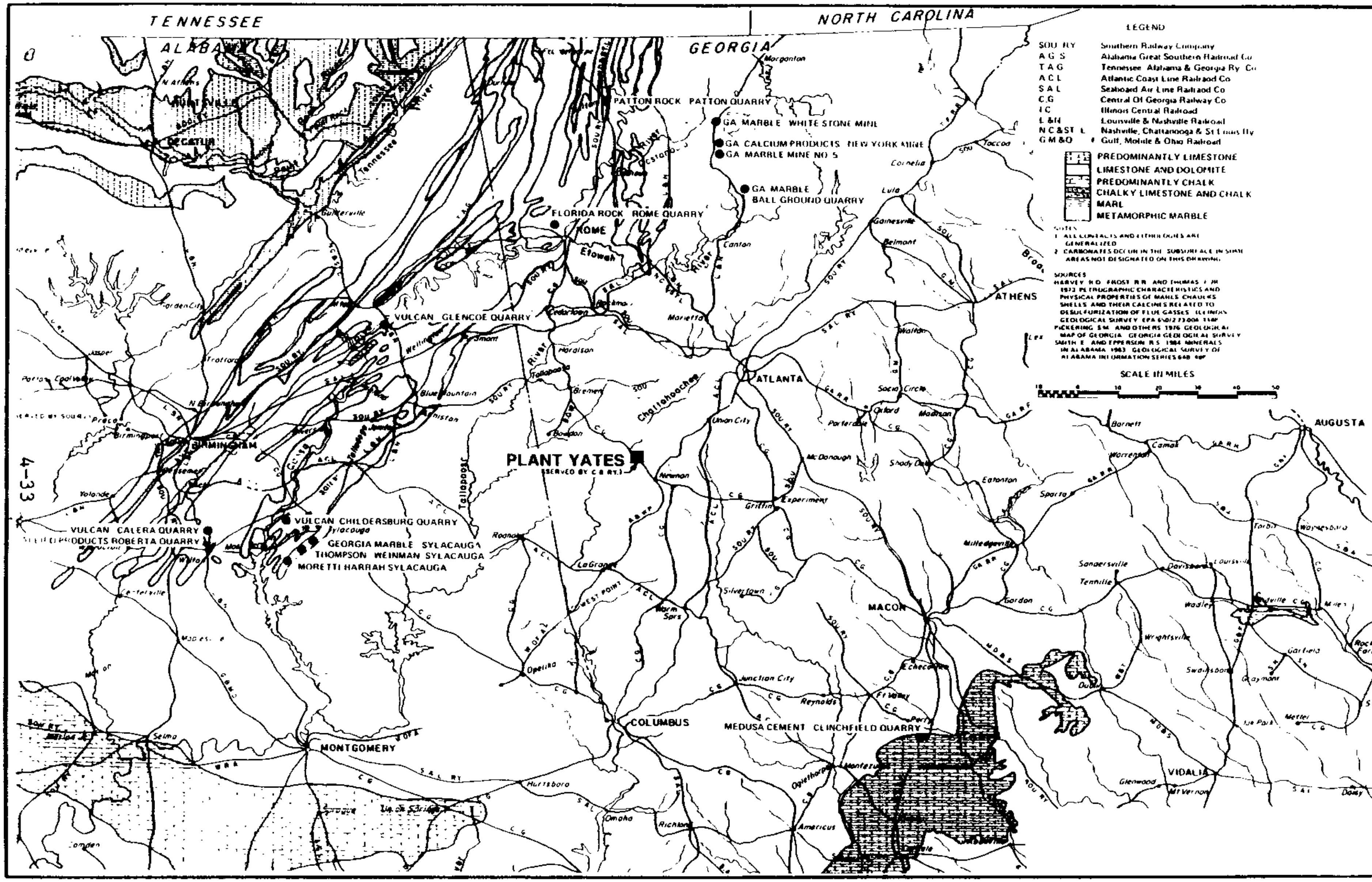


Figure 4-2. Active Limestone Quarries in the Plant Yates Area

4.8 Waste Generation

The CT-121 demonstration project will produce a solid waste in the form of gypsum and, when the high particulate loading tests are being conducted, a gypsum/fly ash mixture. The characteristics and volumes of bottom ash, fly ash, and economizer ash, which are already generated at the plant, are not expected to change. The existing and anticipated volumes of solid waste at Plant Yates are summarized as follows:

		Solid Waste Produced In CT-121 Demonstration (lb/hr)	
Solid Waste	Existing Unit 1 (lb/hr)	Low Particulate Loading	High Particulate Loading
Bottom Ash	1,795	1,795	1,795
Economizer Ash	680	680	680
Fly Ash	13,900	13,900	--
Gypsum (dry)	--	14,700	28,700
(wet)	--	22,050	42,900

As explained in Section 2.1.2.1, the gypsum material will be disposed of in an on-site stacking area. The stacking concept for disposal of waste gypsum is not an innovative or novel concept. The phosphate fertilizer industry in the southeast has utilized stacking for its waste gypsum for at least 20 years. Gypsum stacking of FGD gypsum was demonstrated during the Plant Scholz project; the prototype stack was relatively small (one-half acre and 12 feet high) (Ref. 5). However, the Scholz project demonstrated that FGD gypsum stacking is a viable method of disposal.

The gypsum stacking area planned for Plant Yates will be designed in a manner that is consistent with stacks managed by the phosphate fertilizer industry. Figure 4-3 presents a conceptual cross section of the gypsum and gypsum-fly ash stacks. The stacks will be formed by an upstream method of construction. An earthen starter dike will be constructed to form a pond and stacking area. Gypsum will be pumped to the pond in slurry form and allowed to settle and drain. When sufficient gypsum sediment has accumulated, the dewatered material will be excavated with a dragline to raise the perimeter

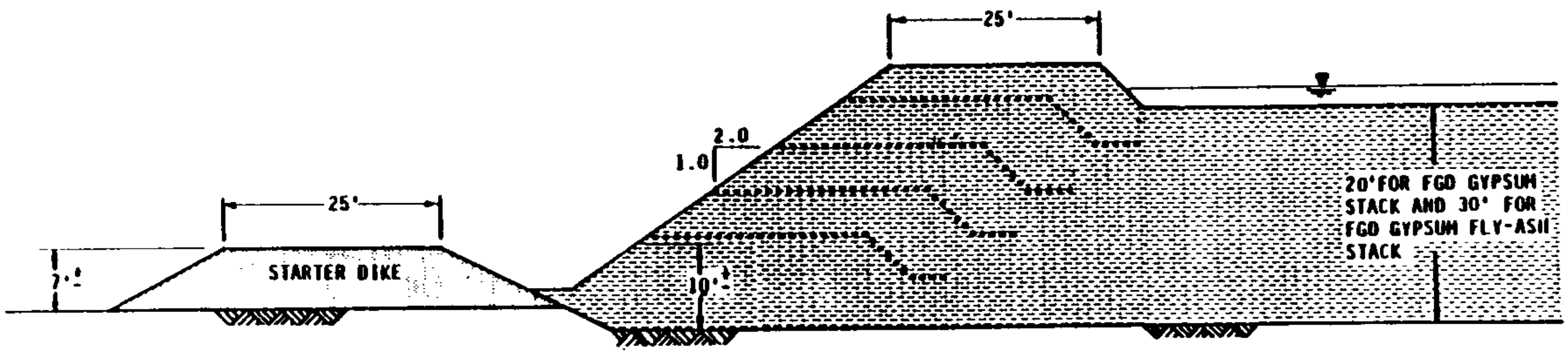


Figure 4-3. Conceptual Cross Section of Proposed FGD and FGD Gypsum-Fly Ash Stacks

dike of the stack. Based upon SCS estimates of waste production, the stack for the 9-month gypsum stacking part of the project will accommodate 28,600 tons of waste within a minimum 20-foot high stack. The base will be approximately 1.2 acres with a top area (at a height of 20 feet) of approximately 0.5 acres. The 15-month gypsum-fly ash stacking phase will result in a stack designed to accommodate 92,600 tons of gypsum-fly ash with a minimum 30-foot high stack. The base of this stack will cover approximately 2.8 acres and the top area (at a height of 30 feet) will encompass approximately 1.2 acres.

The primary impact potentially associated with on-site management of the material is the possible effect on ground water. Other potential impacts on air quality and surface-water quality from operation of the stacking area were discussed in Sections 4.1 and 4.3, respectively. The solid waste management regulations of the Georgia DNR require, on a case-by-case basis, consideration of liners and ground-water monitoring of solid waste management areas.

. At the proposed gypsum and gypsum/fly ash stacking areas at Plant Yates, there is only a low potential for significant leaching of constituents of concern from the material. Favorable hydrogeologic conditions of the site include a relatively thick unsaturated zone, relatively low permeability of the soil, and relatively low permeability of the unweathered rock mass beneath the soils. Furthermore, shallow ground water in the nearby vicinity of the plant is not used for drinking water. As a result of all of the above, no significant impacts are expected to arise from an unlined gypsum stacking area. Nevertheless, as an additional preventive measure against any potential for ground-water contamination, a synthetic or low-permeability clay liner and a leachate collection system will be installed beneath the gypsum and gypsum/-fly ash stacking areas. In addition, a ground-water monitoring system will be located around the stacking area to ensure the integrity of the liner.

4.8.1 Material Composition

The composition of the bottom ash, economizer ash, and fly ash will be unchanged as a result of the demonstration project from the current compositions of these materials.

The composition of the gypsum and gypsum/fly ash mixtures cannot be estimated with confidence, since the required data are nonexistent or unavailable. Available data from the Plant Scholz CT-121 project (Gulf Power Company plant in Florida) provide insight into the composition that might be expected for the gypsum at Plant Yates (Ref. 1). Table 4-8, presented previously, is a summary of the average composition of the gypsum stack return water. Although these data relate to the waters and not to the gypsum per se, they do provide a reference for the types and concentrations of elements expected to be associated with the solids.

With respect to the gypsum/fly ash mixture during tests of a prototype CT-121 system at Plant Scholz of Gulf Power Company (in which an eastern bituminous coal containing 2.0 percent sulfur was burned), a mineralogical analysis of a gypsum/fly ash mixture gave the following composition (in percent of dry weight) (Ref. 5):

	Wt%
Silica (SiO_2)	66.8
Calcium Oxide (CaO)	1.0
Alumina (Al_3O_3)	6.3
Iron Oxide (Fe_2O_3)	5.7
Magnesia (MgO)	0.1

The above five constituents, which comprise the significant portion of typical bituminous fly ashes, accounted for about 80 percent of the gypsum/fly ash mixture. The remaining 20 percent of the mixture may have consisted of other chemical constituents such as potassium, sodium, carbon, and sulfate, as well as gypsum (Ref. 5). Compounds such as the gypsum may not have been analyzed in the mineralogical test, which was probably X-ray diffraction. The nature of the gypsum and other constituents was probably somewhat amorphous, and would not have been clearly defined and quantified. Atomic absorption (AA) and Inductively-Coupled Plasma Emission Spectroscopy (ICPES) methods will be used in the demonstration program to determine a more complete composition of the gypsum.

The limestone to be used in the demonstration program may contain some magnesium. The magnesium could be present with calcium as dolomite ($MgCO_3 \cdot CaCO_3$) that may or may not dissolve in the process. If it does not dissolve, it will be carried through the process as a solid and will be disposed of with the gypsum product. Dolomite will not dissolve or leach appreciably from the product.

Magnesium from the limestone will be present in the liquid phase if the dolomite dissolves. Magnesium present in the liquid phase will react with the SO_2 in the flue gas. However, the resultant magnesium sulfate ($MgSO_4$) will remain dissolved since solid $MgSO_4$ is very soluble. There should not be any significant quantities of solid $MgSO_4$ in the landfill with the gypsum product. Thus, the concentration of magnesium in the gypsum product leachate will not be any higher than the levels estimated in the process water (see Table 4-8).

The composition of the water associated with the gypsum by-product has been estimated and is shown in Table 4-8. The composition of the water from the gypsum/fly ash mixture has not been estimated because data were not found on the characteristics of either fly ash or fly ash/gypsum leachates produced under the conditions present in the gypsum stream or stack. In either case, however, these water streams are likely to be relatively benign (gypsum itself can be used in agricultural applications such as soil benefication). Even in the highly unlikely case of a small leak in the liner under the gypsum or gypsum/fly ash stacking areas, the ground water should not be significantly impacted, because of the leachate composition and low migration rate through the ground under the liner. The leachate collection system will serve as a second line of defense against leaks. The hydrogeologic conditions underlying the gypsum stacking area are described in Section 4.8.2, below.

4.8.2 Hydrogeologic Conditions

This section describes the geological and ground-water features of the demonstration project site, including the gypsum and gypsum/fly ash stacking areas. Hydrogeological information was derived from a number of published regional resource reports (Ref. 10 and 11), as well as plant-specific data collected during the original plant construction, the addition of Units 5 and 6, and installation of the plant's water supply wells.

4.8.2.1 Geology

As reviewed in Section 3.3.3, Plant Yates is located over igneous and metamorphic bedrock just south of the Brevard Fault Zone (see Figures 4-4 and 4-5). Unconsolidated materials on top of the bedrock are saprolite and soils ranging in thickness from 7 to 63 feet.

In addition, boring data from the 1940s (original plant construction) were reviewed. These borings were located between the proposed stacking area and the river. The data reveal that these soils contain up to 40 percent clays and that these clays were found down to 26 feet below the ground surface. The well data sheets for the plant's water supply wells reveal that clay materials were encountered throughout depths ranges from 15 to 35 feet below the ground surface. In addition, visual observation of the target range (where the stacking area will be located) by SCS staff has revealed that clay-rich material is evident in the hillside cut associated with creation of the range. The significance of the presence of these clays is that they may serve as a confining layer between ground surface and the uppermost water-bearing interval. During the foundation preparation work for the stacking area, a number of soil borings, grain size analyses, and permeability analyses on undisturbed soils will be conducted. This information can be used as a part

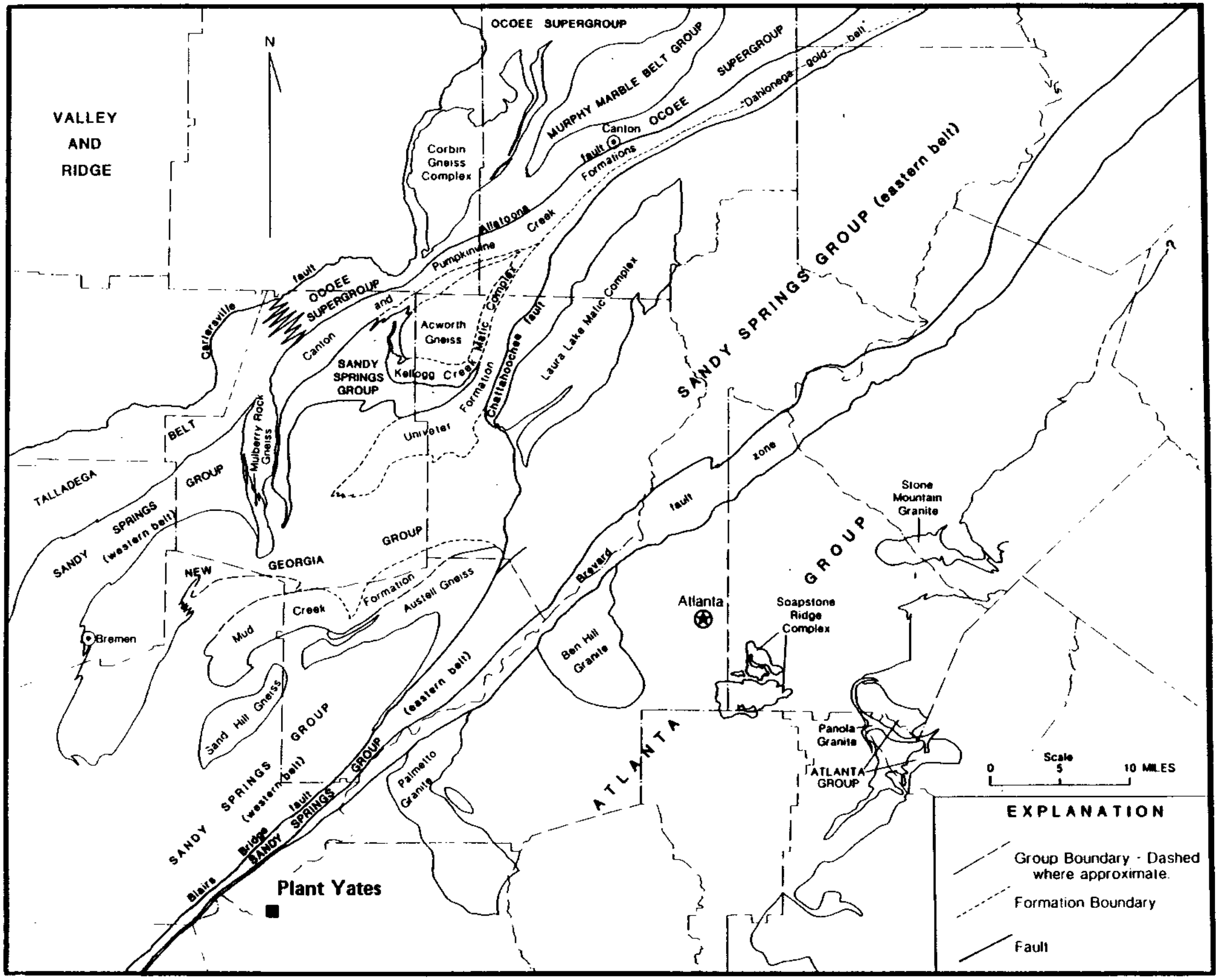
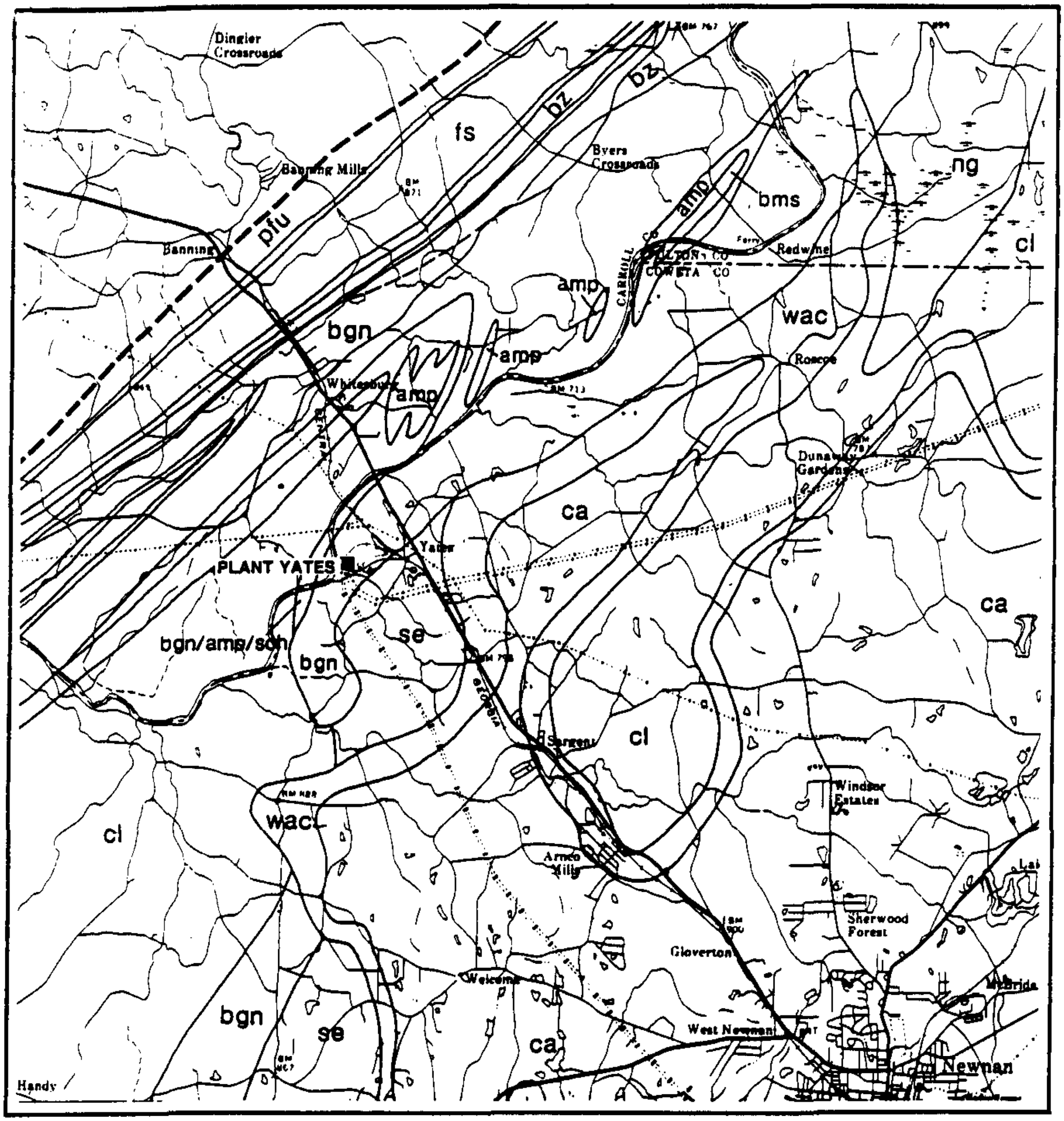


Figure 4-4. Group and Formation Boundaries of the Crystalline Rocks of the Greater Atlanta Regional Map (After McConnell and Abrams, 1984)



LEGEND:

Atlanta Group – Late Precambrian to Early Paleozoic
ca – Clarkston Formation
wac – Wahoo Creek Formation
sc – Senoia Formation
cl – Clairmont Formation
ng – Norcross Gneiss

pfu, fs – Sandy Springs Group
amp, bgn, sch, bms – Unnamed or unassigned units
bz – Ductilely sheared rock

SCALE 1:100,000

0 1 2 3 4 5 MILES

0 1000 2000 3000 4000 5000 FEET

1 2 3 4 5 KILOMETERS

Figure 4-5. Site-Specific Geologic Units in the Vicinity of Plant Yates (After McConnell and Abrams, 1984) of the state permit application for the stacking area to assess the presence and extent of clay material in this area.

4.8.2.2 Ground Water

As is typical of Piedmont ground water, ground water at Plant Yates is concentrated in the weathered rock zone along the soil-rock interface or in fracture zones in the rock mass itself. There is an upper water-bearing interval (10-28 feet) below the plant. This interval is not properly considered an aquifer. Generally, the term aquifer implies a sedimentary structure with water-bearing strata isolated above or below by confining or semi-confining beds. In the Southern Piedmont area, the rocks are high-grade crystalline metamorphics. The uppermost water-bearing section occurs from the top of the hard unweathered rock to the top of the water table. The water occupies joints and fractures in the weathered rock and pore spaces in the overlying residual material.

The residual material generally consists of fine and coarse micaceous sands to fine sandy micaceous silts. Soil thickness ranges from 11 to almost 60 feet. Permeability values of soils mapped at Plant Yates by the Soil Conservation Service range from 1.4×10^{-3} to 4.2×10^{-4} cm/sec. Recharge to the soil/rock interface is supplied by precipitation falling in the area and seeping through the overlying material. Shallow ground water at the site would be expected to flow toward the Chattahoochee River. Approximate flow rate for the plant site, computed using hydraulic conductivity, hydraulic gradient, and average porosity, yielded a value of 3.8×10^{-5} cm/sec.

The plant's water supply wells are located in deep (approximately 500 feet) rock. This water-bearing media is also not properly characterized as an aquifer. In other words, no aquifer layer occurs at 500 feet. The plant wells are drilled into hard rock, and flow occurs through the random fractures intersected by the drill hole through the entire hard rock interval.

Ground-water quality analyses for the plant's four deep rock water supply wells are summarized in Table 4-10. As is evidenced by the data, these wells exhibit relatively high concentrations of iron and manganese. For example, the range of manganese values is 0.04 to 1.4 ppm; the Georgia drinking water standard for manganese is 0.05 ppm. It is probable that this phenomenon is attributable to the subsurface rock features. The manganese and iron are probably released by the weathering of minerals rich in these elements; probable sources include biotite, hornblende, spessartine, garnet, and other minerals commonly found in metamorphic rocks. Generally, the quality of the shallow ground water could not be expected to be better than the values in Table 4-10, since this water comes from deep (approximately 500 feet) rock wells that can be expected to have better water quality than the shallow ground water.

4.8.2.3 Water Well Inventory

A water well inventory was conducted by SCS in December 1988 for an area extending one mile in all directions from the plant site. Information sources included the U.S. Geological Survey, Water Resources Division in Atlanta; the Georgia Department of Natural Resources, Environmental Protection Division in Atlanta; and files of Plant Yates.

Figure 4-6 reflects the location of the four operational wells within the one-mile radius of Plant Yates. As evidenced by the map, these wells are Georgia Power's Wells 4, 5, 6, and 7. Well 4 is not in current use due to the concentrations of iron and manganese, but can be activated if needed. Wells 5, 6, and 7 are used only for potable water at Plant Yates. Historically, three other wells existed at Plant Yates within the one-mile radius; Wells 1, 2, and 3 were drilled for construction purposes, but have been grouted and are no longer in use.

TABLE 4-10. SUMMARY OF PLANT YATES GROUND-WATER QUALITY (ppm) FROM WATER SUPPLY WELLS 4, 5, 6 AND 7

	Well No. 4 3/16/82	Well No. 5 3/16/82	Well No. 5 5/23/84	Well No. 6 3/16/82	Well No. 6 5/23/84	Well No. 7 5/23/84	Range
Total Solids @ 105° C	403	184	418	100	132	452	100-452
*Volatile Solids @ 600° C	18	11	50	10	22	80	80-10
Fixed Solids @ 600° C	385	173	368	90	110	372	90-385
Total Alkalinity as $CaCO_3$ (methyl-orange)	105	36	19	31	83	29	19-105
*Hydroxide (as $CaCO_3$)	0	0	0	0	0	0	0
*Carbonate (as $CaCO_3$)	0	0	0	0	0	0	0
*Bicarbonate (as $CaCO_3$)	105	36	19	31	8.3	29	8.3-105
*Free Carbon Dioxide	100	28	10	25	8.5	5	5-100
Total Hardness (as $CaCO_3$)	270	90	206	38	46	215	38-270
Total Hardness (grains per gallon)	16	5.3	12	2.2	2.7	13	2.2-16
pH	6.3	6.4	6.6	6.4	6.5	7.1	6.3-7.1
Silica (SiO_2)	28	33	31	31	25	32	25-33
Iron Oxide (Fe_2O_3)	0.1	0.2	1.0	**0.04	2.3	1.5	0.04-2.3
Alumina (Al_2O_3)	**0.1	**0.1	**0.04	**0.1	0.1	**0.1	0.04-0.1
Lime (CaO)	100	32	76	9.8	12	84	9.8-100
Magnesia (MgO)	33	13	28	8.1	10	25	8.1-33
Sulfate (SO_4)	150	58	165	20	32	153	20-165
Chloride (Cl)	6.2	4.1	7.5	6.2	11	8	4.1-11
Soda (Na_2O)	23	18	17	6.6	4.5	22	4.5-23
Manganese (Mn)	0.9	0.2	1.4	0.7	0.04	0.7	0.04-1.4
Fluoride (F)	0.2	0.1	0.5	**0.1	0.1	0.4	0.1-0.5

* Calculated
** None found if present less than

Figure 4-6. Water Wells Within a One-Mile Radius of the Project

4.8.3 Waste Utilization

As a commercially usable material, by-product gypsum from the CT-121 process has some real advantages over the calcium sulfite/calcium sulfate generated in conventional FGD processes. These advantages include a significantly larger market potential and a superior method for handling/storage of the by-product. Potential uses for the gypsum are essentially the same as those for natural gypsum; i.e., wallboard, cement, and agriculture. By-product gypsum from the phosphate industry has also begun to receive attention as a potential highway construction material, but its quality limits marketability in many situations.

In light of the above utilization potential for the by-product gypsum, a waste characterization study will be conducted for both the gypsum and the gypsum-fly ash mixture produced during the demonstration program. The characterization study will consist of laboratory evaluations of the mineralogy, crystal morphology, index, settling, consolidation, permeability, shear strength, and compaction characteristics of each of the two materials. The results of the characterization study will be evaluated and compared with results previously reported for FGD gypsum and FGD gypsum/fly ash characterized during previous studies at Plant Scholz (Ref. 1). Recommended properties for use in design of full-scale facilities, as well as implications with regard to material and water balances, sizing and layout, and seepage and stability analyses will also be addressed in this gypsum utilization and characterization study.

4.9 Impact Summary

This section summarizes the anticipated environmental, health, safety, and socioeconomic impacts of the CT-121 demonstration project. As an overview, there are several positive impacts associated with the project: (a) reductions in emissions of SO_2, halogen, and trace elements from Unit 1 flue gas treatment; and (b) stimulus to the local economy from construction and operation activities. The proposed project presents very low health and safety risks during construction, operation, and decommissioning of the project. The plant's existing OSHA compliance policies and procedures should be adequate for the project; during construction, any contractors will comply with all site rules and regulations concerning health and safety procedures. The potential adverse environmental impacts are summarized in the following sections.

4.9.1 Mitigation Measures

4.9.1.1 Air Quality

Any emissions during the construction phase will most likely be fugitive emissions from equipment placement activities, construction of the JBR, land clearing, etc. Fugitive volatile organic compound emissions from fabrication of the JBR will be minimized during construction by keeping solvent use to a minimum. Particulate emissions will be minimized by use of best management practices, such as wetting roads and the process area yard. Fugitive particulate emissions from the operation phase will be similarly mitigated.

The potential for equipment corrosion and acidic liquid fallout from the temporary stack plume will be minimized or eliminated by use of fiberglass equipment and proper design of the ductwork and stack liners. Periodic inspections of the plant area will be conducted to determine the ecological effect, if any, of potential acidic liquid fallout. The potential for acid mist emissions and resultant opacity concerns is speculative since the phenomenon is attributable to site-specific climatological and meteorological conditions. There are no specific mitigation measures planned for this potential impact, although flue gas stack monitoring will be conducted.

4.9.1.2 Surface-Water Quality

Potential nonpoint source contributions to the Chattahoochee River from construction activities will be mitigated by the use of conventional sedimentation control measures, i.e., bales, berms. The primary potential surface-water point source impact of the project is from operation of the gypsum stack. The CT-121 process is a closed system: thus, there are no routine process wastewater discharges anticipated since the effluent is recycled to the process, which is a net consumer of water. To mitigate potential surface-water impacts from discharges of stored process water, the stacking area will be diked around the perimeter and sized to contain the typical volume of process water plus the rainfall from a 10-year, 24-hour storm event. Overflow, if any, from an exceptional storm event will be routed to the existing ash pond that is typically an intermittent discharge pond. Potential surface-water impacts from the gypsum stacking area will be mitigated at the end of the project by planting vegetation in the stacking area. Depending on the results of the ground-water monitoring program, the area could possibly be capped.

4.9.1.3 Ground-Water Quality

The primary potential impact of the demonstration project on ground-water quality is associated with operation of the on-site gypsum stacking area. There is concern that there might be some migration of process water (leachate) from the stacking area into the soil beneath the stacking area and, ultimately, into the ground water. However, impacts on the ground water are not anticipated because: (a) the composition of the by-product gypsum is such that constituents of concern are not expected to leach appreciably from the material; (b) a synthetic or low-permeability clay liner will be installed under the gypsum stacking area; (c) the hydrogeology of the site is such that the subsurface soil horizons and unweathered rock mass exhibit very low permeabilities; and (d) the shallow ground water is not being used for drinking water or other beneficial applications.

The gypsum stacking area will be operated in accordance with an Industrial Sanitary Landfill Design and Operation Plan approved by the Georgia DNR. The operations would adhere to requirements in all permits issued by the DNR for the stacking area. Included in the design of the area will be the installation of a liner beneath the gypsum stacking area, the installation of a leachate collection system, and the location of ground-water monitoring wells around the stacking area. At a minimum, one well would be placed upgradient from the area, and three wells would be installed downgradient. Leachate and ground-water compositions will be regularly monitored as required by the DNR.

With this design, the only potential, though unlikely, cause of ground-water contamination would be a leak in the stack area liner. Additional protection can be provided by the leachate collection system. If significant trends in the ground-water monitoring data indicate that the concentrations of relevant chemicals and/or elements are increasing in the stacking area leachate collection system or ground-water monitoring wells, then the state will be notified, and appropriate action taken.

At the end of the demonstration project, the gypsum stacking area will be covered (possibly capped) and vegetated in accordance with the state solid waste landfill permit. Ground water and leachate monitoring will continue for a period to be specified in the post-closure plan of the state landfill permit.

4.9.2 Monitoring

The test phase of the demonstration project includes a number of monitoring activities that are designed to evaluate process efficiency and environmental parameters of the project. These activities are NEPA-independent; i.e., they are driven by the requirements of the ICCT program itself as well as conventional regulatory compliance requirements. However, the activities will yield data relating to impact-forcing source terms of the project. This section overviews the monitoring that is anticipated for those test phases of the program that are relevant to EHSS source terms.

Process evaluation monitoring will include continuous emission monitoring of SO_2 and particulate sampling to determine pollutant reduction efficiencies. The controlled condensation sampling and analytical technique will also be used to measure sulfuric acid mist that will be present in the flue gas. A number of other discharge and process stream parameters will be regularly monitored. A detailed monitoring schedule will be defined in the Environmental Monitoring Plan (EMP), which will be developed in the very early stages of the demonstration program.

Extensive by-product (gypsum) characterization will also be undertaken. The characterization study will evaluate the mineralogy, permeability, shear strength, and compaction characteristics of the solid waste. The Toxicity Characteristic Leaching Procedure and Extraction Procedure Toxicity test will be performed on the gypsum and gypsum/fly ash mixture. Process liquor will be similarly analyzed for compositional purposes.

The lined gypsum stacking area will be monitored for potential subsurface impacts. The ground-water monitoring program will be initiated by an intensive hydrogeological investigation of the site; the investigation will be based, at a minimum, upon literature survey, photogeology, geophysical surveying, and other field testing and mapping methods. The results of this task will be incorporated into Georgia Power Company's permit application to the state and will also determine the locations for the ground-water monitoring wells.

Upon installation of the wells, baseline ground-water sampling and analysis will be conducted every two months for one year prior to stack construction or as required by the Georgia DNR permit. During the operations phase, ground water will most likely be sampled for analysis every three months. Monitoring will consist of sampling and analysis for a number of inorganic and trace metals. The monitoring will be continued after completion of the project for a period of time required by the Georgia DNR.

Leachate from the leachate collection system will be periodically characterized during and after the demonstration program. The frequency of monitoring will be defined in the state solid waste landfill permit.

5.0 REGULATORY COMPLIANCE

This section describes the regulatory programs currently applicable to the plant and how these programs will or will not be affected by the project.

5.1 Air Quality

Air emissions from Plant Yates are subject to the provisions of the federal and Georgia Clean Air Act; the state program is administered by the Georgia Department of Natural Resources (DNR). The plant is located in the Metropolitan Atlanta Intrastate Air Quality Control Region (AQCR), which is designated as attainment for the following NAAQS: sulfur dioxide, nitrogen dioxide, particulate matter, carbon monoxide, and lead. Portions of the AQCR (predominantly the Atlanta area) are nonattainment for ozone.

Plant Yates has been issued four operating permits (Nos. 4911-038-4838-0; -4839-0; -4840-0; and -4841-0) by the Georgia DNR for four sources (serving the seven units) at the plant. These are identified as source 1 (Units 1, 2, and 3) and source 2 (Units 4 and 5) discharging into separate liners sharing a common stack. Sources 3 and 4 (Units 6 and 7, respectively) each are exhausted into separate liners, sharing a separate stack. In general, these permits require annual stack testing for each source, maintenance of an excess emissions monitoring system for each source, and certain recordkeeping and reporting requirements.

The CT-121 demonstration project will entail flue gas treatment of a small percentage (approximately 12%) of the total flue gas currently generated. Thus, the effect of the project on overall air quality in the area will be slight. Since a temporary 250-foot stack (new point source) will be constructed and operated for exhaust of the CT-121 treated flue gas, a temporary construction and operation permit will be secured from the Air Quality Division of the Georgia DNR. The permitting requirements have been generally discussed with pertinent agency staff. Issuance of the authorization is expected to be administrative in nature and will probably take no more than two to three months, including the time period for public notice.

The project will not trigger new source review under the federal or state New Source Performance Standards (NSPS) or under the Prevention of Significant Deterioration (PSD) program. Although these are categorical standards under the NSPS rules for electric utility steam-generating units, addition of the CT-121 units will not entail the construction of a new source (i.e., a new boiler) nor will it constitute a modification or a reconstruction of the existing unit as those terms are defined in 40 CFR, Secs. 60.14 and 60.15, respectively. Although the project is located in an attainment area, the PSD program will not be triggered. The project will not entail construction of a new major stationary source. Further, it will not consist of a major modification of the existing facility since the project will not result in a significant net emissions increase in any pollutant regulated under the Clean Air Act.

As demonstrated in Section 4.1.1.2, fugitive emissions during the operations phase from the limestone processing area and possibly from the gypsum stack will be minimal (i.e., 10 to 12 lb/day). There are no applicable permitting requirements; the low volume of fugitive particulates coupled with the observance of appropriate control measures (covering, wetting) will ensure that the "no nuisance" provisions of the state's rules will be achieved.

As discussed in Section 4.1.2, on-site fabrication of the fiberglass-reinforced plastic JBR by Ershigs, Inc. will last approximately 8 to 10 weeks. Total volatile organic compound (VOC) emissions during this period are estimated at between 6 and 8 tons. The Georgia DNR's VOC rules require: (a) state approval for any source in Coweta County that emits greater than 25 tons per year of VOCs; and (b) use of reasonably available control technology. Based upon the emission estimates presented above, it does not appear that a state permit will be required for the temporary fabrication activities. However, the Georgia DNR will be notified of the temporary fabrication activities and supplied with the emission estimates, material data safety sheets, and a process description to verify applicable requirements prior to commencement of construction. Any permitting activity, if required, will be handled by Ershigs.

5.2 Wastewater

The discharge of wastewater into the Chattahoochee River at Plant Yates is regulated under the federal and Georgia Clean Water Act. The Georgia DNR has been delegated the federal NPDES permitting program by the U.S. EPA. Plant Yates has been issued an NPDES Permit GA0001473 by the Environmental Protection Division of the Georgia DNR which authorizes the following outfalls: intake screen backwash, condenser cooling water discharge, ash transport water discharge, sump emergency overflows, cooling tower blowdown, and the final plant discharge. Effluent quality requirements are summarized in Table 5-1.

An amendment to this permit will not be required for the CT-121 project. The CT-121 process is essentially a zero-discharge process in which process water is reused. There may be nonroutine discharges from the gypsum stacking area; however, a discharge would only occur during an exceptional rainfall event and the discharge would be routed via an overflow line to the existing ash pond. The Environmental Protection Division of the Georgia DNR has been notified of this internal, intermittent discharge, and upon commencement of the project, will be notified by letter. The need for a nonroutine discharge will be minimized by design and construction of the stacking area to contain a routine volume of process water plus the rainfall from a 10 year, 24-hour rainfall event.

With respect to potential nonpoint source contaminant contributions, the Georgia Erosion and Sedimentation Act of 1975 requires a permit for certain land-disturbing activities and utilization of runoff controls. Georgia Power Company, as a public utility, is expressly exempted from the permitting requirements. Nevertheless, the conservation practices mandated by the statute will be complied with to the extent practicable.

TABLE 5-1. PLANT YATES NPDES PERMIT (GA0001473) LIMITATIONS (SUMMARY)

Outfall/Parameter	Limitation (mg/L)
<u>Condenser Cooling Water</u>	
Total Residual Chlorine	0.20
Flow	NA
<u>Ash Transport Water</u>	
Total Suspended Solids (TSS)	30 (daily average)/ 100 (daily maximum)
Oil and Grease	15/20
Flow	NA
<u>Building Sump Overflow</u>	
TSS	30/100
Oil and Grease	15/100
Flow	NA
<u>Cooling Tower Blowdown</u>	
Free Available Chlorine	0.20 (average)
Total Chromium	0.2 (daily maximum)
Total Zinc	1.0 (daily maximum)
Flow	NA
<u>Final Plant Discharge</u>	
pH, S.U.	6-9/monthly grab
Flow	NA

NA = Not Applicable (although there is an annual reporting requirement).
S.U. = Standard Unit.

5.3 Solid Waste

Plant Yates is authorized to operate an on-site fly ash landfill pursuant to Solid Waste Management Permit No. 038-011D(L)(I) issued by the Georgia DNR. Since the CT-121 project will not result in the generation of significantly different quantities of ash than would otherwise be produced by operation of a coal-fired boiler, no permit amendment will be required.

The CT-121 process will, however, produce a new solid by-product in the form of gypsum and a gypsum/fly ash mixture. This material, produced at approximately 11 lb/MMBtu of feed coal, will be generated during the removal of SO_2 from the flue gas and subsequent precipitation of calcium sulfate (gypsum) in the JBR. An on-site gypsum stack is proposed for the Plant Yates project. No stabilization or pretreatment of the gypsum will be necessary.

A permit will be required for construction and operation of the gypsum stacking area. The units will be permitted under the solid waste management rules of the Land Protection Branch of the Georgia DNR. An application will be submitted well in advance of construction; permitting is not expected to be a lengthy process.

5.4 Water Supply

Plant Yates has been issued a state surface water withdrawal permit (No. 038-1291-02) for a maximum of 666 MGD of industrial process water needs and a state ground-water appropriation permit (No. 4038K0672) for potable water needs. Although process water needs will slightly increase for the CT-121 project (approximately 0.14 MGD), the additional volume is well within the surface water withdrawal permit allowable; therefore, additional water rights will not be necessary.

5.5 Hazardous

Operation
generation of hazar
servation and Recov
Act. No RCRA permi
generate small quan
construction activi
as a generator and

state standards are met. During construction, the contractor will comply with the site rules and regulations concerning health and safety procedures.

The operations phase of the CT-121 project is not expected to require the storage and/or use of any "extremely hazardous substance" as that term is defined under the federal Superfund Amendments and Reauthorization Act (SARA) Title III (Emergency Planning and Community Right-To-Know) and the Georgia Right-To-Know Act. Thus, no SARA Title III emergency planning and release notification appears applicable to the project.

It is possible that Ershigs will temporarily store substances designated by the U.S. EPA as "extremely hazardous substances" (solvents) on site during the fiberglass-reinforced plastic fabrication phase of construction activities, estimated to be 8 to 10 weeks. If so, Ershigs will provide the SARA emergency planning notice to the following agency:

Georgia Local Emergency Planning Committee
Environmental Protection Division
Georgia Department of Natural Resources
205 Butler Street, S.E.
Suite 1152
Atlanta, Georgia 30334
(404) 656-6905

Since the SARA process is not a permitting process, there are no time delays associated with compliance, if required, as a result of Ershigs' temporary activities.

5.8 Floodplain/Wetlands

5.8.1 Floodplain

Appendix B to this document presents a floodplain map of Plant Yates. Although portions of the plant are located in floodplain areas, none of the elements of the CT-121 demonstration project will be situated in these areas. Thus, no impacts to floodplain values are expected, and no state/local floodplain protection programs will be applicable to the demonstration project.

5.8.2 Wetlands

The primary regulatory significance of the presence of wetlands at a project relates to the dredge and fill permitting program of the U.S. Army Corps of Engineers (COE). The U.S. COE issues permits for, among other things, the discharge of dredged or fill material into wetlands that are adjacent to "waters of the U.S." None of the elements of the CT-121 process are expected to impact wetland areas and, in any event, no dredging or filling will be required. The elements are well-distanced from the river where wetlands could potentially be present; the area affected by the project is not inundated by surface or ground water to support vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction of hydrophilic flora typically associated with wetlands.

5.9 State Environmental Impact Assessment Process

The State of Georgia has not enacted an environmental impact assessment process. Thus, no NEPA-type procedures are required at the state or local level.

6.0 LIST OF PREPARERS AND PROFESSIONAL QUALIFICATIONS

This Environmental Information Volume was prepared by Radian Corporation. The qualifications of the principal project members are summarized below. Appendix C consists of the resumes of these individuals.

The Project Director for preparation of this report is Dr. Robert G. Wetherold, a chemical engineer with 23 years experience in the direction of chemical, petroleum refining, synfuels, and environmental programs. Ms. Leslie E. Barras is primarily responsible for preparation of this document. Ms. Barras is a staff attorney with four years of multi-media environmental experience at the federal, state, and local level.

Mr. A. Frank Jones and Mr. Greg Stevens assisted in the air, water, and waste impact evaluation. Mr. Jones is a chemical engineer with 6 years experience, primarily in electric utility water management and flue gas desulfurization (FGD) systems. Mr. Stevens is also a chemical engineer with three years experience in electric utility FGD systems.

The following SCS and Georgia Power Company personnel also provided input to this report:

Mr. Daniel H. Warren
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Birmingham, Alabama 35209
(205) 870-6947

Mr. Jim Redwine, Plant Siting & Geological Services
Southern Company Services, Inc.
49 Inverness Parkway
Birmingham, Alabama 35209
(205) 877-7303

Messrs. Don Holder and George N. Guill
Georgia Power Company
333 Piedmont Avenue, N.E.
Atlanta, Georgia 30308
(404) 526-7039

7.0 REFERENCES AND CONTACTS

7.1 References

1. Radian Corporation. Evaluation of Chiyoda Thoroughbred-121 FGD Process and Gypsum Stacking. Volume 1: Chiyoda Evaluation, prepared for Southern Company Services, Inc. Electric Power Research Institute (EPRI). Report CS-1579, Volume 1, October 1980.

2. Radian Corporation. Results of 30-Day Performance Test and Baseline Characterization Study of Abbott Plant Chiyoda Thoroughbred-121 FGD Process. Prepared for Electric Power Research Institute (EPRI). Research Project 2865-1, Final Report, January 1989.

3. Gilbert, B. R., et al. "*Simultaneous* SO_2 *and Particulate Removal in a* Jet Bubbling Reactor." Presented at the EPA/EPRI Combined FGD and Dry SO_2 Control Symposium, St. Louis, Missouri, October 25-28, 1988.

4. U.S. Environmental Protection Agency. Compilation of Air Pollution Emission Factors, AP-42, Fourth Edition, September 1985; Supplement B, September 1988.

5. Radian Corporation. Evaluation of Chiyoda Thoroughbred-121 FGD Process and Gypsum Stacking. Volume 3: Testing the Feasibility of Stacking FGD Gypsum, prepared for Southern Company Services, Inc. Electric Power Research Institute (EPRI) Report CS-1579, Volume 3, November 1980.

6. Pierce, R. R., 1977, Chem. Eng. 84 (April 11): 125-128. [As referenced in Kohl, A. L., and Riesenfeld, F. C. Gas Purification. Gulf Publishing Company, Houston, Texas, 1979.]

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8. Radian Corporation. Internal Document.

9. Damle, A. S., D. S. Ensor, and L. E. Sparks. Options for Controlling Condensation Aerosols to Meet Opacity Standards. Journal of the Air *Pollution Control Association*, 37(8), 925-933 (1987).

10. McConnell, K. I., and Charlotte E. Abrams. Geology of the Greater Atlanta Region. Georgia Geological Survey Bulletin 96, 1984.

11. Cressler, C. W., C. J. Thurmond, and W. G. Hester. Ground Water in the Greater Atlanta Region. Georgia Geologic Survey Information Circular 63, 1983.

7.2 Contacts

Georgia Department of Transportation
Public Information Division
Atlanta, Georgia
(404) 656-5267

Newnan-Coweta Chamber of Commerce
Post Office Box 1103
Newnan, Georgia 30264
(404) 253-2270

National Bureau of Indian Affairs
Washington, DC
(202) 343-1710

National Park Service
U.S. Department of Interior
Washington, DC
(202) 343-3761

APPENDIX A

CONFIDENTIAL

DOCUMENTATION
YATES ELECTRIC GENERATING STATION
COWETA COUNTY

CULTURAL RESOURCE MANAGEMENT
SCS/DOE EXPERIMENT PROJECT
RESOURCE INVENTORY I

GEORGIA POWER COMPANY
1988

FOR OFFICIAL USE ONLY

INTRODUCTION

CRM studies at the Plant Yates Project Area consisted of a thorough review of literature-data sources, and an on-site reconnaissance of the proposed facility locations. Studies were undertaken by the Cultural Resources Management program, Land Department, Georgia Power Company. It should be noted that the specific location and nature of archaeological properties in the vicinity of Plant Yates, or on the proposed facility locations, are not given herein. This information has not been provided, given the provisions of Section 304; 16 U.S.C. 470 (as amended 1980), in order to avoid the potential for theft, harm or destruction to these properties.

Numerous prehistoric and historic archaeological properties have been previously recorded in the vicinity of Plant Yates. However, no inventory of the Plant Yates site has been conducted.

STUDIES AND RESULTS

(1) Literature-Data Search

The objectives of this research were to identify any previously recorded cultural properties within the Plant Yates project area and to review all relevant local and regional archaeological research. Initial research consisted of the identification of previously recorded cultural properties within a two (2) mile radius of Plant Yates. The focus was on Coweta and Carroll Counties, Georgia. The Georgia State Site and Report Files were examined to obtain this information. Examination of the files for the respective counties and inspection of the Whitesburg USGS 7.5 minute Quad sheet (utilized in conjunction with the files) revealed several previously recorded prehistoric and historic archaeological sites within the immediate vicinty of the project area.

Several published reports for this area have been recorded within the past 15 years. These reports deal primarily with cultural resource survey and testing activites in several counties of West Central Georgia (Johnson 1980; McKenzie and Sheldon 1977; and Simpkins and Larson 1974). Information pertinent to the current study was obtained from the above listed reports, as well as research files at the University of Georgia, map files and archives at the Georgia Power Company (Atlanta), and through conversations with residents of Coweta County.

The State Historic Preservation Office (SHPO) was consulted in order to review the current status of the comprehensive state historic preservation plan. Archaeological and architectural report files for Carroll and Coweta counties were reviewed, and a determination was made as to the potential presence of National Register Properties within the project vicinity.

Documentary archaeological research was also undertaken at the University of Georgia Library (Athens). Published archaeological monographs, research reports, and journals were examined for information on local and regional culture history, excavation data, and site descriptions.

(2) On-Site Data Collection

An on-site reconnaissance of the Plant Yates project area was undertaken on December 22, 1988. This examination was conducted by Mr. James J. Shive and Mrs. JoLee A. Gardner of Georgia Power Company, Atlanta. The purpose of this visit was to: 1) gather general data on project configuration, property line definition, disturbances and surface visibility; 2) record general environmental data; and 3) visit any potential cultural properties within the project area.

The project area at Plant Yates was subdivided into four areas following the initial reconnaissance work. Area A is located within the proposed three (3) acre tract for the gypsum storage facility. Archaeological and architectural evidence revealed the remnants of several historic features. These features included a standing privy, a well, structural remains of a well house, fencing, and a dump site composed of domestic refuse.

Shovel cuts were placed at thirty (30) meter intervals across Area A. This was done to determine the size, depth, and extent of the historic component. The following stratigraphic information was determined though the shovel tests: a heavy layer of pine straw and leaf litter was directly on the ground surface. Immediately below the surface material was a humic layer of decomposed leaf matter (3-4cmbs), followed by a medium gray sandy soil (4-8cmbs). Underlying these soils was a slightly mottled sandy orange clay (sterile subsoil; 8-15 cmbs). Historic artifacts (i.e, wire nails, container glass, whiteware, and plastic) were recovered from the surface as well as the medium gray zone.

Area B is the approximately six (6) acre tract of land that is the proposed site for the run-off pond and holding dike (dam). Reconnaissance in this area revealed historic agricultural terracing along both sides of an unnamed creek branch. The dominant deciduous vegetation in this area includes Pine, Sweet Gum, Magnolia, Oak, and Beech. Additionally, the presence of cane, as well as several other types of grasses and sedges along the creek edge indicate disturbance related activities often associated with the erosion and meandering of an active stream. It is suggested that this area has been relatively undisturbed for the past 50-60 years as evidenced by the size of the overstory trees and the lack of substantial understory. [Note: This area was part of a controlled burn 7-10 years ago, thus contributing to the minimal undergrowth.]

Remnants of a woven wire fence were observed at various points along the creek. No additional archaeological or architectural features were noted within Area B. Shovel cuts were made along the top of the terraces, revealing a moderate accumulation of pine straw underlain by a very thin humic level. Directly below was a mixed orange/brown sandy clay soil extending approximately 6-8 cmbs. A red/orange sandy clay was then observed at the base of the shovel cuts. No cultural materials were recovered from these tests.

Along the terraces in the vicinity of the proposed dike (dam) there were several areas where quartz outcrops could be seen. In addition, marl-like clay pockets were abundant along the base and sides of the creek bed. The presence and availability of these types of resources would suggest the suitability of this area for settlement by prehistoric and historic populations.

Area C is a five (5) to seven (7) acre tract of land that has been designated as the site of a gypsum ash storage facility. Area C is located adjacent to an existing access road and railroad right-of-way. A substantial portion of this area has been used as a borrow pit. The borrow area is currently the site of a large parking area and target range that has been leveled and covered with gravel. Additionally, land clearing activities associated with an adjacent transmission line indicate substantial ground disturbance. Massive rock outcrops were present at the ground surface along the transmission line right-of-way. Dominant vegetation in Area C is Pine with several types of grass and greenbriar in the open, disturbed areas.

Several machine parts and unidentified metal fragments were noted in the vicinity of the transmission towers. The corroded and fragmentary nature of these parts would indicate exposure to the elements over an extended period of time. It is thought that these materials were associated with the construction of the line. Given the disturbed nature of Area C no shovel cuts were completed and no artifacts were collected.

Area D is located in the southwest corner of the Plant Yates facility, and has been designated as the site of a limestone storage and processing facility. Area D is approximately 150 feet wide (46 meters) and 300 feet long (91.5 meters) Reconnaissance revealed several areas exhibiting disturbed ground surfaces. An access road is located along the northeast side of Area D.

The eroded road surface slopes gently to the southwest onto an old landfill associated with the construction of the plant. A walk over of this tract revealed enormous quantities of corroded machine parts, chunks of concrete, gravel and sand, as well as glass and industrial ceramic materials protruding from the surface.

The extreme western edge of Area D parallels the Chattahoochee River. This western edge is approximately 30 feet (9 meters) in height above the surface of the river. A view over the edge revealed large boulders, logs, construction material and metal debris. Disturbance vegetation (i.e., honeysuckle, greenbriar, and several types of grasses) are present in this area. Trees bordering the edge of Area D are primarily pine with an occasional hardwood. One additional intrusion was a large single wooden wall-like structure in the center of the tract. Its use was not determined. No shovel cuts were completed in this area. No artifacts were collected.

ADDITIONAL CRM ACTIONS PROPOSED

The Grantee, prior to project development will cause to be undertaken, the following actions:

1) A Cultural Resources Inventory will be made of the proposed runoff pond and adjacent construction area (Area B). A similar study will also be made of the proposed gypsum storage area (Area A) which is located outside recent, extensive ground distrubances. No inventory will be undertaken of the proposed gypsum ash storage pond or

the limestone storage and processing facility. Should archeological properties be encountered in Areas A and B, studies will be undertaken to gather data sufficient to determine their context under the criterion of the National Register of Historic Places.

2) All studies will be undertaken in consultation with the SHPO, Atlanta Georgia. These studies will be consistent with the Secretary of Interior Standards for Archaeology and Historic Preservation. Determination of National Register eligibility will be by consensus, as provided for in 36 CFR 800.4 (c)(2)-(3).

3) Should National Register eligible archaeological properties be identified, the Grantee will cause to be undertaken actions to mitigate potential adverse effects which could result from project development. This is to be done in consultation with the SHPO for Georgia.

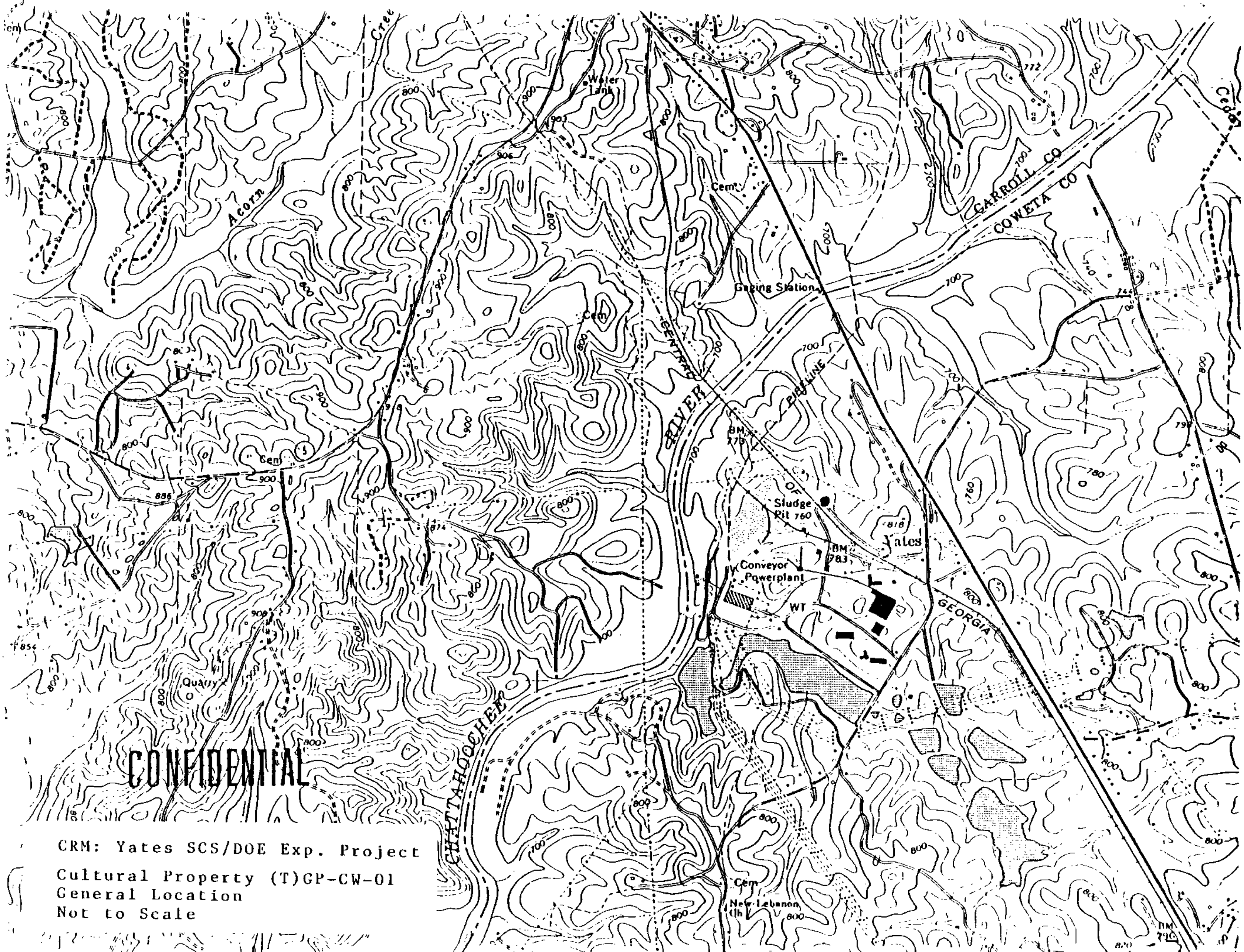
4) No Federally recognized tribal groups are located in Georgia. Therefore, the project would have no effect upon resources of traditional interest to American Indian peoples.

REFERENCES CITED

Johnson, Kenneth W.
1980 Culture Chronology of the Western Georgia Piedmont. Unpublished Masters Thesis, Florida Atlantic University, Boca Raton, Florida.

McKenzie, Harvey K. and Craig T. Sheldon
1977 Archeological Survey of the Plant Wansley Pumping Station, Plant Yates Power Transmission Right-of-Way in Carroll and Coweta Counties, Georgia. West Georgia College, Office of the State Archeologist.

Simpkins, Daniel L. and Lewis H. Larson
1974 An Archeological Survey of Carroll, Haralson, and Paulding Counties, Georgia. Vol. I - III. West Georgia College, Office of the State Archeologist.

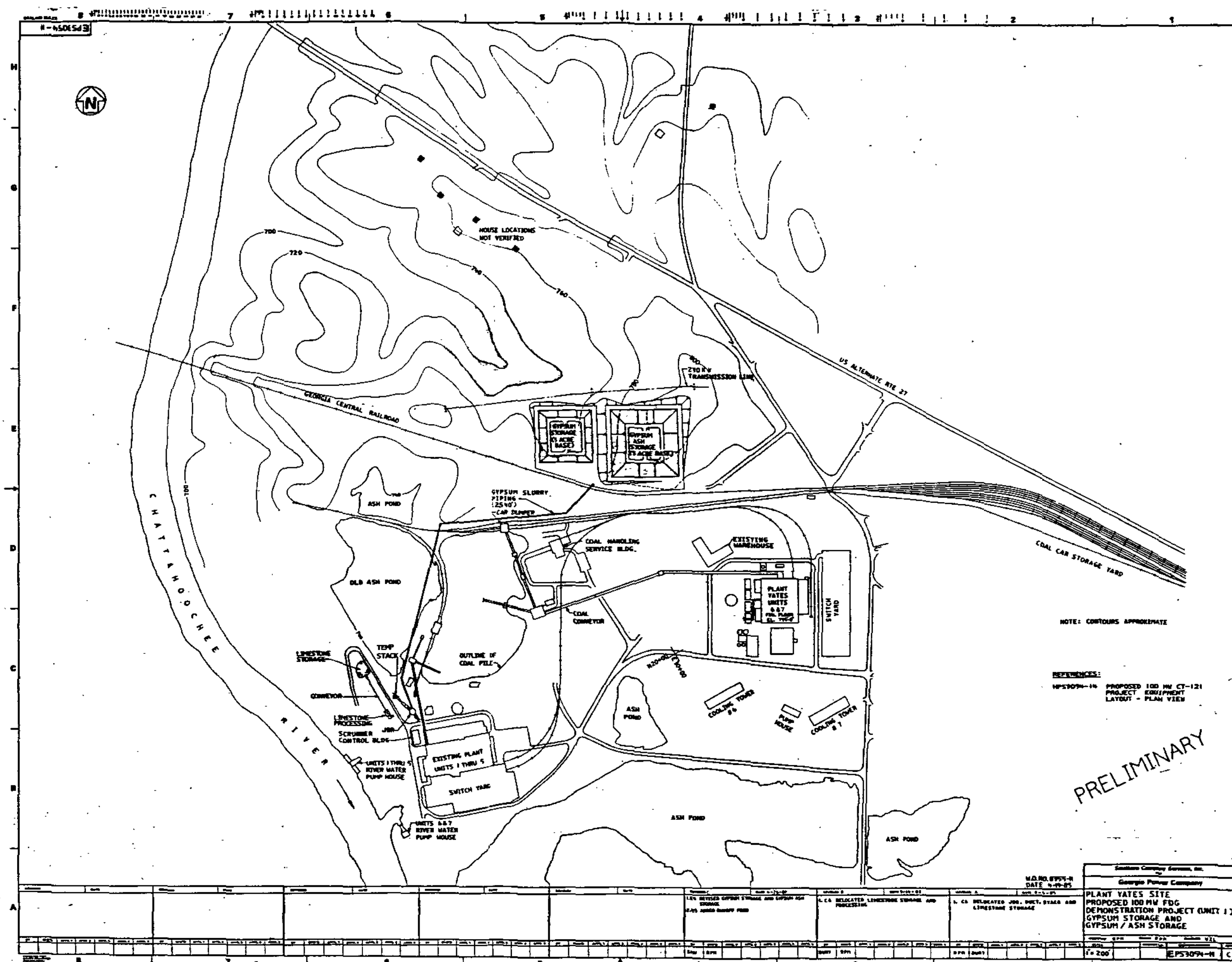


CONFIDENTIAL

CRM: Yates SCS/DOE Exp. Project

Cultural Property (T)GP-CW-01
General Location
Not to Scale

APPENDIX B



EPS3054-H
HOUSE LOCATIONS NOT VERIFIED
700
720
740
760
210 KV TRANSMISSION LINE
US ALTERNATE RTE 27
GEORGIA CENTRAL RAILROAD
GYPSUM STORAGE (5 ACRE BASE)
GYPSUM ASH STORAGE (5 ACRE BASE)
CHATTAHOOCHEE RIVER
ASH POND
GYPSUM SLURRY PIPING (2540')
CAR DUMPER
COAL HANDLING SERVICE BLDG.
EXISTING WAREHOUSE
COAL CAR STORAGE YARD
OLD ASH POND
PLANT YATES UNITS 6 & 7
SWITCH YARD
COAL CONVEYOR
NOTE: CONTOURS APPROXIMATE
TEMP STACK
LIMESTONE STORAGE
OUTLINE OF COAL PILE
REFERENCES:
HPS3094-14 PROPOSED 100 MW CT-121 PROJECT EQUIPMENT LAYOUT - PLAN VIEW
CONVEYOR
COOLING TOWER #6
PUMP HOUSE
COOLING TOWER #7
LIMESTONE PROCESSING
JBR
SCRUBBER CONTROL BLDG
EXISTING PLANT UNITS 1 THRU 5
UNITS 1 THRU 5 RIVER WATER PUMP HOUSE
SWITCH YARD
PRELIMINARY
UNITS 6 & 7 RIVER WATER PUMP HOUSE
ASH POND
W.O.NO. 8955-N
DATE 4-19-85
Southern Company Services, Inc.
Georgia Power Company
PLANT YATES SITE
PROPOSED 100 MW FDG DEMONSTRATION PROJECT (UNIT 1)
GYPSUM STORAGE AND GYPSUM / ASH STORAGE
1"=200'
EPS3094-H
C

APPENDIX C

ROBERT G. WETHEROLD

EDUCATION:

Ph.D., Chemical Engineering, University of Texas at Austin, 1970.

M.S., Chemical Engineering, Texas A&M University, College Station, 1962.

B.S., Chemical Engineering, Texas A&I University, Kingsville, 1960.

EXPERIENCE:

Principal Engineer, Radian Corporation, Austin, TX, 1988-Present.

Senior Staff Engineer/Group Leader, Radian Corporation, Austin, TX, 1976-1987.

Senior Engineer, Radian Corporation, Austin, TX, 1975-1976.

Associate Engineer, Mobil Chemical Company, Edison, NM, 1975.

Senior Development Engineer, Mobil Chemical Company, Beaumont, TX, and Edison, NJ, 1969-1975.

Research Engineer, Chevron Research Corporation, Richmond, CA, 1962-1963, 1965.

FIELDS OF EXPERIENCE:

Dr. Wetherold is a Principal Engineer at Radian. He participates in projects involving the petroleum refining, chemical, and synthetic fuels industries. Dr. Wetherold is particularly interested in the areas of process feasibility studies, technology assessments, air pollution measurement/control, environmental monitoring, and solid waste disposal.

Dr. Wetherold is currently serving as the Project Director for the Environmental Monitoring Program for the Cool Water Coal Gasification Program (CWCGP). The CWCGP operates an integrated combined-cycle coal gasification plant in Daggett, California. Complete environmental monitoring are being performed over the initial five years of operation for this first commercial electricity-producing coal gasification plant. Dr. Wetherold's responsibilities include overall project management, process/analytical data management, emission/process data reduction and evaluation, material balance calculations to determine fates of pollutants, evaluating performance of pollution control systems in the plant, and reporting.

Dr. Wetherold is also currently serving as an in-house consultant and peer reviewer in the area of HAZOP surveys and risk assessment programs in the chemical processing industry.

Robert G. Wetherold

Dr. Wetherold was the Task Director for a recent EPA Work Assignment to assess the effectiveness of control techniques currently in use at hazardous waste treatment, storage and disposal facilities (TSDFs) to reduce volatile organic emissions to the atmosphere. A major part of this program involved the collection of field measurements of controlled and uncontrolled volatile organics emissions and control equipment operating information from operators of selected TSDFs. An aerated surface impoundment at a chemical plant and a petroleum refinery landtreatment operation were studied. The data collected at these sites are being used to determine control efficiencies, costs, and typical operating procedures of control techniques.

Dr. Wetherold was the engineering Task Director for an EPA project to measure atmospheric emissions from hazardous waste disposal facilities. A number of disposal technologies, such as landfilling, landtreatment, a surface impoundments, water treatment units, storage tanks, etc., were examined. Both vented and fugitive emissions from these sources were measured, and the results were used to evaluate existing mathematical models of these technologies. Refinements to existing models or development of new models were considered.

Dr. Wetherold recently served as Project Director in a two-phase study for the American Petroleum Institute to assess the atmospheric emissions of volatile organic compounds (VOC) from the landtreatment (landfarming) of refinery oily sludges. The effects of a number of variables on the mass and rate of fugitive VOC emissions from landfarming were determined through experimental measurements. The various parameters were correlated to the atmospheric emission rates of hydrocarbons. An empirical model was developed to relate emission rate to sludge properties and operating parameters.

Dr. Wetherold served as Task Director in an EPA program to prepare pollution control technical manuals (PCTM) for indirect coal liquefaction processes. The effort involved the development of conceptual process designs for several base case coal conversion facilities, including the design and evaluation of gas cleanup and sulfur recovery units. The various control options were evaluated and their effectiveness, efficiency, and cost were defined.

Dr. Wetherold was the Engineering Task Director for an EPA-sponsored program to measure atmospheric emissions from volatile materials which are present in or above contaminated ground waters. This work involves the development of a standard method for measuring surface emissions, measurement of emissions at selected test sites, and development of a model(s) to describe the emission phenomena.

Dr. Wetherold also served as an in-house engineering consultant in a joint government-industry project to clean up a hazardous waste disposal site on the West Coast. Site evaluation and characterization studies have been completed. A plan to clean up and reclaim this site is now being prepared. Radian will also supervise the clean-up effort.

Dr. Wetherold has had an extensive background in the measurement, evaluation, and control of VOC emissions from both point and fugitive sources. He was the

Robert G. Wetherold

Project Dirctor for a study to assess the effectiveness of maintenance practices in reducing fugitive VOC emissions from synthetic organic chemical manufacturing plants. This program involved extensive monitoring and testing in several types of organic chemical manufacturing plants (including ethylene plants). The maintenance effectiveness, leak occurrence rates, and leak recurrence rates were defined for various types of valves.

Dr. Wetherold served as Project Director in an industrial program to evaluate and recommend control processes to reduce hydrocarbon emissions from a plastics manufacturing plant. Emission sources were identified and measured to define the parameters needed in defining potential control systems. Incineration systems, solvent recovery units, and vapor recovery systems were evaluated. The technical and economic feasibilities of each were analyzed, and recommendations were made for systems to reduce emissions to several different levels.

In a study performed for the EPA, Dr. Wetherold evaluated the feasibility and cost of using carbon adsorption and incineration systems to reduce hydrocarbon emissions from auto assembly plants. The sources of these emissions were the paint spray booths and curing ovens. Conceptual designs were developed for emission control processes for both spray booths and ovens. The technical and economic feasibilities of installing, operating, and maintaining each of these control systems were evaluated. From theoretical considerations and discussions with vendors and operators, the significant design operating parameters were defined. The sensitivity of the costs to variations in these parameters was analyzed.

Dr. Wetherold served as Technical Director of a long-term EPA project to characterize the technology and assess the environmental emissions of petroleum refineries. This project involved an extensive amount of field sampling of fugitive and stack emissions. The efficiencies of various types of control technologies were evaluated through field measurements. The data base generated in this program can be used to: 1) determine the environmental impact of existing and new refineries (including health effects); 2) define the status of control technology and the needs for development of additional controls; and 3) develop emission factors suitable for use in offset analyses for non-attainment areas.

Dr. Wetherold has also participated in EPA-sponsored studies to: 1) determine the impact of proposed amendments to the Clean Air Act on the growth and expansion of the refinery and petrochemical industries; and 2) define the energy penalties incurred in petroleum refineries as a result of environmental regulations.

Dr. Wetherold has also participated in a study for ERDA to characterize waste effluents from coal conversion processes. Included was the development of a conceptual process design for an integrated Synthoil coal liquefaction plant. Heat and material balances were obtained, and the characteristics of effluent gas, water, and solid wastes were estimated.

Robert G. Wetherold

At Mobil Chemical, Dr. Wetherold was employed in the Research and Development Laboratories. He participated in the development of fixed bed catalytic processes for the isomerization of xylenes and disproportionation of toluene. Included in these studies were pilot plant startup and operation, catalyst evaluation, and economic evaluations. Two of these processes have been commercialized. In connection with these pilot plant studies, Dr. Wetherold developed computer techniques and programs for automatically controlling the pilot plants, logging the data, and performing process evaluation calculations. An IBM 1800 computer was used in these applications.

Dr. Wetherold was instrumental in the initiation and development of a superior benzene alkylation process. He was responsible for the design, construction, and startup of alkylation process pilot plants. These units included fixed bed catalytic reactors containing an exothermic gas/liquid high pressure reaction. Other duties included process evaluation studies and economic evaluations. Dr. Wetherold served as Technical Advisor for the design and operation of a commercial demonstration unit. He is a co-holder of a patent for this process (U.S. 3,751,504).

Dr. Wetherold participated in the design and construction of a semi-commercial size (150,000 lb/month) plant for the semi-batch production of a polymeric organic liquid. He was in charge of startup, process development studies, and production. Dr. Wetherold was able to improve the process by 30 percent through engineering studies and optimization of operating conditions.

Dr. Wetherold supervised the blending of oil additives packages (up to 1,000,000 lb/month). He was responsible for raw materials handling and storage, blending and equipment scheduling, process improvement, and bulk and drum shipping. He was able to significantly improve blending-cycle times and product quality.

While employed at Mobil Chemical, Dr. Wetherold also served as Production Engineer and Technical Advisor for a catalyst manufacturing plant. He was responsible for plant startup, production schedules, product quality, and process and product quality improvement studies. Dr. Wetherold was also responsible for pilot plant development of processes to manufacture crude oil additives and flame retardants.

At Chevron Research Corporation, Dr. Wetherold was assigned to the Process Design Division. In this position, he participated in the development of process designs for petrochemical and petroleum refining processes. These included hydrocracking units, hydrotreating plants, crude oil distillation columns, distillation trains, asphalt trains, and olefin units. Work included all phases of process design from conception to final report.

Dr. Wetherold also worked in process simulation while employed at Chevron. He participated in the updating and improvement of existing computer programs such as distillation column design and correlation of hydrocarbon physical and thermodynamic properties. He was a co-developer of a computer program for the design of gasoline splitters and participated in the development of a program for the design of atmospheric crude oil distillation columns.

HONORARY AND PROFESSIONAL SOCIETIES:

American Institute of Chemical Engineers, Sigma Tau, Omega Chi Epsilon.

PUBLICATIONS/REPORTS:

Wetherold, R.G., B.M. Eklund, B.L. Blaney and S.A. Thorneloe, "Assessment of Volatile Organic Emissions from a Petroleum Refinery Land Treatment Site," presented at the National Conference on Hazardous Wastes and Hazardous Materials, Atlanta, GA, March 4-6, 1986.

Wetherold, R.G., B.M. Eklund and T.P. Nelson, "A Case Study of Direct Control of Emissions from a Surface Impoundment," presented at the Eleventh Annual EPA Research Symposium (Land Disposal, Remedial Action, Incineration and Treatment of Hazardous Waste), Cincinnati, OH, April 29-May 1, 1985.

Wetherold, R.G. and W.D. Balfour, "Volatile Emissions from Land Treatment Systems," presented at the Conference Land Treatment - A Hazardous Waste Management Alternative (sponsored by the University of Texas at Austin and the U.S. Environmental Protection Agency), Austin, TX, April 16-18, 1985.

Wetherold, R.G., G.E. Harris, J.I. Steinmetz, and J.W. Kamas, "Economics of Controlling Fugitive Emissions," Chemical Engineering Progress 79(11), 43, November 1983.

Weber, R.C., G.J. Langley, and R.G. Wetherold, "Reduction of Fugitive Volatile Organic Compound (VOC) Emissions by On-Line Maintenance," presented at 181st American Chemical Society National Meeting, Atlanta, GA, Division of Environmental Chemistry, March 30, 1981.

Wetherold, R.G., D.D. Rosebrook, and E.W. Cunningham, "Assessment of Hydrocarbon Emissions from Landtreatment of Oily Sludges," presented at the Seventh Annual Research Symposium, sponsored by the U.S. Environmental Protection Agency (Office of RD&D) at Philadelphia, PA, March 16-18, 1981.

Randall, J.L., R.G. Wetherold, et al., "Airborne Hydrocarbon Emissions from Landfarming of Refinery Wastes - A Laboratory Study," presented at Symposium on Fugitive Hydrocarbon Emissions at the 181st National Meeting of the American Chemical Society, Atlanta, GA, 1981.

Wetherold, R.G., R.M. Mann, et al., "Environmental Test Results for the Ruhrkohle/Ruhrchemie Coal Gasification Pilot Plant," presented at the Symposium on Environmental Aspects of Fuel Conversion Technology-VI, A Symposium on Coal-Based Synfuels, Denver, CO, October 26-30, 1981.

Provost, L.P., R.G. Wetherold, and D.D. Rosebrook, "Quality Assurance Procedures and Statistical Analysis of Fugitive Emission Data from Petroleum

Refineries," presented at conference on Quality Assurance in Air Pollution Measurement, cooperatively sponsored by the Air Pollution Association and the American Society for Quality Control, Grand Hotel, New Orleans, LA, March 11-14, 1979.

Rosebrook, D.D., R.G. Wetherold, C.D. Smith, G.E. Harris, and I.A. Jefcoat, "The Measurement of Fugitive Hydrocarbon Emissions from Selected Sources in Petroleum Refineries," presented at the 71st Annual Meeting of the Air Pollution Control Association, Houston, TX, June 1978.

Rosebrook, D.D. and R.G. Wetherold, "Fugitive Emissions - Current and Projected Studies," presented at 76th Annual Meeting of the National Petroleum Refiners Association, San Antonio, TX, March 19-21, 1978.

Rosebrook, D.D., R.G. Wetherold, and G.E. Harris, "The Assessment of Atmospheric Emissions from Petroleum Refining," presented at the Process Measurements for Environmental Assessment Symposium, New Orleans, LA, sponsored by the Environmental Protection Agency, February 1978.

Jefcoat, I.A., L. Short, R.G. Wetherold, "Fugitive Emission Control Strategies for Petroleum Refineries," presented at Refinery Emissions Symposium/Workshop, Jekyll Island, GA, sponsored by the Environmental Protection Agency, April 26-28, 1978.

Wetherold, R.G., E.H. Wissler, and K.B. Bischoff, "An Experimental and Computational Study of the Hydrolysis of Methyl Formate in a Chromatographic Reactor," Advances in Chemistry, Series 133, 1974.

Wetherold, R.G., "An Experimental and Computational Study of a Chromatographic Reactor," Ph.D. Dissertation, University of Texas at Austin, 1970.

Wetherold, R.G., "A Convergence Method (Computer) for Strippers and Absorbers," M.S. Thesis, Texas A&M University, 1962.

LESLIE ELIZABETH BARRAS

EDUCATION:

J.D., Law, The University of Texas, Austin, TX, 1984.

M.P.A., Public Affairs, The University of Texas, Austin, TX, 1984.

B.A., Political Science, Texas A&M University, College Station, TX, 1980.

EXPERIENCE:

Attorney, Environmental Analysis Department, Radian Corporation, Austin, TX, 1987-Present.

Attorney, Lloyd, Gosselink, Ryan & Fowler, P.C., Austin, TX, 1984-1987, (environmental law practice).

Law Clerk, Booth, Lloyd & Simmons P.C., Austin, TX, 1981-1984, (environmental law practice).

FIELDS OF EXPERIENCE:

Ms. Barras is familiar with the major federal and state environmental statutes relating to the regulation of hazardous waste, solid waste, water quality, air quality, and toxic substances. As an attorney in the Environmental Analysis Department, Ms. Barras' primary function is to ensure that Radian's permitting and compliance reports address applicable federal and state statutory and regulatory requirements.

Hazardous Waste Management

Ms. Barras assists Radian technical staff in helping clients resolve regulatory issues relating to hazardous waste management. She has worked with several large oil refineries on the Texas Gulf Coast on issues involving permitting exemptions and recycling matters, and has been involved in waste characterization matters with respect to a bulk liquid terminal on the Texas Gulf Coast.

Ms. Barras has also prepared and reviewed surface impoundment closure plans for a number of facilities including an Air Force base in the southwestern U.S., an oil refinery in Alaska, and a synthetic chemicals manufacturing plant in the Midwest.

Ms. Barras has further had extensive involvement in the Part B application and permitting process. She has assisted in preparing a response to a Notice of Deficiency for a major oil refinery on the Texas Gulf Coast and reviewing and preparing a response to the draft permit provisions of another refinery in the same locale. She is directly responsible for preparing the general facility management portions, including the training plan and contingency plan, for a proposed commercial hazardous waste incinerator facility in East Texas.

Regulatory Compliance Planning

Ms. Barras undertook primary responsibility for preparation of a regulatory compliance plan for the two Texas sites proposed for location of the Superconducting Super Collider; one of the sites was selected as the candidate locale by the U.S. Department of Energy in November 1988. This task involved several months of intensive research on applicable local, state, and federal requirements as well as numerous contacts with regulatory officials.

More recently, Ms. Barras has completed a regulatory compliance assessment for a national pharmaceuticals company which is relocating an eye care product formulation plant from California to a central Texas location. In addition, to enable a central Texas lime plant to understand the regulatory implications of burning hazardous waste-derived fuels for energy recovery, Ms. Barras developed a detailed environmental compliance document. She is also undertaking ongoing environmental compliance forecasting and planning for two petrochemical plants, one on the Texas Gulf Coast and the other on the Louisiana Gulf Coast.

Environmental/Regulatory Compliance Auditing

With the increased concern of parties to real estate transactions about environmental liability implications, Radian has been extensively involved in site investigations and assessments. Ms. Barras has participated in transactions involving a waste reclamation facility, a cogeneration facility, and a petrochemical plant on the Texas Gulf Coast, a warehouse facility in the Dallas-Fort Worth area, and a commercial office building in central Texas. She has also undertaken an environmental audit of a cement manufacturing facility in north-central Texas.

Ms. Barras has also participated in intensive environmental compliance evaluations for a number of U.S. Air Force Strategic Air Command Bases in Texas. These evaluations involve intensive, one-week assessments of Base compliance in a number of media areas, such as pesticides, waste, air, water, hazardous materials, and polychlorinated biphenyls.

Prior Work Experience

In private practice, Ms. Barras represented individuals, private and public corporations, and municipalities in securing water quality and hazardous waste permits from the Texas Water Commission. Clients included a national commercial hazardous waste management firm, a specialty steel plant, a recreation lodge, and an agricultural concern. She also provided legal input into preparation of applications for these permits and worked with both the legal and technical staffs of the Commission during their review of the applications. Solid waste permitting by the Texas Department of Health for municipal clients is another area in which Ms. Barras served as counsel for municipal applicants. Ms. Barras also had extensive experience in reviewing draft permits for regulatory and legal sufficiency and operational feasibility and negotiated permit conditions with the legal and technical staffs of several regulatory agencies.

The expansion of administrative enforcement powers of the environmental agencies of the State of Texas as well as the federal Environmental Protection Agency provided Ms. Barras further opportunities for environmental counsel. She has negotiated and participated in drafting administrative orders that imposed remediation requirements and monetary penalties on wastewater treatment facilities and hazardous waste management facilities.

The range of her representation of clients in enforcement matters during private practice varied from resolving alleged water quality violations at a vegetable processing plant to alleged hazardous waste violations at creosoting, electroplating, and oil field service facilities. Ms. Barras also participated in resolving administrative enforcement actions brought by the Texas Air Control Board against a number of industrial clients.

PROFESSIONAL SOCIETIES:

State Bar of Texas, Natural Resources and Environmental Law Section

PUBLICATIONS:

Bell, R. and L. Barras. "On-Site Versus Off-Site Incineration to Remediate a Surface Impoundment." Presented at International Conference on Incineration of Hazardous, Radioactive, and Mixed Wastes, University of California at Irvine, May 3-6, 1988.

A. FRANK JONES

EDUCATION:

B.S., Chemical Engineering, Texas A&M University, College Station, TX, 1983.

EXPERIENCE:

Staff Engineer, Radian Corporation, Austin, TX, 1986-Present.

Engineer, Radian Corporation, Austin, TX, 1983-1985.

FIELDS OF EXPERIENCE:

Since joining Radian, Mr. Jones has participated in numerous projects evaluating emission control techniques, water management systems, inorganic water treatment, and chemical and energy processing operations. His primary areas of expertise are electric utility water management and flue gas desulfurization (FGD) systems. As a part of these programs, Mr. Jones has been involved in project management and scheduling, test plan development, process design, economic analysis, development and use of computerized process simulation, field testing of full-scale and pilot units, computerized data collection and reduction, and technical report preparation.

In the utility water management area, Mr. Jones has been involved in several projects evaluating integrated water management systems. These programs have included evaluation of gypsum and calcium carbonate scaling potential; identifying the source of trace species in discharge streams; identifying the potential for unpermitted discharges; evaluating alternative flow configurations; and modelling, integration, and optimization of water management systems.

In the utility FGD area, Mr. Jones has been involved in numerous projects on both pilot and full-scale FGD systems. He has provided on-site engineering at 14 utility FGD systems with a wide variety of designs. These projects have involved the supervision of acceptance tests; testing, design, and optimization of limestone grinding circuits; evaluation of different limestone sources; testing and optimization of dibasic acid (DBA), adipic acid, and thiosulfate addition; designing, evaluating, and modifying mist eliminator washing systems; design of a hydroclone system to dewater FGD sludge; and evaluating and optimizing FGD system water balances.

Mr. Jones's recent experience includes involvement in the following projects.

<u>Water Management System Evaluations</u>

- Mr. Jones is currently involved in a program evaluating the integrated water management system at a lignite-fired electric utility. The water management system includes stormwater treatment, cooling towers, bottom ash sluicing, FGD system, and waste disposal runoff treatment. The objectives of the program include prevention of unpermitted discharges and high concentrations of trace metals in permitted discharges. As the lead project engineer, Mr. Jones is responsible for developing a detailed flow diagram and water balance of the water management system, preparing a computer spreadsheet model to perform flow and chemical specie balances, developing recommendations to solve water management problems, and preparing technical reports.

- Mr. Jones served as the project Director on a program which examined the effect of dry sodium injection for SO_2 removal on the scaling potential (gypsum and calcium carbonate) of water used for fly ash sluicing. Mr. Jones was responsible for test plant development, on-site support, data analysis, and reporting.

- At a lignite-fired electric utility located in the southwest, Mr. Jones has been involved in several programs to simulate, monitor, and optimize the water management system. The integrated system includes a cooling lake, bottom and fly ash sluicing, FGD system, and FGD sludge disposal ponds. Through these programs, the gypsum scaling potential has been reduced while maintaining zero discharge from the plant. Options have also been identified to solve high pH problems in the cooling lake. Mr. Jones's areas of responsibility in these programs have included program planning, test plan development, on-site engineering support, computer model development, data collection and analysis, and report preparation.

- Mr. Jones was involved in a water management program at a natural gas-fired utility. The program involved identifying viable options for wastewater disposal, preparing a computer model to simulate the water management system, and evaluating the options based on regulatory, technical, and cost factors.

- In a program sponsored by EPRI, Mr. Jones evaluated utility responses to a survey covering ash sluice system operating problems. The survey was primarily concerned with utilities which recycled ash sluice water. The survey responses were used to determine the reason for ash sluice water recycle; the types and costs of related operating problems; the types, costs, effectiveness, and savings of corrective actions; and the relative cost of ash sluice operating problems in comparison to problems associated with other major plant water systems.

<u>Flue Gas Desulfurization</u>

- Mr. Jones was involved in a program at New York State Electric and Gas Somerset Station to optimize the FGD system. The optimum set-points for reaction tank density and pH, thiosulfate concentration, and number of hydroclones in service were identified. In addition, recommended modifications to the mist eliminator wash system were installed which significantly reduced scaling and improved the FGD system water balance. Mr. Jones was responsible for test plan development and implementation, data collection and analysis, and reporting for this program.

- Mr. Jones served as a Task Leader for the Unit 4 FGD system optimization project at Texas Utilities Electric Company Sandow Station. The program evaluated the economic and operating trade-offs between dibasic acid addition and limestone utilization, spray pump power, mist eliminator scaling, and sulfur dioxide removal efficiency. This work also included evaluations of the limestone grinding circuit, FGD system water balance, and mist eliminator wash scheme. A hydroclone system was also designed to provide initial dewatering of the reaction tank slurry. Mr. Jones was responsible for test plan development, on-site engineering support, data evaluation, and hydroclone system design.

- Mr. Jones served as the on-site engineer for testing of adipic acid in the Unit 3 FGD system at Indianapolis Power and Light Petersburg Station. His responsibilities included test plan development, sample collection/analysis, data analysis, and reporting.

- Mr. Jones was involved in the process design of the reagent preparation area for pilot wet FGD systems at the EPRI High Sulfur Test Center. Mr. Jones prepared detailed mass and material balances for several different processes used to prepare lime and limestone slurries. He was also involved in design of the process control system.

As a part of programs in other areas, Mr. Jones has performed technical and economic analysis of the various methods of producing electricity, liquid hydrogen, liquid oxygen, and liquid nitrogen; reviewed the research, development, and commercial operating experience in the field of atmospheric fluidized bed combustion; and performed economic analyses of processes such as lime manufacturing, hazardous waste landfilling, and hazardous waste incineration.

HONORARY AND PROFESSIONAL SOCIETIES:

Tau Beta Pi
Omega Chi Epsilon
Phi Kappa Phi
American Institute of Chemical Engineers

A. Frank Jones

PUBLICATIONS:

Owen, M.L. and A.F. Jones, "Assessment of Ash-Sluice-System Operating Problems," Prepared for the Electric Power Research Institute under RP 1260-44, EPRI Report No. CS-3923, Final Report, March 1985.

Murin, P.J., K.A. Ferland, A.F. Jones, S.N. Husband, R.L. Leonard, and W.C. Thomas, "Feasibility of Producing Commodities and Electricity for Space Shuttle Operations at Vandenberg Air Force Base." Prepared for the U.S. Environmental Protection Agency, Final Report, U.S. EPA Report No. EPA-600/S7-84-100, January 1985.

Aul, E.F., M.L. Owen, and A.F. Jones, "Fluidized Bed Combustion: Effectiveness as an SO_2 Control Technology for Industrial Boilers," Final Report Prepared for the U.S. Environmental Protection Agency under Contract No. 68-01-6558 WA31, September 1984.

REPORTS/PAPERS:

Jones, A.F., S.J. Galegher, and J.D. Colley, HL&P Limestone Station Water Balance Study - Results and Recommendations, Prepared for Houston Lighting and Power, March 1988.

Moser, R.E., A.F. Jones, and J.D. Colley, Troubleshooting Utility FGD Chemical Process Problems, Paper Presented at the Energy Technology Conference, Washington, D.C., 17 February 1988.

Jones, A.F., and J.D. Colley, New York State Electric and Gas Somerset Station - FGD System Optimization, Prepared for New York State Electric and Gas Corporation, November 1987.

Jones, A.F., W.D. Balfour, and L.A. Rohlack, Seminole Electric Cooperative - Seminole Units 1 and 2, Prepared for Electric Power Research Institute under RP 2250-3, August 1987.

Colley, J.D., R.D. Delleney, and A.F. Jones, Optimization of the Gibbons Creek Limestone FGD System, Paper Presented at the Fourteenth Biennial Lignite Symposium, Dallas, Texas, 20 May 1987.

Jones, A.F., J.D. Colley, and G. Maller, Results of Initial Thiosulfate Test Program - IP&L Petersburg Unit 4 FGD System, Prepared for Indianapolis Power and Light, September 1987.

Jones, A.F., Sandow FGD System Water Balance and Methods to Reduce the Accumulation Rate in the SO_2 Ponds, Prepared for the Sandow Water Resources Task Force, March 1987.

Castaldi, F.J., A.F. Jones, B.J. Hayes, and M.L. Owen, Evaluation of Options for Control of Alcoa Lake Water Quality, Prepared for Texas Utilities Electric Company, February 1987.

A. Frank Jones

Behrens, G.P., M.L. Owen, and A.F. Jones, Alternative Wastewater Disposal Methods for the Collin Steam Electric Station: Final Report, Prepared for Texas Utilities Generating Company, February 1987.

Thompson, C.M., A.F. Jones, and W.D. Balfour, Monitoring Effects of Ammonia Injection at Tampa Electric Company Big Bend Unit 4 for the Period November 1985 to February 1986, Prepared for Electric Power Research Institute under RP 2250-3, January 1987.

Jones, A.F., and J.D. Colley, Recommendations for Mist Eliminator Wash Modifications at Seminole Electric Cooperative, Inc. Seminole Units 1 and 2, Prepared for Electric Power Research Institute under RP 2250-3, September 1986.

Jones, A.F., and J.D. Colley, Hydroclone Design Study for Sandow Unit 4 Scrubbers, Prepared for Texas Utilities Generating Company, September 1986.

Maller, G. and A.F. Jones, AES Deepwater Cogeneration Project Performance Test Program: Test Report, Prepared for Babcock & Wilcox Company and Foster Wheeler Energy Corporation, June 1986.

Jones, A.F., et. al., Seminole Electric Cooperative Seminole Unit 1, Prepared for Electric Power Research Institute under RP 2250-3, May 1986.

Jones, A.F., et. al., Tampa Electric Company Big Bend 4 Ammonia Injection Test, Prepared for Electric Power Research Institute under RP 2250-3, February 1986.

Jones, A.F., Seminole Electric Cooperative, Inc. Flue Gas Desulfurization System Final Performance Test Results, Prepared for Peabody Process Systems, Inc., December 1985.

Jones, A.F. and J.D. Colley, Optimization of the Sandow 4 Limestone FGD System: Results of Phase II, Prepared for Texas Utilities Generating Company, October 1985.

Jones, A.F. and J.D. Colley, Technical Note: CILCo Duck Creek Limestone Tests, Prepared for the Electric Power Research Institute under RP 2248-1, September 1985.

Jones, A.F. and J.D. Colley, Optimization of the Sandow 4 Limestone FGD System: Results of Phase I, Prepared for Texas Utilities Generating Company, July 1985.

Jones, A.F. and M.L. Owen, Evaluation of Alternatives to Delay Construction of SO_2 Pond #3, Prepared for Sandow Water Resources Task Force - Texas Utilities Generating Company, March 1985.

A. Frank Jones

Owen, M.L. and A.F. Jones, Results of Sandow Water Management System Monitoring Program - Final Report, Prepared for Sandow Water Resources Task Force - Texas Utilities Generating Company, December 1984.

Kamas, J.W., R.L. Leonard, G.B. DeWolf, A.F. Jones, G.D. Jones (Radian Corporation), D.B. Derrington, J. DeDany, and W.R. Schofield (J.M. Huber Corporation), Preliminary Cost Comparisons of the Huber Advanced Electric Reactor with Competing Technologies for PCB-Contaminated Soil Treatment/Disposal, Prepared for the J.M. Huber Corporation, June 1984.

Owen, M.L. and A.F. Jones, Evaluation of Sandow Water Management Alternatives - Final Report, Prepared for Sandow Water Resources Task Force - Texas Utilities Generating Company, May 1984.

Owen, M.L. and A.F. Jones, Evaluation of Sandow Water Management Alternatives - Final Summary Report, Prepared for Sandow Water Resources Task Force - Texas Utilities Generating Company, January 1984.

Owen, M.L., S.T. Litherland, and A.F. Jones, Technical Evaluation of Additional Water Management Alternatives at the Sandow Generating Station, Prepared for Sandow Water Resources Task Force - Texas Utilities Generating Company, December 1983.

DeWolf, G.B., A.F. Jones, and G.D. Jones, Preliminary Cost Comparisons of High Temperature Fluid Wall Reactor and Competing Technologies for PCB-Contaminated Soil Treatment/Disposal, Prepared for J.M. Huber Corporation, October 1983.

GREGORY E. STEVENS

EDUCATION:

M.S., Chemical Engineering, Michigan State University, Lansing, MI, 1986.

B.A., Chemistry, Spring Arbor College, Spring Arbor, MI, 1983.

EXPERIENCE:

Chemical Engineer, Radian Corporation, Austin, TX, 1986-Present.

Research Assistant, Chemical Engineering, Michigan State University, Lansing, MI, 1983-1986.

Undergraduate Research Assistant, DOE Redox Project, Spring Arbor College, Spring Arbor, MI, 1981-1983.

Laboratory Assistant, NASA Lewis Research Center, Cleveland, OH, 1981.

FIELDS OF EXPERIENCE:

As a chemical engineer at Radian, Mr. Stevens is active in Flue Gas Desulfurization (FGD) R&D as well as on-site engineering services involving full-scale FGD wet scrubbing technology for electric utilities. His experience with FGD has included operation of bench-, mini-pilot-, pilot-, and full-scale systems. Recently, Mr. Stevens has been involved in the following projects:

<u>On-Site Test Engineering</u>

- Project engineer for the Electric Power Research Institute's (EPRI) current year-long monitoring program of the University of Illinois Abbott Power Plant's Chiyoda CT-121 wet FGD scrubber. Responsibilities include process data collection and interpretation, analysis of material and energy balances, system economic and technical evaluation, and report preparation.

- EPRI High Sulfur Test Center (HSTC) in Somerset, New York, as one of three on-site engineers. The three-month assignment included implementing the process QA/QC program, calibrating/troubleshooting the SO_2/O_2 continuous emission monitoring system, coordinating reagent preparation (ball mill operation), and collecting process data.

- Site investigation of thiosulfate addition and hydroclone performance at NYSEG's Somerset Station wet FGD scrubbing system. As the on-site engineer, collected liquid and solid samples, performed on-site analyses, and coordinated process test conditions.

- Site sampling of Elkem Metal's Ashtabula, Ohio ferroalloy plant as part of EPA's regulatory development efforts. Analyzed various liquid process, effluent, and waste treatment streams for hazardous metal characterization.

- Performance test engineer for gas sampling at AEC's Deepwater power generating facility in Pasadena, Texas. Used EPA methods to determine gas emission rates of hazardous pollutants.

EPRI Bench-Scale Wet FGD Scrubbing

- Investigation of the effects of thiosulfate addition on reagent utilization for Arizona Public Service's Cholla Station. As bench-scale wet FGD process operator and task leader, developed test plan, coordinated testing, and evaluated and reported results.

- Investigation of forced oxidation feasibility for Ohio Edison's Bruce Mansfield Station.

- Investigation of thiosulfate addition for Kansas City Power and Light's LaCygne power generating station.

- Addition of dibasic acid (DBA) to FGD systems. Determined effects on major process variables and operating conditions.

- Fundamental study of the effects of trace species on FGD system operation using laboratory- and bench-scale FGD simulations. Developed test plan, conducted literature search, operated bench system, and co-authored final report.

- Experimental FGD computer model validation. As task leader, coordinated bench-scale testing and data evaluation.

- Design and construction of EPRI's new bench-scale wet FGD scrubber located at the High Sulfur Test Center (HSTC) in Somerset, New York. Was the design engineer and coordinated and participated in the installation of the unit, which is used as a research tool for EPRI's ongoing pilot and mini-pilot wet FGD efforts.

Laboratory Investigations

- Investigation of calcium carbonate scrubbing of HCL flue gases using $CaCO_3$ precipitated from a municipal water softening process. This study resulted in a paper both co-authored and presented by Mr. Stevens at the 1988 National Waste Processing Conference.

PROFESSIONAL SOCIETIES:

American Institute of Chemical Engineers

Gregory E. Stevens

PRESENTATIONS/PUBLICATIONS:

Bell, R.D., G.E. Stevens, F.B. Meserole, and M.R. Guinn. Calcium Carbonate Scrubbing of Hydrogen Chloride in Flue Gases. Paper presented at The American Society of Mechanical Engineers 1988 National Waste Processing Conference, Philadelphia, PA, May 1988.

APPENDIX D

Detailed Air Modeling Results

COMMENTS

a. The receptors used for Plant Yates as input into the ISCLT model was a square grid, 36 kilometers on a side, with the plant located in the center. Each receptor was located at plant elevation, thereby assuming flat terrain surrounding the plant. Meteorology for the ISCLT model run of Plant Yates included ambient air temperature of 289.48 degrees Kelvin, a mixing height of 1542 meters, and a five-year average stability wind rose (Atlanta, Georgia, Station 13874, January 1959-December 1963).

Receptors for Plant Yates were input into the PTMTP model along a single radial ranging from 0.5 kilometer to 2.0 kilometer from the plant. The 16 receptors were spaced 0.1 kilometers apart. Each receptor was located at plant elevation. The meteorology input in the PTMTP model was identified by initial runs of the PTMAX model for each source. The final stability/wind speed cases used in PTMTP are listed in the attached table.

The air quality effect of terrain variations near Plant Yates was deemed to be small because the area around the immediate area of the plant is gently rolling. The conservatism of the screening techniques employed should adequately account for the air quality effects of terrain, which would be more specifically analyzed only in a much more sophisticated modeling analysis. For short-term averages, conservative screening models predicted concentrations from the new Unit 1 stack along at only a small fraction of the NAAQS at a location very close to the plant (0.7 km) where the concentrations from the other stack are predicted to be insignificant under the same meteorological conditions. At large distances, where higher terrain feature are located, the relatively low emissions of the project stack are expected to be sufficiently dispersed that higher predicted concentrations are unlikely. For long-term averages, the predicted concentrations were insignificant and the effect of terrain would not be expected to make any substantive changes to these predicted values.

b. Plant Yates was modeled only for the maximum <u>changes</u> that would occur in SO_2 concentrations. Since only Units 1-5 at the plant were affected by these changes and Units 6&7 remained as before, the changes that occurred in the stack(s) for Units 1-5 at the plant were modeled.

Attachment 1

Meteorological Input for PTMTP

Plant Yates

Theta (Deg)	U (M/SEC)	KST	HL (M)	T (Deg K)
270	1.0	1	5000	289.9
270	1.5	1	5000	289.9
270	2.0	1	5000	289.9
270	2.5	1	5000	289.9
270	3.0	1	5000	289.9
270	5.0	4	5000	289.9
270	7.0	4	5000	289.9
270	10.0	4	5000	289.9

Plant Yates

SO2

Long-Term

ISCLT Model

Case 1

```
*****************************************************************************************************
** VM/SP SERVICE LEVEL 0411 **** CPU SERIAL  000019  CPU MODEL  0580 *********************************
```

B1955934	B1955934	USERID	ORIGIN
BLANCHE	VMRBHMC1	DISTCODE	SYSTEM
YATESAS	REPORT	FILENAME	FILETYPE
03/17/89	13:12:40	FILE CREATION DATE	
4128	00000353	SPOOLID	COUNT
03/17/89	13:42:44	FILE PRINT DATE	
R	0500	CLASS	DEVICE
STANDARD		FORMS	

147

```
                      S
                     SCS
                    SCSBS
                   SCSBSCS
                  SCSBSCSBS
     AMDAHL       SCSBSCSBS
     470  V/8     SCSSCSBSS
  32 Megabytes    SCSCSBSCS
                  SCSBSCSBS
   SCSCSCS        SCSBSCSBS
   SSCSBSS              SCS
   SCSBSCS            SCSBSCS
   SCSBSCS         SCSBSCSBSCS
   SCSBSCS      SCSBSCSBSCSBSCSBS
SCSCSCSCSCSCSCSCSCSCSCSCSCSCSCSCS
```

Southern Company
Services, Inc.

Information Services
Birmingham

For Assistance,
Call ISC at 7378

VM/SP HPO
Release 4.2

TAG DATA: VMRBHMC1 SYSTEM

B1955934

BLANCHE

```
                              - ISCLT INPUT DATA -

   NUMBER OF SOURCES =    1
   NUMBER OF X AXIS GRID SYSTEM POINTS =   19
   NUMBER OF Y AXIS GRID SYSTEM POINTS =   19
   NUMBER OF SPECIAL POINTS =    0
   NUMBER OF SEASONS =    1
   NUMBER OF WIND SPEED CLASSES =   6
   NUMBER OF STABILITY CLASSES =   6
   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, 2, 2, 0, 0, 0, 0, 0, 0, 0, 0, 0,
   ALL SOURCES ARE USED TO FORM SOURCE COMBINATION  1
  DISTANCE X AXIS GRID SYSTEM POINTS (METERS )=  -18000.00,  -16000.00,  -14000.00,  -12000.00,  -10000.00,   -8000.00,
      -6000.00,   -4000.00,   -2000.00,       0.00,    2000.00,    4000.00,    6000.00,    8000.00,   10000.00,   12000.00,
      14000.00,   16000.00,   18000.00,
  DISTANCE Y AXIS GRID SYSTEM POINTS (METERS )=  -18000.00,  -16000.00,  -14000.00,  -12000.00,  -10000.00,   -8000.00,
      -6000.00,   -4000.00,   -2000.00,       0.00,    2000.00,    4000.00,    6000.00,    8000.00,   10000.00,   12000.00,
      14000.00,   16000.00,   18000.00,

                    - AMBIENT AIR TEMPERATURE (DEGREES KELVIN) -

              STABILITY  STABILITY  STABILITY  STABILITY  STABILITY  STABILITY
              CATEGORY 1 CATEGORY 2 CATEGORY 3 CATEGORY 4 CATEGORY 5 CATEGORY 6
   SEASON  1   289.4800   289.4800   289.4800   289.4800   289.4800   289.4800

                          - MIXING LAYER HEIGHT (METERS) -

                                  SEASON 1
                WIND SPEED  WIND SPEED  WIND SPEED  WIND SPEED  WIND SPEED  WIND SPEED
                CATEGORY 1  CATEGORY 2  CATEGORY 3  CATEGORY 4  CATEGORY 5  CATEGORY 6
STABILITY CATEGORY 10.154200E+040.154200E+040.154200E+040.154200E+040.154200E+040.154200E+04
STABILITY CATEGORY 20.154200E+040.154200E+040.154200E+040.154200E+040.154200E+040.154200E+04
STABILITY CATEGORY 30.154200E+040.154200E+040.154200E+040.154200E+040.154200E+040.154200E+04
STABILITY CATEGORY 40.154200E+040.154200E+040.154200E+040.154200E+040.154200E+040.154200E+04
STABILITY CATEGORY 50.100000E+050.100000E+050.100000E+050.100000E+050.100000E+050.100000E+05
STABILITY CATEGORY 60.100000E+050.100000E+050.100000E+050.100000E+050.100000E+050.100000E+05
```

- 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	0.00026999	0.00022999	0.00000000	0.00000000	0.00000000	0.00000000
22.500	0.00020999	0.00013999	0.00000000	0.00000000	0.00000000	0.00000000
45.000	0.00035998	0.00022999	0.00000000	0.00000000	0.00000000	0.00000000
67.500	0.00042998	0.00056997	0.00000000	0.00000000	0.00000000	0.00000000
90.000	0.00033998	0.00031998	0.00000000	0.00000000	0.00000000	0.00000000
112.500	0.00027999	0.00040998	0.00000000	0.00000000	0.00000000	0.00000000
135.000	0.00033998	0.00031998	0.00000000	0.00000000	0.00000000	0.00000000
157.500	0.00010999	0.00029998	0.00000000	0.00000000	0.00000000	0.00000000
180.000	0.00030998	0.00040998	0.00000000	0.00000000	0.00000000	0.00000000
202.500	0.00030998	0.00033998	0.00000000	0.00000000	0.00000000	0.00000000
225.000	0.00045998	0.00040998	0.00000000	0.00000000	0.00000000	0.00000000
247.500	0.00025999	0.00054997	0.00000000	0.00000000	0.00000000	0.00000000
270.000	0.00037998	0.00036998	0.00000000	0.00000000	0.00000000	0.00000000
292.500	0.00048997	0.00056997	0.00000000	0.00000000	0.00000000	0.00000000
315.000	0.00047998	0.00086996	0.00000000	0.00000000	0.00000000	0.00000000
337.500	0.00019999	0.00029998	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	0.00106994	0.00086996	0.00045998	0.00000000	0.00000000	0.00000000
22.500	0.00070996	0.00102995	0.00031998	0.00000000	0.00000000	0.00000000
45.000	0.00138993	0.00150992	0.00152992	0.00000000	0.00000000	0.00000000
67.500	0.00154992	0.00186990	0.00134993	0.00000000	0.00000000	0.00000000
90.000	0.00119994	0.00159992	0.00118994	0.00000000	0.00000000	0.00000000
112.500	0.00111994	0.00175991	0.00111994	0.00000000	0.00000000	0.00000000
135.000	0.00107994	0.00136993	0.00090995	0.00000000	0.00000000	0.00000000
157.500	0.00058997	0.00077996	0.00036998	0.00000000	0.00000000	0.00000000
180.000	0.00115994	0.00163992	0.00067996	0.00000000	0.00000000	0.00000000
202.500	0.00113994	0.00120994	0.00083996	0.00000000	0.00000000	0.00000000
225.000	0.00146992	0.00216989	0.00099995	0.00000000	0.00000000	0.00000000
247.500	0.00118994	0.00202990	0.00154992	0.00000000	0.00000000	0.00000000
270.000	0.00095995	0.00195990	0.00198990	0.00000000	0.00000000	0.00000000
292.500	0.00157992	0.00312984	0.00275986	0.00000000	0.00000000	0.00000000
315.000	0.00186990	0.00280986	0.00280986	0.00000000	0.00000000	0.00000000
337.500	0.00112994	0.00157992	0.00115994	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	0.00017999	0.00095995	0.00090995	0.00005000	0.00000000	0.00000000
22.500	0.00022999	0.00102995	0.00115994	0.00005000	0.00000000	0.00000000
45.000	0.00054997	0.00268986	0.00412978	0.00040998	0.00000000	0.00000000
67.500	0.00048997	0.00296985	0.00506974	0.00083996	0.00000000	0.00000000
90.000	0.00052997	0.00193990	0.00405979	0.00054997	0.00000000	0.00000000
112.500	0.00029998	0.00141993	0.00289985	0.00040998	0.00000000	0.00000000
135.000	0.00041998	0.00186990	0.00273986	0.00033998	0.00005000	0.00000000
157.500	0.00024999	0.00095995	0.00136993	0.00026999	0.00000000	0.00000000
180.000	0.00057997	0.00159992	0.00252987	0.00024999	0.00002000	0.00002000
202.500	0.00030998	0.00159992	0.00214989	0.00040998	0.00002000	0.00002000
225.000	0.00054997	0.00239988	0.00360981	0.00054997	0.00015999	0.00000000
247.500	0.00035998	0.00248987	0.00529972	0.00102995	0.00007000	0.00000000
270.000	0.00039998	0.00259987	0.00584970	0.00143993	0.00010999	0.00000000
292.500	0.00042998	0.00316984	0.00915953	0.00182991	0.00020999	0.00000000
315.000	0.00066997	0.00362981	0.00997949	0.00184990	0.00022999	0.00000000
337.500	0.00048997	0.00166991	0.00355982	0.00056997	0.00005000	0.00002000

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	0.00037998	0.00157992	0.00191990	0.00070996	0.00002000	0.00000000
22.500	0.00051997	0.00218989	0.00209989	0.00083995	0.00002000	0.00000000
45.000	0.00155992	0.00721963	0.01378929	0.00869955	0.00152992	0.00005000
67.500	0.00163992	0.00773960	0.02737859	0.02193887	0.00266986	0.00007000
90.000	0.00251987	0.00787959	0.02056894	0.00967950	0.00109994	0.00002000
112.500	0.00147992	0.00467976	0.01205938	0.00584970	0.00056997	0.00013999
135.000	0.00136993	0.00399979	0.00985949	0.00581970	0.00093995	0.00005000
157.500	0.00083996	0.00234988	0.00606969	0.00305984	0.00115994	0.00026999
180.000	0.00110994	0.00364981	0.00844957	0.00618968	0.00154992	0.00049997
202.500	0.00076996	0.00234988	0.00815968	0.00478975	0.00106994	0.00007000
225.000	0.00114994	0.00442977	0.01017947	0.00657966	0.00207989	0.00026999
247.500	0.00074996	0.00289985	0.01102943	0.00999948	0.00184990	0.00072996
270.000	0.00073996	0.00316984	0.01150940	0.01355930	0.00373981	0.00074996
292.500	0.00060997	0.00300985	0.01529921	0.03038843	0.00842956	0.00227988
315.000	0.00096995	0.00412978	0.01689913	0.03314829	0.01086944	0.00095995
337.500	0.00049997	0.00200990	0.00367981	0.00383980	0.00040998	0.00000000

- 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	0.00000000	0.00150992	0.00093995	0.00000000	0.00000000	0.00000000
22.500	0.00000000	0.00104995	0.00088995	0.00000000	0.00000000	0.00000000
45.000	0.00000000	0.00351982	0.00494974	0.00000000	0.00000000	0.00000000
67.500	0.00000000	0.00399979	0.00661966	0.00000000	0.00000000	0.00000000
90.000	0.00000000	0.00433978	0.00396980	0.00000000	0.00000000	0.00000000
112.500	0.00000000	0.00316984	0.00193990	0.00000000	0.00000000	0.00000000
135.000	0.00000000	0.00426978	0.00257987	0.00000000	0.00000000	0.00000000
157.500	0.00000000	0.00218989	0.00129993	0.00000000	0.00000000	0.00000000
180.000	0.00000000	0.00433978	0.00257987	0.00000000	0.00000000	0.00000000
202.500	0.00000000	0.00275986	0.00193990	0.00000000	0.00000000	0.00000000
225.000	0.00000000	0.00447977	0.00561971	0.00000000	0.00000000	0.00000000
247.500	0.00000000	0.00394979	0.00736962	0.00000000	0.00000000	0.00000000
270.000	0.00000000	0.00447977	0.01408928	0.00000000	0.00000000	0.00000000
292.500	0.00000000	0.00412978	0.01606917	0.00000000	0.00000000	0.00000000
315.000	0.00000000	0.00435977	0.02230885	0.00000000	0.00000000	0.00000000
337.500	0.00000000	0.00143993	0.00364981	0.00000000	0.00000000	0.00000000

SEASON 1

STABILITY CATEGORY 6

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	0.00309984	0.00280986	0.00000000	0.00000000	0.00000000	0.00000000
22.500	0.00243987	0.00189990	0.00000000	0.00000000	0.00000000	0.00000000
45.000	0.00589969	0.00675965	0.00000000	0.00000000	0.00000000	0.00000000
67.500	0.00541972	0.00709963	0.00000000	0.00000000	0.00000000	0.00000000
90.000	0.00578970	0.00618968	0.00000000	0.00000000	0.00000000	0.00000000
112.500	0.00415978	0.00326983	0.00000000	0.00000000	0.00000000	0.00000000
135.000	0.00653966	0.00531973	0.00000000	0.00000000	0.00000000	0.00000000
157.500	0.00370981	0.00335983	0.00000000	0.00000000	0.00000000	0.00000000
180.000	0.00578970	0.00593969	0.00000000	0.00000000	0.00000000	0.00000000
202.500	0.00406979	0.00378980	0.00000000	0.00000000	0.00000000	0.00000000
225.000	0.00598969	0.00705963	0.00000000	0.00000000	0.00000000	0.00000000
247.500	0.00616968	0.00853956	0.00000000	0.00000000	0.00000000	0.00000000
270.000	0.00579970	0.01102943	0.00000000	0.00000000	0.00000000	0.00000000
292.500	0.00685965	0.01145941	0.00000000	0.00000000	0.00000000	0.00000000
315.000	0.00874955	0.01417927	0.00000000	0.00000000	0.00000000	0.00000000
337.500	0.00463976	0.00478975	0.00000000	0.00000000	0.00000000	0.00000000

```
                          - ISCLT INPUT DATA (CONT.) -

            - VERTICAL POTENTIAL TEMPERATURE GRADIENT (DEGREES KELVIN/METER) -

                      WIND SPEED  WIND SPEED  WIND SPEED  WIND SPEED  WIND SPEED  WIND SPEED
                      CATEGORY 1  CATEGORY 2  CATEGORY 3  CATEGORY 4  CATEGORY 5  CATEGORY 6
STABILITY CATEGORY 10.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+00
STABILITY CATEGORY 20.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+00
STABILITY CATEGORY 30.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+00
STABILITY CATEGORY 40.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+00
STABILITY CATEGORY 50.200000E-010.200000E-010.200000E-010.200000E-010.200000E-010.200000E-01
STABILITY CATEGORY 60.350000E-010.350000E-010.350000E-010.350000E-010.350000E-010.350000E-01

                          - WIND PROFILE POWER LAW EXPONENTS -

                      WIND SPEED  WIND SPEED  WIND SPEED  WIND SPEED  WIND SPEED  WIND SPEED
                      CATEGORY 1  CATEGORY 2  CATEGORY 3  CATEGORY 4  CATEGORY 5  CATEGORY 6
STABILITY CATEGORY 10.100000E+000.100000E+000.100000E+000.100000E+000.100000E+000.100000E+00
STABILITY CATEGORY 20.150000E+000.150000E+000.150000E+000.150000E+000.150000E+000.150000E+00
STABILITY CATEGORY 30.200000E+000.200000E+000.200000E+000.200000E+000.200000E+000.200000E+00
STABILITY CATEGORY 40.250000E+000.250000E+000.250000E+000.250000E+000.250000E+000.250000E+00
STABILITY CATEGORY 50.300000E+000.300000E+000.300000E+000.300000E+000.300000E+000.300000E+00
STABILITY CATEGORY 60.300000E+000.300000E+000.300000E+000.300000E+000.300000E+000.300000E+00
```

- SOURCE INPUT DATA -

CARD	TAPE	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	694.70	3704.39	251.46	0.00	GAS EXIT TEMP (DEG K)= 412.80, GAS EXIT VEL. (M/SEC)= 28.10, STACK DIAMETER (M)= 7.070, 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
3.81500E+03			

** ANNUAL GROUND LEVEL CONCENTRATION (MICROGRAMS PER CUBIC METER) FROM ALL SOURCES COMBINED **

- GRID SYSTEM RECEPTORS -
- X AXIS (DISTANCE, METERS) -

Y AXIS (DISTANCE, METERS)	-18000.000	-16000.000	-14000.000	-12000.000	-10000.000	-8000.000	-6000.000	-4000.000	-2000.000
	- CONCENTRATION -								
18000.000	0.582529	0.589997	0.600707	0.573141	0.528669	0.475194	0.411332	0.442197	0.549231
16000.000	0.596297	0.604972	0.617715	0.635401	0.606425	0.553350	0.483470	0.437889	0.570005
14000.000	0.613586	0.624261	0.640520	0.663636	0.693473	0.660632	0.587222	0.482256	0.587420
12000.000	0.634398	0.648119	0.669375	0.699959	0.739733	0.785253	0.733610	0.607572	0.582891
10000.000	0.672355	0.681868	0.703381	0.743492	0.795742	0.853956	0.903433	0.782425	0.549934
8000.000	0.722822	0.735941	0.761736	0.803522	0.862214	0.935730	0.987409	0.975213	0.678577
6000.000	0.779442	0.796713	0.829316	0.881732	0.954279	1.034970	1.097939	1.069245	0.731735
4000.000	0.839200	0.860169	0.898540	0.960745	1.048637	1.146819	1.205863	1.099778	0.573684
2000.000	0.928824	0.958401	1.007861	1.084792	1.193386	1.321636	1.429821	1.424421	0.858974
0.000	1.034670	1.073421	1.132911	1.221674	1.347600	1.491369	1.465344	1.316360	0.837206
-2000.000	1.147187	1.193198	1.258256	1.290080	1.288244	1.290510	1.270876	1.066159	0.579628
-4000.000	1.260554	1.218869	1.178262	1.147714	1.129278	1.119845	1.021325	0.745006	0.471430
-6000.000	1.156755	1.105782	1.058621	1.019887	0.992729	0.920727	0.751322	0.515821	0.423381
-8000.000	1.055597	1.002645	0.952918	0.911174	0.842534	0.716580	0.554079	0.370842	0.373501
-10000.000	0.964209	0.911673	0.863091	0.794722	0.688112	0.560583	0.410274	0.327956	0.329766
-12000.000	0.883536	0.833491	0.767507	0.672922	0.564070	0.440896	0.304309	0.293712	0.294331
-14000.000	0.813312	0.751154	0.666175	0.570341	0.463919	0.347937	0.265465	0.266961	0.266713
-16000.000	0.739901	0.663512	0.578053	0.483909	0.382110	0.274443	0.245896	0.246219	0.245452
-18000.000	0.661884	0.585460	0.501479	0.410743	0.314661	0.230156	0.230316	0.229937	0.228922

- GRID SYSTEM RECEPTORS -
- X AXIS (DISTANCE, METERS) -

Y AXIS (DISTANCE, METERS)	0.000	2000.000	4000.000	6000.000	8000.000	10000.000	12000.000	14000.000	16000.000
	- CONCENTRATION -								
18000.000	0.664125	0.677110	0.634427	0.593196	0.630309	0.690488	0.739084	0.778260	0.794800
16000.000	0.715312	0.733508	0.682060	0.647679	0.730836	0.792700	0.836828	0.851343	0.846459
14000.000	0.776841	0.802218	0.739494	0.773986	0.868467	0.927439	0.939560	0.924680	0.910413
12000.000	0.831439	0.867253	0.797042	0.946795	1.054259	1.074489	1.046913	1.015568	0.987259
10000.000	0.838835	0.892922	0.944146	1.177324	1.254394	1.228811	1.177822	1.122944	1.074704
8000.000	0.703500	0.804701	1.135570	1.399908	1.457637	1.415669	1.314734	1.209649	1.128757
6000.000	0.338440	0.498297	1.187149	1.636031	1.641654	1.530870	1.396908	1.278214	1.186065
4000.000	0.002064	0.502152	1.119860	1.698688	1.748811	1.627383	1.475558	1.343128	1.241793
2000.000	0.154858	0.821714	1.964223	2.415675	2.238665	1.985685	1.755054	1.571743	1.435535
0.000	0.393570	0.866799	2.401096	2.697944	2.582278	2.364255	2.054226	1.824318	1.655205
-2000.000	0.477060	0.849093	1.673087	2.603877	2.550071	2.339552	2.161473	2.026180	1.861292
-4000.000	0.460465	0.726895	1.131616	1.858622	2.379204	2.292870	2.127898	2.002750	1.911030
-6000.000	0.418124	0.608167	0.877522	1.322964	1.801505	2.159679	2.103812	1.989956	1.903617
-8000.000	0.370036	0.508913	0.707447	0.937789	1.366004	1.725524	2.016634	1.986929	1.905385
-10000.000	0.326859	0.431673	0.583834	0.710309	1.036826	1.379357	1.677116	1.929622	1.913577
-12000.000	0.291757	0.373527	0.494234	0.599343	0.785488	1.103267	1.393324	1.649866	1.870617
-14000.000	0.264443	0.330223	0.428832	0.517864	0.594544	0.881762	1.156591	1.407173	1.629697
-16000.000	0.243474	0.297844	0.380389	0.456992	0.524900	0.702040	0.958478	1.198293	1.416389
-18000.000	0.227192	0.273174	0.343620	0.410305	0.471132	0.554735	0.792331	1.018819	1.228809

** ANNUAL GROUND LEVEL CONCENTRATION (MICROGRAMS PER CUBIC METER) FROM ALL SOURCES COMBINED (CONT.) **

- GRID SYSTEM RECEPTORS -

- X AXIS (DISTANCE, METERS) -

Y AXIS (DISTANCE , METERS)	18000.000
	- CONCENTRATION -
18000.000	0.794810
16000.000	0.842034
14000.000	0.898673
12000.000	0.964486
10000.000	1.023458
8000.000	1.069195
6000.000	1.118491
4000.000	1.168087
2000.000	1.336231
0.000	1.530236
-2000.000	1.718572
-4000.000	1.844100
-6000.000	1.838357
-8000.000	1.840720
-10000.000	1.848397
-12000.000	1.859076
-14000.000	1.822975
-16000.000	1.610168
-18000.000	1.418988

- PROGRAM DETERMINED MAXIMUM 10 VALUES -

X COORDINATE (METERS)	Y COORDINATE (METERS)	CONCENTRATION
6000.00	0.00	2.697944
6000.00	-2000.00	2.603877
8000.00	0.00	2.582278
8000.00	-2000.00	2.550071
6000.00	2000.00	2.415675
4000.00	0.00	2.401096
8000.00	-4000.00	2.379204
10000.00	0.00	2.364255
10000.00	-2000.00	2.339552
10000.00	-4000.00	2.292870

147-END

PRINT COMPLETED AT 13:42:49 FOR USER: B1955934 DIST: BLANCHE

END-147

Plant Yates

SO2

Long-Term

ISCLT Model

Case 2

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*******************************************************************************************************
** VM/SP SERVICE LEVEL 0411 **** CPU SERIAL  000019  CPU MODEL  0580 ***********************************
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B1955934	B1955934	USERID	ORIGIN
BLANCHE	VMRBHMC1	DISTCODE	SYSTEM
YATESBS	REPORT	FILENAME	FILETYPE
03/17/89	13:12:39	FILE CREATION DATE	
4125	00000359	SPOOLID	COUNT
03/17/89	13:42:39	FILE PRINT DATE	
R	0500	CLASS	DEVICE
STANDARD		FORMS	

```
              S              Southern Company
             SCS               Services, Inc.
            SCSBS
           SCSBSCS        Information Services
          SCSBSCSBS            Birmingham
           SCSBSCSBS
   AMDAHL   SCSSCSBSS        For Assistance,
   470  V/8   SCSCSBSCS        Call ISC at 7378
32 Megabytes   SCSBSCSBS
                 SCSBSCSBS
   SCSCSCS            SCS          VM/SP  HPO
  SSCSBSS          SCSBSCS         Release  4.2
 SCSBSCS        SCSBSCSBSCS
SCSBSCS   SCSBSCSBSCSBSCSBS
SCSCSCSCSCSCSCSCSCSCSCSCSCS
```

TAG DATA: VMRBHMC1 SYSTEM

B1955934

BLANCHE

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                                   - ISCLT INPUT DATA -

     NUMBER OF SOURCES =    2
     NUMBER OF X AXIS GRID SYSTEM POINTS =    19
     NUMBER OF Y AXIS GRID SYSTEM POINTS =    19
     NUMBER OF SPECIAL POINTS =     0
     NUMBER OF SEASONS =    1
     NUMBER OF WIND SPEED CLASSES =    6
     NUMBER OF STABILITY CLASSES =    6
     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, 2, 2, 0, 0, 0, 0, 0, 0, 0, 0, 0,
     ALL SOURCES ARE USED TO FORM SOURCE COMBINATION  1
    DISTANCE X AXIS GRID SYSTEM POINTS (METERS )=  -18000.00,  -16000.00,  -14000.00,  -12000.00,  -10000.00,   -8000.00,
        -6000.00,   -4000.00,   -2000.00,       0.00,    2000.00,    4000.00,    6000.00,    8000.00,   10000.00,   12000.00,
        14000.00,   16000.00,   18000.00,
    DISTANCE Y AXIS GRID SYSTEM POINTS (METERS )=  -18000.00,  -16000.00,  -14000.00,  -12000.00,  -10000.00,   -8000.00,
        -6000.00,   -4000.00,   -2000.00,       0.00,    2000.00,    4000.00,    6000.00,    8000.00,   10000.00,   12000.00,
        14000.00,   16000.00,   18000.00,
```

- 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	289.4800	289.4800	289.4800	289.4800	289.4800	289.4800

- 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	0.154200E+04	0.154200E+04	0.154200E+04	0.154200E+04	0.154200E+04	0.154200E+04
STABILITY CATEGORY 2	0.154200E+04	0.154200E+04	0.154200E+04	0.154200E+04	0.154200E+04	0.154200E+04
STABILITY CATEGORY 3	0.154200E+04	0.154200E+04	0.154200E+04	0.154200E+04	0.154200E+04	0.154200E+04
STABILITY CATEGORY 4	0.154200E+04	0.154200E+04	0.154200E+04	0.154200E+04	0.154200E+04	0.154200E+04
STABILITY CATEGORY 5	0.100000E+05	0.100000E+05	0.100000E+05	0.100000E+05	0.100000E+05	0.100000E+05
STABILITY CATEGORY 6	0.100000E+05	0.100000E+05	0.100000E+05	0.100000E+05	0.100000E+05	0.100000E+05

- 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	0.00026999	0.00022999	0.00000000	0.00000000	0.00000000	0.00000000
22.500	0.00020999	0.00013999	0.00000000	0.00000000	0.00000000	0.00000000
45.000	0.00035998	0.00022999	0.00000000	0.00000000	0.00000000	0.00000000
67.500	0.00042998	0.00056997	0.00000000	0.00000000	0.00000000	0.00000000
90.000	0.00033998	0.00031998	0.00000000	0.00000000	0.00000000	0.00000000
112.500	0.00027999	0.00040998	0.00000000	0.00000000	0.00000000	0.00000000
135.000	0.00033998	0.00031998	0.00000000	0.00000000	0.00000000	0.00000000
157.500	0.00010999	0.00029998	0.00000000	0.00000000	0.00000000	0.00000000
180.000	0.00030998	0.00040998	0.00000000	0.00000000	0.00000000	0.00000000
202.500	0.00030998	0.00033998	0.00000000	0.00000000	0.00000000	0.00000000
225.000	0.00045998	0.00040998	0.00000000	0.00000000	0.00000000	0.00000000
247.500	0.00025999	0.00054997	0.00000000	0.00000000	0.00000000	0.00000000
270.000	0.00037998	0.00036998	0.00000000	0.00000000	0.00000000	0.00000000
292.500	0.00048997	0.00056997	0.00000000	0.00000000	0.00000000	0.00000000
315.000	0.00047998	0.00086996	0.00000000	0.00000000	0.00000000	0.00000000
337.500	0.00019999	0.00029998	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	0.00106994	0.00086996	0.00045998	0.00000000	0.00000000	0.00000000
22.500	0.00070996	0.00102995	0.00031998	0.00000000	0.00000000	0.00000000
45.000	0.00138993	0.00150992	0.00152992	0.00000000	0.00000000	0.00000000
67.500	0.00154992	0.00186990	0.00134993	0.00000000	0.00000000	0.00000000
90.000	0.00119994	0.00159992	0.00118994	0.00000000	0.00000000	0.00000000
112.500	0.00111994	0.00175991	0.00111994	0.00000000	0.00000000	0.00000000
135.000	0.00107994	0.00136993	0.00090995	0.00000000	0.00000000	0.00000000
157.500	0.00058997	0.00077996	0.00036998	0.00000000	0.00000000	0.00000000
180.000	0.00115994	0.00163992	0.00067996	0.00000000	0.00000000	0.00000000
202.500	0.00113994	0.00120994	0.00083996	0.00000000	0.00000000	0.00000000
225.000	0.00146992	0.00216989	0.00099995	0.00000000	0.00000000	0.00000000
247.500	0.00118994	0.00202990	0.00154992	0.00000000	0.00000000	0.00000000
270.000	0.00095995	0.00195990	0.00198990	0.00000000	0.00000000	0.00000000
292.500	0.00157992	0.00312984	0.00275986	0.00000000	0.00000000	0.00000000
315.000	0.00186990	0.00280986	0.00280986	0.00000000	0.00000000	0.00000000
337.500	0.00112994	0.00157992	0.00115994	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	0.00017999	0.00095995	0.00090995	0.00005000	0.00000000	0.00000000
22.500	0.00022999	0.00102995	0.00115994	0.00005000	0.00000000	0.00000000
45.000	0.00054997	0.00268986	0.00412978	0.00040998	0.00000000	0.00000000
67.500	0.00048997	0.00296985	0.00506974	0.00083996	0.00000000	0.00000000
90.000	0.00052997	0.00193990	0.00405979	0.00054997	0.00000000	0.00000000
112.500	0.00029998	0.00141993	0.00289985	0.00040998	0.00000000	0.00000000
135.000	0.00041998	0.00186990	0.00273986	0.00033998	0.00005000	0.00000000
157.500	0.00024999	0.00095995	0.00136993	0.00026999	0.00000000	0.00000000
180.000	0.00057997	0.00159992	0.00252987	0.00024999	0.00002000	0.00002000
202.500	0.00030998	0.00159992	0.00214989	0.00040998	0.00002000	0.00002000
225.000	0.00054997	0.00239988	0.00360981	0.00054997	0.00015999	0.00000000
247.500	0.00035998	0.00248987	0.00529972	0.00102995	0.00007000	0.00000000
270.000	0.00039998	0.00259987	0.00584970	0.00143993	0.00010999	0.00000000
292.500	0.00042998	0.00316984	0.00915953	0.00182991	0.00020999	0.00000000
315.000	0.00066997	0.00362981	0.00997949	0.00184990	0.00022999	0.00000000
337.500	0.00048997	0.00166991	0.00355982	0.00056997	0.00005000	0.00002000

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	0.00037998	0.00157992	0.00191990	0.00070996	0.00002000	0.00000000
22.500	0.00051997	0.00218989	0.00209989	0.00083996	0.00002000	0.00000000
45.000	0.00155992	0.00721963	0.01378929	0.00869955	0.00152992	0.00005000
67.500	0.00163992	0.00773960	0.02737859	0.02193887	0.00266986	0.00007000
90.000	0.00251987	0.00787959	0.02056894	0.00967950	0.00109994	0.00002000
112.500	0.00147992	0.00467976	0.01205938	0.00584970	0.00056997	0.00013999
135.000	0.00136993	0.00399979	0.00985949	0.00581970	0.00093995	0.00005000
157.500	0.00083996	0.00234988	0.00606969	0.00305984	0.00115994	0.00026999
180.000	0.00110994	0.00364981	0.00844957	0.00618968	0.00154992	0.00049997
202.500	0.00076996	0.00234988	0.00615968	0.00478975	0.00106994	0.00007000
225.000	0.00114994	0.00442977	0.01017947	0.00657966	0.00207989	0.00026999
247.500	0.00074996	0.00289985	0.01102943	0.00999948	0.00184990	0.00072996
270.000	0.00073996	0.00316984	0.01150940	0.01355930	0.00373981	0.00074996
292.500	0.00060997	0.00300985	0.01529921	0.03038843	0.00842956	0.00227988
315.000	0.00096995	0.00412978	0.01689913	0.03314829	0.01086944	0.00095995
337.500	0.00049997	0.00200990	0.00367981	0.00383980	0.00040998	0.00000000

- 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	0.00000000	0.00150992	0.00093995	0.00000000	0.00000000	0.00000000
22.500	0.00000000	0.00104995	0.00088995	0.00000000	0.00000000	0.00000000
45.000	0.00000000	0.00351982	0.00494974	0.00000000	0.00000000	0.00000000
67.500	0.00000000	0.00399979	0.00661966	0.00000000	0.00000000	0.00000000
90.000	0.00000000	0.00433978	0.00396980	0.00000000	0.00000000	0.00000000
112.500	0.00000000	0.00316984	0.00193990	0.00000000	0.00000000	0.00000000
135.000	0.00000000	0.00426978	0.00257987	0.00000000	0.00000000	0.00000000
157.500	0.00000000	0.00218989	0.00129993	0.00000000	0.00000000	0.00000000
180.000	0.00000000	0.00433978	0.00257987	0.00000000	0.00000000	0.00000000
202.500	0.00000000	0.00275986	0.00193990	0.00000000	0.00000000	0.00000000
225.000	0.00000000	0.00447977	0.00561971	0.00000000	0.00000000	0.00000000
247.500	0.00000000	0.00394979	0.00736962	0.00000000	0.00000000	0.00000000
270.000	0.00000000	0.00447977	0.01408928	0.00000000	0.00000000	0.00000000
292.500	0.00000000	0.00412978	0.01606917	0.00000000	0.00000000	0.00000000
315.000	0.00000000	0.00435977	0.02230885	0.00000000	0.00000000	0.00000000
337.500	0.00000000	0.00143993	0.00364981	0.00000000	0.00000000	0.00000000

SEASON 1

STABILITY CATEGORY 6

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	0.00309984	0.00280986	0.00000000	0.00000000	0.00000000	0.00000000
22.500	0.00243987	0.00189990	0.00000000	0.00000000	0.00000000	0.00000000
45.000	0.00589969	0.00675965	0.00000000	0.00000000	0.00000000	0.00000000
67.500	0.00541972	0.00709963	0.00000000	0.00000000	0.00000000	0.00000000
90.000	0.00578970	0.00618968	0.00000000	0.00000000	0.00000000	0.00000000
112.500	0.00415978	0.00326983	0.00000000	0.00000000	0.00000000	0.00000000
135.000	0.00653966	0.00531973	0.00000000	0.00000000	0.00000000	0.00000000
157.500	0.00370981	0.00335983	0.00000000	0.00000000	0.00000000	0.00000000
180.000	0.00578970	0.00593969	0.00000000	0.00000000	0.00000000	0.00000000
202.500	0.00406979	0.00378980	0.00000000	0.00000000	0.00000000	0.00000000
225.000	0.00598969	0.00705963	0.00000000	0.00000000	0.00000000	0.00000000
247.500	0.00616968	0.00853956	0.00000000	0.00000000	0.00000000	0.00000000
270.000	0.00579970	0.01102943	0.00000000	0.00000000	0.00000000	0.00000000
292.500	0.00685965	0.01145941	0.00000000	0.00000000	0.00000000	0.00000000
315.000	0.00874955	0.01417927	0.00000000	0.00000000	0.00000000	0.00000000
337.500	0.00463976	0.00478975	0.00000000	0.00000000	0.00000000	0.00000000

- ISCLT INPUT DATA (CONT.) -

- 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
STABILITY CATEGORY 6	0.350000E-01	0.350000E-01	0.350000E-01	0.350000E-01	0.350000E-01	0.350000E-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 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
STABILITY CATEGORY 6	0.300000E+00	0.300000E+00	0.300000E+00	0.300000E+00	0.300000E+00	0.300000E+00

```
                                  - SOURCE INPUT DATA -

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        1  STACK     694.70     3704.39 251.46    0.00 GAS EXIT TEMP (DEG K)= 412.80, GAS EXIT VEL. (M/SEC)= 23.00,
                                                        STACK DIAMETER (M)= 7.070, 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
                                                                  3.12100E+03
X        2  STACK     694.60     3704.48  76.20    0.00 GAS EXIT TEMP (DEG K)= 338.81, GAS EXIT VEL. (M/SEC)= 14.00,
                                                        STACK DIAMETER (M)= 3.960, 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
                                                                  6.94000E+01
```

**** ISCLT ************* PLANT YATES- SO2 ******** PAGE 7 ****

** ANNUAL GROUND LEVEL CONCENTRATION (MICROGRAMS PER CUBIC METER) FROM ALL SOURCES COMBINED **

- GRID SYSTEM RECEPTORS -
- X AXIS (DISTANCE, METERS) -

Y AXIS (DISTANCE, METERS)	-18000.000	-16000.000	-14000.000	-12000.000	-10000.000	-8000.000	-6000.000	-4000.000	-2000.000
				- CONCENTRATION -					
18000.000	0.661596	0.675184	0.692211	0.663660	0.614426	0.553987	0.481023	0.516379	0.638501
16000.000	0.677696	0.692941	0.712348	0.737052	0.705858	0.645652	0.565463	0.513207	0.664488
14000.000	0.697006	0.714557	0.737811	0.768452	0.806829	0.770158	0.686984	0.567729	0.690303
12000.000	0.719546	0.740374	0.768956	0.807567	0.856520	0.914849	0.861514	0.722694	0.699243
10000.000	0.774956	0.783848	0.804959	0.853343	0.916653	0.992740	1.070294	0.952745	0.687809
8000.000	0.850691	0.867539	0.894956	0.935407	0.990669	1.084425	1.179320	1.231687	0.915613
6000.000	0.933892	0.960345	1.001491	1.062279	1.146821	1.247351	1.341672	1.375761	1.128187
4000.000	1.020351	1.056501	1.111346	1.192900	1.310004	1.457784	1.602291	1.607821	1.097727
2000.000	1.127527	1.177774	1.251192	1.358399	1.513225	1.719707	1.966352	2.179321	1.591961
0.000	1.246525	1.310950	1.401227	1.528901	1.711593	1.937372	1.951422	1.808559	1.187501
-2000.000	1.368211	1.443995	1.544981	1.601891	1.607195	1.611346	1.580459	1.326561	0.695437
-4000.000	1.486358	1.458839	1.426851	1.397992	1.372066	1.344572	1.211629	0.869338	0.517442
-6000.000	1.351504	1.308236	1.263136	1.219101	1.177092	1.078228	0.866662	0.569126	0.453483
-8000.000	1.222380	1.172774	1.120616	1.069414	0.982226	0.826824	0.623283	0.391513	0.396644
-10000.000	1.106779	1.054302	1.000558	0.919733	0.792837	0.637169	0.450297	0.346978	0.350424
-12000.000	1.005380	0.953103	0.879177	0.770694	0.642202	0.493269	0.324908	0.312131	0.314227
-14000.000	0.917534	0.850502	0.755948	0.646478	0.521873	0.382900	0.282520	0.285117	0.286187
-16000.000	0.828008	0.745101	0.650130	0.543080	0.424708	0.296775	0.262902	0.264286	0.264732
-18000.000	0.735412	0.652429	0.559326	0.456642	0.345650	0.246257	0.247272	0.247891	0.248005

- GRID SYSTEM RECEPTORS -
- X AXIS (DISTANCE, METERS) -

Y AXIS (DISTANCE, METERS)	0.000	2000.000	4000.000	6000.000	8000.000	10000.000	12000.000	14000.000	16000.000
				- CONCENTRATION -					
18000.000	0.769417	0.777255	0.718024	0.661255	0.702135	0.772177	0.828024	0.871895	0.886015
16000.000	0.830440	0.842595	0.770399	0.720427	0.817560	0.890179	0.941322	0.953869	0.940837
14000.000	0.908718	0.927131	0.836430	0.867777	0.976124	1.044638	1.055070	1.030466	1.007347
12000.000	0.994224	1.022356	0.910489	1.077385	1.193580	1.207492	1.166086	1.124236	1.086304
10000.000	1.056317	1.103228	1.126209	1.372574	1.427959	1.371790	1.301158	1.233928	1.175871
8000.000	0.987484	1.089705	1.455058	1.682359	1.663576	1.571010	1.447554	1.334850	1.247927
6000.000	0.566891	0.885360	1.694039	2.006503	1.902082	1.728518	1.562930	1.427663	1.324449
4000.000	0.141897	0.955941	1.808697	2.193603	2.082979	1.871274	1.674212	1.517213	1.399312
2000.000	0.304167	1.694298	3.109549	3.139278	2.683146	2.292696	1.994187	1.773386	1.612321
0.000	0.542169	1.154280	3.289893	3.404040	3.060803	2.710797	2.323865	2.048055	1.846834
-2000.000	0.564229	0.983232	2.009166	3.146760	2.998405	2.688066	2.444814	2.263705	2.061633
-4000.000	0.511684	0.792746	1.214840	2.134062	2.760947	2.632226	2.412608	2.244671	2.115501
-6000.000	0.451004	0.645308	0.914513	1.452912	2.039231	2.465973	2.383835	2.229718	2.107807
-8000.000	0.395165	0.535232	0.733188	0.988087	1.511281	1.938611	2.271708	2.218811	2.104378
-10000.000	0.349246	0.454441	0.606119	0.732266	1.122238	1.524833	1.863329	2.139739	2.103012
-12000.000	0.313251	0.395258	0.515471	0.620182	0.830944	1.200563	1.527782	1.807904	2.040760
-14000.000	0.285384	0.351308	0.449401	0.538022	0.614301	0.944983	1.252541	1.525022	1.760223
-16000.000	0.264098	0.318551	0.400532	0.476625	0.544046	0.741219	1.026022	1.285677	1.516079
-18000.000	0.247499	0.293504	0.363318	0.429389	0.489620	0.577231	0.839242	1.083310	1.304721

** ANNUAL GROUND LEVEL CONCENTRATION (MICROGRAMS PER CUBIC METER) FROM ALL SOURCES COMBINED (CONT.) **

- GRID SYSTEM RECEPTORS -
- X AXIS (DISTANCE, METERS) -

Y AXIS (DISTANCE, METERS)	18000.000
	- CONCENTRATION -
18000.000	0.878617
16000.000	0.928424
14000.000	0.987198
12000.000	1.054627
10000.000	1.120617
8000.000	1.181298
6000.000	1.245950
4000.000	1.310568
2000.000	1.492188
0.000	1.695654
-2000.000	1.888676
-4000.000	2.015489
-6000.000	2.010698
-8000.000	2.009746
-10000.000	2.010306
-12000.000	2.011075
-14000.000	1.958735
-16000.000	1.715910
-18000.000	1.501099

- PROGRAM DETERMINED MAXIMUM 10 VALUES -

X COORDINATE (METERS)	Y COORDINATE (METERS)	CONCENTRATION
6000.00	0.00	3.404040
4000.00	0.00	3.289893
6000.00	-2000.00	3.146760
6000.00	2000.00	3.139278
4000.00	2000.00	3.109549
8000.00	0.00	3.060803
8000.00	-2000.00	2.998405
8000.00	-4000.00	2.760947
10000.00	0.00	2.710797
10000.00	-2000.00	2.688066

146-END

PRINT COMPLETED AT 13:42:44 FOR USER: B1955934 DIST: BLANCHE

END-146

Plant Yates

SO_2

Long-Term

ISCLT Model

Case 3

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****************************************************************************************************************************
** VM/SP SERVICE LEVEL 0411 **** CPU SERIAL  000019  CPU MODEL  0580 ****************************************************
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B1955934	B1955934	USERID	ORIGIN
BLANCHE	VMRBHMC1	DISTCODE	SYSTEM
YATESCS	REPORT	FILENAME	FILETYPE
03/17/89	13:12:38	FILE CREATION DATE	
4124	00000353	SPOOLID	COUNT
03/17/89	13:42:34	FILE PRINT DATE	
R	0500	CLASS	DEVICE
STANDARD		FORMS	

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    **      ****      ********
    **     ** **       ********
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                   S               Southern Company
                  SCS               Services, Inc.
                 SCSBS
                SCSBSCS          Information Services
               SCSBSCSBS              Birmingham
                SCSBSCSBS
      AMDAHL   SCSSCSBSS           For Assistance,
     470  V/8   SCSCSBSCS           Call ISC at 7378
   32 Megabytes  SCSBSCSBS
                  SCSBSCSBS
       SCSCSCS            SCS         VM/SP  HPO
      SSCSBSS          SCSBSCS        Release  4.2
     SCSBSCS        SCSBSCSBSCS
    SCSBSCS    SCSBSCSBSCSBSCSBS
   SCSCSCSCSCSCSCSCSCSCSCSCSCSCS
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TAG DATA: VMRBHMC1 SYSTEM

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********        *     *******   *********  *********   *******   *********         *
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**** ISCLT ************* PLANT YATES- SO2                                             ******** PAGE      1 ****

                              - ISCLT INPUT DATA -

      NUMBER OF SOURCES =    1
      NUMBER OF X AXIS GRID SYSTEM POINTS =    19
      NUMBER OF Y AXIS GRID SYSTEM POINTS =    19
      NUMBER OF SPECIAL POINTS =    0
      NUMBER OF SEASONS =    1
      NUMBER OF WIND SPEED CLASSES =    6
      NUMBER OF STABILITY CLASSES =    6
      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, 2, 2, 0, 0, 0, 0, 0, 0, 0, 0, 0,
      ALL SOURCES ARE USED TO FORM SOURCE COMBINATION  1
     DISTANCE X AXIS GRID SYSTEM POINTS (METERS )=  -18000.00,  -16000.00,  -14000.00,  -12000.00,  -10000.00,   -8000.00,
        -6000.00,   -4000.00,   -2000.00,       0.00,    2000.00,    4000.00,    6000.00,    8000.00,   10000.00,   12000.00,
        14000.00,   16000.00,   18000.00,
     DISTANCE Y AXIS GRID SYSTEM POINTS (METERS )=  -18000.00,  -16000.00,  -14000.00,  -12000.00,  -10000.00,   -8000.00,
        -6000.00,   -4000.00,   -2000.00,       0.00,    2000.00,    4000.00,    6000.00,    8000.00,   10000.00,   12000.00,
        14000.00,   16000.00,   18000.00,

                      - AMBIENT AIR TEMPERATURE (DEGREES KELVIN) -

                 STABILITY  STABILITY  STABILITY  STABILITY  STABILITY  STABILITY
                 CATEGORY 1 CATEGORY 2 CATEGORY 3 CATEGORY 4 CATEGORY 5 CATEGORY 6
      SEASON  1   289.4800   289.4800   289.4800   289.4800   289.4800   289.4800

                             - MIXING LAYER HEIGHT (METERS) -

                                       SEASON 1
                   WIND SPEED  WIND SPEED  WIND SPEED  WIND SPEED  WIND SPEED  WIND SPEED
                   CATEGORY 1  CATEGORY 2  CATEGORY 3  CATEGORY 4  CATEGORY 5  CATEGORY 6
STABILITY CATEGORY 10.154200E+040.154200E+040.154200E+040.154200E+040.154200E+040.154200E+04
STABILITY CATEGORY 20.154200E+040.154200E+040.154200E+040.154200E+040.154200E+040.154200E+04
STABILITY CATEGORY 30.154200E+040.154200E+040.154200E+040.154200E+040.154200E+040.154200E+04
STABILITY CATEGORY 40.154200E+040.154200E+040.154200E+040.154200E+040.154200E+040.154200E+04
STABILITY CATEGORY 50.100000E+050.100000E+050.100000E+050.100000E+050.100000E+050.100000E+05
STABILITY CATEGORY 60.100000E+050.100000E+050.100000E+050.100000E+050.100000E+050.100000E+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	0.00026999	0.00022999	0.00000000	0.00000000	0.00000000	0.00000000
22.500	0.00020999	0.00013999	0.00000000	0.00000000	0.00000000	0.00000000
45.000	0.00035998	0.00022999	0.00000000	0.00000000	0.00000000	0.00000000
67.500	0.00042998	0.00056997	0.00000000	0.00000000	0.00000000	0.00000000
90.000	0.00033998	0.00031998	0.00000000	0.00000000	0.00000000	0.00000000
112.500	0.00027999	0.00040998	0.00000000	0.00000000	0.00000000	0.00000000
135.000	0.00033998	0.00031998	0.00000000	0.00000000	0.00000000	0.00000000
157.500	0.00010999	0.00029998	0.00000000	0.00000000	0.00000000	0.00000000
180.000	0.00030998	0.00040998	0.00000000	0.00000000	0.00000000	0.00000000
202.500	0.00030998	0.00033998	0.00000000	0.00000000	0.00000000	0.00000000
225.000	0.00045998	0.00040998	0.00000000	0.00000000	0.00000000	0.00000000
247.500	0.00025999	0.00054997	0.00000000	0.00000000	0.00000000	0.00000000
270.000	0.00037998	0.00036998	0.00000000	0.00000000	0.00000000	0.00000000
292.500	0.00048997	0.00056997	0.00000000	0.00000000	0.00000000	0.00000000
315.000	0.00047998	0.00086996	0.00000000	0.00000000	0.00000000	0.00000000
337.500	0.00019999	0.00029998	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	0.00106994	0.00086996	0.00045998	0.00000000	0.00000000	0.00000000
22.500	0.00070996	0.00102995	0.00031998	0.00000000	0.00000000	0.00000000
45.000	0.00138993	0.00150992	0.00152992	0.00000000	0.00000000	0.00000000
67.500	0.00154992	0.00186990	0.00134993	0.00000000	0.00000000	0.00000000
90.000	0.00119994	0.00159992	0.00118994	0.00000000	0.00000000	0.00000000
112.500	0.00111994	0.00175991	0.00111994	0.00000000	0.00000000	0.00000000
135.000	0.00107994	0.00136993	0.00090995	0.00000000	0.00000000	0.00000000
157.500	0.00058997	0.00077996	0.00036998	0.00000000	0.00000000	0.00000000
180.000	0.00115994	0.00163992	0.00067996	0.00000000	0.00000000	0.00000000
202.500	0.00113994	0.00120994	0.00083996	0.00000000	0.00000000	0.00000000
225.000	0.00146992	0.00216989	0.00099995	0.00000000	0.00000000	0.00000000
247.500	0.00118994	0.00202990	0.00154992	0.00000000	0.00000000	0.00000000
270.000	0.00095995	0.00195990	0.00198990	0.00000000	0.00000000	0.00000000
292.500	0.00157992	0.00312984	0.00275986	0.00000000	0.00000000	0.00000000
315.000	0.00186990	0.00280986	0.00280986	0.00000000	0.00000000	0.00000000
337.500	0.00112994	0.00157992	0.00115994	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	0.00017999	0.00095995	0.00090995	0.00005000	0.00000000	0.00000000
22.500	0.00022999	0.00102995	0.00115994	0.00005000	0.00000000	0.00000000
45.000	0.00054997	0.00268986	0.00412978	0.00040998	0.00000000	0.00000000
67.500	0.00048997	0.00296985	0.00506974	0.00083996	0.00000000	0.00000000
90.000	0.00052997	0.00193990	0.00405979	0.00054997	0.00000000	0.00000000
112.500	0.00029998	0.00141993	0.00289985	0.00040998	0.00000000	0.00000000
135.000	0.00041998	0.00186990	0.00273986	0.00033998	0.00005000	0.00000000
157.500	0.00024999	0.00095995	0.00136993	0.00026999	0.00000000	0.00000000
180.000	0.00057997	0.00159992	0.00252987	0.00024999	0.00002000	0.00002000
202.500	0.00030998	0.00159992	0.00214989	0.00040998	0.00002000	0.00002000
225.000	0.00054997	0.00239988	0.00360981	0.00054997	0.00015999	0.00000000
247.500	0.00035998	0.00248987	0.00529972	0.00102995	0.00007000	0.00000000
270.000	0.00039998	0.00259987	0.00584970	0.00143993	0.00010999	0.00000000
292.500	0.00042998	0.00316984	0.00915953	0.00182991	0.00020999	0.00000000
315.000	0.00066997	0.00362981	0.00997949	0.00184990	0.00022999	0.00000000
337.500	0.00048997	0.00166991	0.00355982	0.00056997	0.00005000	0.00002000

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	0.00037998	0.00157992	0.00191990	0.00070996	0.00002000	0.00000000
22.500	0.00051997	0.00218989	0.00209989	0.00083996	0.00002000	0.00000000
45.000	0.00155992	0.00721963	0.01378929	0.00869955	0.00152992	0.00005000
67.500	0.00163992	0.00773960	0.02737859	0.02193887	0.00266986	0.00007000
90.000	0.00251987	0.00787959	0.02056894	0.00967950	0.00109994	0.00002000
112.500	0.00147992	0.00467976	0.01205938	0.00584970	0.00056997	0.00013999
135.000	0.00136993	0.00399979	0.00985949	0.00581970	0.00093995	0.00005000
157.500	0.00083996	0.00234988	0.00606969	0.00305984	0.00115994	0.00026999
180.000	0.00110994	0.00364981	0.00844957	0.00618968	0.00154992	0.00049997
202.500	0.00076996	0.00234988	0.00615968	0.00478975	0.00106994	0.00007000
225.000	0.00114994	0.00442977	0.01017947	0.00657966	0.00207989	0.00026999
247.500	0.00074996	0.00289985	0.01102943	0.00999948	0.00184990	0.00072996
270.000	0.00073996	0.00316984	0.01150940	0.01355930	0.00373981	0.00074996
292.500	0.00060997	0.00300985	0.01529921	0.03038843	0.00842956	0.00227988
315.000	0.00096995	0.00412978	0.01689913	0.03314829	0.01086944	0.00095995
337.500	0.00049997	0.00200990	0.00367981	0.00383980	0.00040998	0.00000000

- 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	0.00000000	0.00150992	0.00093995	0.00000000	0.00000000	0.00000000
22.500	0.00000000	0.00104995	0.00088995	0.00000000	0.00000000	0.00000000
45.000	0.00000000	0.00351982	0.00494974	0.00000000	0.00000000	0.00000000
67.500	0.00000000	0.00398979	0.00681966	0.00000000	0.00000000	0.00000000
90.000	0.00000000	0.00433978	0.00396980	0.00000000	0.00000000	0.00000000
112.500	0.00000000	0.00316984	0.00193990	0.00000000	0.00000000	0.00000000
135.000	0.00000000	0.00426978	0.00257987	0.00000000	0.00000000	0.00000000
157.500	0.00000000	0.00218989	0.00129993	0.00000000	0.00000000	0.00000000
180.000	0.00000000	0.00433978	0.00257987	0.00000000	0.00000000	0.00000000
202.500	0.00000000	0.00275986	0.00193990	0.00000000	0.00000000	0.00000000
225.000	0.00000000	0.00447977	0.00561971	0.00000000	0.00000000	0.00000000
247.500	0.00000000	0.00394979	0.00736962	0.00000000	0.00000000	0.00000000
270.000	0.00000000	0.00447977	0.01408928	0.00000000	0.00000000	0.00000000
292.500	0.00000000	0.00412978	0.01606917	0.00000000	0.00000000	0.00000000
315.000	0.00000000	0.00435977	0.02230885	0.00000000	0.00000000	0.00000000
337.500	0.00000000	0.00143993	0.00364981	0.00000000	0.00000000	0.00000000

SEASON 1

STABILITY CATEGORY 6

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	0.00309984	0.00280986	0.00000000	0.00000000	0.00000000	0.00000000
22.500	0.00243987	0.00189990	0.00000000	0.00000000	0.00000000	0.00000000
45.000	0.00589969	0.00675965	0.00000000	0.00000000	0.00000000	0.00000000
67.500	0.00541972	0.00709963	0.00000000	0.00000000	0.00000000	0.00000000
90.000	0.00578970	0.00618968	0.00000000	0.00000000	0.00000000	0.00000000
112.500	0.00415978	0.00326983	0.00000000	0.00000000	0.00000000	0.00000000
135.000	0.00653966	0.00531973	0.00000000	0.00000000	0.00000000	0.00000000
157.500	0.00370981	0.00335983	0.00000000	0.00000000	0.00000000	0.00000000
180.000	0.00578970	0.00593969	0.00000000	0.00000000	0.00000000	0.00000000
202.500	0.00406979	0.00378980	0.00000000	0.00000000	0.00000000	0.00000000
225.000	0.00598969	0.00705963	0.00000000	0.00000000	0.00000000	0.00000000
247.500	0.00616968	0.00853956	0.00000000	0.00000000	0.00000000	0.00000000
270.000	0.00579970	0.01102943	0.00000000	0.00000000	0.00000000	0.00000000
292.500	0.00685965	0.01145941	0.00000000	0.00000000	0.00000000	0.00000000
315.000	0.00874955	0.01417927	0.00000000	0.00000000	0.00000000	0.00000000
337.500	0.00463976	0.00478975	0.00000000	0.00000000	0.00000000	0.00000000

- ISCLT INPUT DATA (CONT.) -

- 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
STABILITY CATEGORY 6	0.350000E-01	0.350000E-01	0.350000E-01	0.350000E-01	0.350000E-01	0.350000E-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 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
STABILITY CATEGORY 6	0.300000E+00	0.300000E+00	0.300000E+00	0.300000E+00	0.300000E+00	0.300000E+00

- SOURCE INPUT DATA -

CARD	TAPE	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	694.80	3704.48	78.20	0.00	GAS EXIT TEMP (DEG K)= 338.81, GAS EXIT VEL. (M/SEC)= 14.00, STACK DIAMETER (M)= 3.960, 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
6.94000E+01			

** ANNUAL GROUND LEVEL CONCENTRATION (MICROGRAMS PER CUBIC METER) FROM ALL SOURCES COMBINED **

- GRID SYSTEM RECEPTORS -

- X AXIS (DISTANCE, METERS) -

Y AXIS (DISTANCE, METERS)	-18000.000	-16000.000	-14000.000	-12000.000	-10000.000	-8000.000	-6000.000	-4000.000	-2000.000
	- CONCENTRATION -								
18000.000	0.128683	0.137009	0.145912	0.144101	0.136851	0.126017	0.111133	0.120322	0.148507
16000.000	0.132714	0.142255	0.152562	0.163572	0.160868	0.150333	0.133768	0.122855	0.158235
14000.000	0.136844	0.147647	0.159598	0.172742	0.186793	0.181581	0.164717	0.138781	0.168243
12000.000	0.140983	0.153137	0.166963	0.182523	0.199095	0.217120	0.208228	0.178994	0.175690
10000.000	0.159929	0.166195	0.174492	0.192483	0.212825	0.235811	0.260433	0.240036	0.181715
8000.000	0.185966	0.197736	0.210030	0.221423	0.230923	0.256516	0.287719	0.320333	0.263462
6000.000	0.212727	0.230719	0.251310	0.274056	0.299339	0.324003	0.341343	0.360665	0.387789
4000.000	0.238845	0.263132	0.292500	0.327704	0.371605	0.424333	0.483002	0.532397	0.503690
2000.000	0.259997	0.290000	0.327424	0.374605	0.437136	0.520733	0.635200	0.796699	0.710507
0.000	0.277201	0.311618	0.355373	0.411420	0.487256	0.582465	0.600130	0.553705	0.360202
-2000.000	0.290198	0.327288	0.374478	0.414225	0.435622	0.444811	0.425300	0.340085	0.150755
-4000.000	0.298743	0.316592	0.332636	0.345092	0.349323	0.339524	0.295451	0.197839	0.092830
-6000.000	0.266039	0.276353	0.284109	0.287138	0.281594	0.254938	0.198508	0.113848	0.080752
-8000.000	0.235926	0.241126	0.243016	0.239884	0.222994	0.186928	0.133989	0.069563	0.071815
-10000.000	0.209420	0.210793	0.208894	0.197107	0.172485	0.137499	0.090640	0.063295	0.065216
-12000.000	0.186431	0.185157	0.176565	0.158698	0.133981	0.101457	0.060675	0.058220	0.060031
-14000.000	0.166694	0.160089	0.146414	0.128158	0.104575	0.075094	0.052247	0.054001	0.055599
-16000.000	0.146725	0.135899	0.121810	0.103959	0.081937	0.055548	0.048979	0.050542	0.051971
-18000.000	0.126866	0.115667	0.101715	0.084706	0.064444	0.044802	0.046226	0.047611	0.048905

- GRID SYSTEM RECEPTORS -

- X AXIS (DISTANCE, METERS) -

Y AXIS (DISTANCE, METERS)	0.000	2000.000	4000.000	6000.000	8000.000	10000.000	12000.000	14000.000	16000.000
	- CONCENTRATION -								
18000.000	0.177851	0.175028	0.154641	0.134794	0.142370	0.157696	0.168344	0.174995	0.172644
16000.000	0.196064	0.192669	0.166779	0.147605	0.170775	0.187149	0.196728	0.194005	0.183452
14000.000	0.218870	0.214784	0.180921	0.183066	0.208719	0.224312	0.221903	0.208022	0.195015
12000.000	0.245956	0.241348	0.196617	0.234302	0.260488	0.258186	0.240116	0.223277	0.207285
10000.000	0.276270	0.272952	0.257976	0.309027	0.310203	0.284436	0.260337	0.239220	0.220243
8000.000	0.299260	0.307086	0.370476	0.386542	0.350446	0.314555	0.285185	0.263191	0.243842
6000.000	0.247110	0.380269	0.506283	0.460282	0.406095	0.361564	0.324046	0.293244	0.267878
4000.000	0.135836	0.499390	0.655666	0.562924	0.478634	0.413438	0.362288	0.322318	0.290579
2000.000	0.166215	0.901850	1.113929	0.837197	0.634485	0.511355	0.428524	0.369660	0.325903
0.000	0.146658	0.285723	0.965776	0.884869	0.719527	0.592482	0.485695	0.411833	0.357784
-2000.000	0.115689	0.183811	0.452554	0.772118	0.701322	0.591058	0.505575	0.439423	0.381302
-4000.000	0.095541	0.135536	0.200538	0.465792	0.625353	0.573336	0.498037	0.437320	0.386800
-6000.000	0.082658	0.108915	0.143465	0.280532	0.428446	0.521257	0.483999	0.429133	0.382979
-8000.000	0.073493	0.092082	0.117402	0.167574	0.295230	0.386724	0.445810	0.416788	0.375638
-10000.000	0.066773	0.080689	0.100018	0.116295	0.204562	0.287541	0.347492	0.388172	0.365697
-12000.000	0.061495	0.072385	0.087508	0.100597	0.141310	0.214889	0.271967	0.314054	0.343490
-14000.000	0.056949	0.065668	0.077844	0.088717	0.097836	0.161403	0.213880	0.254886	0.285860
-16000.000	0.053218	0.060382	0.070407	0.079559	0.087479	0.121545	0.169020	0.207847	0.238687
-18000.000	0.050055	0.056065	0.064487	0.072271	0.079223	0.091618	0.134269	0.170335	0.200077

** ANNUAL GROUND LEVEL CONCENTRATION (MICROGRAMS PER CUBIC METER) FROM ALL SOURCES COMBINED (CONT.) **

- GRID SYSTEM RECEPTORS -

- X AXIS (DISTANCE, METERS) -

Y AXIS (DISTANCE , METERS)	18000.000
	- CONCENTRATION -
18000.000	0.164314
16000.000	0.173461
14000.000	0.183139
12000.000	0.193079
10000.000	0.206921
8000.000	0.226201
6000.000	0.245480
4000.000	0.263625
2000.000	0.290839
0.000	0.315704
-2000.000	0.334951
-4000.000	0.345450
-6000.000	0.344361
-8000.000	0.340229
-10000.000	0.333722
-12000.000	0.325702
-14000.000	0.308407
-16000.000	0.262504
-18000.000	0.224036

- PROGRAM DETERMINED MAXIMUM 10 VALUES -

X COORDINATE (METERS)	Y COORDINATE (METERS)	CONCENTRATION
4000.00	2000.00	1.113929
4000.00	0.00	0.965776
2000.00	2000.00	0.901850
6000.00	0.00	0.884869
6000.00	2000.00	0.837197
-4000.00	2000.00	0.796699
6000.00	-2000.00	0.772118
8000.00	0.00	0.719527
-2000.00	2000.00	0.710507
8000.00	-2000.00	0.701322

```
***************************************** END OF ISCLT PROGRAM,     1 SOURCES PROCESSED ****************************************
```

Plant Yates

Particulates

Long-Term

ISCLT Model

Case 1

** VM/SP SERVICE LEVEL 0411 **** CPU SERIAL 000019 CPU MODEL 0580 **

B1955934	B1955934	USERID	ORIGIN
BLANCHE	VMRBHMC1	DISTCODE	SYSTEM
YATESAP	REPORT	FILENAME	FILETYPE
03/17/89	13:12:37	FILE CREATION DATE	
4123	00000353	SPOOLID	COUNT
03/17/89	13:42:29	FILE PRINT DATE	
R	0500	CLASS	DEVICE
STANDARD		FORMS	

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                 S
                SCS
               SCSBS
              SCSBSCS
             SCSBSCSBS
AMDAHL      SCSBSCSBS
470  V/8     SCSSCSBSS
32 Megabytes  SCSCSBSCS
               SCSBSCSBS
                SCSBSCSBS
SCSCSCS               SCS
SSCSBSS             SCSBSCS
SCSBSCS           SCSBSCSBSCS
SCSBSCS   SCSBSCSBSCSBSCSBS
SCSCSCSCSCSCSCSCSCSCSCSCSCS
```

Southern Company
Services, Inc.

Information Services
Birmingham

For Assistance,
Call ISC at 7378

VM/SP HPO
Release 4.2

TAG DATA: VMRBHMC1 SYSTEM

B1955934

BLANCHE

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**** ISCLT ************* PLANT YATES - PARTICULATES                                        ******** PAGE     1 ****

                                    - ISCLT INPUT DATA -

        NUMBER OF SOURCES =    1
        NUMBER OF X AXIS GRID SYSTEM POINTS =    19
        NUMBER OF Y AXIS GRID SYSTEM POINTS =    19
        NUMBER OF SPECIAL POINTS =    0
        NUMBER OF SEASONS =    1
        NUMBER OF WIND SPEED CLASSES =   6
        NUMBER OF STABILITY CLASSES =   6
        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, 2, 2, 0, 0, 0, 0, 0, 0, 0, 0, 0,
        ALL SOURCES ARE USED TO FORM SOURCE COMBINATION  1
       DISTANCE X AXIS GRID SYSTEM POINTS (METERS )=  -18000.00,  -16000.00,  -14000.00,  -12000.00,  -10000.00,   -8000.00,
          -6000.00,   -4000.00,   -2000.00,       0.00,    2000.00,    4000.00,    6000.00,    8000.00,   10000.00,   12000.00,
          14000.00,   16000.00,   18000.00,
       DISTANCE Y AXIS GRID SYSTEM POINTS (METERS )=  -18000.00,  -16000.00,  -14000.00,  -12000.00,  -10000.00,   -8000.00,
          -6000.00,   -4000.00,   -2000.00,       0.00,    2000.00,    4000.00,    6000.00,    8000.00,   10000.00,   12000.00,
          14000.00,   16000.00,   18000.00,

                          - AMBIENT AIR TEMPERATURE (DEGREES KELVIN) -

                   STABILITY  STABILITY  STABILITY  STABILITY  STABILITY  STABILITY
                   CATEGORY 1 CATEGORY 2 CATEGORY 3 CATEGORY 4 CATEGORY 5 CATEGORY 6
        SEASON  1    289.4800   289.4800   289.4800   289.4800   289.4800   289.4800

                                 - MIXING LAYER HEIGHT (METERS) -

                                          SEASON 1
                     WIND SPEED  WIND SPEED  WIND SPEED  WIND SPEED  WIND SPEED  WIND SPEED
                     CATEGORY 1  CATEGORY 2  CATEGORY 3  CATEGORY 4  CATEGORY 5  CATEGORY 6
STABILITY CATEGORY 10.154200E+040.154200E+040.154200E+040.154200E+040.154200E+040.154200E+04
STABILITY CATEGORY 20.154200E+040.154200E+040.154200E+040.154200E+040.154200E+040.154200E+04
STABILITY CATEGORY 30.154200E+040.154200E+040.154200E+040.154200E+040.154200E+040.154200E+04
STABILITY CATEGORY 40.154200E+040.154200E+040.154200E+040.154200E+040.154200E+040.154200E+04
STABILITY CATEGORY 50.100000E+050.100000E+050.100000E+050.100000E+050.100000E+050.100000E+05
STABILITY CATEGORY 60.100000E+050.100000E+050.100000E+050.100000E+050.100000E+050.100000E+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	0.00026999	0.00022999	0.00000000	0.00000000	0.00000000	0.00000000
22.500	0.00020999	0.00013999	0.00000000	0.00000000	0.00000000	0.00000000
45.000	0.00035998	0.00022999	0.00000000	0.00000000	0.00000000	0.00000000
67.500	0.00042998	0.00056997	0.00000000	0.00000000	0.00000000	0.00000000
90.000	0.00033998	0.00031998	0.00000000	0.00000000	0.00000000	0.00000000
112.500	0.00027999	0.00040998	0.00000000	0.00000000	0.00000000	0.00000000
135.000	0.00033998	0.00031998	0.00000000	0.00000000	0.00000000	0.00000000
157.500	0.00010999	0.00029998	0.00000000	0.00000000	0.00000000	0.00000000
180.000	0.00030998	0.00040998	0.00000000	0.00000000	0.00000000	0.00000000
202.500	0.00030998	0.00033998	0.00000000	0.00000000	0.00000000	0.00000000
225.000	0.00045998	0.00040998	0.00000000	0.00000000	0.00000000	0.00000000
247.500	0.00025999	0.00054997	0.00000000	0.00000000	0.00000000	0.00000000
270.000	0.00037998	0.00036998	0.00000000	0.00000000	0.00000000	0.00000000
292.500	0.00048997	0.00056997	0.00000000	0.00000000	0.00000000	0.00000000
315.000	0.00047998	0.00086996	0.00000000	0.00000000	0.00000000	0.00000000
337.500	0.00019999	0.00029998	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	0.00106994	0.00086996	0.00045998	0.00000000	0.00000000	0.00000000
22.500	0.00070996	0.00102995	0.00031998	0.00000000	0.00000000	0.00000000
45.000	0.00138993	0.00150992	0.00152992	0.00000000	0.00000000	0.00000000
67.500	0.00154992	0.00186990	0.00134993	0.00000000	0.00000000	0.00000000
90.000	0.00119994	0.00159992	0.00118994	0.00000000	0.00000000	0.00000000
112.500	0.00111994	0.00175991	0.00111994	0.00000000	0.00000000	0.00000000
135.000	0.00107994	0.00136993	0.00090995	0.00000000	0.00000000	0.00000000
157.500	0.00058997	0.00077996	0.00036998	0.00000000	0.00000000	0.00000000
180.000	0.00115994	0.00163992	0.00067996	0.00000000	0.00000000	0.00000000
202.500	0.00113994	0.00120994	0.00083996	0.00000000	0.00000000	0.00000000
225.000	0.00146992	0.00216989	0.00099995	0.00000000	0.00000000	0.00000000
247.500	0.00118994	0.00202990	0.00154992	0.00000000	0.00000000	0.00000000
270.000	0.00095995	0.00195990	0.00198990	0.00000000	0.00000000	0.00000000
292.500	0.00157992	0.00312984	0.00275986	0.00000000	0.00000000	0.00000000
315.000	0.00186990	0.00280986	0.00280986	0.00000000	0.00000000	0.00000000
337.500	0.00112994	0.00157992	0.00115994	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	0.00017999	0.00095995	0.00090995	0.00005000	0.00000000	0.00000000
22.500	0.00022999	0.00102995	0.00115994	0.00005000	0.00000000	0.00000000
45.000	0.00054997	0.00268986	0.00412978	0.00040998	0.00000000	0.00000000
67.500	0.00048997	0.00296985	0.00506974	0.00083996	0.00000000	0.00000000
90.000	0.00052997	0.00193990	0.00405979	0.00054997	0.00000000	0.00000000
112.500	0.00029998	0.00141993	0.00289985	0.00040998	0.00000000	0.00000000
135.000	0.00041998	0.00186990	0.00273986	0.00033998	0.00005000	0.00000000
157.500	0.00024999	0.00095995	0.00136993	0.00026999	0.00000000	0.00000000
180.000	0.00057997	0.00159992	0.00252987	0.00024999	0.00002000	0.00002000
202.500	0.00030998	0.00159992	0.00214989	0.00040998	0.00002000	0.00002000
225.000	0.00054997	0.00239988	0.00360981	0.00054997	0.00015999	0.00000000
247.500	0.00035998	0.00248987	0.00529972	0.00102995	0.00007000	0.00000000
270.000	0.00039998	0.00259987	0.00584970	0.00143993	0.00010999	0.00000000
292.500	0.00042998	0.00316984	0.00915953	0.00182991	0.00020999	0.00000000
315.000	0.00066997	0.00362981	0.00997949	0.00184990	0.00022999	0.00000000
337.500	0.00048997	0.00166991	0.00355982	0.00056997	0.00005000	0.00002000

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	0.00037998	0.00157992	0.00191990	0.00070996	0.00002000	0.00000000
22.500	0.00051997	0.00218989	0.00209989	0.00083996	0.00002000	0.00000000
45.000	0.00155992	0.00721963	0.01378929	0.00869955	0.00152992	0.00005000
67.500	0.00163992	0.00773960	0.02737859	0.02193887	0.00266986	0.00007000
90.000	0.00251987	0.00787959	0.02056894	0.00967950	0.00109994	0.00002000
112.500	0.00147992	0.00467976	0.01205938	0.00584970	0.00056997	0.00013999
135.000	0.00136993	0.00399979	0.00985949	0.00581970	0.00093995	0.00005000
157.500	0.00083996	0.00234988	0.00606969	0.00305984	0.00115994	0.00026999
180.000	0.00110994	0.00364981	0.00844957	0.00618968	0.00154992	0.00049997
202.500	0.00076996	0.00234988	0.00615968	0.00478975	0.00106994	0.00007000
225.000	0.00114994	0.00442977	0.01017947	0.00657966	0.00207989	0.00026999
247.500	0.00074996	0.00289985	0.01102943	0.00999948	0.00184990	0.00072996
270.000	0.00073996	0.00316984	0.01150940	0.01355930	0.00373981	0.00074996
292.500	0.00060997	0.00300985	0.01529921	0.03038843	0.00842956	0.00227988
315.000	0.00096995	0.00412978	0.01689913	0.03314829	0.01086944	0.00095995
337.500	0.00049997	0.00200990	0.00367981	0.00383980	0.00040998	0.00000000

- 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	0.00000000	0.00150992	0.00093995	0.00000000	0.00000000	0.00000000
22.500	0.00000000	0.00104995	0.00088995	0.00000000	0.00000000	0.00000000
45.000	0.00000000	0.00351982	0.00494974	0.00000000	0.00000000	0.00000000
67.500	0.00000000	0.00399979	0.00661966	0.00000000	0.00000000	0.00000000
90.000	0.00000000	0.00433978	0.00396980	0.00000000	0.00000000	0.00000000
112.500	0.00000000	0.00316984	0.00193990	0.00000000	0.00000000	0.00000000
135.000	0.00000000	0.00426978	0.00257987	0.00000000	0.00000000	0.00000000
157.500	0.00000000	0.00218989	0.00128993	0.00000000	0.00000000	0.00000000
180.000	0.00000000	0.00433978	0.00257987	0.00000000	0.00000000	0.00000000
202.500	0.00000000	0.00275986	0.00193990	0.00000000	0.00000000	0.00000000
225.000	0.00000000	0.00447977	0.00561971	0.00000000	0.00000000	0.00000000
247.500	0.00000000	0.00394979	0.00736962	0.00000000	0.00000000	0.00000000
270.000	0.00000000	0.00447977	0.01408928	0.00000000	0.00000000	0.00000000
292.500	0.00000000	0.00412978	0.01606917	0.00000000	0.00000000	0.00000000
315.000	0.00000000	0.00435977	0.02230885	0.00000000	0.00000000	0.00000000
337.500	0.00000000	0.00143993	0.00364981	0.00000000	0.00000000	0.00000000

SEASON 1

STABILITY CATEGORY 6

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	0.00309984	0.00280986	0.00000000	0.00000000	0.00000000	0.00000000
22.500	0.00243987	0.00189990	0.00000000	0.00000000	0.00000000	0.00000000
45.000	0.00589969	0.00675965	0.00000000	0.00000000	0.00000000	0.00000000
67.500	0.00541972	0.00709963	0.00000000	0.00000000	0.00000000	0.00000000
90.000	0.00578970	0.00618968	0.00000000	0.00000000	0.00000000	0.00000000
112.500	0.00415978	0.00326983	0.00000000	0.00000000	0.00000000	0.00000000
135.000	0.00653966	0.00531973	0.00000000	0.00000000	0.00000000	0.00000000
157.500	0.00370981	0.00335983	0.00000000	0.00000000	0.00000000	0.00000000
180.000	0.00578970	0.00593969	0.00000000	0.00000000	0.00000000	0.00000000
202.500	0.00406979	0.00378980	0.00000000	0.00000000	0.00000000	0.00000000
225.000	0.00598969	0.00705963	0.00000000	0.00000000	0.00000000	0.00000000
247.500	0.00616968	0.00853956	0.00000000	0.00000000	0.00000000	0.00000000
270.000	0.00579970	0.01102943	0.00000000	0.00000000	0.00000000	0.00000000
292.500	0.00685965	0.01145941	0.00000000	0.00000000	0.00000000	0.00000000
315.000	0.00874955	0.01417927	0.00000000	0.00000000	0.00000000	0.00000000
337.500	0.00463976	0.00478975	0.00000000	0.00000000	0.00000000	0.00000000

- ISCLT INPUT DATA (CONT.) -

- 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
STABILITY CATEGORY 6	0.350000E-01	0.350000E-01	0.350000E-01	0.350000E-01	0.350000E-01	0.350000E-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 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
STABILITY CATEGORY 6	0.300000E+00	0.300000E+00	0.300000E+00	0.300000E+00	0.300000E+00	0.300000E+00

- SOURCE INPUT DATA -

CARD	TAPE	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	694.70	3704.39	251.46	0.00	GAS EXIT TEMP (DEG K)= 412.80, GAS EXIT VEL. (M/SEC)= 28.10, STACK DIAMETER (M)= 7.070, 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
2.01400E+02			

** ANNUAL GROUND LEVEL CONCENTRATION (MICROGRAMS PER CUBIC METER) FROM ALL SOURCES COMBINED **

- GRID SYSTEM RECEPTORS -
- X AXIS (DISTANCE, METERS) -

Y AXIS (DISTANCE, METERS)	-18000.000	-16000.000	-14000.000	-12000.000	-10000.000	-8000.000	-6000.000	-4000.000	-2000.000
	- CONCENTRATION -								
18000.000	0.030753	0.031147	0.031712	0.030257	0.027909	0.025086	0.021715	0.023344	0.028995
16000.000	0.031479	0.031937	0.032610	0.033544	0.032014	0.029212	0.025523	0.023117	0.030092
14000.000	0.032392	0.032956	0.033814	0.035034	0.036610	0.034876	0.031000	0.025459	0.031011
12000.000	0.033491	0.034215	0.035337	0.036952	0.039052	0.041455	0.038728	0.032075	0.030772
10000.000	0.035495	0.035997	0.037133	0.039250	0.042008	0.045082	0.047694	0.041305	0.029032
8000.000	0.038159	0.038852	0.040213	0.042419	0.045518	0.049399	0.052127	0.051483	0.035823
6000.000	0.041148	0.042060	0.043781	0.046548	0.050378	0.054638	0.057982	0.056447	0.038629
4000.000	0.044303	0.045410	0.047435	0.050719	0.055359	0.060543	0.063660	0.058059	0.030286
2000.000	0.049034	0.050596	0.053207	0.057268	0.063001	0.069771	0.075483	0.075197	0.045347
0.000	0.054622	0.056668	0.059808	0.064494	0.071142	0.078732	0.077358	0.069493	0.044197
-2000.000	0.060562	0.062991	0.066425	0.068106	0.068008	0.068128	0.067092	0.056284	0.030600
-4000.000	0.066546	0.064346	0.062202	0.060590	0.059617	0.059119	0.053918	0.039330	0.024888
-6000.000	0.061067	0.058376	0.055886	0.053842	0.052408	0.048607	0.039663	0.027231	0.022351
-8000.000	0.055727	0.052931	0.050306	0.048102	0.044479	0.037829	0.029251	0.019577	0.019718
-10000.000	0.050902	0.048129	0.045564	0.041955	0.036327	0.029594	0.021659	0.017313	0.017409
-12000.000	0.046643	0.044001	0.040518	0.035525	0.029778	0.023276	0.016065	0.015506	0.015538
-14000.000	0.042936	0.039655	0.035168	0.030109	0.024491	0.018368	0.014014	0.014093	0.014080
-16000.000	0.039061	0.035028	0.030516	0.025546	0.020172	0.014488	0.012981	0.012998	0.012958
-18000.000	0.034942	0.030907	0.026474	0.021684	0.016611	0.012150	0.012159	0.012139	0.012085

- GRID SYSTEM RECEPTORS -
- X AXIS (DISTANCE, METERS) -

Y AXIS (DISTANCE, METERS)	0.000	2000.000	4000.000	6000.000	8000.000	10000.000	12000.000	14000.000	16000.000
	- CONCENTRATION -								
18000.000	0.035060	0.035746	0.033492	0.031316	0.033275	0.036452	0.039017	0.041086	0.041959
16000.000	0.037762	0.038723	0.036007	0.034192	0.038582	0.041848	0.044177	0.044944	0.044686
14000.000	0.041011	0.042350	0.039039	0.040860	0.045848	0.048961	0.049601	0.048815	0.048062
12000.000	0.043893	0.045784	0.042077	0.049983	0.055656	0.056724	0.055268	0.053614	0.052119
10000.000	0.044263	0.047139	0.049843	0.062153	0.066221	0.064871	0.062179	0.059282	0.056736
8000.000	0.037139	0.042481	0.059949	0.073903	0.076951	0.074736	0.069407	0.063859	0.059589
6000.000	0.017867	0.026306	0.062672	0.086369	0.086666	0.080817	0.073745	0.067479	0.062614
4000.000	0.000109	0.026509	0.059119	0.089676	0.092323	0.085912	0.077897	0.070906	0.065556
2000.000	0.008175	0.043380	0.103694	0.127527	0.118183	0.104828	0.092652	0.082975	0.075784
0.000	0.020777	0.045760	0.126758	0.142429	0.136323	0.124813	0.108446	0.096309	0.087381
-2000.000	0.025185	0.044625	0.088325	0.137463	0.134622	0.123509	0.114107	0.106965	0.098261
-4000.000	0.024309	0.038374	0.059740	0.098120	0.125602	0.121044	0.112335	0.105728	0.100887
-6000.000	0.022073	0.032106	0.046326	0.069841	0.095104	0.114013	0.111064	0.105053	0.100495
-8000.000	0.019535	0.026866	0.037347	0.049507	0.072114	0.091093	0.106461	0.104893	0.100588
-10000.000	0.017255	0.022789	0.030822	0.037498	0.054736	0.072819	0.088538	0.101868	0.101021
-12000.000	0.015402	0.019719	0.026091	0.031640	0.041467	0.058243	0.073556	0.087099	0.098753
-14000.000	0.013960	0.017433	0.022639	0.027339	0.031387	0.046550	0.061059	0.074287	0.086034
-16000.000	0.012853	0.015724	0.020081	0.024125	0.027710	0.037062	0.050600	0.063260	0.074773
-18000.000	0.011994	0.014421	0.018140	0.021661	0.024872	0.029285	0.041828	0.053785	0.064871

** ANNUAL GROUND LEVEL CONCENTRATION (MICROGRAMS PER CUBIC METER) FROM ALL SOURCES COMBINED (CONT.) **

- GRID SYSTEM RECEPTORS -

- X AXIS (DISTANCE, METERS) -

Y AXIS (DISTANCE , METERS)	18000.000
	- CONCENTRATION -
18000.000	0.041959
16000.000	0.044452
14000.000	0.047442
12000.000	0.050917
10000.000	0.054030
8000.000	0.056445
6000.000	0.059047
4000.000	0.061665
2000.000	0.070542
0.000	0.080784
-2000.000	0.090726
-4000.000	0.097353
-6000.000	0.097050
-8000.000	0.097175
-10000.000	0.097580
-12000.000	0.098144
-14000.000	0.096238
-16000.000	0.085003
-18000.000	0.074911

- PROGRAM DETERMINED MAXIMUM 10 VALUES -

X COORDINATE (METERS)	Y COORDINATE (METERS)	CONCENTRATION
6000.00	0.00	0.142429
6000.00	-2000.00	0.137463
8000.00	0.00	0.136323
8000.00	-2000.00	0.134622
6000.00	2000.00	0.127527
4000.00	0.00	0.126758
8000.00	-4000.00	0.125602
10000.00	0.00	0.124813
10000.00	-2000.00	0.123509
10000.00	-4000.00	0.121044

144-END

PRINT COMPLETED AT 13:42:34 FOR USER: 81955934 DIST: BLANCHE

END-144

Plant Yates

Paticulates

Long-Term

ISCLT Model

Case 2

** VM/SP SERVICE LEVEL 0411 **** CPU SERIAL 000019 CPU MODEL 0580 **

B1955934	B1955934	USERID	ORIGIN
BLANCHE	VMRBHMC1	DISTCODE	SYSTEM
YATESBP	REPORT	FILENAME	FILETYPE
03/17/89	13:12:35	FILE CREATION DATE	
4122	00000353	SPOOLID	COUNT
03/17/89	13:42:23	FILE PRINT DATE	
R	0500	CLASS	DEVICE
STANDARD		FORMS	

143

AMDAHL
470 V/8
32 Megabytes

Southern Company
Services, Inc.

Information Services
Birmingham

For Assistance,
Call ISC at 7378

VM/SP HPO
Release 4.2

TAG DATA: VMRBHMC1 SYSTEM

B1955934

BLANCHE

```
**** ISCLT ************* PLANT YATES - PARTICULATES
                                   - ISCLT INPUT DATA -

        NUMBER OF SOURCES =    1
        NUMBER OF X AXIS GRID SYSTEM POINTS =   19
        NUMBER OF Y AXIS GRID SYSTEM POINTS =   19
        NUMBER OF SPECIAL POINTS =    0
        NUMBER OF SEASONS =    1
        NUMBER OF WIND SPEED CLASSES =   6
        NUMBER OF STABILITY CLASSES =   6
        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, 2, 2, 0, 0, 0, 0, 0, 0, 0, 0, 0,
        ALL SOURCES ARE USED TO FORM SOURCE COMBINATION  1
       DISTANCE X AXIS GRID SYSTEM POINTS (METERS )=  -18000.00,  -16000.00,  -14000.00,  -12000.00,  -10000.00,   -8000.00,
           -6000.00,   -4000.00,   -2000.00,       0.00,    2000.00,    4000.00,    6000.00,    8000.00,   10000.00,   12000.00,
           14000.00,   16000.00,   18000.00,
       DISTANCE Y AXIS GRID SYSTEM POINTS (METERS )=  -18000.00,  -16000.00,  -14000.00,  -12000.00,  -10000.00,   -8000.00,
           -6000.00,   -4000.00,   -2000.00,       0.00,    2000.00,    4000.00,    6000.00,    8000.00,   10000.00,   12000.00,
           14000.00,   16000.00,   18000.00,

                             - AMBIENT AIR TEMPERATURE (DEGREES KELVIN) -

                    STABILITY  STABILITY  STABILITY  STABILITY  STABILITY  STABILITY
                    CATEGORY 1 CATEGORY 2 CATEGORY 3 CATEGORY 4 CATEGORY 5 CATEGORY 6
         SEASON  1   289.4800   289.4800   289.4800   289.4800   289.4800   289.4800

                                   - MIXING LAYER HEIGHT (METERS) -

                                             SEASON 1
                       WIND SPEED  WIND SPEED  WIND SPEED  WIND SPEED  WIND SPEED  WIND SPEED
                       CATEGORY 1  CATEGORY 2  CATEGORY 3  CATEGORY 4  CATEGORY 5  CATEGORY 6
    STABILITY CATEGORY 10.154200E+040.154200E+040.154200E+040.154200E+040.154200E+040.154200E+04
    STABILITY CATEGORY 20.154200E+040.154200E+040.154200E+040.154200E+040.154200E+040.154200E+04
    STABILITY CATEGORY 30.154200E+040.154200E+040.154200E+040.154200E+040.154200E+040.154200E+04
    STABILITY CATEGORY 40.154200E+040.154200E+040.154200E+040.154200E+040.154200E+040.154200E+04
    STABILITY CATEGORY 50.100000E+050.100000E+050.100000E+050.100000E+050.100000E+050.100000E+05
    STABILITY CATEGORY 60.100000E+050.100000E+050.100000E+050.100000E+050.100000E+050.100000E+05
```

- 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	0.00026999	0.00022999	0.00000000	0.00000000	0.00000000	0.00000000
22.500	0.00020999	0.00013999	0.00000000	0.00000000	0.00000000	0.00000000
45.000	0.00035998	0.00022999	0.00000000	0.00000000	0.00000000	0.00000000
67.500	0.00042998	0.00056997	0.00000000	0.00000000	0.00000000	0.00000000
90.000	0.00033998	0.00031998	0.00000000	0.00000000	0.00000000	0.00000000
112.500	0.00027999	0.00040998	0.00000000	0.00000000	0.00000000	0.00000000
135.000	0.00033998	0.00031998	0.00000000	0.00000000	0.00000000	0.00000000
157.500	0.00010999	0.00029998	0.00000000	0.00000000	0.00000000	0.00000000
180.000	0.00030998	0.00040998	0.00000000	0.00000000	0.00000000	0.00000000
202.500	0.00030998	0.00033998	0.00000000	0.00000000	0.00000000	0.00000000
225.000	0.00045998	0.00040998	0.00000000	0.00000000	0.00000000	0.00000000
247.500	0.00025999	0.00054997	0.00000000	0.00000000	0.00000000	0.00000000
270.000	0.00037998	0.00036998	0.00000000	0.00000000	0.00000000	0.00000000
292.500	0.00048997	0.00056997	0.00000000	0.00000000	0.00000000	0.00000000
315.000	0.00047998	0.00086996	0.00000000	0.00000000	0.00000000	0.00000000
337.500	0.00019999	0.00029998	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	0.00106994	0.00086996	0.00045998	0.00000000	0.00000000	0.00000000
22.500	0.00070996	0.00102995	0.00031998	0.00000000	0.00000000	0.00000000
45.000	0.00138993	0.00150992	0.00152992	0.00000000	0.00000000	0.00000000
67.500	0.00154992	0.00186990	0.00134993	0.00000000	0.00000000	0.00000000
90.000	0.00119994	0.00159992	0.00118994	0.00000000	0.00000000	0.00000000
112.500	0.00111994	0.00175991	0.00111994	0.00000000	0.00000000	0.00000000
135.000	0.00107994	0.00136993	0.00090995	0.00000000	0.00000000	0.00000000
157.500	0.00058997	0.00077996	0.00036998	0.00000000	0.00000000	0.00000000
180.000	0.00115994	0.00163992	0.00067996	0.00000000	0.00000000	0.00000000
202.500	0.00113994	0.00120994	0.00083996	0.00000000	0.00000000	0.00000000
225.000	0.00146992	0.00216989	0.00099995	0.00000000	0.00000000	0.00000000
247.500	0.00118994	0.00202990	0.00154992	0.00000000	0.00000000	0.00000000
270.000	0.00095995	0.00195990	0.00198990	0.00000000	0.00000000	0.00000000
292.500	0.00157992	0.00312984	0.00275986	0.00000000	0.00000000	0.00000000
315.000	0.00186990	0.00280986	0.00280986	0.00000000	0.00000000	0.00000000
337.500	0.00112994	0.00157992	0.00115994	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	0.00017999	0.00095995	0.00090995	0.00005000	0.00000000	0.00000000
22.500	0.00022999	0.00102995	0.00115994	0.00005000	0.00000000	0.00000000
45.000	0.00054997	0.00268986	0.00412978	0.00040998	0.00000000	0.00000000
67.500	0.00048997	0.00296985	0.00506974	0.00083996	0.00000000	0.00000000
90.000	0.00052997	0.00193990	0.00405979	0.00054997	0.00000000	0.00000000
112.500	0.00029998	0.00141993	0.00289985	0.00040998	0.00000000	0.00000000
135.000	0.00041998	0.00186990	0.00273986	0.00033998	0.00005000	0.00000000
157.500	0.00024999	0.00095995	0.00136993	0.00026999	0.00000000	0.00000000
180.000	0.00057997	0.00159992	0.00252987	0.00024999	0.00002000	0.00002000
202.500	0.00030998	0.00159992	0.00214989	0.00040998	0.00002000	0.00002000
225.000	0.00054997	0.00239988	0.00360981	0.00054997	0.00015999	0.00000000
247.500	0.00035998	0.00248987	0.00529972	0.00102995	0.00007000	0.00000000
270.000	0.00039998	0.00259987	0.00584970	0.00143993	0.00010999	0.00000000
292.500	0.00042998	0.00316984	0.00915953	0.00182991	0.00020999	0.00000000
315.000	0.00066997	0.00362981	0.00997949	0.00184990	0.00022999	0.00000000
337.500	0.00048997	0.00166991	0.00355982	0.00056997	0.00005000	0.00002000

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	0.00037998	0.00157992	0.00191990	0.00070996	0.00002000	0.00000000
22.500	0.00051997	0.00218989	0.00209989	0.00083996	0.00002000	0.00000000
45.000	0.00155992	0.00721963	0.01378929	0.00869955	0.00152992	0.00005000
67.500	0.00163992	0.00773960	0.02737859	0.02193887	0.00266986	0.00007000
90.000	0.00251987	0.00787959	0.02056894	0.00967950	0.00109994	0.00002000
112.500	0.00147992	0.00467976	0.01205938	0.00584970	0.00056997	0.00013999
135.000	0.00136993	0.00399979	0.00985949	0.00581970	0.00093995	0.00005000
157.500	0.00083996	0.00234988	0.00606969	0.00305984	0.00115994	0.00026999
180.000	0.00110994	0.00364981	0.00844957	0.00618968	0.00154992	0.00049997
202.500	0.00076996	0.00234988	0.00615968	0.00478975	0.00106994	0.00007000
225.000	0.00114994	0.00442977	0.01017947	0.00657966	0.00207989	0.00026999
247.500	0.00074996	0.00289985	0.01102943	0.00999948	0.00184990	0.00072996
270.000	0.00073996	0.00316984	0.01150940	0.01355930	0.00373981	0.00074996
292.500	0.00060997	0.00300985	0.01529921	0.03038843	0.00842956	0.00227988
315.000	0.00096995	0.00412978	0.01689913	0.03314829	0.01086944	0.00095995
337.500	0.00049997	0.00200990	0.00367981	0.00383980	0.00040998	0.00000000

- 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	0.00000000	0.00150992	0.00093995	0.00000000	0.00000000	0.00000000
22.500	0.00000000	0.00104995	0.00088995	0.00000000	0.00000000	0.00000000
45.000	0.00000000	0.00351982	0.00494974	0.00000000	0.00000000	0.00000000
67.500	0.00000000	0.00399979	0.00661966	0.00000000	0.00000000	0.00000000
90.000	0.00000000	0.00433978	0.00396980	0.00000000	0.00000000	0.00000000
112.500	0.00000000	0.00316984	0.00193990	0.00000000	0.00000000	0.00000000
135.000	0.00000000	0.00426978	0.00257987	0.00000000	0.00000000	0.00000000
157.500	0.00000000	0.00218989	0.00129993	0.00000000	0.00000000	0.00000000
180.000	0.00000000	0.00433978	0.00257987	0.00000000	0.00000000	0.00000000
202.500	0.00000000	0.00275986	0.00193990	0.00000000	0.00000000	0.00000000
225.000	0.00000000	0.00447977	0.00561971	0.00000000	0.00000000	0.00000000
247.500	0.00000000	0.00394979	0.00736962	0.00000000	0.00000000	0.00000000
270.000	0.00000000	0.00447977	0.01408928	0.00000000	0.00000000	0.00000000
292.500	0.00000000	0.00412978	0.01606917	0.00000000	0.00000000	0.00000000
315.000	0.00000000	0.00435977	0.02230885	0.00000000	0.00000000	0.00000000
337.500	0.00000000	0.00143993	0.00364981	0.00000000	0.00000000	0.00000000

SEASON 1

STABILITY CATEGORY 6

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	0.00309984	0.00280986	0.00000000	0.00000000	0.00000000	0.00000000
22.500	0.00243987	0.00189990	0.00000000	0.00000000	0.00000000	0.00000000
45.000	0.00589969	0.00675965	0.00000000	0.00000000	0.00000000	0.00000000
67.500	0.00541972	0.00709963	0.00000000	0.00000000	0.00000000	0.00000000
90.000	0.00578970	0.00618968	0.00000000	0.00000000	0.00000000	0.00000000
112.500	0.00415978	0.00326983	0.00000000	0.00000000	0.00000000	0.00000000
135.000	0.00653966	0.00531973	0.00000000	0.00000000	0.00000000	0.00000000
157.500	0.00370981	0.00335983	0.00000000	0.00000000	0.00000000	0.00000000
180.000	0.00578970	0.00593969	0.00000000	0.00000000	0.00000000	0.00000000
202.500	0.00406979	0.00378980	0.00000000	0.00000000	0.00000000	0.00000000
225.000	0.00598969	0.00705963	0.00000000	0.00000000	0.00000000	0.00000000
247.500	0.00616968	0.00853956	0.00000000	0.00000000	0.00000000	0.00000000
270.000	0.00579970	0.01102943	0.00000000	0.00000000	0.00000000	0.00000000
292.500	0.00685965	0.01145941	0.00000000	0.00000000	0.00000000	0.00000000
315.000	0.00874955	0.01417927	0.00000000	0.00000000	0.00000000	0.00000000
337.500	0.00463976	0.00478975	0.00000000	0.00000000	0.00000000	0.00000000

- ISCLT INPUT DATA (CONT.) -

- VERTICAL POTENTIAL TEMPERATURE GRADIENT (DEGREES KELVIN/METER) -

```
                        WIND SPEED  WIND SPEED  WIND SPEED  WIND SPEED  WIND SPEED  WIND SPEED
                        CATEGORY 1  CATEGORY 2  CATEGORY 3  CATEGORY 4  CATEGORY 5  CATEGORY 6
STABILITY CATEGORY 10.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+00
STABILITY CATEGORY 20.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+00
STABILITY CATEGORY 30.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+00
STABILITY CATEGORY 40.000000E+000.000000E+000.000000E+000.000000E+000.000000E+000.000000E+00
STABILITY CATEGORY 50.200000E-010.200000E-010.200000E-010.200000E-010.200000E-010.200000E-01
STABILITY CATEGORY 60.350000E-010.350000E-010.350000E-010.350000E-010.350000E-010.350000E-01
```

- WIND PROFILE POWER LAW EXPONENTS -

```
                        WIND SPEED  WIND SPEED  WIND SPEED  WIND SPEED  WIND SPEED  WIND SPEED
                        CATEGORY 1  CATEGORY 2  CATEGORY 3  CATEGORY 4  CATEGORY 5  CATEGORY 6
STABILITY CATEGORY 10.100000E+000.100000E+000.100000E+000.100000E+000.100000E+000.100000E+00
STABILITY CATEGORY 20.150000E+000.150000E+000.150000E+000.150000E+000.150000E+000.150000E+00
STABILITY CATEGORY 30.200000E+000.200000E+000.200000E+000.200000E+000.200000E+000.200000E+00
STABILITY CATEGORY 40.250000E+000.250000E+000.250000E+000.250000E+000.250000E+000.250000E+00
STABILITY CATEGORY 50.300000E+000.300000E+000.300000E+000.300000E+000.300000E+000.300000E+00
STABILITY CATEGORY 60.300000E+000.300000E+000.300000E+000.300000E+000.300000E+000.300000E+00
```

**** ISCLT ************* PLANT YATES - PARTICULATES

- SOURCE INPUT DATA -

CARD	TAPE	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	694.60	3704.48	76.20	0.00	GAS EXIT TEMP (DEG K)= 338.81, GAS EXIT VEL. (M/SEC)= 14.00, STACK DIAMETER (M)= 3.960, 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
4.60000E+00			

** ANNUAL GROUND LEVEL CONCENTRATION (MICROGRAMS PER CUBIC METER) FROM ALL SOURCES COMBINED **

- GRID SYSTEM RECEPTORS -
- X AXIS (DISTANCE, METERS) -

Y AXIS (DISTANCE, METERS)	-18000.000	-16000.000	-14000.000	-12000.000	-10000.000	-8000.000	-6000.000	-4000.000	-2000.000
	- CONCENTRATION -								
18000.000	0.008529	0.009081	0.009671	0.009551	0.009071	0.008353	0.007366	0.007975	0.009843
16000.000	0.008797	0.009429	0.010112	0.010842	0.010663	0.009964	0.008866	0.008143	0.010488
14000.000	0.009070	0.009786	0.010579	0.011450	0.012381	0.012036	0.010918	0.008199	0.011152
12000.000	0.009345	0.010150	0.011067	0.012098	0.013196	0.014391	0.013802	0.011864	0.011645
10000.000	0.010600	0.011016	0.011566	0.012758	0.014107	0.015630	0.017262	0.015910	0.012045
8000.000	0.012326	0.013106	0.013921	0.014676	0.015306	0.017002	0.019071	0.021232	0.017463
6000.000	0.014100	0.015293	0.016657	0.018165	0.019841	0.021476	0.022625	0.023906	0.025704
4000.000	0.015831	0.017441	0.019388	0.021721	0.024631	0.028126	0.032015	0.035289	0.033386
2000.000	0.017233	0.019222	0.021702	0.024830	0.028974	0.034515	0.042103	0.052807	0.047094
0.000	0.018374	0.020655	0.023555	0.027270	0.032297	0.038607	0.039778	0.036701	0.023875
-2000.000	0.019235	0.021693	0.024821	0.027456	0.028874	0.029483	0.028190	0.022542	0.009992
-4000.000	0.019801	0.020985	0.022048	0.022874	0.023154	0.022505	0.019583	0.013113	0.006153
-6000.000	0.017634	0.018317	0.018831	0.019032	0.018665	0.016898	0.013158	0.007546	0.005352
-8000.000	0.015638	0.015982	0.016108	0.015900	0.014781	0.012390	0.008881	0.004611	0.004760
-10000.000	0.013881	0.013972	0.013846	0.013065	0.011433	0.009114	0.006008	0.004195	0.004323
-12000.000	0.012357	0.012273	0.011703	0.010519	0.008881	0.006725	0.004022	0.003859	0.003979
-14000.000	0.011049	0.010611	0.009705	0.008495	0.006931	0.004977	0.003463	0.003579	0.003685
-16000.000	0.009725	0.009008	0.008074	0.006891	0.005431	0.003682	0.003246	0.003350	0.003445
-18000.000	0.008409	0.007667	0.006742	0.005615	0.004271	0.002970	0.003064	0.003156	0.003242

- GRID SYSTEM RECEPTORS -
- X AXIS (DISTANCE, METERS) -

Y AXIS (DISTANCE, METERS)	0.000	2000.000	4000.000	6000.000	8000.000	10000.000	12000.000	14000.000	16000.000
	- CONCENTRATION -								
18000.000	0.011788	0.011601	0.010250	0.008934	0.009437	0.010452	0.011158	0.011599	0.011443
16000.000	0.012996	0.012771	0.011054	0.009784	0.011319	0.012405	0.013040	0.012859	0.012160
14000.000	0.014507	0.014236	0.011992	0.012134	0.013834	0.014868	0.014708	0.013788	0.012926
12000.000	0.016303	0.015997	0.013032	0.015530	0.017266	0.017113	0.015915	0.014799	0.013739
10000.000	0.018312	0.018092	0.017099	0.020483	0.020561	0.018853	0.017256	0.015856	0.014598
8000.000	0.019836	0.020354	0.024556	0.025621	0.023228	0.020849	0.018903	0.017445	0.016162
6000.000	0.016379	0.025205	0.033558	0.030509	0.026917	0.023965	0.021479	0.019437	0.017756
4000.000	0.009004	0.033101	0.043459	0.037312	0.031725	0.027404	0.024013	0.021364	0.019260
2000.000	0.011017	0.059777	0.073834	0.055491	0.042055	0.033894	0.028404	0.024502	0.021602
0.000	0.009721	0.018938	0.064014	0.058651	0.047692	0.039271	0.032193	0.027297	0.023715
-2000.000	0.007668	0.012183	0.029996	0.051178	0.046485	0.039177	0.033511	0.029126	0.025274
-4000.000	0.006333	0.008984	0.013292	0.030874	0.041450	0.038002	0.033011	0.028987	0.025638
-6000.000	0.005479	0.007219	0.009509	0.018594	0.028398	0.034550	0.032081	0.028444	0.025385
-8000.000	0.004871	0.006103	0.007782	0.011107	0.019569	0.025633	0.029549	0.027626	0.024898
-10000.000	0.004426	0.005348	0.006629	0.007708	0.013559	0.019059	0.023033	0.025729	0.024239
-12000.000	0.004076	0.004798	0.005800	0.006868	0.009366	0.014243	0.018027	0.020816	0.022767
-14000.000	0.003775	0.004353	0.005160	0.005880	0.006485	0.010698	0.014176	0.016894	0.018947
-16000.000	0.003527	0.004002	0.004667	0.005273	0.005798	0.008056	0.011203	0.013777	0.015821
-18000.000	0.003318	0.003716	0.004273	0.004790	0.005251	0.006073	0.008900	0.011290	0.013262

** ANNUAL GROUND LEVEL CONCENTRATION (MICROGRAMS PER CUBIC METER) FROM ALL SOURCES COMBINED (CONT.) **

- GRID SYSTEM RECEPTORS -

- X AXIS (DISTANCE, METERS) -

Y AXIS (DISTANCE , METERS)	18000.000
	- CONCENTRATION -
18000.000	0.010891
16000.000	0.011497
14000.000	0.012139
12000.000	0.012798
10000.000	0.013715
8000.000	0.014993
6000.000	0.016271
4000.000	0.017474
2000.000	0.019278
0.000	0.020926
-2000.000	0.022201
-4000.000	0.022897
-6000.000	0.022825
-8000.000	0.022551
-10000.000	0.022120
-12000.000	0.021588
-14000.000	0.020442
-16000.000	0.017399
-18000.000	0.014850

- PROGRAM DETERMINED MAXIMUM 10 VALUES -

X COORDINATE (METERS)	Y COORDINATE (METERS)	CONCENTRATION
4000.00	2000.00	0.073834
4000.00	0.00	0.064014
2000.00	2000.00	0.059777
6000.00	0.00	0.058651
6000.00	2000.00	0.055491
-4000.00	2000.00	0.052807
6000.00	-2000.00	0.051178
8000.00	0.00	0.047692
-2000.00	2000.00	0.047094
8000.00	-2000.00	0.046485

143-END

PRINT COMPLETED AT 13:42:28 FOR USER: B1955934 DIST: BLANCHE

END-143

Plant Yates

Particulates

Long-Term

ISCLT Model

Case 3

```
*****************************************************************************************************************
** VM/SP SERVICE LEVEL 0411 **** CPU SERIAL  000019  CPU MODEL  0580 ********************************************
```

B1955934	B1955934	USERID	ORIGIN
BLANCHE	VMRBHMC1	DISTCODE	SYSTEM
YATESCP	OUTPUT	FILENAME	FILETYPE
03/17/89	13:13:56	FILE CREATION DATE	
4178	00000353	SPOOLID	COUNT
03/17/89	13:46:06	FILE PRINT DATE	
R	0500	CLASS	DEVICE
STANDARD		FORMS	

187

```
                  S
                 SCS
                SCSBS
               SCSBSCS
              SCSBSCSBS
               SCSBSCSBS
   AMDAHL     SCSSCSBSS
  470  V/8     SCSCSBSCS
32 Megabytes   SCSBSCSBS
                SCSBSCSBS
   SCSCSCS            SCS
  SSCSBSS          SCSBSCS
 SCSBSCS        SCSBSCSBSCS
SCSBSCS    SCSBSCSBSCSBSCSBS
SCSCSCSCSCSCSCSCSCSCSCSCSCSCS
```

Southern Company
Services, Inc.

Information Services
Birmingham

For Assistance,
Call ISC at 7378

VM/SP HPO
Release 4.2

TAG DATA: VMRBHMC1 SYSTEM

B1955934

BLANCHE

```
                                  - ISCLT INPUT DATA -

      NUMBER OF SOURCES =    1
      NUMBER OF X AXIS GRID SYSTEM POINTS =   19
      NUMBER OF Y AXIS GRID SYSTEM POINTS =   19
      NUMBER OF SPECIAL POINTS =    0
      NUMBER OF SEASONS =   1
      NUMBER OF WIND SPEED CLASSES =   6
      NUMBER OF STABILITY CLASSES =   6
      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, 2, 2, 0, 0, 0, 0, 0, 0, 0, 0, 0,
      ALL SOURCES ARE USED TO FORM SOURCE COMBINATION  1
     DISTANCE X AXIS GRID SYSTEM POINTS (METERS )=  -18000.00,  -16000.00,  -14000.00,  -12000.00,  -10000.00,   -8000.00,
         -6000.00,   -4000.00,   -2000.00,       0.00,    2000.00,    4000.00,    6000.00,    8000.00,   10000.00,   12000.00,
         14000.00,   16000.00,   18000.00,
     DISTANCE Y AXIS GRID SYSTEM POINTS (METERS )=  -18000.00,  -16000.00,  -14000.00,  -12000.00,  -10000.00,   -8000.00,
         -6000.00,   -4000.00,   -2000.00,       0.00,    2000.00,    4000.00,    6000.00,    8000.00,   10000.00,   12000.00,
         14000.00,   16000.00,   18000.00,

                         - AMBIENT AIR TEMPERATURE (DEGREES KELVIN) -

                 STABILITY  STABILITY  STABILITY  STABILITY  STABILITY  STABILITY
                 CATEGORY 1 CATEGORY 2 CATEGORY 3 CATEGORY 4 CATEGORY 5 CATEGORY 6
      SEASON  1   289.4800   289.4800   289.4800   289.4800   289.4800   289.4800

                                  - MIXING LAYER HEIGHT (METERS) -

                                           SEASON 1
                    WIND SPEED  WIND SPEED  WIND SPEED  WIND SPEED  WIND SPEED  WIND SPEED
                    CATEGORY 1  CATEGORY 2  CATEGORY 3  CATEGORY 4  CATEGORY 5  CATEGORY 6
STABILITY CATEGORY 10.154200E+040.154200E+040.154200E+040.154200E+040.154200E+040.154200E+04
STABILITY CATEGORY 20.154200E+040.154200E+040.154200E+040.154200E+040.154200E+040.154200E+04
STABILITY CATEGORY 30.154200E+040.154200E+040.154200E+040.154200E+040.154200E+040.154200E+04
STABILITY CATEGORY 40.154200E+040.154200E+040.154200E+040.154200E+040.154200E+040.154200E+04
STABILITY CATEGORY 50.100000E+050.100000E+050.100000E+050.100000E+050.100000E+050.100000E+05
STABILITY CATEGORY 60.100000E+050.100000E+050.100000E+050.100000E+050.100000E+050.100000E+05
```

- 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	0.00026999	0.00022999	0.00000000	0.00000000	0.00000000	0.00000000
22.500	0.00020999	0.00013999	0.00000000	0.00000000	0.00000000	0.00000000
45.000	0.00035998	0.00022999	0.00000000	0.00000000	0.00000000	0.00000000
67.500	0.00042998	0.00056997	0.00000000	0.00000000	0.00000000	0.00000000
90.000	0.00033998	0.00031998	0.00000000	0.00000000	0.00000000	0.00000000
112.500	0.00027999	0.00040998	0.00000000	0.00000000	0.00000000	0.00000000
135.000	0.00033998	0.00031998	0.00000000	0.00000000	0.00000000	0.00000000
157.500	0.00010999	0.00029998	0.00000000	0.00000000	0.00000000	0.00000000
180.000	0.00030998	0.00040998	0.00000000	0.00000000	0.00000000	0.00000000
202.500	0.00030998	0.00033998	0.00000000	0.00000000	0.00000000	0.00000000
225.000	0.00045998	0.00040998	0.00000000	0.00000000	0.00000000	0.00000000
247.500	0.00025999	0.00054997	0.00000000	0.00000000	0.00000000	0.00000000
270.000	0.00037998	0.00036998	0.00000000	0.00000000	0.00000000	0.00000000
292.500	0.00048997	0.00056997	0.00000000	0.00000000	0.00000000	0.00000000
315.000	0.00047998	0.00086996	0.00000000	0.00000000	0.00000000	0.00000000
337.500	0.00019999	0.00029998	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	0.00106994	0.00086996	0.00045998	0.00000000	0.00000000	0.00000000
22.500	0.00070996	0.00102995	0.00031998	0.00000000	0.00000000	0.00000000
45.000	0.00138993	0.00150992	0.00152992	0.00000000	0.00000000	0.00000000
67.500	0.00154992	0.00186990	0.00134993	0.00000000	0.00000000	0.00000000
90.000	0.00119994	0.00159992	0.00118994	0.00000000	0.00000000	0.00000000
112.500	0.00111994	0.00175991	0.00111994	0.00000000	0.00000000	0.00000000
135.000	0.00107994	0.00136993	0.00090995	0.00000000	0.00000000	0.00000000
157.500	0.00058997	0.00077996	0.00036998	0.00000000	0.00000000	0.00000000
180.000	0.00115994	0.00163992	0.00067996	0.00000000	0.00000000	0.00000000
202.500	0.00113994	0.00120994	0.00083996	0.00000000	0.00000000	0.00000000
225.000	0.00146992	0.00216989	0.00099995	0.00000000	0.00000000	0.00000000
247.500	0.00118994	0.00202990	0.00154992	0.00000000	0.00000000	0.00000000
270.000	0.00095995	0.00195990	0.00198990	0.00000000	0.00000000	0.00000000
292.500	0.00157992	0.00312984	0.00275986	0.00000000	0.00000000	0.00000000
315.000	0.00186990	0.00280986	0.00280986	0.00000000	0.00000000	0.00000000
337.500	0.00112994	0.00157992	0.00115994	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	0.00017999	0.00095995	0.00090995	0.00005000	0.00000000	0.00000000
22.500	0.00022999	0.00102995	0.00115994	0.00005000	0.00000000	0.00000000
45.000	0.00054997	0.00268986	0.00412978	0.00040998	0.00000000	0.00000000
67.500	0.00048997	0.00296985	0.00506974	0.00083996	0.00000000	0.00000000
90.000	0.00052997	0.00193990	0.00405979	0.00054997	0.00000000	0.00000000
112.500	0.00029998	0.00141993	0.00289985	0.00040998	0.00000000	0.00000000
135.000	0.00041998	0.00186990	0.00273986	0.00033998	0.00005000	0.00000000
157.500	0.00024999	0.00095995	0.00136993	0.00026999	0.00000000	0.00000000
180.000	0.00057997	0.00159992	0.00252987	0.00024999	0.00002000	0.00002000
202.500	0.00030998	0.00159992	0.00214989	0.00040998	0.00002000	0.00002000
225.000	0.00054997	0.00239988	0.00360981	0.00054997	0.00015999	0.00000000
247.500	0.00035998	0.00248987	0.00529972	0.00102995	0.00007000	0.00000000
270.000	0.00039998	0.00259987	0.00584970	0.00143993	0.00010999	0.00000000
292.500	0.00042998	0.00316984	0.00915953	0.00182991	0.00020999	0.00000000
315.000	0.00066997	0.00362981	0.00997949	0.00184990	0.00022999	0.00000000
337.500	0.00048997	0.00166991	0.00355982	0.00056997	0.00005000	0.00002000

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	0.00037998	0.00157992	0.00191990	0.00070996	0.00002000	0.00000000
22.500	0.00051997	0.00218989	0.00209989	0.00083996	0.00002000	0.00000000
45.000	0.00155992	0.00721963	0.01378929	0.00869955	0.00152992	0.00005000
67.500	0.00163992	0.00773960	0.02737859	0.02193887	0.00266986	0.00007000
90.000	0.00251987	0.00787959	0.02056894	0.00967950	0.00109994	0.00002000
112.500	0.00147992	0.00467976	0.01205938	0.00584970	0.00056997	0.00013999
135.000	0.00136993	0.00399979	0.00985949	0.00581970	0.00093995	0.00005000
157.500	0.00083996	0.00234988	0.00808969	0.00305984	0.00115994	0.00026999
180.000	0.00110994	0.00364981	0.00844957	0.00618968	0.00154992	0.00049997
202.500	0.00076996	0.00234988	0.00615968	0.00478975	0.00106994	0.00007000
225.000	0.00114994	0.00442977	0.01017947	0.00657966	0.00207989	0.00026999
247.500	0.00074996	0.00289985	0.01102943	0.00999948	0.00184990	0.00072996
270.000	0.00073996	0.00316984	0.01150940	0.01355930	0.00373981	0.00074996
292.500	0.00060997	0.00300985	0.01529921	0.03038843	0.00842956	0.00227988
315.000	0.00096995	0.00412978	0.01689913	0.03314829	0.01086944	0.00095995
337.500	0.00049997	0.00200990	0.00367981	0.00383980	0.00040998	0.00000000

- 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	0.00000000	0.00150992	0.00093995	0.00000000	0.00000000	0.00000000
22.500	0.00000000	0.00104995	0.00088995	0.00000000	0.00000000	0.00000000
45.000	0.00000000	0.00351982	0.00494974	0.00000000	0.00000000	0.00000000
67.500	0.00000000	0.00399979	0.00661966	0.00000000	0.00000000	0.00000000
90.000	0.00000000	0.00433978	0.00396980	0.00000000	0.00000000	0.00000000
112.500	0.00000000	0.00316984	0.00193990	0.00000000	0.00000000	0.00000000
135.000	0.00000000	0.00426978	0.00257987	0.00000000	0.00000000	0.00000000
157.500	0.00000000	0.00218989	0.00129993	0.00000000	0.00000000	0.00000000
180.000	0.00000000	0.00433978	0.00257987	0.00000000	0.00000000	0.00000000
202.500	0.00000000	0.00275986	0.00193990	0.00000000	0.00000000	0.00000000
225.000	0.00000000	0.00447977	0.00561971	0.00000000	0.00000000	0.00000000
247.500	0.00000000	0.00394979	0.00736962	0.00000000	0.00000000	0.00000000
270.000	0.00000000	0.00447977	0.01408928	0.00000000	0.00000000	0.00000000
292.500	0.00000000	0.00412978	0.01606917	0.00000000	0.00000000	0.00000000
315.000	0.00000000	0.00435977	0.02230885	0.00000000	0.00000000	0.00000000
337.500	0.00000000	0.00143993	0.00364981	0.00000000	0.00000000	0.00000000

SEASON 1

STABILITY CATEGORY 6

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	0.00309984	0.00280986	0.00000000	0.00000000	0.00000000	0.00000000
22.500	0.00243987	0.00189990	0.00000000	0.00000000	0.00000000	0.00000000
45.000	0.00589969	0.00675965	0.00000000	0.00000000	0.00000000	0.00000000
67.500	0.00541972	0.00709963	0.00000000	0.00000000	0.00000000	0.00000000
90.000	0.00578970	0.00618968	0.00000000	0.00000000	0.00000000	0.00000000
112.500	0.00415978	0.00326983	0.00000000	0.00000000	0.00000000	0.00000000
135.000	0.00653966	0.00531973	0.00000000	0.00000000	0.00000000	0.00000000
157.500	0.00370981	0.00335983	0.00000000	0.00000000	0.00000000	0.00000000
180.000	0.00578970	0.00593969	0.00000000	0.00000000	0.00000000	0.00000000
202.500	0.00406979	0.00378980	0.00000000	0.00000000	0.00000000	0.00000000
225.000	0.00598969	0.00705963	0.00000000	0.00000000	0.00000000	0.00000000
247.500	0.00616968	0.00853956	0.00000000	0.00000000	0.00000000	0.00000000
270.000	0.00579970	0.01102943	0.00000000	0.00000000	0.00000000	0.00000000
292.500	0.00685965	0.01145941	0.00000000	0.00000000	0.00000000	0.00000000
315.000	0.00874955	0.01417927	0.00000000	0.00000000	0.00000000	0.00000000
337.500	0.00463976	0.00478975	0.00000000	0.00000000	0.00000000	0.00000000

- ISCLT INPUT DATA (CONT.) -

- 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
STABILITY CATEGORY 6	0.350000E-01	0.350000E-01	0.350000E-01	0.350000E-01	0.350000E-01	0.350000E-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 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
STABILITY CATEGORY 6	0.300000E+00	0.300000E+00	0.300000E+00	0.300000E+00	0.300000E+00	0.300000E+00

- 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	694.60	3704.48	76.20	0.00	GAS EXIT TEMP (DEG K)= 338.81, GAS EXIT VEL. (M/SEC)= 14.00, STACK DIAMETER (M)= 3.960, 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
4.60000E+00			

** ANNUAL GROUND LEVEL CONCENTRATION (MICROGRAMS PER CUBIC METER) FROM ALL SOURCES COMBINED **

- GRID SYSTEM RECEPTORS -
- X AXIS (DISTANCE, METERS) -

Y AXIS (DISTANCE, METERS)	-18000.000	-16000.000	-14000.000	-12000.000	-10000.000	-8000.000	-6000.000	-4000.000	-2000.000
	- CONCENTRATION -								
18000.000	0.008529	0.009081	0.009671	0.009551	0.009071	0.008353	0.007366	0.007975	0.009843
16000.000	0.008797	0.009429	0.010112	0.010842	0.010663	0.009964	0.008866	0.008143	0.010488
14000.000	0.009070	0.009786	0.010579	0.011450	0.012381	0.012036	0.010918	0.009199	0.011152
12000.000	0.009345	0.010150	0.011067	0.012098	0.013196	0.014391	0.013802	0.011864	0.011645
10000.000	0.010600	0.011016	0.011566	0.012758	0.014107	0.015630	0.017262	0.015910	0.012045
8000.000	0.012326	0.013106	0.013921	0.014676	0.015306	0.017002	0.019071	0.021232	0.017463
6000.000	0.014100	0.015293	0.016657	0.018165	0.019841	0.021476	0.022625	0.023906	0.025704
4000.000	0.015831	0.017441	0.019388	0.021721	0.024631	0.028126	0.032015	0.035289	0.033386
2000.000	0.017233	0.019222	0.021702	0.024830	0.028974	0.034515	0.042103	0.052807	0.047094
0.000	0.018374	0.020655	0.023555	0.027270	0.032297	0.038607	0.039778	0.036701	0.023875
-2000.000	0.019235	0.021693	0.024821	0.027456	0.028874	0.029483	0.028190	0.022542	0.009992
-4000.000	0.019801	0.020985	0.022048	0.022874	0.023154	0.022505	0.019583	0.013113	0.006153
-6000.000	0.017634	0.018317	0.018831	0.019032	0.018665	0.016898	0.013158	0.007546	0.005352
-8000.000	0.015638	0.015982	0.016108	0.015900	0.014781	0.012390	0.008881	0.004611	0.004760
-10000.000	0.013881	0.013972	0.013846	0.013065	0.011433	0.009114	0.006008	0.004195	0.004323
-12000.000	0.012357	0.012273	0.011703	0.010519	0.008881	0.006725	0.004022	0.003859	0.003979
-14000.000	0.011049	0.010611	0.009705	0.008495	0.006931	0.004977	0.003463	0.003579	0.003685
-16000.000	0.009725	0.009008	0.008074	0.006891	0.005431	0.003682	0.003246	0.003350	0.003445
-18000.000	0.008409	0.007667	0.006742	0.005615	0.004271	0.002970	0.003064	0.003156	0.003242

- GRID SYSTEM RECEPTORS -
- X AXIS (DISTANCE, METERS) -

Y AXIS (DISTANCE, METERS)	0.000	2000.000	4000.000	6000.000	8000.000	10000.000	12000.000	14000.000	16000.000
	- CONCENTRATION -								
18000.000	0.011788	0.011601	0.010250	0.008934	0.009437	0.010452	0.011158	0.011599	0.011443
16000.000	0.012996	0.012771	0.011054	0.009784	0.011319	0.012405	0.013040	0.012859	0.012160
14000.000	0.014507	0.014236	0.011992	0.012134	0.013834	0.014868	0.014708	0.013788	0.012926
12000.000	0.016303	0.015997	0.013032	0.015530	0.017266	0.017113	0.015915	0.014799	0.013739
10000.000	0.018312	0.018092	0.017099	0.020483	0.020561	0.018853	0.017256	0.015856	0.014598
8000.000	0.019836	0.020354	0.024556	0.025621	0.023228	0.020849	0.018903	0.017445	0.016162
6000.000	0.016379	0.025205	0.033558	0.030509	0.026917	0.023965	0.021479	0.019437	0.017756
4000.000	0.009004	0.033101	0.043459	0.037312	0.031725	0.027404	0.024013	0.021364	0.019260
2000.000	0.011017	0.059777	0.073834	0.055491	0.042055	0.033894	0.028404	0.024502	0.021602
0.000	0.009721	0.018938	0.064014	0.058651	0.047692	0.039271	0.032193	0.027297	0.023715
-2000.000	0.007668	0.012183	0.029998	0.051178	0.046485	0.039177	0.033511	0.029126	0.025274
-4000.000	0.006333	0.008984	0.013292	0.030874	0.041450	0.038002	0.033011	0.028987	0.025638
-6000.000	0.005479	0.007219	0.009509	0.018594	0.028398	0.034550	0.032081	0.028444	0.025385
-8000.000	0.004871	0.006103	0.007782	0.011107	0.019569	0.025633	0.029549	0.027626	0.024898
-10000.000	0.004426	0.005348	0.006629	0.007708	0.013559	0.019059	0.023033	0.025729	0.024239
-12000.000	0.004076	0.004798	0.005800	0.006668	0.009366	0.014243	0.018027	0.020816	0.022767
-14000.000	0.003775	0.004353	0.005160	0.005880	0.006485	0.010698	0.014176	0.016894	0.018947
-16000.000	0.003527	0.004002	0.004667	0.005273	0.005798	0.008056	0.011203	0.013777	0.015821
-18000.000	0.003318	0.003716	0.004273	0.004790	0.005251	0.006073	0.008900	0.011290	0.013262

** ANNUAL GROUND LEVEL CONCENTRATION (MICROGRAMS PER CUBIC METER) FROM ALL SOURCES COMBINED (CONT.) **

- GRID SYSTEM RECEPTORS -

- X AXIS (DISTANCE, METERS) -

Y AXIS (DISTANCE, METERS)	18000.000
	- CONCENTRATION -
18000.000	0.010891
16000.000	0.011497
14000.000	0.012139
12000.000	0.012798
10000.000	0.013715
8000.000	0.014993
6000.000	0.016271
4000.000	0.017474
2000.000	0.019278
0.000	0.020926
-2000.000	0.022201
-4000.000	0.022897
-6000.000	0.022825
-8000.000	0.022551
-10000.000	0.022120
-12000.000	0.021588
-14000.000	0.020442
-16000.000	0.017399
-18000.000	0.014850

- PROGRAM DETERMINED MAXIMUM 10 VALUES -

X COORDINATE (METERS)	Y COORDINATE (METERS)	CONCENTRATION
4000.00	2000.00	0.073834
4000.00	0.00	0.064014
2000.00	2000.00	0.059777
6000.00	0.00	0.058651
6000.00	2000.00	0.055491
-4000.00	2000.00	0.052807
6000.00	-2000.00	0.051178
8000.00	0.00	0.047692
-2000.00	2000.00	0.047094
8000.00	-2000.00	0.046485

187-END

PRINT COMPLETED AT 13:46:11 FOR USER: B1955934 DIST: BLANCHE

END-187

Plant Yates

SO2

Short-Term

PTMTP Model

Case 1

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*****************************************************************************************************************************
** VM/SP SERVICE LEVEL 0411 **** CPU SERIAL  000019  CPU MODEL  0580 ******************************************************

B1955934   B1955934   USERID     ORIGIN                                   S            Southern Company
                                                                        SCS            Services, Inc.
BLANCHE    VMRBHMC1   DISTCODE   SYSTEM                                SCSBS
                                                                      SCSBSCS      Information Services
S0215      REPORT     FILENAME   FILETYPE                            SCSBSCSBS           Birmingham
                                                                      SCSBSCSBS
03/17/89   13:11:53   FILE CREATION DATE                   AMDAHL    SCSSCSBSS       For Assistance,
                                                          470  V/8   SCSCSBSCS         Call ISC at 7378
4100       00000849   SPOOLID    COUNT                 32 Megabytes   SCSBSCSBS
                                                                        SCSBSCSBS
03/17/89   13:41:52   FILE PRINT DATE                        SCSCSCS        SCS          VM/SP  HPO
                                                            SSCSBSS      SCSBSCS        Release  4.2
R          0500       CLASS      DEVICE                   SCSBSCS     SCSBSCSBSCS
                                                         SCSBSCS   SCSBSCSBSCSBSCSBS
STANDARD              FORMS                             SCSCSCSCSCSCSCSCSCSCSCSCSCS


TAG DATA: VMRBHMC1 SYSTEM
```

```
 ENTER A 66 CHARACTER TITLE
PLANT YATES  - SHORT-TERM - CASE A: UNITS 1-5 ALONE - SET 1

 ENTER NUMBER OF SOURCES, UP TO 10
         1

 ENTER (1) TO ENTER SOURCE INFORMATION FROM FILE.
         0

 ENTER Q(G/S),HP(M),TS(DEG K),VS(M/S),D(M),R(KM)(X-COORD),S(KM)(Y-COORD)
       FOR SOURCE NUMBER  1
   3815.00/    251.46/    412.80/     28.10/      7.07/       .00/       .00

 THIRTY:(1); INDIVIDUAL:(2); RANGE&SPACE:(3)  ?
         3

 ENTER X-COORD OF FIRST RECEPTOR IN KM
      .5000

 ENTER X-COORD OF LAST RECEPTOR IN KM
     2.0000

 ENTER SPACING OF RECEPTORS IN KM
      .1000

 ENTER (1) TO ENTER 1-HOUR OF MET DATA, ENTER (2) TO ACCESS MET DATA FILE
         1

 ENTER MET DATA: THETA(DEG),U(M/SEC),KST,HL(M),T(DEG K)
   270.0000/     1.0000/          1/  5000.0000/    289.9400

 ALL PARTIALS:(1); AVER.PTS.:(2); NO PTS.:(3)  ?
         2

 ENTER (1) IF YOU WANT METEOROLOGY LISTED; ENTER (2) IF NOT
         1


  PLANT YATES  - SHORT-TERM - CASE A: UNITS 1-5 ALONE - SET 1

 H=HF
```

* * * S O U R C E S * * *

NO.	Q (G/SEC)	HP (M)	TS (DEG K)	VS (M/SEC)	D (M)	VF (CU M/SEC)	R (KM)	S (KM)
1.	3815.00	251.46	412.80	28.10	7.07	1103.15	.000	.000

```
 * * * M E T E O R O L O G Y * * *
NO.    THETA     U     KST    HL        T
       (DEG)   (M/SEC)        (M)    (DEG K)

 2     270.     1.00    1   5000.00   289.9

 AVERAGE CONCENTRATIONS FOR  1 HOURS

 * * * R E C E P T O R   N U M B E R * * *
               1.        2.        3.        4.        5.        6.
 SOURCE        PARTIAL CONCENTRATIONS (G/CU M)
    1.       0.000E+00 0.000E+00 4.322E-21 3.726E-13 4.053E-09 6.351E-07
               TOTAL CONCENTRATIONS (G/CU M)
             0.000E+00 0.000E+00 4.322E-21 3.726E-13 4.053E-09 6.351E-07

 * * * R E C E P T O R   N U M B E R * * *
               7.        8.        9.       10.       11.       12.
 SOURCE        PARTIAL CONCENTRATIONS (G/CU M)
    1.       1.139E-05 6.269E-05 1.755E-04 3.280E-04 4.776E-04 5.935E-04
               TOTAL CONCENTRATIONS (G/CU M)
             1.139E-05 6.269E-05 1.755E-04 3.280E-04 4.776E-04 5.935E-04

 * * * R E C E P T O R   N U M B E R * * *
              13.       14.       15.       16.
 SOURCE        PARTIAL CONCENTRATIONS (G/CU M)
    1.       6.653E-04 6.968E-04 6.972E-04 6.764E-04
               TOTAL CONCENTRATIONS (G/CU M)
             6.653E-04 6.968E-04 6.972E-04 6.764E-04
```

PLANT YATES - SHORT-TERM - CASE A: UNITS 1-5 ALONE - SET 1

MAXIMUM 1 HOUR CONCENTRATION

****

RECEPTOR NUMBER	X-COORD. (KMS)	Y-COORD. (KMS)	DOWNWIND DIST.(KMS)	CONCENTRATION (MUGS/M3)
1	.50	.00	.50	.00
2	.60	.00	.60	.00
3	.70	.00	.70	.00
4	.80	.00	.80	.00
5	.90	.00	.90	.00
6	1.00	.00	1.00	.64
7	1.10	.00	1.10	11.39
8	1.20	.00	1.20	62.69
9	1.30	.00	1.30	175.49

10	1.40	.00	1.40	327.97
11	1.50	.00	1.50	477.57
12	1.60	.00	1.60	593.46
13	1.70	.00	1.70	665.30
14	1.80	.00	1.80	696.75
15	1.90	.00	1.90	697.15
16	2.00	.00	2.00	676.39

```
ENTER (1) TO MAKE ANOTHER ENTIRE RUN
ENTER (2) TO CHANGE SOURCE, RECEPTOR, AND MET DATA
ENTER (3) TO CHANGE ONLY RECEPTOR AND MET DATA
ENTER (4) TO CHANGE ONLY MET DATA
ENTER (5) TO END
         4

ENTER (1) TO ENTER 1-HOUR OF MET DATA, ENTER (2) TO ACCESS MET DATA FILE
         1

ENTER MET DATA: THETA(DEG),U(M/SEC),KST,HL(M),T(DEG K)
   270.0000/     1.5000/          1/   5000.0000/    289.9400

ALL PARTIALS:(1); AVER.PTS.:(2); NO PTS.:(3)  ?
         2

ENTER (1) IF YOU WANT METEOROLOGY LISTED; ENTER (2) IF NOT
         1
```

PLANT YATES - SHORT-TERM - CASE A: UNITS 1-5 ALONE - SET 1

H=HF

* * * S O U R C E S * * *

NO.	Q (G/SEC)	HP (M)	TS (DEG K)	VS (M/SEC)	D (M)	VF (CU M/SEC)	R (KM)	S (KM)
1.	3815.00	251.46	412.80	28.10	7.07	1103.15	.000	.000

* * * M E T E O R O L O G Y * * *

NO.	THETA (DEG)	U (M/SEC)	KST	HL (M)	T (DEG K)
2	270.	1.50	1	5000.00	289.9

AVERAGE CONCENTRATIONS FOR 1 HOURS

```
* * * R E C E P T O R   N U M B E R * * *
               1.        2.        3.        4.        5.        6.
SOURCE          PARTIAL CONCENTRATIONS (G/CU M)
   1.      0.000E+00 2.067E-20 6.341E-12 5.055E-08 4.529E-06 4.908E-05
            TOTAL CONCENTRATIONS (G/CU M)
           0.000E+00 2.067E-20 6.341E-12 5.055E-08 4.529E-06 4.908E-05

* * * R E C E P T O R   N U M B E R * * *
               7.        8.        9.       10.       11.       12.
SOURCE          PARTIAL CONCENTRATIONS (G/CU M)
   1.      1.816E-04 3.759E-04 5.597E-04 6.863E-04 7.480E-04 7.578E-04
            TOTAL CONCENTRATIONS (G/CU M)
           1.816E-04 3.759E-04 5.597E-04 6.863E-04 7.480E-04 7.578E-04

* * * R E C E P T O R   N U M B E R * * *
              13.       14.       15.       16.
SOURCE          PARTIAL CONCENTRATIONS (G/CU M)
   1.      7.333E-04 6.893E-04 6.362E-04 5.806E-04
            TOTAL CONCENTRATIONS (G/CU M)
           7.333E-04 6.893E-04 6.362E-04 5.806E-04
```

PLANT YATES - SHORT-TERM - CASE A: UNITS 1-5 ALONE - SET 1

MAXIMUM 1 HOUR CONCENTRATION

****

RECEPTOR NUMBER	X-COORD. (KMS)	Y-COORD. (KMS)	DOWNWIND DIST.(KMS)	CONCENTRATION (MUGS/M3)
1	.50	.00	.50	.00
2	.60	.00	.60	.00
3	.70	.00	.70	.00
4	.80	.00	.80	.05
5	.90	.00	.90	4.53
6	1.00	.00	1.00	49.08
7	1.10	.00	1.10	181.61
8	1.20	.00	1.20	375.93
9	1.30	.00	1.30	559.71
10	1.40	.00	1.40	686.28
11	1.50	.00	1.50	747.97
12	1.60	.00	1.60	757.81
13	1.70	.00	1.70	733.33
14	1.80	.00	1.80	689.33
15	1.90	.00	1.90	636.22
16	2.00	.00	2.00	580.57

```
ENTER (1) TO MAKE ANOTHER ENTIRE RUN
ENTER (2) TO CHANGE SOURCE, RECEPTOR, AND MET DATA
ENTER (3) TO CHANGE ONLY RECEPTOR AND MET DATA
ENTER (4) TO CHANGE ONLY MET DATA
ENTER (5) TO END
        4

ENTER (1) TO ENTER 1-HOUR OF MET DATA, ENTER (2) TO ACCESS MET DATA FILE
        1

ENTER MET DATA: THETA(DEG),U(M/SEC),KST,HL(M),T(DEG K)
  270.0000/     2.0000/          1/   5000.0000/    289.9400

ALL PARTIALS:(1); AVER.PTS.:(2); NO PTS.:(3)  ?
        2

ENTER (1) IF YOU WANT METEOROLOGY LISTED; ENTER (2) IF NOT
        1


 PLANT YATES  - SHORT-TERM - CASE A: UNITS 1-5 ALONE - SET 1

H=HF


* * * S O U R C E S * * *
NO.      Q          HP     TS      VS       D      VF        R       S
      (G/SEC)      (M)  (DEG K) (M/SEC)    (M)  (CU M/SEC)  (KM)    (KM)

 1.  3815.00   251.46  412.80   28.10    7.07   1103.15    .000    .000

* * * M E T E O R O L O G Y * * *
NO.    THETA      U      KST    HL        T
       (DEG)   (M/SEC)          (M)     (DEG K)

 2      270.     2.00     1   5000.00    289.9

AVERAGE CONCENTRATIONS FOR  1 HOURS

* * * R E C E P T O R  N U M B E R * * *
                 1.         2.         3.         4.         5.         6.
SOURCE         PARTIAL CONCENTRATIONS (G/CU M)
  1.       0.000E+00 7.401E-14 1.429E-08 3.588E-06 5.386E-05 2.159E-04
            TOTAL CONCENTRATIONS (G/CU M)
           0.000E+00 7.401E-14 1.429E-08 3.588E-06 5.386E-05 2.159E-04

* * * R E C E P T O R  N U M B E R * * *
```

```
              7.         8.         9.        10.        11.        12.
SOURCE      PARTIAL CONCENTRATIONS (G/CU M)
   1.     4.441E-04 6.387E-04 7.518E-04 7.879E-04 7.710E-04 7.239E-04
           TOTAL CONCENTRATIONS (G/CU M)
          4.441E-04 6.387E-04 7.518E-04 7.879E-04 7.710E-04 7.239E-04

* * * R E C E P T O R   N U M B E R * * *
             13.        14.        15.       16.
SOURCE      PARTIAL CONCENTRATIONS (G/CU M)
   1.     6.632E-04 5.988E-04 5.363E-04 4.784E-04
           TOTAL CONCENTRATIONS (G/CU M)
          6.632E-04 5.988E-04 5.363E-04 4.784E-04
```

PLANT YATES - SHORT-TERM - CASE A: UNITS 1-5 ALONE - SET 1

MAXIMUM 1 HOUR CONCENTRATION

****

RECEPTOR NUMBER	X-COORD. (KMS)	Y-COORD. (KMS)	DOWNWIND DIST.(KMS)	CONCENTRATION (MUGS/M3)
1	.50	.00	.50	.00
2	.60	.00	.60	.00
3	.70	.00	.70	.01
4	.80	.00	.80	3.59
5	.90	.00	.90	53.86
6	1.00	.00	1.00	215.93
7	1.10	.00	1.10	444.10
8	1.20	.00	1.20	638.70
9	1.30	.00	1.30	751.77
10	1.40	.00	1.40	787.91
11	1.50	.00	1.50	770.95
12	1.60	.00	1.60	723.93
13	1.70	.00	1.70	663.21
14	1.80	.00	1.80	598.84
15	1.90	.00	1.90	536.33
16	2.00	.00	2.00	478.38

```
ENTER (1) TO MAKE ANOTHER ENTIRE RUN
ENTER (2) TO CHANGE SOURCE, RECEPTOR, AND MET DATA
ENTER (3) TO CHANGE ONLY RECEPTOR AND MET DATA
ENTER (4) TO CHANGE ONLY MET DATA
ENTER (5) TO END
          4

ENTER (1) TO ENTER 1-HOUR OF MET DATA, ENTER (2) TO ACCESS MET DATA FILE
```

```
          1

 ENTER MET DATA: THETA(DEG),U(M/SEC),KST,HL(M),T(DEG K)
    270.0000/      2.5000/            1/   5000.0000/    289.9400

 ALL PARTIALS:(1); AVER.PTS.:(2); NO PTS.:(3)  ?
          2

 ENTER (1) IF YOU WANT METEOROLOGY LISTED; ENTER (2) IF NOT
          1


  PLANT YATES  - SHORT-TERM - CASE A: UNITS 1-5 ALONE - SET 1

 H=HF


 * * * S O U R C E S * * *
 NO.     Q         HP      TS       VS        D        VF        R        S
      (G/SEC)     (M)   (DEG K)  (M/SEC)     (M)   (CU M/SEC)   (KM)     (KM)

  1.  3815.00   251.46  412.80   28.10     7.07    1103.15     .000     .000

 * * * M E T E O R O L O G Y * * *
NO.    THETA      U      KST     HL        T
       (DEG)   (M/SEC)           (M)    (DEG K)

  2      270.     2.50     1   5000.00    289.9

 AVERAGE CONCENTRATIONS FOR  1 HOURS

 * * * R E C E P T O R   N U M B E R * * *
                1.        2.        3.        4.        5.        6.
 SOURCE        PARTIAL CONCENTRATIONS (G/CU M)
    1.      5.915E-20 1.112E-10 5.792E-07 2.671E-05 1.670E-04 4.112E-04
             TOTAL CONCENTRATIONS (G/CU M)
            5.915E-20 1.112E-10 5.792E-07 2.671E-05 1.670E-04 4.112E-04

 * * * R E C E P T O R   N U M B E R * * *
                7.        8.        9.       10.       11.       12.
 SOURCE        PARTIAL CONCENTRATIONS (G/CU M)
    1.      6.341E-04 7.629E-04 8.002E-04 7.766E-04 7.208E-04 6.521E-04
             TOTAL CONCENTRATIONS (G/CU M)
            6.341E-04 7.629E-04 8.002E-04 7.766E-04 7.208E-04 6.521E-04

 * * * R E C E P T O R   N U M B E R * * *
               13.       14.       15.       16.
 SOURCE        PARTIAL CONCENTRATIONS (G/CU M)
```

```
1.      5.815E-04 5.148E-04 4.544E-04 4.008E-04
         TOTAL CONCENTRATIONS (G/CU M)
        5.815E-04 5.148E-04 4.544E-04 4.008E-04
```

PLANT YATES - SHORT-TERM - CASE A: UNITS 1-5 ALONE - SET 1

MAXIMUM 1 HOUR CONCENTRATION

****

RECEPTOR NUMBER	X-COORD. (KMS)	Y-COORD. (KMS)	DOWNWIND DIST.(KMS)	CONCENTRATION (MUGS/M3)
1	.50	.00	.50	.00
2	.60	.00	.60	.00
3	.70	.00	.70	.58
4	.80	.00	.80	26.71
5	.90	.00	.90	167.00
6	1.00	.00	1.00	411.19
7	1.10	.00	1.10	634.11
8	1.20	.00	1.20	762.89
9	1.30	.00	1.30	800.24
10	1.40	.00	1.40	776.63
11	1.50	.00	1.50	720.78
12	1.60	.00	1.60	652.06
13	1.70	.00	1.70	581.55
14	1.80	.00	1.80	514.85
15	1.90	.00	1.90	454.38
16	2.00	.00	2.00	400.77

```
ENTER (1) TO MAKE ANOTHER ENTIRE RUN
ENTER (2) TO CHANGE SOURCE, RECEPTOR, AND MET DATA
ENTER (3) TO CHANGE ONLY RECEPTOR AND MET DATA
ENTER (4) TO CHANGE ONLY MET DATA
ENTER (5) TO END
          4

ENTER (1) TO ENTER 1-HOUR OF MET DATA, ENTER (2) TO ACCESS MET DATA FILE
          1

ENTER MET DATA: THETA(DEG),U(M/SEC),KST,HL(M),T(DEG K)
   270.0000/     3.0000/          1/   5000.0000/    289.9400

ALL PARTIALS:(1); AVER.PTS.:(2); NO PTS.:(3)  ?
          2

ENTER (1) IF YOU WANT METEOROLOGY LISTED; ENTER (2) IF NOT
```

```
          1


 PLANT YATES  - SHORT-TERM - CASE A: UNITS 1-5 ALONE - SET 1
H=HF

* * * S O U R C E S * * *
NO.     Q          HP      TS      VS       D       VF        R        S
     (G/SEC)      (M)   (DEG K) (M/SEC)    (M)  (CU M/SEC)   (KM)     (KM)

 1.  3815.00   251.46  412.80   28.10    7.07   1103.15    .000     .000

* * * M E T E O R O L O G Y * * *
NO.     THETA      U      KST    HL        T
        (DEG)   (M/SEC)          (M)    (DEG K)

 2      270.     3.00      1   5000.00    289.9

AVERAGE CONCENTRATIONS FOR  1 HOURS

* * * R E C E P T O R   N U M B E R * * *
               1.        2.        3.        4.        5.        6.
SOURCE          PARTIAL CONCENTRATIONS (G/CU M)
   1.       5.675E-16 6.982E-09 4.582E-06 7.994E-05 3.026E-04 5.634E-04
             TOTAL CONCENTRATIONS (G/CU M)
            5.675E-16 6.982E-09 4.582E-06 7.994E-05 3.026E-04 5.634E-04

* * * R E C E P T O R   N U M B E R * * *
               7.        8.        9.       10.       11.       12.
SOURCE          PARTIAL CONCENTRATIONS (G/CU M)
   1.       7.366E-04 8.000E-04 7.855E-04 7.295E-04 6.568E-04 5.816E-04
             TOTAL CONCENTRATIONS (G/CU M)
            7.366E-04 8.000E-04 7.855E-04 7.295E-04 6.568E-04 5.816E-04

* * * R E C E P T O R   N U M B E R * * *
              13.       14.       15.       16.
SOURCE          PARTIAL CONCENTRATIONS (G/CU M)
   1.       5.108E-04 4.471E-04 3.913E-04 3.429E-04
             TOTAL CONCENTRATIONS (G/CU M)
            5.108E-04 4.471E-04 3.913E-04 3.429E-04


 PLANT YATES  - SHORT-TERM - CASE A: UNITS 1-5 ALONE - SET 1
```

MAXIMUM 1 HOUR CONCENTRATION

****

RECEPTOR NUMBER	X-COORD. (KMS)	Y-COORD. (KMS)	DOWNWIND DIST.(KMS)	CONCENTRATION (MUGS/M3)
1	.50	.00	.50	.00
2	.60	.00	.60	.01
3	.70	.00	.70	4.58
4	.80	.00	.80	79.94
5	.90	.00	.90	302.58
6	1.00	.00	1.00	563.38
7	1.10	.00	1.10	736.59
8	1.20	.00	1.20	799.98
9	1.30	.00	1.30	785.52
10	1.40	.00	1.40	729.46
11	1.50	.00	1.50	656.79
12	1.60	.00	1.60	581.62
13	1.70	.00	1.70	510.80
14	1.80	.00	1.80	447.13
15	1.90	.00	1.90	391.28
16	2.00	.00	2.00	342.92

```
ENTER (1) TO MAKE ANOTHER ENTIRE RUN
ENTER (2) TO CHANGE SOURCE, RECEPTOR, AND MET DATA
ENTER (3) TO CHANGE ONLY RECEPTOR AND MET DATA
ENTER (4) TO CHANGE ONLY MET DATA
ENTER (5) TO END
          4

ENTER (1) TO ENTER 1-HOUR OF MET DATA, ENTER (2) TO ACCESS MET DATA FILE
          1

ENTER MET DATA: THETA(DEG),U(M/SEC),KST,HL(M),T(DEG K)
   270.0000/      5.0000/          4/   5000.0000/    289.9400

ALL PARTIALS:(1); AVER.PTS.:(2); NO PTS.:(3)  ?
          2

ENTER (1) IF YOU WANT METEOROLOGY LISTED; ENTER (2) IF NOT
          1


 PLANT YATES  - SHORT-TERM - CASE A: UNITS 1-5 ALONE - SET 1

H=HF
```

```
* * * S O U R C E S * * *
NO.     Q          HP      TS      VS        D       VF        R       S
     (G/SEC)      (M)   (DEG K) (M/SEC)    (M)  (CU M/SEC)   (KM)    (KM)

 1.  3815.00   251.46  412.80   28.10     7.07   1103.15    .000    .000

* * * M E T E O R O L O G Y * * *
NO.   THETA      U      KST     HL        T
      (DEG)   (M/SEC)          (M)     (DEG K)

 2     270.     5.00     4   5000.00    289.9

AVERAGE CONCENTRATIONS FOR  1 HOURS

* * * R E C E P T O R   N U M B E R * * *
                1.         2.         3.         4.         5.         6.
SOURCE        PARTIAL CONCENTRATIONS (G/CU M)
   1.       0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
             TOTAL CONCENTRATIONS (G/CU M)
            0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00

* * * R E C E P T O R   N U M B E R * * *
                7.         8.         9.        10.        11.        12.
SOURCE        PARTIAL CONCENTRATIONS (G/CU M)
   1.       0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
             TOTAL CONCENTRATIONS (G/CU M)
            0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00

* * * R E C E P T O R   N U M B E R * * *
               13.        14.        15.        16.
SOURCE        PARTIAL CONCENTRATIONS (G/CU M)
   1.       0.000E+00 7.643E-23 1.651E-21 2.502E-20
             TOTAL CONCENTRATIONS (G/CU M)
            0.000E+00 7.643E-23 1.651E-21 2.502E-20


 PLANT YATES  - SHORT-TERM - CASE A: UNITS 1-5 ALONE - SET 1

                MAXIMUM  1 HOUR  CONCENTRATION

            *****************************************

RECEPTOR    X-COORD.   Y-COORD.   DOWNWIND     CONCENTRATION
NUMBER       (KMS)      (KMS)    DIST.(KMS)      (MUGS/M3)
```

1	.50	.00	.50	.00
2	.60	.00	.60	.00
3	.70	.00	.70	.00
4	.80	.00	.80	.00
5	.90	.00	.90	.00
6	1.00	.00	1.00	.00
7	1.10	.00	1.10	.00
8	1.20	.00	1.20	.00
9	1.30	.00	1.30	.00
10	1.40	.00	1.40	.00
11	1.50	.00	1.50	.00
12	1.60	.00	1.60	.00
13	1.70	.00	1.70	.00
14	1.80	.00	1.80	.00
15	1.90	.00	1.90	.00
16	2.00	.00	2.00	.00

```
ENTER (1) TO MAKE ANOTHER ENTIRE RUN
ENTER (2) TO CHANGE SOURCE, RECEPTOR, AND MET DATA
ENTER (3) TO CHANGE ONLY RECEPTOR AND MET DATA
ENTER (4) TO CHANGE ONLY MET DATA
ENTER (5) TO END
         4

ENTER (1) TO ENTER 1-HOUR OF MET DATA, ENTER (2) TO ACCESS MET DATA FILE
         1

ENTER MET DATA: THETA(DEG),U(M/SEC),KST,HL(M),T(DEG K)
   270.0000/      7.0000/          4/   5000.0000/    289.9400

ALL PARTIALS:(1); AVER.PTS.:(2); NO PTS.:(3)  ?
         2

ENTER (1) IF YOU WANT METEOROLOGY LISTED; ENTER (2) IF NOT
         1
```

PLANT YATES - SHORT-TERM - CASE A: UNITS 1-5 ALONE - SET 1

H=HF

* * * S O U R C E S * * *

NO.	Q (G/SEC)	HP (M)	TS (DEG K)	VS (M/SEC)	D (M)	VF (CU M/SEC)	R (KM)	S (KM)
1.	3815.00	251.46	412.80	28.10	7.07	1103.15	.000	.000

```
 * * * M E T E O R O L O G Y * * *
NO.    THETA      U      KST    HL         T
       (DEG)   (M/SEC)          (M)     (DEG K)

 2      270.     7.00     4   5000.00    289.9

 AVERAGE CONCENTRATIONS FOR  1 HOURS

 * * * R E C E P T O R   N U M B E R * * *
             1.        2.        3.        4.        5.        6.
 SOURCE       PARTIAL CONCENTRATIONS (G/CU M)
   1.       0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
             TOTAL CONCENTRATIONS (G/CU M)
            0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00

 * * * R E C E P T O R   N U M B E R * * *
             7.        8.        9.        10.       11.       12.
 SOURCE       PARTIAL CONCENTRATIONS (G/CU M)
   1.       0.000E+00 0.000E+00 0.000E+00 6.908E-24 4.133E-22 1.374E-20
             TOTAL CONCENTRATIONS (G/CU M)
            0.000E+00 0.000E+00 0.000E+00 6.908E-24 4.133E-22 1.374E-20

 * * * R E C E P T O R   N U M B E R * * *
             13.       14.       15.       16.
 SOURCE       PARTIAL CONCENTRATIONS (G/CU M)
   1.       2.840E-19 3.982E-18 4.049E-17 3.147E-16
             TOTAL CONCENTRATIONS (G/CU M)
            2.840E-19 3.982E-18 4.049E-17 3.147E-16
```

PLANT YATES - SHORT-TERM - CASE A: UNITS 1-5 ALONE - SET 1

MAXIMUM 1 HOUR CONCENTRATION

****

RECEPTOR NUMBER	X-COORD. (KMS)	Y-COORD. (KMS)	DOWNWIND DIST.(KMS)	CONCENTRATION (MUGS/M3)
1	.50	.00	.50	.00
2	.60	.00	.60	.00
3	.70	.00	.70	.00
4	.80	.00	.80	.00
5	.90	.00	.90	.00
6	1.00	.00	1.00	.00
7	1.10	.00	1.10	.00
8	1.20	.00	1.20	.00

9	1.30	.00	1.30	.00
10	1.40	.00	1.40	.00
11	1.50	.00	1.50	.00
12	1.60	.00	1.60	.00
13	1.70	.00	1.70	.00
14	1.80	.00	1.80	.00
15	1.90	.00	1.90	.00
16	2.00	.00	2.00	.00

```
ENTER (1) TO MAKE ANOTHER ENTIRE RUN
ENTER (2) TO CHANGE SOURCE, RECEPTOR, AND MET DATA
ENTER (3) TO CHANGE ONLY RECEPTOR AND MET DATA
ENTER (4) TO CHANGE ONLY MET DATA
ENTER (5) TO END
          4

ENTER (1) TO ENTER 1-HOUR OF MET DATA, ENTER (2) TO ACCESS MET DATA FILE
          1

ENTER MET DATA: THETA(DEG),U(M/SEC),KST,HL(M),T(DEG K)
   270.0000/     10.0000/          4/   5000.0000/    289.9400

ALL PARTIALS:(1); AVER.PTS.:(2); NO PTS.:(3)  ?
          2

ENTER (1) IF YOU WANT METEOROLOGY LISTED; ENTER (2) IF NOT
          1
```

PLANT YATES - SHORT-TERM - CASE A: UNITS 1-5 ALONE - SET 1

H=HF

* * * S O U R C E S * * *

NO.	Q (G/SEC)	HP (M)	TS (DEG K)	VS (M/SEC)	D (M)	VF (CU M/SEC)	R (KM)	S (KM)
1.	3815.00	251.46	412.80	28.10	7.07	1103.15	.000	.000

* * * M E T E O R O L O G Y * * *

NO.	THETA (DEG)	U (M/SEC)	KST	HL (M)	T (DEG K)
2	270.	10.00	4	5000.00	289.9

AVERAGE CONCENTRATIONS FOR 1 HOURS

```
* * * R E C E P T O R   N U M B E R * * *
               1.          2.          3.          4.          5.          6.
SOURCE          PARTIAL CONCENTRATIONS (G/CU M)
   1.      0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
             TOTAL CONCENTRATIONS (G/CU M)
           0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00

* * * R E C E P T O R   N U M B E R * * *
               7.          8.          9.         10.         11.         12.
SOURCE          PARTIAL CONCENTRATIONS (G/CU M)
   1.      0.000E+00 3.125E-23 2.967E-21 1.335E-19 3.347E-18 5.274E-17
             TOTAL CONCENTRATIONS (G/CU M)
           0.000E+00 3.125E-23 2.967E-21 1.335E-19 3.347E-18 5.274E-17

* * * R E C E P T O R   N U M B E R * * *
               13.         14.         15.         16.
SOURCE          PARTIAL CONCENTRATIONS (G/CU M)
   1.      5.710E-16 4.549E-15 2.812E-14 1.406E-13
             TOTAL CONCENTRATIONS (G/CU M)
           5.710E-16 4.549E-15 2.812E-14 1.406E-13
```

PLANT YATES - SHORT-TERM - CASE A: UNITS 1-5 ALONE - SET 1

MAXIMUM 1 HOUR CONCENTRATION

****

RECEPTOR NUMBER	X-COORD. (KMS)	Y-COORD. (KMS)	DOWNWIND DIST.(KMS)	CONCENTRATION (MUGS/M3)
1	.50	.00	.50	.00
2	.60	.00	.60	.00
3	.70	.00	.70	.00
4	.80	.00	.80	.00
5	.90	.00	.90	.00
6	1.00	.00	1.00	.00
7	1.10	.00	1.10	.00
8	1.20	.00	1.20	.00
9	1.30	.00	1.30	.00
10	1.40	.00	1.40	.00
11	1.50	.00	1.50	.00
12	1.60	.00	1.60	.00
13	1.70	.00	1.70	.00
14	1.80	.00	1.80	.00
15	1.90	.00	1.90	.00
16	2.00	.00	2.00	.00

```
ENTER (1) TO MAKE ANOTHER ENTIRE RUN
ENTER (2) TO CHANGE SOURCE, RECEPTOR, AND MET DATA
ENTER (3) TO CHANGE ONLY RECEPTOR AND MET DATA
ENTER (4) TO CHANGE ONLY MET DATA
ENTER (5) TO END
         5
```

138-END

PRINT COMPLETED AT 13:41:58 FOR USER: B1955934 DIST: BLANCHE

END-138

Plant Yates

SO2

Short-Term

PTMTP Model

Case 2

```
*******************************************************************************************************************
** VM/SP SERVICE LEVEL 0411 **** CPU SERIAL  000019  CPU MODEL  0580 *********************************************
```

B1955934	B1955934	USERID	ORIGIN		
BLANCHE	VMRBHMC1	DISTCODE	SYSTEM		
S02251	REPORT	FILENAME	FILETYPE		
03/17/89	13:11:51	FILE CREATION DATE			
4098	00000885	SPOOLID	COUNT		
03/17/89	13:41:38	FILE PRINT DATE			
R	0500	CLASS	DEVICE		
STANDARD		FORMS			

```
     *      *********   *******
    **      *********  *********
   ***      **     **  **     **
    **           **    **
    **         ****    ********
    **        ******   *********
    **            **   **     **
    **      **    **   **     **
  ******    *********  *********
  ******     *******    *******
```

```
                S           Southern Company
               SCS           Services, Inc.
              SCSBS
             SCSBSCS       Information Services
            SCSBSCSBS           Birmingham
             SCSBSCSBS
   AMDAHL    SCSSCSBSS       For Assistance,
  470  V/8    SCSCSBSCS        Call ISC at 7378
32 Megabytes   SCSBSCSBS
                SCSBSCSBS
    SCSCSCS           SCS          VM/SP  HPO
   SSCSBSS          SCSBSCS        Release  4.2
  SCSBSCS         SCSBSCSBSCS
 SCSBSCS     SCSBSCSBSCSBSCSBS
SCSCSCSCSCSCSCSCSCSCSCSCSCSCS
```

TAG DATA: VMRBHMC1 SYSTEM

```
********       *     *******   *********  *********   *******   *********      *
*********     **    *********  *********  *********  *********  *********     **
**     **    ***    **     **  **         **         **     **  **     **    ***
**     **     **    **     **  ********   ********   **     **        **    ****
********      **    *********   ********   ********  *********      ****   ** **
********      **     ********         **         **   ********     ******  **  **
**     **     **           **         **         **         **         **  *********
**     **     **    **     **  **     **  **     **  **     **  **     **  *********
*********   ******  *********  *********  *********  *********  *********       **
********    ******   *******    *******    *******    *******    *******        **
```

```
********   **           ***     *      **   *******   **     **  *********
*********  **          *****    **     **  *********  **     **  *********
**     **  **         **   **   ***    **  **     **  **     **  **
**     **  **        **     **  ****   **  **         **     **  **
********   **        **     **  ** **  **  **         *********  ******
********   **        *********  **  ** **  **         *********  ******
**     **  **        *********  **   ****  **         **     **  **
**     **  **        **     **  **    ***  **     **  **     **  **
*********  ********* **     **  **     **  *********  **     **  *********
********   ********* **     **  **      *   *******   **     **  *********
```

```
 ENTER A 66 CHARACTER TITLE
PLANT YATES - SHORT-TERM - CASE B: UNITS 2-5 AND UNIT 1- SET 2

 ENTER NUMBER OF SOURCES, UP TO 10
          2

 ENTER (1) TO ENTER SOURCE INFORMATION FROM FILE.
          0

 ENTER Q(G/S),HP(M),TS(DEG K),VS(M/S),D(M),R(KM)(X-COORD),S(KM)(Y-COORD)
       FOR SOURCE NUMBER  1
   3121.00/    251.46/    412.80/     28.10/      7.07/       .00/       .00

 ENTER Q(G/S),HP(M),TS(DEG K),VS(M/S),D(M),R(KM)(X-COORD),S(KM)(Y-COORD)
       FOR SOURCE NUMBER  2
     69.40/     76.20/    338.81/     14.00/      3.96/       .00/       .00

 THIRTY:(1); INDIVIDUAL:(2); RANGE&SPACE:(3)  ?
          3

 ENTER X-COORD OF FIRST RECEPTOR IN KM
       .5000

 ENTER X-COORD OF LAST RECEPTOR IN KM
      2.0000

 ENTER SPACING OF RECEPTORS IN KM
       .1000

 ENTER (1) TO ENTER 1-HOUR OF MET DATA, ENTER (2) TO ACCESS MET DATA FILE
          1

 ENTER MET DATA: THETA(DEG),U(M/SEC),KST,HL(M),T(DEG K)
   270.0000/      1.0000/           1/   5000.0000/    289.9400

 ALL PARTIALS:(1); AVER.PTS.:(2); NO PTS.:(3)  ?
          2

 ENTER (1) IF YOU WANT METEOROLOGY LISTED; ENTER (2) IF NOT
          1


  PLANT YATES - SHORT-TERM - CASE B: UNITS 2-5 AND UNIT 1- SET 2

 H=HF


 * * * S O U R C E S * * *
 NO.      Q          HP       TS       VS        D       VF         R        S
       (G/SEC)      (M)    (DEG K)  (M/SEC)     (M)  (CU M/SEC)   (KM)     (KM)
```

1.	3121.00	251.46	412.80	28.10	7.07	1103.15	.000	.000
2.	69.40	76.20	338.81	14.00	3.96	172.43	.000	.000

* * * M E T E O R O L O G Y * * *

NO.	THETA (DEG)	U (M/SEC)	KST	HL (M)	T (DEG K)
2	270.	1.00	1	5000.00	289.9

AVERAGE CONCENTRATIONS FOR 1 HOURS

* * * R E C E P T O R N U M B E R * * *

SOURCE	1.	2.	3.	4.	5.	6.
	PARTIAL CONCENTRATIONS (G/CU M)					
1.	0.000E+00	0.000E+00	3.536E-21	3.048E-13	3.316E-09	5.196E-07
2.	2.408E-08	5.222E-06	3.776E-05	7.948E-05	1.009E-04	1.022E-04
	TOTAL CONCENTRATIONS (G/CU M)					
	2.408E-08	5.222E-06	3.776E-05	7.948E-05	1.009E-04	1.028E-04

* * * R E C E P T O R N U M B E R * * *

SOURCE	7.	8.	9.	10.	11.	12.
	PARTIAL CONCENTRATIONS (G/CU M)					
1.	9.315E-06	5.129E-05	1.436E-04	2.683E-04	3.907E-04	4.855E-04
2.	9.333E-05	8.112E-05	6.899E-05	5.820E-05	4.906E-05	4.147E-05
	TOTAL CONCENTRATIONS (G/CU M)					
	1.026E-04	1.324E-04	2.126E-04	3.265E-04	4.398E-04	5.270E-04

* * * R E C E P T O R N U M B E R * * *

SOURCE	13.	14.	15.	16.
	PARTIAL CONCENTRATIONS (G/CU M)			
1.	5.443E-04	5.700E-04	5.703E-04	5.533E-04
2.	3.522E-05	3.008E-05	2.584E-05	2.234E-05
	TOTAL CONCENTRATIONS (G/CU M)			
	5.795E-04	6.001E-04	5.982E-04	5.757E-04

PLANT YATES - SHORT-TERM - CASE B: UNITS 2-5 AND UNIT 1- SET 2

MAXIMUM 1 HOUR CONCENTRATION

****

RECEPTOR NUMBER	X-COORD. (KMS)	Y-COORD. (KMS)	DOWNWIND DIST.(KMS)	CONCENTRATION (MUGS/M3)
1	.50	.00	.50	.02

2	.60	.00	.60	5.22
3	.70	.00	.70	37.76
4	.80	.00	.80	79.48
5	.90	.00	.90	100.88
6	1.00	.00	1.00	102.76
7	1.10	.00	1.10	102.64
8	1.20	.00	1.20	132.41
9	1.30	.00	1.30	212.55
10	1.40	.00	1.40	326.51
11	1.50	.00	1.50	439.75
12	1.60	.00	1.60	526.97
13	1.70	.00	1.70	579.50
14	1.80	.00	1.80	600.08
15	1.90	.00	1.90	596.18
16	2.00	.00	2.00	575.68

```
ENTER (1) TO MAKE ANOTHER ENTIRE RUN
ENTER (2) TO CHANGE SOURCE, RECEPTOR, AND MET DATA
ENTER (3) TO CHANGE ONLY RECEPTOR AND MET DATA
ENTER (4) TO CHANGE ONLY MET DATA
ENTER (5) TO END
          4

ENTER (1) TO ENTER 1-HOUR OF MET DATA, ENTER (2) TO ACCESS MET DATA FILE
          1

ENTER MET DATA: THETA(DEG),U(M/SEC),KST,HL(M),T(DEG K)
   270.0000/     1.5000/           1/   5000.0000/    289.9400

ALL PARTIALS:(1); AVER.PTS.:(2); NO PTS.:(3)  ?
          2

ENTER (1) IF YOU WANT METEOROLOGY LISTED; ENTER (2) IF NOT
          1
```

PLANT YATES - SHORT-TERM - CASE B: UNITS 2-5 AND UNIT 1- SET 2

H=HF

* * * S O U R C E S * * *

NO.	Q (G/SEC)	HP (M)	TS (DEG K)	VS (M/SEC)	D (M)	VF (CU M/SEC)	R (KM)	S (KM)
1.	3121.00	251.46	412.80	28.10	7.07	1103.15	.000	.000
2.	69.40	76.20	338.81	14.00	3.96	172.43	.000	.000

```
 * * * M E T E O R O L O G Y * * *
NO.     THETA      U      KST     HL         T
        (DEG)   (M/SEC)          (M)     (DEG K)

 2      270.      1.50     1   5000.00    289.9

 AVERAGE CONCENTRATIONS FOR  1 HOURS

 * * * R E C E P T O R   N U M B E R * * *
              1.        2.        3.        4.        5.        6.
 SOURCE        PARTIAL CONCENTRATIONS (G/CU M)
    1.      0.000E+00 1.691E-20 5.188E-12 4.135E-08 3.705E-06 4.015E-05
    2.      3.324E-06 4.094E-05 9.084E-05 1.099E-04 1.047E-04 9.050E-05
             TOTAL CONCENTRATIONS (G/CU M)
            3.324E-06 4.094E-05 9.084E-05 1.099E-04 1.084E-04 1.307E-04

 * * * R E C E P T O R   N U M B E R * * *
              7.        8.        9.       10.       11.       12.
 SOURCE        PARTIAL CONCENTRATIONS (G/CU M)
    1.      1.486E-04 3.075E-04 4.579E-04 5.614E-04 6.119E-04 6.200E-04
    2.      7.519E-05 6.165E-05 5.049E-05 4.154E-05 3.442E-05 2.874E-05
             TOTAL CONCENTRATIONS (G/CU M)
            2.238E-04 3.692E-04 5.084E-04 6.030E-04 6.463E-04 6.487E-04

 * * * R E C E P T O R   N U M B E R * * *
             13.       14.       15.       16.
 SOURCE        PARTIAL CONCENTRATIONS (G/CU M)
    1.      5.999E-04 5.639E-04 5.205E-04 4.750E-04
    2.      2.420E-05 2.053E-05 1.756E-05 1.512E-05
             TOTAL CONCENTRATIONS (G/CU M)
            6.241E-04 5.845E-04 5.380E-04 4.901E-04
```

PLANT YATES - SHORT-TERM - CASE B: UNITS 2-5 AND UNIT 1- SET 2

MAXIMUM 1 HOUR CONCENTRATION

****

RECEPTOR NUMBER	X-COORD. (KMS)	Y-COORD. (KMS)	DOWNWIND DIST.(KMS)	CONCENTRATION (MUGS/M3)
1	.50	.00	.50	3.32
2	.60	.00	.60	40.94
3	.70	.00	.70	90.84
4	.80	.00	.80	109.92
5	.90	.00	.90	108.43
6	1.00	.00	1.00	130.65

7	1.10	.00	1.10	223.77
8	1.20	.00	1.20	369.20
9	1.30	.00	1.30	508.39
10	1.40	.00	1.40	602.98
11	1.50	.00	1.50	646.32
12	1.60	.00	1.60	648.69
13	1.70	.00	1.70	624.12
14	1.80	.00	1.80	584.46
15	1.90	.00	1.90	538.04
16	2.00	.00	2.00	490.08

```
ENTER (1) TO MAKE ANOTHER ENTIRE RUN
ENTER (2) TO CHANGE SOURCE, RECEPTOR, AND MET DATA
ENTER (3) TO CHANGE ONLY RECEPTOR AND MET DATA
ENTER (4) TO CHANGE ONLY MET DATA
ENTER (5) TO END
        4

ENTER (1) TO ENTER 1-HOUR OF MET DATA, ENTER (2) TO ACCESS MET DATA FILE
        1

ENTER MET DATA: THETA(DEG),U(M/SEC),KST,HL(M),T(DEG K)
  270.0000/     2.0000/        1/   5000.0000/    289.9400

ALL PARTIALS:(1); AVER.PTS.:(2); NO PTS.:(3)  ?
        2

ENTER (1) IF YOU WANT METEOROLOGY LISTED; ENTER (2) IF NOT
        1
```

PLANT YATES - SHORT-TERM - CASE B: UNITS 2-5 AND UNIT 1- SET 2

H=HF

* * * S O U R C E S * * *

NO.	Q (G/SEC)	HP (M)	TS (DEG K)	VS (M/SEC)	D (M)	VF (CU M/SEC)	R (KM)	S (KM)
1.	3121.00	251.46	412.80	28.10	7.07	1103.15	.000	.000
2.	69.40	76.20	338.81	14.00	3.96	172.43	.000	.000

* * * M E T E O R O L O G Y * * *

NO.	THETA (DEG)	U (M/SEC)	KST	HL (M)	T (DEG K)

```
 2      270.      2.00      1    5000.00     289.9

AVERAGE CONCENTRATIONS FOR  1 HOURS

* * * R E C E P T O R   N U M B E R * * *
               1.          2.          3.          4.          5.          6.
SOURCE          PARTIAL CONCENTRATIONS (G/CU M)
   1.        0.000E+00 8.055E-14 1.169E-08 2.936E-06 4.406E-05 1.767E-04
   2.        1.863E-05 7.779E-05 1.105E-04 1.085E-04 9.282E-05 7.554E-05
              TOTAL CONCENTRATIONS (G/CU M)
             1.863E-05 7.779E-05 1.106E-04 1.114E-04 1.369E-04 2.522E-04

* * * R E C E P T O R   N U M B E R * * *
               7.          8.          9.         10.         11.         12.
SOURCE          PARTIAL CONCENTRATIONS (G/CU M)
   1.        3.633E-04 5.225E-04 6.150E-04 6.446E-04 6.307E-04 5.922E-04
   2.        6.057E-05 4.858E-05 3.923E-05 3.197E-05 2.631E-05 2.187E-05
              TOTAL CONCENTRATIONS (G/CU M)
             4.239E-04 5.711E-04 6.542E-04 6.766E-04 6.570E-04 6.141E-04

* * * R E C E P T O R   N U M B E R * * *
              13.         14.         15.         16.
SOURCE          PARTIAL CONCENTRATIONS (G/CU M)
   1.        5.426E-04 4.899E-04 4.388E-04 3.914E-04
   2.        1.835E-05 1.554E-05 1.326E-05 1.140E-05
              TOTAL CONCENTRATIONS (G/CU M)
             5.609E-04 5.054E-04 4.520E-04 4.028E-04
```

PLANT YATES - SHORT-TERM - CASE B: UNITS 2-5 AND UNIT 1- SET 2

MAXIMUM 1 HOUR CONCENTRATION

****

RECEPTOR NUMBER	X-COORD. (KMS)	Y-COORD. (KMS)	DOWNWIND DIST.(KMS)	CONCENTRATION (MUGS/M3)
1	.50	.00	.50	18.63
2	.60	.00	.60	77.79
3	.70	.00	.70	110.56
4	.80	.00	.80	111.43
5	.90	.00	.90	136.89
6	1.00	.00	1.00	252.19
7	1.10	.00	1.10	423.88
8	1.20	.00	1.20	571.09
9	1.30	.00	1.30	654.24
10	1.40	.00	1.40	676.55
11	1.50	.00	1.50	657.02

12	1.60	.00	1.60	614.11
13	1.70	.00	1.70	560.92
14	1.80	.00	1.80	505.44
15	1.90	.00	1.90	452.02
16	2.00	.00	2.00	402.76

```
ENTER (1) TO MAKE ANOTHER ENTIRE RUN
ENTER (2) TO CHANGE SOURCE, RECEPTOR, AND MET DATA
ENTER (3) TO CHANGE ONLY RECEPTOR AND MET DATA
ENTER (4) TO CHANGE ONLY MET DATA
ENTER (5) TO END
        4

ENTER (1) TO ENTER 1-HOUR OF MET DATA, ENTER (2) TO ACCESS MET DATA FILE
        1

ENTER MET DATA: THETA(DEG),U(M/SEC),KST,HL(M),T(DEG K)
  270.0000/     2.5000/         1/   5000.0000/    289.9400

ALL PARTIALS:(1); AVER.PTS.:(2); NO PTS.:(3)  ?
        2

ENTER (1) IF YOU WANT METEOROLOGY LISTED; ENTER (2) IF NOT
        1
```

PLANT YATES - SHORT-TERM - CASE B: UNITS 2-5 AND UNIT 1- SET 2

H=HF

* * * S O U R C E S * * *

NO.	Q (G/SEC)	HP (M)	TS (DEG K)	VS (M/SEC)	D (M)	VF (CU M/SEC)	R (KM)	S (KM)
1.	3121.00	251.46	412.80	28.10	7.07	1103.15	.000	.000
2.	69.40	76.20	338.81	14.00	3.96	172.43	.000	.000

* * * M E T E O R O L O G Y * * *

NO.	THETA (DEG)	U (M/SEC)	KST	HL (M)	T (DEG K)
2	270.	2.50	1	5000.00	289.9

AVERAGE CONCENTRATIONS FOR 1 HOURS

```
* * * R E C E P T O R   N U M B E R * * *
              1.        2.        3.        4.        5.        6.
SOURCE         PARTIAL CONCENTRATIONS (G/CU M)
   1.      4.839E-20 9.100E-11 4.738E-07 2.185E-05 1.386E-04 3.364E-04
   2.      4.038E-05 9.864E-05 1.124E-04 9.947E-05 8.067E-05 6.372E-05
            TOTAL CONCENTRATIONS (G/CU M)
           4.038E-05 9.864E-05 1.129E-04 1.213E-04 2.173E-04 4.001E-04

* * * R E C E P T O R   N U M B E R * * *
              7.        8.        9.        10.       11.       12.
SOURCE         PARTIAL CONCENTRATIONS (G/CU M)
   1.      5.188E-04 6.241E-04 6.547E-04 6.353E-04 5.897E-04 5.334E-04
   2.      5.020E-05 3.983E-05 3.194E-05 2.590E-05 2.125E-05 1.763E-05
            TOTAL CONCENTRATIONS (G/CU M)
           5.690E-04 6.639E-04 6.866E-04 6.613E-04 6.109E-04 5.511E-04

* * * R E C E P T O R   N U M B E R * * *
              13.       14.       15.       16.
SOURCE         PARTIAL CONCENTRATIONS (G/CU M)
   1.      4.758E-04 4.212E-04 3.717E-04 3.279E-04
   2.      1.477E-05 1.248E-05 1.065E-05 9.148E-06
            TOTAL CONCENTRATIONS (G/CU M)
           4.905E-04 4.337E-04 3.824E-04 3.370E-04
```

PLANT YATES - SHORT-TERM - CASE B: UNITS 2-5 AND UNIT 1- SET 2

MAXIMUM 1 HOUR CONCENTRATION

****

RECEPTOR NUMBER	X-COORD. (KMS)	Y-COORD. (KMS)	DOWNWIND DIST.(KMS)	CONCENTRATION (MUGS/M3)
1	.50	.00	.50	40.38
2	.60	.00	.60	98.64
3	.70	.00	.70	112.88
4	.80	.00	.80	121.32
5	.90	.00	.90	217.29
6	1.00	.00	1.00	400.11
7	1.10	.00	1.10	568.96
8	1.20	.00	1.20	663.94
9	1.30	.00	1.30	686.60
10	1.40	.00	1.40	661.25
11	1.50	.00	1.50	610.91
12	1.60	.00	1.60	551.07
13	1.70	.00	1.70	490.52
14	1.80	.00	1.80	433.68
15	1.90	.00	1.90	382.35
16	2.00	.00	2.00	337.01

```
ENTER (1) TO MAKE ANOTHER ENTIRE RUN
ENTER (2) TO CHANGE SOURCE, RECEPTOR, AND MET DATA
ENTER (3) TO CHANGE ONLY RECEPTOR AND MET DATA
ENTER (4) TO CHANGE ONLY MET DATA
ENTER (5) TO END
          4

ENTER (1) TO ENTER 1-HOUR OF MET DATA, ENTER (2) TO ACCESS MET DATA FILE
          1

ENTER MET DATA: THETA(DEG),U(M/SEC),KST,HL(M),T(DEG K)
   270.0000/      3.0000/            1/   5000.0000/     289.9400

ALL PARTIALS:(1); AVER.PTS.:(2); NO PTS.:(3)  ?
          2

ENTER (1) IF YOU WANT METEOROLOGY LISTED; ENTER (2) IF NOT
          1
```

PLANT YATES - SHORT-TERM - CASE B: UNITS 2-5 AND UNIT 1- SET 2

H=HF

* * * S O U R C E S * * *

NO.	Q (G/SEC)	HP (M)	TS (DEG K)	VS (M/SEC)	D (M)	VF (CU M/SEC)	R (KM)	S (KM)
1.	3121.00	251.46	412.80	28.10	7.07	1103.15	.000	.000
2.	69.40	76.20	338.81	14.00	3.98	172.43	.000	.000

* * * M E T E O R O L O G Y * * *

NO.	THETA (DEG)	U (M/SEC)	KST	HL (M)	T (DEG K)
2	270.	3.00	1	5000.00	289.9

AVERAGE CONCENTRATIONS FOR 1 HOURS

* * * R E C E P T O R N U M B E R * * *

PARTIAL CONCENTRATIONS (G/CU M)

SOURCE	1.	2.	3.	4.	5.	6.
1.	4.643E-16	5.712E-09	3.748E-06	6.540E-05	2.475E-04	4.609E-04
2.	5.992E-05	1.073E-04	1.076E-04	8.970E-05	7.053E-05	5.475E-05

TOTAL CONCENTRATIONS (G/CU M)
5.992E-05 1.073E-04 1.114E-04 1.551E-04 3.181E-04 5.156E-04

* * * R E C E P T O R N U M B E R * * *

SOURCE	7.	8.	9.	10.	11.	12.
	PARTIAL CONCENTRATIONS (G/CU M)					
1.	6.026E-04	6.545E-04	6.426E-04	5.968E-04	5.373E-04	4.758E-04
2.	4.270E-05	3.367E-05	2.688E-05	2.175E-05	1.781E-05	1.475E-05
	TOTAL CONCENTRATIONS (G/CU M)					
	6.453E-04	6.881E-04	6.695E-04	6.185E-04	5.551E-04	4.906E-04

* * * R E C E P T O R N U M B E R * * *

SOURCE	13.	14.	15.	16.
	PARTIAL CONCENTRATIONS (G/CU M)			
1.	4.179E-04	3.658E-04	3.201E-04	2.805E-04
2.	1.234E-05	1.043E-05	8.889E-06	7.636E-06
	TOTAL CONCENTRATIONS (G/CU M)			
	4.302E-04	3.762E-04	3.290E-04	2.882E-04

PLANT YATES - SHORT-TERM - CASE B: UNITS 2-5 AND UNIT 1- SET 2

MAXIMUM 1 HOUR CONCENTRATION

****

RECEPTOR NUMBER	X-COORD. (KMS)	Y-COORD. (KMS)	DOWNWIND DIST.(KMS)	CONCENTRATION (MUGS/M3)
1	.50	.00	.50	59.92
2	.60	.00	.60	107.34
3	.70	.00	.70	111.38
4	.80	.00	.80	155.10
5	.90	.00	.90	318.06
6	1.00	.00	1.00	515.65
7	1.10	.00	1.10	645.30
8	1.20	.00	1.20	688.12
9	1.30	.00	1.30	669.51
10	1.40	.00	1.40	618.50
11	1.50	.00	1.50	555.12
12	1.60	.00	1.60	490.56
13	1.70	.00	1.70	430.22
14	1.80	.00	1.80	376.22
15	1.90	.00	1.90	328.99
16	2.00	.00	2.00	288.17

ENTER (1) TO MAKE ANOTHER ENTIRE RUN
ENTER (2) TO CHANGE SOURCE, RECEPTOR, AND MET DATA

```
ENTER (3) TO CHANGE ONLY RECEPTOR AND MET DATA
ENTER (4) TO CHANGE ONLY MET DATA
ENTER (5) TO END
         4

ENTER (1) TO ENTER 1-HOUR OF MET DATA, ENTER (2) TO ACCESS MET DATA FILE
         1

ENTER MET DATA: THETA(DEG),U(M/SEC),KST,HL(M),T(DEG K)
   270.0000/     5.0000/          4/   5000.0000/    289.9400

ALL PARTIALS:(1); AVER.PTS.:(2); NO PTS.:(3)  ?
         2

ENTER (1) IF YOU WANT METEOROLOGY LISTED; ENTER (2) IF NOT
         1


 PLANT YATES - SHORT-TERM - CASE B: UNITS 2-5 AND UNIT 1- SET 2

H=HF


* * * S O U R C E S * * *
NO.      Q         HP      TS       VS       D       VF        R        S
     (G/SEC)      (M)   (DEG K) (M/SEC)    (M)  (CU M/SEC)   (KM)     (KM)

 1.  3121.00   251.46  412.80   28.10    7.07   1103.15    .000     .000
 2.    69.40    76.20  338.81   14.00    3.96    172.43    .000     .000

* * * M E T E O R O L O G Y * * *
NO.    THETA      U      KST    HL         T
       (DEG)   (M/SEC)          (M)     (DEG K)

 2      270.     5.00     4   5000.00    289.9

AVERAGE CONCENTRATIONS FOR  1 HOURS

* * * R E C E P T O R   N U M B E R * * *
                 1.         2.        3.         4.         5.         6.
SOURCE        PARTIAL CONCENTRATIONS (G/CU M)
   1.       0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
   2.       7.560E-15 5.404E-12 3.469E-10 5.737E-09 4.157E-08 1.768E-07
             TOTAL CONCENTRATIONS (G/CU M)
            7.560E-15 5.404E-12 3.469E-10 5.737E-09 4.157E-08 1.768E-07

* * * R E C E P T O R   N U M B E R * * *
                 7.         8.        9.        10.        11.        12.
```

```
SOURCE      PARTIAL CONCENTRATIONS (G/CU M)
   1.     0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
   2.     4.188E-07 8.308E-07 1.444E-06 2.272E-06 3.306E-06 4.523E-06
           TOTAL CONCENTRATIONS (G/CU M)
          4.188E-07 8.308E-07 1.444E-06 2.272E-06 3.306E-06 4.523E-06

* * * R E C E P T O R   N U M B E R * * *
            13.       14.       15.       16.
SOURCE      PARTIAL CONCENTRATIONS (G/CU M)
   1.     0.000E+00 6.253E-23 1.350E-21 2.047E-20
   2.     5.893E-06 7.379E-06 8.942E-06 1.055E-05
           TOTAL CONCENTRATIONS (G/CU M)
          5.893E-06 7.379E-06 8.942E-06 1.055E-05
```

PLANT YATES - SHORT-TERM - CASE B: UNITS 2-5 AND UNIT 1- SET 2

MAXIMUM 1 HOUR CONCENTRATION

****

RECEPTOR NUMBER	X-COORD. (KMS)	Y-COORD. (KMS)	DOWNWIND DIST.(KMS)	CONCENTRATION (MUGS/M3)
1	.50	.00	.50	.00
2	.60	.00	.60	.00
3	.70	.00	.70	.00
4	.80	.00	.80	.01
5	.90	.00	.90	.04
6	1.00	.00	1.00	.18
7	1.10	.00	1.10	.42
8	1.20	.00	1.20	.83
9	1.30	.00	1.30	1.44
10	1.40	.00	1.40	2.27
11	1.50	.00	1.50	3.31
12	1.60	.00	1.60	4.52
13	1.70	.00	1.70	5.89
14	1.80	.00	1.80	7.38
15	1.90	.00	1.90	8.94
16	2.00	.00	2.00	10.55

ENTER (1) TO MAKE ANOTHER ENTIRE RUN
ENTER (2) TO CHANGE SOURCE, RECEPTOR, AND MET DATA
ENTER (3) TO CHANGE ONLY RECEPTOR AND MET DATA
ENTER (4) TO CHANGE ONLY MET DATA
ENTER (5) TO END
4

```
 ENTER (1) TO ENTER 1-HOUR OF MET DATA, ENTER (2) TO ACCESS MET DATA FILE
          1

 ENTER MET DATA: THETA(DEG),U(M/SEC),KST,HL(M),T(DEG K)
    270.0000/      7.0000/            4/   5000.0000/    289.9400

 ALL PARTIALS:(1); AVER.PTS.:(2); NO PTS.:(3)  ?
          2

 ENTER (1) IF YOU WANT METEOROLOGY LISTED; ENTER (2) IF NOT
          1


  PLANT YATES - SHORT-TERM - CASE B: UNITS 2-5 AND UNIT 1- SET 2

 H=HF


 * * * S O U R C E S * * *
 NO.      Q         HP       TS      VS       D       VF        R       S
       (G/SEC)      (M)   (DEG K)  (M/SEC)   (M)  (CU M/SEC)   (KM)    (KM)


  1.  3121.00    251.46  412.80   28.10    7.07   1103.15    .000    .000
  2.    69.40     76.20  338.81   14.00    3.96    172.43    .000    .000

 * * * M E T E O R O L O G Y * * *
NO.    THETA      U      KST     HL        T
        (DEG)  (M/SEC)           (M)    (DEG K)


  2      270.     7.00      4  5000.00    289.9

 AVERAGE CONCENTRATIONS FOR  1 HOURS

 * * * R E C E P T O R   N U M B E R * * *
             1.         2.         3.         4.         5.         6.
 SOURCE        PARTIAL CONCENTRATIONS (G/CU M)
    1.     0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
    2.     2.762E-12 4.001E-10 9.205E-09 7.531E-08 3.289E-07 9.592E-07
            TOTAL CONCENTRATIONS (G/CU M)
           2.762E-12 4.001E-10 9.205E-09 7.531E-08 3.289E-07 9.592E-07

 * * * R E C E P T O R   N U M B E R * * *
             7.         8.         9.        10.        11.        12.
 SOURCE        PARTIAL CONCENTRATIONS (G/CU M)
    1.     0.000E+00 0.000E+00 0.000E+00 5.652E-24 3.381E-22 1.124E-20
    2.     1.797E-06 2.948E-06 4.381E-06 6.040E-06 7.860E-06 9.772E-06
            TOTAL CONCENTRATIONS (G/CU M)
           1.797E-06 2.948E-06 4.381E-06 6.040E-06 7.860E-06 9.772E-06
```

```
* * * R E C E P T O R   N U M B E R * * *
              13.        14.        15.        16.
SOURCE        PARTIAL CONCENTRATIONS (G/CU M)
   1.       2.323E-19 3.257E-18 3.312E-17 2.575E-16
   2.       1.172E-05 1.364E-05 1.551E-05 1.728E-05
             TOTAL CONCENTRATIONS (G/CU M)
            1.172E-05 1.364E-05 1.551E-05 1.728E-05
```

PLANT YATES - SHORT-TERM - CASE B: UNITS 2-5 AND UNIT 1- SET 2

MAXIMUM 1 HOUR CONCENTRATION

****

RECEPTOR NUMBER	X-COORD. (KMS)	Y-COORD. (KMS)	DOWNWIND DIST.(KMS)	CONCENTRATION (MUGS/M3)
1	.50	.00	.50	.00
2	.60	.00	.60	.00
3	.70	.00	.70	.01
4	.80	.00	.80	.08
5	.90	.00	.90	.33
6	1.00	.00	1.00	.96
7	1.10	.00	1.10	1.80
8	1.20	.00	1.20	2.95
9	1.30	.00	1.30	4.38
10	1.40	.00	1.40	6.04
11	1.50	.00	1.50	7.86
12	1.60	.00	1.60	9.77
13	1.70	.00	1.70	11.72
14	1.80	.00	1.80	13.64
15	1.90	.00	1.90	15.51
16	2.00	.00	2.00	17.28

```
ENTER (1) TO MAKE ANOTHER ENTIRE RUN
ENTER (2) TO CHANGE SOURCE, RECEPTOR, AND MET DATA
ENTER (3) TO CHANGE ONLY RECEPTOR AND MET DATA
ENTER (4) TO CHANGE ONLY MET DATA
ENTER (5) TO END
          4

ENTER (1) TO ENTER 1-HOUR OF MET DATA, ENTER (2) TO ACCESS MET DATA FILE
          1

ENTER MET DATA: THETA(DEG),U(M/SEC),KST,HL(M),T(DEG K)
   270.0000/     10.0000/          4/   5000.0000/    289.9400
```

```
 ALL PARTIALS:(1); AVER.PTS.:(2); NO PTS.:(3)  ?
          2

 ENTER (1) IF YOU WANT METEOROLOGY LISTED; ENTER (2) IF NOT
          1


  PLANT YATES - SHORT-TERM - CASE B: UNITS 2-5 AND UNIT 1- SET 2

 H=HF


 * * * S O U R C E S * * *
 NO.     Q          HP      TS       VS       D       VF        R        S
      (G/SEC)      (M)   (DEG K)  (M/SEC)    (M)  (CU M/SEC)   (KM)     (KM)

  1.  3121.00    251.46  412.80    28.10    7.07   1103.15    .000     .000
  2.    69.40     76.20  338.81    14.00    3.96    172.43    .000     .000

 * * * M E T E O R O L O G Y * * *
NO.     THETA      U      KST    HL        T
        (DEG)   (M/SEC)          (M)     (DEG K)

  2      270.    10.00     4   5000.00    289.9

 AVERAGE CONCENTRATIONS FOR  1 HOURS

 * * * R E C E P T O R   N U M B E R * * *
              1.        2.        3.         4.        5.        6.
 SOURCE        PARTIAL CONCENTRATIONS (G/CU M)
    1.       0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
    2.       1.213E-10 6.093E-09 7.094E-08 3.639E-07 1.136E-06 2.578E-06
              TOTAL CONCENTRATIONS (G/CU M)
             1.213E-10 6.093E-09 7.094E-08 3.639E-07 1.136E-06 2.578E-06

 * * * R E C E P T O R   N U M B E R * * *
              7.        8.        9.        10.       11.       12.
 SOURCE        PARTIAL CONCENTRATIONS (G/CU M)
    1.       0.000E+00 2.556E-23 2.427E-21 1.092E-19 2.738E-18 4.314E-17
    2.       4.136E-06 5.979E-06 8.006E-06 1.011E-05 1.222E-05 1.426E-05
              TOTAL CONCENTRATIONS (G/CU M)
             4.136E-06 5.979E-06 8.006E-06 1.011E-05 1.222E-05 1.426E-05

 * * * R E C E P T O R   N U M B E R * * *
              13.       14.       15.       16.
 SOURCE        PARTIAL CONCENTRATIONS (G/CU M)
    1.       4.671E-16 3.722E-15 2.301E-14 1.150E-13
```

2. 1.617E-05 1.795E-05 1.955E-05 2.099E-05
TOTAL CONCENTRATIONS (G/CU M)
1.617E-05 1.795E-05 1.955E-05 2.099E-05

PLANT YATES - SHORT-TERM - CASE B: UNITS 2-5 AND UNIT 1- SET 2

MAXIMUM 1 HOUR CONCENTRATION

****

RECEPTOR NUMBER	X-COORD. (KMS)	Y-COORD. (KMS)	DOWNWIND DIST.(KMS)	CONCENTRATION (MUGS/M3)
1	.50	.00	.50	.00
2	.60	.00	.60	.01
3	.70	.00	.70	.07
4	.80	.00	.80	.36
5	.90	.00	.90	1.14
6	1.00	.00	1.00	2.58
7	1.10	.00	1.10	4.14
8	1.20	.00	1.20	5.98
9	1.30	.00	1.30	8.01
10	1.40	.00	1.40	10.11
11	1.50	.00	1.50	12.22
12	1.60	.00	1.60	14.26
13	1.70	.00	1.70	16.17
14	1.80	.00	1.80	17.95
15	1.90	.00	1.90	19.55
16	2.00	.00	2.00	20.99

ENTER (1) TO MAKE ANOTHER ENTIRE RUN
ENTER (2) TO CHANGE SOURCE, RECEPTOR, AND MET DATA
ENTER (3) TO CHANGE ONLY RECEPTOR AND MET DATA
ENTER (4) TO CHANGE ONLY MET DATA
ENTER (5) TO END
5

136-END

PRINT COMPLETED AT 13:41:45 FOR USER: B1955934 DIST: BLANCHE

END-136

Plant Yates

SO2

Short-Term

PTMTP Model

Case 3

```
*******************************************************************************************************************************
** VM/SP SERVICE LEVEL 0411 **** CPU SERIAL  000019  CPU MODEL  0580 ***********************************************************
```

```
B1955934   B1955934   USERID     ORIGIN
BLANCHE    VMRBHMC1   DISTCODE   SYSTEM
S021       REPORT     FILENAME   FILETYPE
03/17/89   13:11:52   FILE CREATION DATE
4099       00000849   SPOOLID    COUNT
03/17/89   13:41:45   FILE PRINT DATE
R          0500       CLASS      DEVICE
STANDARD              FORMS
```

```
     *     *********  *********
    **     *********  *********
   ***     **    **   **     **
    **          **          **
    **        ****         **
    **       ******       **
    **           **      **
    **     **    **      **
  ******   *********     **
  ******    *******      **
```

```
                  S                  Southern Company
                 SCS                   Services, Inc.
                SCSBS
               SCSBSCS             Information Services
              SCSBSCSBS                 Birmingham
               SCSBSCSBS
   AMDAHL    SCSSCSBSS             For Assistance,
  470  V/8    SCSCSBSCS               Call ISC at 7378
32 Megabytes  SCSBSCSBS
               SCSBSCSBS
    SCSCSCS              SCS          VM/SP  HPO
   SSCSBSS             SCSBSCS        Release  4.2
  SCSBSCS           SCSBSCSBSCS
 SCSBSCS    SCSBSCSBSCSBSCSBS
SCSCSCSCSCSCSCSCSCSCSCSCSCSCS
```

TAG DATA: VMRBHMC1 SYSTEM

```
********      *      *******  *********  *********  *******   *********      *
*********    **     ********* *********  *********  *********  *********     **
**     **   ***     **    **  **         **         **     **  **    **     ***
**     **    **     **    **  ********   ********   **     **       **     ****
********     **     *********  ********   ********  *********     ****    ** **
********     **      ********        **         **   ********     ******  **  **
**     **    **            **        **         **         **        **  *********
**     **    **     **     ** **     **  **     **  **     **  **    **  *********
*********  ******   ********* *********  *********  *********  *********      **
********   ******    *******   *******    *******    *******    *******       **
```

```
********   **             ***    *      **   *******   **     **  *********
*********  **            *****   **     **  *********  **     **  *********
**     **  **           **   **  ***    **  **     **  **     **  **
**     **  **          **    **  ****   **  **         **     **  **
********   **          **    **  ** **  **  **         *********  ******
********   **          ********* **  ** **  **         *********  ******
**     **  **          ********* **   ****  **         **     **  **
**     **  **          **    **  **    ***  **     **  **     **  **
*********  *********   **    **  **     **  *********  **     **  *********
********   *********   **    **  **      *   *******   **     **  *********
```

```
 ENTER A 68 CHARACTER TITLE
PLANT YATES - SHORT-TERM - CASE B: UNITS 2-5 AND UNIT 1- SET 2

 ENTER NUMBER OF SOURCES, UP TO 10
        1

 ENTER (1) TO ENTER SOURCE INFORMATION FROM FILE.
        0

 ENTER Q(G/S),HP(M),TS(DEG K),VS(M/S),D(M),R(KM)(X-COORD),S(KM)(Y-COORD)
      FOR SOURCE NUMBER  1
    69.40/     76.20/    338.81/     14.00/      3.96/       .00/       .00

 THIRTY:(1); INDIVIDUAL:(2); RANGE&SPACE:(3)  ?
        3

 ENTER X-COORD OF FIRST RECEPTOR IN KM
      .5000

 ENTER X-COORD OF LAST RECEPTOR IN KM
     2.0000

 ENTER SPACING OF RECEPTORS IN KM
      .1000

 ENTER (1) TO ENTER 1-HOUR OF MET DATA, ENTER (2) TO ACCESS MET DATA FILE
        1

 ENTER MET DATA: THETA(DEG),U(M/SEC),KST,HL(M),T(DEG K)
   270.0000/      1.0000/          1/   5000.0000/    289.9400

 ALL PARTIALS:(1); AVER.PTS.:(2); NO PTS.:(3)  ?
        2

 ENTER (1) IF YOU WANT METEOROLOGY LISTED; ENTER (2) IF NOT
        1
```

PLANT YATES - SHORT-TERM - CASE B: UNITS 2-5 AND UNIT 1- SET 2

H=HF

* * * S O U R C E S * * *

NO.	Q (G/SEC)	HP (M)	TS (DEG K)	VS (M/SEC)	D (M)	VF (CU M/SEC)	R (KM)	S (KM)
1.	69.40	76.20	338.81	14.00	3.96	172.43	.000	.000

```
 * * * M E T E O R O L O G Y * * *
NO.    THETA      U       KST    HL         T
       (DEG)   (M/SEC)           (M)     (DEG K)

  2     270.     1.00      1   5000.00    289.9

 AVERAGE CONCENTRATIONS FOR  1 HOURS

 * * * R E C E P T O R   N U M B E R * * *
                1.        2.        3.        4.        5.        6.
 SOURCE       PARTIAL CONCENTRATIONS (G/CU M)
    1.      2.408E-08 5.222E-06 3.776E-05 7.948E-05 1.009E-04 1.022E-04
             TOTAL CONCENTRATIONS (G/CU M)
            2.408E-08 5.222E-06 3.776E-05 7.948E-05 1.009E-04 1.022E-04

 * * * R E C E P T O R   N U M B E R * * *
                7.        8.        9.       10.       11.       12.
 SOURCE       PARTIAL CONCENTRATIONS (G/CU M)
    1.      9.333E-05 8.112E-05 6.899E-05 5.820E-05 4.906E-05 4.147E-05
             TOTAL CONCENTRATIONS (G/CU M)
            9.333E-05 8.112E-05 6.899E-05 5.820E-05 4.906E-05 4.147E-05

 * * * R E C E P T O R   N U M B E R * * *
               13.       14.       15.       16.
 SOURCE       PARTIAL CONCENTRATIONS (G/CU M)
    1.      3.522E-05 3.008E-05 2.584E-05 2.234E-05
             TOTAL CONCENTRATIONS (G/CU M)
            3.522E-05 3.008E-05 2.584E-05 2.234E-05
```

PLANT YATES - SHORT-TERM - CASE B: UNITS 2-5 AND UNIT 1- SET 2

MAXIMUM 1 HOUR CONCENTRATION

****

RECEPTOR NUMBER	X-COORD. (KMS)	Y-COORD. (KMS)	DOWNWIND DIST.(KMS)	CONCENTRATION (MUGS/M3)
1	.50	.00	.50	.02
2	.60	.00	.60	5.22
3	.70	.00	.70	37.76
4	.80	.00	.80	79.48
5	.90	.00	.90	100.88
6	1.00	.00	1.00	102.24
7	1.10	.00	1.10	93.33
8	1.20	.00	1.20	81.12
9	1.30	.00	1.30	68.99

10	1.40	.00	1.40	58.20
11	1.50	.00	1.50	49.06
12	1.60	.00	1.60	41.47
13	1.70	.00	1.70	35.22
14	1.80	.00	1.80	30.08
15	1.90	.00	1.90	25.84
16	2.00	.00	2.00	22.34

```
ENTER (1) TO MAKE ANOTHER ENTIRE RUN
ENTER (2) TO CHANGE SOURCE, RECEPTOR, AND MET DATA
ENTER (3) TO CHANGE ONLY RECEPTOR AND MET DATA
ENTER (4) TO CHANGE ONLY MET DATA
ENTER (5) TO END
          4

ENTER (1) TO ENTER 1-HOUR OF MET DATA, ENTER (2) TO ACCESS MET DATA FILE
          1

ENTER MET DATA: THETA(DEG),U(M/SEC),KST,HL(M),T(DEG K)
   270.0000/      1.5000/          1/   5000.0000/    289.9400

ALL PARTIALS:(1); AVER.PTS.:(2); NO PTS.:(3)  ?
          2

ENTER (1) IF YOU WANT METEOROLOGY LISTED; ENTER (2) IF NOT
          1
```

PLANT YATES - SHORT-TERM - CASE B: UNITS 2-5 AND UNIT 1- SET 2

H=HF

* * * S O U R C E S * * *

NO.	Q (G/SEC)	HP (M)	TS (DEG K)	VS (M/SEC)	D (M)	VF (CU M/SEC)	R (KM)	S (KM)
1.	69.40	76.20	338.81	14.00	3.96	172.43	.000	.000

* * * M E T E O R O L O G Y * * *

NO.	THETA (DEG)	U (M/SEC)	KST	HL (M)	T (DEG K)
2	270.	1.50	1	5000.00	289.9

AVERAGE CONCENTRATIONS FOR 1 HOURS

```
* * * R E C E P T O R   N U M B E R * * *
              1.        2.        3.        4.        5.        6.
SOURCE       PARTIAL CONCENTRATIONS (G/CU M)
   1.     3.324E-06 4.094E-05 9.084E-05 1.099E-04 1.047E-04 9.050E-05
           TOTAL CONCENTRATIONS (G/CU M)
          3.324E-06 4.094E-05 9.084E-05 1.099E-04 1.047E-04 9.050E-05

* * * R E C E P T O R   N U M B E R * * *
              7.        8.        9.       10.       11.       12.
SOURCE       PARTIAL CONCENTRATIONS (G/CU M)
   1.     7.519E-05 6.165E-05 5.049E-05 4.154E-05 3.442E-05 2.874E-05
           TOTAL CONCENTRATIONS (G/CU M)
          7.519E-05 6.165E-05 5.049E-05 4.154E-05 3.442E-05 2.874E-05

* * * R E C E P T O R   N U M B E R * * *
             13.       14.       15.       16.
SOURCE       PARTIAL CONCENTRATIONS (G/CU M)
   1.     2.420E-05 2.053E-05 1.756E-05 1.512E-05
           TOTAL CONCENTRATIONS (G/CU M)
          2.420E-05 2.053E-05 1.756E-05 1.512E-05
```

PLANT YATES - SHORT-TERM - CASE B: UNITS 2-5 AND UNIT 1- SET 2

MAXIMUM 1 HOUR CONCENTRATION

****

RECEPTOR NUMBER	X-COORD. (KMS)	Y-COORD. (KMS)	DOWNWIND DIST.(KMS)	CONCENTRATION (MUGS/M3)
1	.50	.00	.50	3.32
2	.60	.00	.60	40.94
3	.70	.00	.70	90.84
4	.80	.00	.80	109.88
5	.90	.00	.90	104.73
6	1.00	.00	1.00	90.50
7	1.10	.00	1.10	75.19
8	1.20	.00	1.20	61.65
9	1.30	.00	1.30	50.49
10	1.40	.00	1.40	41.54
11	1.50	.00	1.50	34.42
12	1.60	.00	1.60	28.74
13	1.70	.00	1.70	24.20
14	1.80	.00	1.80	20.53
15	1.90	.00	1.90	17.56
16	2.00	.00	2.00	15.12

```
ENTER (1) TO MAKE ANOTHER ENTIRE RUN
ENTER (2) TO CHANGE SOURCE, RECEPTOR, AND MET DATA
ENTER (3) TO CHANGE ONLY RECEPTOR AND MET DATA
ENTER (4) TO CHANGE ONLY MET DATA
ENTER (5) TO END
          4

ENTER (1) TO ENTER 1-HOUR OF MET DATA, ENTER (2) TO ACCESS MET DATA FILE
          1

ENTER MET DATA: THETA(DEG),U(M/SEC),KST,HL(M),T(DEG K)
   270.0000/      2.0000/           1/   5000.0000/    289.9400

ALL PARTIALS:(1); AVER.PTS.:(2); NO PTS.:(3)  ?
          2

ENTER (1) IF YOU WANT METEOROLOGY LISTED; ENTER (2) IF NOT
          1


 PLANT YATES - SHORT-TERM - CASE B: UNITS 2-5 AND UNIT 1- SET 2

H=HF


* * * S O U R C E S * * *
NO.      Q          HP      TS       VS        D       VF         R        S
      (G/SEC)      (M)   (DEG K)  (M/SEC)     (M)  (CU M/SEC)   (KM)     (KM)

 1.    69.40     76.20   338.81    14.00     3.96    172.43     .000     .000

* * * M E T E O R O L O G Y * * *
NO.    THETA        U       KST     HL         T
       (DEG)    (M/SEC)             (M)     (DEG K)

 2      270.       2.00      1    5000.00    289.9

AVERAGE CONCENTRATIONS FOR  1 HOURS

* * * R E C E P T O R   N U M B E R * * *
                  1.        2.        3.         4.         5.         6.
SOURCE         PARTIAL CONCENTRATIONS (G/CU M)
   1.       1.863E-05 7.779E-05 1.105E-04 1.085E-04 9.282E-05 7.554E-05
             TOTAL CONCENTRATIONS (G/CU M)
            1.863E-05 7.779E-05 1.105E-04 1.085E-04 9.282E-05 7.554E-05

* * * R E C E P T O R   N U M B E R * * *
```

```
                7.        8.        9.        10.       11.       12.
SOURCE      PARTIAL CONCENTRATIONS (G/CU M)
   1.     6.057E-05 4.858E-05 3.923E-05 3.197E-05 2.631E-05 2.187E-05
           TOTAL CONCENTRATIONS (G/CU M)
          6.057E-05 4.858E-05 3.923E-05 3.197E-05 2.631E-05 2.187E-05

* * * R E C E P T O R   N U M B E R * * *
               13.       14.       15.       16.
SOURCE      PARTIAL CONCENTRATIONS (G/CU M)
   1.     1.835E-05 1.554E-05 1.326E-05 1.140E-05
           TOTAL CONCENTRATIONS (G/CU M)
          1.835E-05 1.554E-05 1.326E-05 1.140E-05
```

PLANT YATES - SHORT-TERM - CASE B: UNITS 2-5 AND UNIT 1- SET 2

MAXIMUM 1 HOUR CONCENTRATION

****

RECEPTOR NUMBER	X-COORD. (KMS)	Y-COORD. (KMS)	DOWNWIND DIST.(KMS)	CONCENTRATION (MUGS/M3)
1	.50	.00	.50	18.63
2	.60	.00	.60	77.79
3	.70	.00	.70	110.54
4	.80	.00	.80	108.49
5	.90	.00	.90	92.82
6	1.00	.00	1.00	75.54
7	1.10	.00	1.10	60.57
8	1.20	.00	1.20	48.58
9	1.30	.00	1.30	39.23
10	1.40	.00	1.40	31.97
11	1.50	.00	1.50	26.31
12	1.60	.00	1.60	21.87
13	1.70	.00	1.70	18.35
14	1.80	.00	1.80	15.54
15	1.90	.00	1.90	13.26
16	2.00	.00	2.00	11.40

```
ENTER (1) TO MAKE ANOTHER ENTIRE RUN
ENTER (2) TO CHANGE SOURCE, RECEPTOR, AND MET DATA
ENTER (3) TO CHANGE ONLY RECEPTOR AND MET DATA
ENTER (4) TO CHANGE ONLY MET DATA
ENTER (5) TO END
          4

ENTER (1) TO ENTER 1-HOUR OF MET DATA, ENTER (2) TO ACCESS MET DATA FILE
```

```
          1

 ENTER MET DATA: THETA(DEG),U(M/SEC),KST,HL(M),T(DEG K)
   270.0000/     2.5000/          1/   5000.0000/    289.9400

 ALL PARTIALS:(1); AVER.PTS.:(2); NO PTS.:(3)  ?
          2

 ENTER (1) IF YOU WANT METEOROLOGY LISTED; ENTER (2) IF NOT
          1


  PLANT YATES - SHORT-TERM - CASE B: UNITS 2-5 AND UNIT 1- SET 2

 H=HF


 * * * S O U R C E S * * *
 NO.     Q         HP      TS      VS       D       VF        R        S
      (G/SEC)     (M)   (DEG K) (M/SEC)    (M)  (CU M/SEC)   (KM)     (KM)

  1.    69.40    76.20  338.81   14.00    3.96    172.43    .000     .000

 * * * M E T E O R O L O G Y * * *
NO.    THETA      U      KST    HL         T
       (DEG)   (M/SEC)          (M)     (DEG K)

  2     270.     2.50     1   5000.00    289.9

 AVERAGE CONCENTRATIONS FOR  1 HOURS

 * * * R E C E P T O R   N U M B E R * * *
              1.         2.         3.         4.         5.         6.
 SOURCE        PARTIAL CONCENTRATIONS (G/CU M)
    1.      4.038E-05 9.864E-05 1.124E-04 9.947E-05 8.067E-05 6.372E-05
             TOTAL CONCENTRATIONS (G/CU M)
            4.038E-05 9.864E-05 1.124E-04 9.947E-05 8.067E-05 6.372E-05

 * * * R E C E P T O R   N U M B E R * * *
              7.         8.         9.        10.        11.        12.
 SOURCE        PARTIAL CONCENTRATIONS (G/CU M)
    1.      5.020E-05 3.983E-05 3.194E-05 2.590E-05 2.125E-05 1.763E-05
             TOTAL CONCENTRATIONS (G/CU M)
            5.020E-05 3.983E-05 3.194E-05 2.590E-05 2.125E-05 1.763E-05

 * * * R E C E P T O R   N U M B E R * * *
             13.        14.        15.        16.
 SOURCE        PARTIAL CONCENTRATIONS (G/CU M)
```

1. 1.477E-05 1.248E-05 1.065E-05 9.148E-06
TOTAL CONCENTRATIONS (G/CU M)
1.477E-05 1.248E-05 1.065E-05 9.148E-06

PLANT YATES - SHORT-TERM - CASE B: UNITS 2-5 AND UNIT 1- SET 2

MAXIMUM 1 HOUR CONCENTRATION

****

RECEPTOR NUMBER	X-COORD. (KMS)	Y-COORD. (KMS)	DOWNWIND DIST.(KMS)	CONCENTRATION (MUGS/M3)
1	.50	.00	.50	40.38
2	.60	.00	.60	98.64
3	.70	.00	.70	112.41
4	.80	.00	.80	99.47
5	.90	.00	.90	80.67
6	1.00	.00	1.00	63.72
7	1.10	.00	1.10	50.20
8	1.20	.00	1.20	39.83
9	1.30	.00	1.30	31.94
10	1.40	.00	1.40	25.90
11	1.50	.00	1.50	21.25
12	1.60	.00	1.60	17.63
13	1.70	.00	1.70	14.77
14	1.80	.00	1.80	12.48
15	1.90	.00	1.90	10.65
16	2.00	.00	2.00	9.15

ENTER (1) TO MAKE ANOTHER ENTIRE RUN
ENTER (2) TO CHANGE SOURCE, RECEPTOR, AND MET DATA
ENTER (3) TO CHANGE ONLY RECEPTOR AND MET DATA
ENTER (4) TO CHANGE ONLY MET DATA
ENTER (5) TO END
4

ENTER (1) TO ENTER 1-HOUR OF MET DATA, ENTER (2) TO ACCESS MET DATA FILE
1

ENTER MET DATA: THETA(DEG),U(M/SEC),KST,HL(M),T(DEG K)
270.0000/ 3.0000/ 1/ 5000.0000/ 289.9400

ALL PARTIALS:(1); AVER.PTS.:(2); NO PTS.:(3) ?
2

ENTER (1) IF YOU WANT METEOROLOGY LISTED; ENTER (2) IF NOT

```
          1


 PLANT YATES - SHORT-TERM - CASE B: UNITS 2-5 AND UNIT 1- SET 2
 H=HF


 * * * S O U R C E S * * *
 NO.     Q          HP      TS       VS        D       VF         R        S
      (G/SEC)      (M)   (DEG K)  (M/SEC)     (M)   (CU M/SEC)   (KM)     (KM)

  1.    69.40     76.20   338.81   14.00      3.96    172.43     .000     .000

 * * * M E T E O R O L O G Y * * *
 NO.    THETA       U       KST      HL          T
        (DEG)    (M/SEC)             (M)      (DEG K)

  2      270.      3.00      1    5000.00      289.9

 AVERAGE CONCENTRATIONS FOR  1 HOURS

 * * * R E C E P T O R   N U M B E R * * *
               1.          2.          3.          4.          5.          6.
 SOURCE      PARTIAL CONCENTRATIONS (G/CU M)
   1.      5.992E-05 1.073E-04 1.076E-04 8.970E-05 7.053E-05 5.475E-05
             TOTAL CONCENTRATIONS (G/CU M)
           5.992E-05 1.073E-04 1.076E-04 8.970E-05 7.053E-05 5.475E-05

 * * * R E C E P T O R   N U M B E R * * *
               7.          8.          9.         10.         11.         12.
 SOURCE      PARTIAL CONCENTRATIONS (G/CU M)
   1.      4.270E-05 3.367E-05 2.688E-05 2.175E-05 1.781E-05 1.475E-05
             TOTAL CONCENTRATIONS (G/CU M)
           4.270E-05 3.367E-05 2.688E-05 2.175E-05 1.781E-05 1.475E-05

 * * * R E C E P T O R   N U M B E R * * *
              13.         14.         15.         16.
 SOURCE      PARTIAL CONCENTRATIONS (G/CU M)
   1.      1.234E-05 1.043E-05 8.889E-06 7.636E-06
             TOTAL CONCENTRATIONS (G/CU M)
           1.234E-05 1.043E-05 8.889E-06 7.636E-06
```

MAXIMUM 1 HOUR CONCENTRATION

****

RECEPTOR NUMBER	X-COORD. (KMS)	Y-COORD. (KMS)	DOWNWIND DIST.(KMS)	CONCENTRATION (MUGS/M3)
1	.50	.00	.50	59.92
2	.60	.00	.60	107.33
3	.70	.00	.70	107.63
4	.80	.00	.80	89.70
5	.90	.00	.90	70.53
6	1.00	.00	1.00	54.75
7	1.10	.00	1.10	42.70
8	1.20	.00	1.20	33.67
9	1.30	.00	1.30	26.88
10	1.40	.00	1.40	21.75
11	1.50	.00	1.50	17.81
12	1.60	.00	1.60	14.75
13	1.70	.00	1.70	12.34
14	1.80	.00	1.80	10.43
15	1.90	.00	1.90	8.89
16	2.00	.00	2.00	7.64

```
ENTER (1) TO MAKE ANOTHER ENTIRE RUN
ENTER (2) TO CHANGE SOURCE, RECEPTOR, AND MET DATA
ENTER (3) TO CHANGE ONLY RECEPTOR AND MET DATA
ENTER (4) TO CHANGE ONLY MET DATA
ENTER (5) TO END
         4

ENTER (1) TO ENTER 1-HOUR OF MET DATA, ENTER (2) TO ACCESS MET DATA FILE
         1

ENTER MET DATA: THETA(DEG),U(M/SEC),KST,HL(M),T(DEG K)
   270.0000/      5.0000/           4/   5000.0000/    289.9400

ALL PARTIALS:(1); AVER.PTS.:(2); NO PTS.:(3)  ?
         2

ENTER (1) IF YOU WANT METEOROLOGY LISTED; ENTER (2) IF NOT
         1


 PLANT YATES - SHORT-TERM - CASE B: UNITS 2-5 AND UNIT 1- SET 2

H=HF
```

```
 * * * S O U R C E S * * *
 NO.      Q         HP     TS       VS        D      VF          R        S
       (G/SEC)     (M)  (DEG K)  (M/SEC)    (M)   (CU M/SEC)   (KM)     (KM)

  1.    69.40     76.20  338.81   14.00     3.96    172.43     .000     .000

 * * * M E T E O R O L O G Y * * *
NO.   THETA     U      KST    HL        T
      (DEG)  (M/SEC)          (M)    (DEG K)

 2     270.    5.00     4   5000.00   289.9

 AVERAGE CONCENTRATIONS FOR  1 HOURS

 * * * R E C E P T O R   N U M B E R * * *
                1.         2.         3.         4.         5.         6.
 SOURCE          PARTIAL CONCENTRATIONS (G/CU M)
    1.       7.560E-15 5.404E-12 3.469E-10 5.737E-09 4.157E-08 1.768E-07
               TOTAL CONCENTRATIONS (G/CU M)
             7.560E-15 5.404E-12 3.469E-10 5.737E-09 4.157E-08 1.768E-07

 * * * R E C E P T O R   N U M B E R * * *
                7.         8.         9.        10.        11.        12.
 SOURCE          PARTIAL CONCENTRATIONS (G/CU M)
    1.       4.188E-07 8.308E-07 1.444E-06 2.272E-06 3.306E-06 4.523E-06
               TOTAL CONCENTRATIONS (G/CU M)
             4.188E-07 8.308E-07 1.444E-06 2.272E-06 3.306E-06 4.523E-06

 * * * R E C E P T O R   N U M B E R * * *
               13.        14.        15.        16.
 SOURCE          PARTIAL CONCENTRATIONS (G/CU M)
    1.       5.893E-06 7.379E-06 8.942E-06 1.055E-05
               TOTAL CONCENTRATIONS (G/CU M)
             5.893E-06 7.379E-06 8.942E-06 1.055E-05


  PLANT YATES - SHORT-TERM - CASE B: UNITS 2-5 AND UNIT 1- SET 2

                 MAXIMUM  1 HOUR  CONCENTRATION

             *****************************************

 RECEPTOR    X-COORD.   Y-COORD.   DOWNWIND     CONCENTRATION
 NUMBER       (KMS)      (KMS)     DIST.(KMS)     (MUGS/M3)
```

1	.50	.00	.50	.00
2	.60	.00	.60	.00
3	.70	.00	.70	.00
4	.80	.00	.80	.01
5	.90	.00	.90	.04
6	1.00	.00	1.00	.18
7	1.10	.00	1.10	.42
8	1.20	.00	1.20	.83
9	1.30	.00	1.30	1.44
10	1.40	.00	1.40	2.27
11	1.50	.00	1.50	3.31
12	1.60	.00	1.60	4.52
13	1.70	.00	1.70	5.89
14	1.80	.00	1.80	7.38
15	1.90	.00	1.90	8.94
16	2.00	.00	2.00	10.55

```
ENTER (1) TO MAKE ANOTHER ENTIRE RUN
ENTER (2) TO CHANGE SOURCE, RECEPTOR, AND MET DATA
ENTER (3) TO CHANGE ONLY RECEPTOR AND MET DATA
ENTER (4) TO CHANGE ONLY MET DATA
ENTER (5) TO END
          4

ENTER (1) TO ENTER 1-HOUR OF MET DATA, ENTER (2) TO ACCESS MET DATA FILE
          1

ENTER MET DATA: THETA(DEG),U(M/SEC),KST,HL(M),T(DEG K)
   270.0000/      7.0000/          4/   5000.0000/    289.9400

ALL PARTIALS:(1); AVER.PTS.:(2); NO PTS.:(3)  ?
          2

ENTER (1) IF YOU WANT METEOROLOGY LISTED; ENTER (2) IF NOT
          1
```

PLANT YATES - SHORT-TERM - CASE B: UNITS 2-5 AND UNIT 1- SET 2

H=HF

* * * S O U R C E S * * *

NO.	Q (G/SEC)	HP (M)	TS (DEG K)	VS (M/SEC)	D (M)	VF (CU M/SEC)	R (KM)	S (KM)
1.	69.40	76.20	338.81	14.00	3.96	172.43	.000	.000

```
* * * M E T E O R O L O G Y * * *
NO.   THETA     U      KST    HL        T
      (DEG)  (M/SEC)          (M)    (DEG K)

 2    270.     7.00     4   5000.00   289.9

AVERAGE CONCENTRATIONS FOR  1 HOURS

* * * R E C E P T O R   N U M B E R * * *
              1.        2.        3.        4.        5.        6.
SOURCE        PARTIAL CONCENTRATIONS (G/CU M)
   1.     2.762E-12 4.001E-10 9.205E-09 7.531E-08 3.289E-07 9.592E-07
           TOTAL CONCENTRATIONS (G/CU M)
          2.762E-12 4.001E-10 9.205E-09 7.531E-08 3.289E-07 9.592E-07

* * * R E C E P T O R   N U M B E R * * *
              7.        8.        9.       10.       11.       12.
SOURCE        PARTIAL CONCENTRATIONS (G/CU M)
   1.     1.797E-06 2.948E-06 4.381E-06 6.040E-06 7.860E-06 9.772E-06
           TOTAL CONCENTRATIONS (G/CU M)
          1.797E-06 2.948E-06 4.381E-06 6.040E-06 7.860E-06 9.772E-06

* * * R E C E P T O R   N U M B E R * * *
             13.       14.       15.       16.
SOURCE        PARTIAL CONCENTRATIONS (G/CU M)
   1.     1.172E-05 1.364E-05 1.551E-05 1.728E-05
           TOTAL CONCENTRATIONS (G/CU M)
          1.172E-05 1.364E-05 1.551E-05 1.728E-05
```

PLANT YATES - SHORT-TERM - CASE 8: UNITS 2-5 AND UNIT 1- SET 2

MAXIMUM 1 HOUR CONCENTRATION

****

RECEPTOR NUMBER	X-COORD. (KMS)	Y-COORD. (KMS)	DOWNWIND DIST.(KMS)	CONCENTRATION (MUGS/M3)
1	.50	.00	.50	.00
2	.60	.00	.60	.00
3	.70	.00	.70	.01
4	.80	.00	.80	.08
5	.90	.00	.90	.33
6	1.00	.00	1.00	.96
7	1.10	.00	1.10	1.80
8	1.20	.00	1.20	2.95

9	1.30	.00	1.30	4.38
10	1.40	.00	1.40	6.04
11	1.50	.00	1.50	7.86
12	1.60	.00	1.60	9.77
13	1.70	.00	1.70	11.72
14	1.80	.00	1.80	13.64
15	1.90	.00	1.90	15.51
16	2.00	.00	2.00	17.28

```
ENTER (1) TO MAKE ANOTHER ENTIRE RUN
ENTER (2) TO CHANGE SOURCE, RECEPTOR, AND MET DATA
ENTER (3) TO CHANGE ONLY RECEPTOR AND MET DATA
ENTER (4) TO CHANGE ONLY MET DATA
ENTER (5) TO END
          4

ENTER (1) TO ENTER 1-HOUR OF MET DATA, ENTER (2) TO ACCESS MET DATA FILE
          1

ENTER MET DATA: THETA(DEG),U(M/SEC),KST,HL(M),T(DEG K)
  270.0000/    10.0000/          4/  5000.0000/    289.9400

ALL PARTIALS:(1); AVER.PTS.:(2); NO PTS.:(3)  ?
          2

ENTER (1) IF YOU WANT METEOROLOGY LISTED; ENTER (2) IF NOT
          1
```

PLANT YATES - SHORT-TERM - CASE B: UNITS 2-5 AND UNIT 1- SET 2

H=HF

* * * S O U R C E S * * *

NO.	Q (G/SEC)	HP (M)	TS (DEG K)	VS (M/SEC)	D (M)	VF (CU M/SEC)	R (KM)	S (KM)
1.	69.40	76.20	338.81	14.00	3.96	172.43	.000	.000

* * * M E T E O R O L O G Y * * *

NO.	THETA (DEG)	U (M/SEC)	KST	HL (M)	T (DEG K)
2	270.	10.00	4	5000.00	289.9

```
ENTER (1) TO MAKE ANOTHER ENTIRE RUN
ENTER (2) TO CHANGE SOURCE, RECEPTOR, AND MET DATA
ENTER (3) TO CHANGE ONLY RECEPTOR AND MET DATA
ENTER (4) TO CHANGE ONLY MET DATA
ENTER (5) TO END
          5
```

137-END

PRINT COMPLETED AT 13:41:51 FOR USER: B1955934 DIST: BLANCHE

END-137

Plant Yates

Particulates

Short-Term

PTMTP Model

Case 1

** VM/SP SERVICE LEVEL 0411 **** CPU SERIAL 000019 CPU MODEL 0580 **

B1955934	B1955934	USERID	ORIGIN
BLANCHE	VMRBHMC1	DISTCODE	SYSTEM
PM15	REPORT	FILENAME	FILETYPE
03/17/89	13:11:56	FILE CREATION DATE	
4103	00000849	SPOOLID	COUNT
03/17/89	13:42:13	FILE PRINT DATE	
R	0500	CLASS	DEVICE
STANDARD		FORMS	

141

AMDAHL
470 V/8
32 Megabytes

Southern Company
Services, Inc.

Information Services
Birmingham

For Assistance,
Call ISC at 7378

VM/SP HPO
Release 4.2

TAG DATA: VMRBHMC1 SYSTEM

B1955934

BLANCHE

```
 ENTER A 66 CHARACTER TITLE
PLANT YATES  - SHORT-TERM - CASE A: UNITS 1-5 ALONE - SET 1

 ENTER NUMBER OF SOURCES, UP TO 10
          1

 ENTER (1) TO ENTER SOURCE INFORMATION FROM FILE.
          0

 ENTER Q(G/S),HP(M),TS(DEG K),VS(M/S),D(M),R(KM)(X-COORD),S(KM)(Y-COORD)
       FOR SOURCE NUMBER  1
    201.40/    251.46/    412.80/     28.10/      7.07/       .00/       .00

 THIRTY:(1); INDIVIDUAL:(2); RANGE&SPACE:(3)  ?
          3

 ENTER X-COORD OF FIRST RECEPTOR IN KM
       .5000

 ENTER X-COORD OF LAST RECEPTOR IN KM
      2.0000

 ENTER SPACING OF RECEPTORS IN KM
       .1000

 ENTER (1) TO ENTER 1-HOUR OF MET DATA, ENTER (2) TO ACCESS MET DATA FILE
          1

 ENTER MET DATA: THETA(DEG),U(M/SEC),KST,HL(M),T(DEG K)
    270.0000/      1.0000/          1/   5000.0000/    289.9400

 ALL PARTIALS:(1); AVER.PTS.:(2); NO PTS.:(3)  ?
          2

 ENTER (1) IF YOU WANT METEOROLOGY LISTED; ENTER (2) IF NOT
          1


  PLANT YATES  - SHORT-TERM - CASE A: UNITS 1-5 ALONE - SET 1

 H=HF


 * * * S O U R C E S * * *
 NO.     Q          HP      TS       VS        D       VF         R        S
      (G/SEC)      (M)   (DEG K) (M/SEC)     (M)  (CU M/SEC)    (KM)     (KM)

  1.   201.40    251.46  412.80   28.10     7.07   1103.15     .000     .000
```

```
 * * * M E T E O R O L O G Y * * *
NO.    THETA      U       KST    HL        T
       (DEG)   (M/SEC)           (M)     (DEG K)

 2      270.     1.00      1   5000.00    289.9

AVERAGE CONCENTRATIONS FOR  1 HOURS

* * * R E C E P T O R   N U M B E R * * *
              1.        2.        3.        4.        5.        6.
SOURCE       PARTIAL CONCENTRATIONS (G/CU M)
  1.      0.000E+00 0.000E+00 2.282E-22 1.967E-14 2.140E-10 3.353E-08
           TOTAL CONCENTRATIONS (G/CU M)
          0.000E+00 0.000E+00 2.282E-22 1.967E-14 2.140E-10 3.353E-08

* * * R E C E P T O R   N U M B E R * * *
              7.        8.        9.       10.       11.       12.
SOURCE       PARTIAL CONCENTRATIONS (G/CU M)
  1.      6.011E-07 3.310E-06 9.264E-06 1.731E-05 2.521E-05 3.133E-05
           TOTAL CONCENTRATIONS (G/CU M)
          6.011E-07 3.310E-06 9.264E-06 1.731E-05 2.521E-05 3.133E-05

* * * R E C E P T O R   N U M B E R * * *
             13.       14.       15.       16.
SOURCE       PARTIAL CONCENTRATIONS (G/CU M)
  1.      3.512E-05 3.678E-05 3.680E-05 3.571E-05
           TOTAL CONCENTRATIONS (G/CU M)
          3.512E-05 3.678E-05 3.680E-05 3.571E-05
```

PLANT YATES - SHORT-TERM - CASE A: UNITS 1-5 ALONE - SET 1

MAXIMUM 1 HOUR CONCENTRATION

****

RECEPTOR NUMBER	X-COORD. (KMS)	Y-COORD. (KMS)	DOWNWIND DIST.(KMS)	CONCENTRATION (MUGS/M3)
1	.50	.00	.50	.00
2	.60	.00	.60	.00
3	.70	.00	.70	.00
4	.80	.00	.80	.00
5	.90	.00	.90	.00
6	1.00	.00	1.00	.03
7	1.10	.00	1.10	.60
8	1.20	.00	1.20	3.31
9	1.30	.00	1.30	9.26

10	1.40	.00	1.40	17.31
11	1.50	.00	1.50	25.21
12	1.60	.00	1.60	31.33
13	1.70	.00	1.70	35.12
14	1.80	.00	1.80	36.78
15	1.90	.00	1.90	36.80
16	2.00	.00	2.00	35.71

```
ENTER (1) TO MAKE ANOTHER ENTIRE RUN
ENTER (2) TO CHANGE SOURCE, RECEPTOR, AND MET DATA
ENTER (3) TO CHANGE ONLY RECEPTOR AND MET DATA
ENTER (4) TO CHANGE ONLY MET DATA
ENTER (5) TO END
          4

ENTER (1) TO ENTER 1-HOUR OF MET DATA, ENTER (2) TO ACCESS MET DATA FILE
          1

ENTER MET DATA: THETA(DEG),U(M/SEC),KST,HL(M),T(DEG K)
   270.0000/      1.5000/           1/   5000.0000/    289.9400

ALL PARTIALS:(1); AVER.PTS.:(2); NO PTS.:(3)  ?
          2

ENTER (1) IF YOU WANT METEOROLOGY LISTED; ENTER (2) IF NOT
          1
```

PLANT YATES - SHORT-TERM - CASE A: UNITS 1-5 ALONE - SET 1

H=HF

* * * S O U R C E S * * *

NO.	Q (G/SEC)	HP (M)	TS (DEG K)	VS (M/SEC)	D (M)	VF (CU M/SEC)	R (KM)	S (KM)
1.	201.40	251.46	412.80	28.10	7.07	1103.15	.000	.000

* * * M E T E O R O L O G Y * * *

NO.	THETA (DEG)	U (M/SEC)	KST	HL (M)	T (DEG K)
2	270.	1.50	1	5000.00	289.9

AVERAGE CONCENTRATIONS FOR 1 HOURS

```
* * * R E C E P T O R   N U M B E R * * *
             1.        2.        3.        4.        5.        6.
SOURCE     PARTIAL CONCENTRATIONS (G/CU M)
   1.     0.000E+00 1.091E-21 3.348E-13 2.669E-09 2.391E-07 2.591E-06
           TOTAL CONCENTRATIONS (G/CU M)
          0.000E+00 1.091E-21 3.348E-13 2.669E-09 2.391E-07 2.591E-06

* * * R E C E P T O R   N U M B E R * * *
             7.        8.        9.       10.       11.       12.
SOURCE     PARTIAL CONCENTRATIONS (G/CU M)
   1.     9.588E-06 1.985E-05 2.955E-05 3.623E-05 3.949E-05 4.001E-05
           TOTAL CONCENTRATIONS (G/CU M)
          9.588E-06 1.985E-05 2.955E-05 3.623E-05 3.949E-05 4.001E-05

* * * R E C E P T O R   N U M B E R * * *
            13.       14.       15.       16.
SOURCE     PARTIAL CONCENTRATIONS (G/CU M)
   1.     3.871E-05 3.639E-05 3.359E-05 3.065E-05
           TOTAL CONCENTRATIONS (G/CU M)
          3.871E-05 3.639E-05 3.359E-05 3.065E-05
```

PLANT YATES - SHORT-TERM - CASE A: UNITS 1-5 ALONE - SET 1

MAXIMUM 1 HOUR CONCENTRATION

****

RECEPTOR NUMBER	X-COORD. (KMS)	Y-COORD. (KMS)	DOWNWIND DIST.(KMS)	CONCENTRATION (MUGS/M3)
1	.50	.00	.50	.00
2	.60	.00	.60	.00
3	.70	.00	.70	.00
4	.80	.00	.80	.00
5	.90	.00	.90	.24
6	1.00	.00	1.00	2.59
7	1.10	.00	1.10	9.59
8	1.20	.00	1.20	19.85
9	1.30	.00	1.30	29.55
10	1.40	.00	1.40	36.23
11	1.50	.00	1.50	39.49
12	1.60	.00	1.60	40.01
13	1.70	.00	1.70	38.71
14	1.80	.00	1.80	36.39
15	1.90	.00	1.90	33.59
16	2.00	.00	2.00	30.65

```
ENTER (1) TO MAKE ANOTHER ENTIRE RUN
ENTER (2) TO CHANGE SOURCE, RECEPTOR, AND MET DATA
ENTER (3) TO CHANGE ONLY RECEPTOR AND MET DATA
ENTER (4) TO CHANGE ONLY MET DATA
ENTER (5) TO END
         4

ENTER (1) TO ENTER 1-HOUR OF MET DATA, ENTER (2) TO ACCESS MET DATA FILE
         1

ENTER MET DATA: THETA(DEG),U(M/SEC),KST,HL(M),T(DEG K)
   270.0000/      2.0000/           1/   5000.0000/    289.9400

ALL PARTIALS:(1); AVER.PTS.:(2); NO PTS.:(3)  ?
         2

ENTER (1) IF YOU WANT METEOROLOGY LISTED; ENTER (2) IF NOT
         1


 PLANT YATES  - SHORT-TERM - CASE A: UNITS 1-5 ALONE - SET 1

H=HF


* * * S O U R C E S * * *
NO.     Q          HP      TS      VS        D       VF        R        S
     (G/SEC)      (M)    (DEG K) (M/SEC)    (M)  (CU M/SEC)  (KM)     (KM)

 1.   201.40   251.46  412.80   28.10     7.07   1103.15    .000     .000

* * * M E T E O R O L O G Y * * *
NO.   THETA      U       KST     HL          T
      (DEG)   (M/SEC)            (M)      (DEG K)

 2      270.     2.00      1   5000.00     289.9

AVERAGE CONCENTRATIONS FOR  1 HOURS

* * * R E C E P T O R   N U M B E R * * *
              1.        2.        3.        4.         5.        6.
SOURCE        PARTIAL CONCENTRATIONS (G/CU M)
  1.      0.000E+00 3.907E-15 7.543E-10 1.894E-07 2.843E-06 1.140E-05
           TOTAL CONCENTRATIONS (G/CU M)
          0.000E+00 3.907E-15 7.543E-10 1.894E-07 2.843E-06 1.140E-05

* * * R E C E P T O R   N U M B E R * * *
```

```
              7.         8.         9.        10.        11.        12.
SOURCE       PARTIAL CONCENTRATIONS (G/CU M)
   1.      2.344E-05 3.372E-05 3.969E-05 4.160E-05 4.070E-05 3.822E-05
            TOTAL CONCENTRATIONS (G/CU M)
           2.344E-05 3.372E-05 3.969E-05 4.160E-05 4.070E-05 3.822E-05

* * * R E C E P T O R   N U M B E R * * *
             13.       14.        15.       16.
SOURCE       PARTIAL CONCENTRATIONS (G/CU M)
   1.      3.501E-05 3.161E-05 2.831E-05 2.525E-05
            TOTAL CONCENTRATIONS (G/CU M)
           3.501E-05 3.161E-05 2.831E-05 2.525E-05
```

PLANT YATES - SHORT-TERM - CASE A: UNITS 1-5 ALONE - SET 1

MAXIMUM 1 HOUR CONCENTRATION

****

RECEPTOR NUMBER	X-COORD. (KMS)	Y-COORD. (KMS)	DOWNWIND DIST.(KMS)	CONCENTRATION (MUGS/M3)
1	.50	.00	.50	.00
2	.60	.00	.60	.00
3	.70	.00	.70	.00
4	.80	.00	.80	.19
5	.90	.00	.90	2.84
6	1.00	.00	1.00	11.40
7	1.10	.00	1.10	23.44
8	1.20	.00	1.20	33.72
9	1.30	.00	1.30	39.69
10	1.40	.00	1.40	41.60
11	1.50	.00	1.50	40.70
12	1.60	.00	1.60	38.22
13	1.70	.00	1.70	35.01
14	1.80	.00	1.80	31.61
15	1.90	.00	1.90	28.31
16	2.00	.00	2.00	25.25

```
ENTER (1) TO MAKE ANOTHER ENTIRE RUN
ENTER (2) TO CHANGE SOURCE, RECEPTOR, AND MET DATA
ENTER (3) TO CHANGE ONLY RECEPTOR AND MET DATA
ENTER (4) TO CHANGE ONLY MET DATA
ENTER (5) TO END
          4

ENTER (1) TO ENTER 1-HOUR OF MET DATA, ENTER (2) TO ACCESS MET DATA FILE
```

```
           1

 ENTER MET DATA: THETA(DEG),U(M/SEC),KST,HL(M),T(DEG K)
    270.0000/      2.5000/          1/   5000.0000/    289.9400

 ALL PARTIALS:(1); AVER.PTS.:(2); NO PTS.:(3)  ?
           2

 ENTER (1) IF YOU WANT METEOROLOGY LISTED; ENTER (2) IF NOT
           1


  PLANT YATES  - SHORT-TERM - CASE A: UNITS 1-5 ALONE - SET 1

 H=HF


 * * * S O U R C E S * * *
 NO.     Q         HP      TS      VS       D       VF        R        S
      (G/SEC)     (M)   (DEG K) (M/SEC)    (M)  (CU M/SEC)  (KM)     (KM)


  1.   201.40   251.46  412.80   28.10    7.07   1103.15    .000     .000

 * * * M E T E O R O L O G Y * * *
NO.     THETA      U      KST     HL         T
        (DEG)   (M/SEC)          (M)      (DEG K)


  2      270.     2.50     1   5000.00    289.9

 AVERAGE CONCENTRATIONS FOR  1 HOURS

 * * * R E C E P T O R  N U M B E R * * *
                1.         2.         3.         4.         5.         6.
 SOURCE       PARTIAL CONCENTRATIONS (G/CU M)
    1.      3.122E-21 5.872E-12 3.058E-08 1.410E-06 8.816E-06 2.171E-05
             TOTAL CONCENTRATIONS (G/CU M)
            3.122E-21 5.872E-12 3.058E-08 1.410E-06 8.816E-06 2.171E-05

 * * * R E C E P T O R  N U M B E R * * *
                7.         8.         9.        10.        11.        12.
 SOURCE       PARTIAL CONCENTRATIONS (G/CU M)
    1.      3.348E-05 4.027E-05 4.225E-05 4.100E-05 3.805E-05 3.442E-05
             TOTAL CONCENTRATIONS (G/CU M)
            3.348E-05 4.027E-05 4.225E-05 4.100E-05 3.805E-05 3.442E-05

 * * * R E C E P T O R  N U M B E R * * *
               13.        14.        15.        16.
 SOURCE       PARTIAL CONCENTRATIONS (G/CU M)
```

```
1.      3.070E-05 2.718E-05 2.399E-05 2.116E-05
         TOTAL CONCENTRATIONS (G/CU M)
        3.070E-05 2.718E-05 2.399E-05 2.116E-05
```

PLANT YATES - SHORT-TERM - CASE A: UNITS 1-5 ALONE - SET 1

MAXIMUM 1 HOUR CONCENTRATION

****

RECEPTOR NUMBER	X-COORD. (KMS)	Y-COORD. (KMS)	DOWNWIND DIST.(KMS)	CONCENTRATION (MUGS/M3)
1	.50	.00	.50	.00
2	.60	.00	.60	.00
3	.70	.00	.70	.03
4	.80	.00	.80	1.41
5	.90	.00	.90	8.82
6	1.00	.00	1.00	21.71
7	1.10	.00	1.10	33.48
8	1.20	.00	1.20	40.27
9	1.30	.00	1.30	42.25
10	1.40	.00	1.40	41.00
11	1.50	.00	1.50	38.05
12	1.60	.00	1.60	34.42
13	1.70	.00	1.70	30.70
14	1.80	.00	1.80	27.18
15	1.90	.00	1.90	23.99
16	2.00	.00	2.00	21.16

```
ENTER (1) TO MAKE ANOTHER ENTIRE RUN
ENTER (2) TO CHANGE SOURCE, RECEPTOR, AND MET DATA
ENTER (3) TO CHANGE ONLY RECEPTOR AND MET DATA
ENTER (4) TO CHANGE ONLY MET DATA
ENTER (5) TO END
          4

ENTER (1) TO ENTER 1-HOUR OF MET DATA, ENTER (2) TO ACCESS MET DATA FILE
          1

ENTER MET DATA: THETA(DEG),U(M/SEC),KST,HL(M),T(DEG K)
   270.0000/      3.0000/          1/   5000.0000/    289.9400

ALL PARTIALS:(1); AVER.PTS.:(2); NO PTS.:(3)  ?
          2

ENTER (1) IF YOU WANT METEOROLOGY LISTED; ENTER (2) IF NOT
```

```
          1


 PLANT YATES   - SHORT-TERM - CASE A: UNITS 1-5 ALONE - SET 1

H=HF


* * * S O U R C E S * * *
NO.     Q         HP     TS      VS       D      VF        R       S
     (G/SEC)     (M)   (DEG K) (M/SEC)   (M)  (CU M/SEC)  (KM)    (KM)


 1.   201.40   251.46  412.80   28.10    7.07   1103.15   .000    .000

* * * M E T E O R O L O G Y * * *
NO.    THETA      U      KST    HL        T
       (DEG)   (M/SEC)          (M)    (DEG K)


 2      270.     3.00      1   5000.00   289.9

AVERAGE CONCENTRATIONS FOR  1 HOURS

* * * R E C E P T O R   N U M B E R * * *
               1.        2.        3.        4.        5.        6.
SOURCE      PARTIAL CONCENTRATIONS (G/CU M)
   1.     2.996E-17 3.686E-10 2.419E-07 4.220E-06 1.597E-05 2.974E-05
           TOTAL CONCENTRATIONS (G/CU M)
          2.996E-17 3.686E-10 2.419E-07 4.220E-06 1.597E-05 2.974E-05

* * * R E C E P T O R   N U M B E R * * *
               7.        8.        9.       10.       11.       12.
SOURCE      PARTIAL CONCENTRATIONS (G/CU M)
   1.     3.889E-05 4.223E-05 4.147E-05 3.851E-05 3.467E-05 3.070E-05
           TOTAL CONCENTRATIONS (G/CU M)
          3.889E-05 4.223E-05 4.147E-05 3.851E-05 3.467E-05 3.070E-05

* * * R E C E P T O R   N U M B E R * * *
              13.       14.       15.       16.
SOURCE      PARTIAL CONCENTRATIONS (G/CU M)
   1.     2.697E-05 2.360E-05 2.066E-05 1.810E-05
           TOTAL CONCENTRATIONS (G/CU M)
          2.697E-05 2.360E-05 2.066E-05 1.810E-05
```

MAXIMUM 1 HOUR CONCENTRATION

****

RECEPTOR NUMBER	X-COORD. (KMS)	Y-COORD. (KMS)	DOWNWIND DIST.(KMS)	CONCENTRATION (MUGS/M3)
1	.50	.00	.50	.00
2	.60	.00	.60	.00
3	.70	.00	.70	.24
4	.80	.00	.80	4.22
5	.90	.00	.90	15.97
6	1.00	.00	1.00	29.74
7	1.10	.00	1.10	38.89
8	1.20	.00	1.20	42.23
9	1.30	.00	1.30	41.47
10	1.40	.00	1.40	38.51
11	1.50	.00	1.50	34.67
12	1.60	.00	1.60	30.70
13	1.70	.00	1.70	26.97
14	1.80	.00	1.80	23.60
15	1.90	.00	1.90	20.66
16	2.00	.00	2.00	18.10

```
ENTER (1) TO MAKE ANOTHER ENTIRE RUN
ENTER (2) TO CHANGE SOURCE, RECEPTOR, AND MET DATA
ENTER (3) TO CHANGE ONLY RECEPTOR AND MET DATA
ENTER (4) TO CHANGE ONLY MET DATA
ENTER (5) TO END
          4

ENTER (1) TO ENTER 1-HOUR OF MET DATA, ENTER (2) TO ACCESS MET DATA FILE
          1

ENTER MET DATA: THETA(DEG),U(M/SEC),KST,HL(M),T(DEG K)
   270.0000/     5.0000/          4/   5000.0000/    289.9400

ALL PARTIALS:(1); AVER.PTS.:(2); NO PTS.:(3)  ?
          2

ENTER (1) IF YOU WANT METEOROLOGY LISTED; ENTER (2) IF NOT
          1
```

PLANT YATES - SHORT-TERM - CASE A: UNITS 1-5 ALONE - SET 1

H=HF

```
 * * * S O U R C E S * * *
NO.      Q          HP       TS       VS        D      VF        R        S
      (G/SEC)      (M)    (DEG K)  (M/SEC)    (M)  (CU M/SEC)  (KM)     (KM)

 1.   201.40     251.46   412.80    28.10     7.07   1103.15    .000     .000

 * * * M E T E O R O L O G Y * * *
NO.   THETA      U       KST     HL          T
      (DEG)   (M/SEC)            (M)      (DEG K)

 2     270.     5.00      4    5000.00     289.9

 AVERAGE CONCENTRATIONS FOR  1 HOURS

 * * * R E C E P T O R   N U M B E R * * *
                 1.        2.        3.        4.        5.        6.
 SOURCE      PARTIAL CONCENTRATIONS (G/CU M)
    1.      0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
             TOTAL CONCENTRATIONS (G/CU M)
            0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00

 * * * R E C E P T O R   N U M B E R * * *
                 7.        8.        9.       10.       11.       12.
 SOURCE      PARTIAL CONCENTRATIONS (G/CU M)
    1.      0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
             TOTAL CONCENTRATIONS (G/CU M)
            0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00

 * * * R E C E P T O R   N U M B E R * * *
                13.       14.       15.       16.
 SOURCE      PARTIAL CONCENTRATIONS (G/CU M)
    1.      0.000E+00 4.035E-24 8.714E-23 1.321E-21
             TOTAL CONCENTRATIONS (G/CU M)
            0.000E+00 4.035E-24 8.714E-23 1.321E-21


  PLANT YATES  - SHORT-TERM - CASE A: UNITS 1-5 ALONE - SET 1

               MAXIMUM  1 HOUR  CONCENTRATION

            *****************************************

 RECEPTOR     X-COORD.   Y-COORD.   DOWNWIND     CONCENTRATION
 NUMBER        (KMS)      (KMS)    DIST.(KMS)      (MUGS/M3)
```

1	.50	.00	.50	.00
2	.60	.00	.60	.00
3	.70	.00	.70	.00
4	.80	.00	.80	.00
5	.90	.00	.90	.00
6	1.00	.00	1.00	.00
7	1.10	.00	1.10	.00
8	1.20	.00	1.20	.00
9	1.30	.00	1.30	.00
10	1.40	.00	1.40	.00
11	1.50	.00	1.50	.00
12	1.60	.00	1.60	.00
13	1.70	.00	1.70	.00
14	1.80	.00	1.80	.00
15	1.90	.00	1.90	.00
16	2.00	.00	2.00	.00

```
ENTER (1) TO MAKE ANOTHER ENTIRE RUN
ENTER (2) TO CHANGE SOURCE, RECEPTOR, AND MET DATA
ENTER (3) TO CHANGE ONLY RECEPTOR AND MET DATA
ENTER (4) TO CHANGE ONLY MET DATA
ENTER (5) TO END
          4

ENTER (1) TO ENTER 1-HOUR OF MET DATA, ENTER (2) TO ACCESS MET DATA FILE
          1

ENTER MET DATA: THETA(DEG),U(M/SEC),KST,HL(M),T(DEG K)
   270.0000/     7.0000/          4/   5000.0000/    289.9400

ALL PARTIALS:(1); AVER.PTS.:(2); NO PTS.:(3)  ?
          2

ENTER (1) IF YOU WANT METEOROLOGY LISTED; ENTER (2) IF NOT
          1
```

PLANT YATES - SHORT-TERM - CASE A: UNITS 1-5 ALONE - SET 1

H=HF

* * * S O U R C E S * * *

NO.	Q (G/SEC)	HP (M)	TS (DEG K)	VS (M/SEC)	D (M)	VF (CU M/SEC)	R (KM)	S (KM)
1.	201.40	251.46	412.80	28.10	7.07	1103.15	.000	.000

```
 * * * M E T E O R O L O G Y * * *
NO.    THETA      U      KST    HL        T
       (DEG)   (M/SEC)          (M)    (DEG K)

 2      270.     7.00     4   5000.00   289.9

 AVERAGE CONCENTRATIONS FOR  1 HOURS

 * * * R E C E P T O R   N U M B E R * * *
            1.         2.         3.         4.         5.         6.
 SOURCE      PARTIAL CONCENTRATIONS (G/CU M)
    1.     0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
            TOTAL CONCENTRATIONS (G/CU M)
           0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00

 * * * R E C E P T O R   N U M B E R * * *
            7.         8.         9.        10.        11.        12.
 SOURCE      PARTIAL CONCENTRATIONS (G/CU M)
    1.     0.000E+00 0.000E+00 0.000E+00 3.647E-25 2.182E-23 7.252E-22
            TOTAL CONCENTRATIONS (G/CU M)
           0.000E+00 0.000E+00 0.000E+00 3.647E-25 2.182E-23 7.252E-22

 * * * R E C E P T O R   N U M B E R * * *
           13.        14.        15.        16.
 SOURCE      PARTIAL CONCENTRATIONS (G/CU M)
    1.     1.499E-20 2.102E-19 2.137E-18 1.661E-17
            TOTAL CONCENTRATIONS (G/CU M)
           1.499E-20 2.102E-19 2.137E-18 1.661E-17
```

PLANT YATES - SHORT-TERM - CASE A: UNITS 1-5 ALONE - SET 1

MAXIMUM 1 HOUR CONCENTRATION

****

RECEPTOR NUMBER	X-COORD. (KMS)	Y-COORD. (KMS)	DOWNWIND DIST.(KMS)	CONCENTRATION (MUGS/M3)
1	.50	.00	.50	.00
2	.60	.00	.60	.00
3	.70	.00	.70	.00
4	.80	.00	.80	.00
5	.90	.00	.90	.00
6	1.00	.00	1.00	.00
7	1.10	.00	1.10	.00
8	1.20	.00	1.20	.00

9	1.30	.00	1.30	.00
10	1.40	.00	1.40	.00
11	1.50	.00	1.50	.00
12	1.60	.00	1.60	.00
13	1.70	.00	1.70	.00
14	1.80	.00	1.80	.00
15	1.90	.00	1.90	.00
16	2.00	.00	2.00	.00

```
ENTER (1) TO MAKE ANOTHER ENTIRE RUN
ENTER (2) TO CHANGE SOURCE, RECEPTOR, AND MET DATA
ENTER (3) TO CHANGE ONLY RECEPTOR AND MET DATA
ENTER (4) TO CHANGE ONLY MET DATA
ENTER (5) TO END
          4

ENTER (1) TO ENTER 1-HOUR OF MET DATA, ENTER (2) TO ACCESS MET DATA FILE
          1

ENTER MET DATA: THETA(DEG),U(M/SEC),KST,HL(M),T(DEG K)
   270.0000/     10.0000/          4/   5000.0000/    289.9400

ALL PARTIALS:(1); AVER.PTS.:(2); NO PTS.:(3)  ?
          2

ENTER (1) IF YOU WANT METEOROLOGY LISTED; ENTER (2) IF NOT
          1
```

PLANT YATES - SHORT-TERM - CASE A: UNITS 1-5 ALONE - SET 1

H=HF

* * * S O U R C E S * * *

NO.	Q (G/SEC)	HP (M)	TS (DEG K)	VS (M/SEC)	D (M)	VF (CU M/SEC)	R (KM)	S (KM)
1.	201.40	251.46	412.80	28.10	7.07	1103.15	.000	.000

* * * M E T E O R O L O G Y * * *

NO.	THETA (DEG)	U (M/SEC)	KST	HL (M)	T (DEG K)
2	270.	10.00	4	5000.00	288.9

```
AVERAGE CONCENTRATIONS FOR  1 HOURS

* * * R E C E P T O R   N U M B E R * * *
             1.        2.        3.        4.        5.        6.
SOURCE        PARTIAL CONCENTRATIONS (G/CU M)
   1.      0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
             TOTAL CONCENTRATIONS (G/CU M)
           0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00

* * * R E C E P T O R   N U M B E R * * *
             7.        8.        9.       10.       11.       12.
SOURCE        PARTIAL CONCENTRATIONS (G/CU M)
   1.      0.000E+00 1.649E-24 1.566E-22 7.045E-21 1.767E-19 2.784E-18
             TOTAL CONCENTRATIONS (G/CU M)
           0.000E+00 1.649E-24 1.566E-22 7.045E-21 1.767E-19 2.784E-18

* * * R E C E P T O R   N U M B E R * * *
            13.       14.       15.       16.
SOURCE        PARTIAL CONCENTRATIONS (G/CU M)
   1.      3.014E-17 2.402E-16 1.485E-15 7.424E-15
             TOTAL CONCENTRATIONS (G/CU M)
           3.014E-17 2.402E-16 1.485E-15 7.424E-15
```

PLANT YATES - SHORT-TERM - CASE A: UNITS 1-5 ALONE - SET 1

MAXIMUM 1 HOUR CONCENTRATION

****

RECEPTOR NUMBER	X-COORD. (KMS)	Y-COORD. (KMS)	DOWNWIND DIST.(KMS)	CONCENTRATION (MUGS/M3)
1	.50	.00	.50	.00
2	.60	.00	.60	.00
3	.70	.00	.70	.00
4	.80	.00	.80	.00
5	.90	.00	.90	.00
6	1.00	.00	1.00	.00
7	1.10	.00	1.10	.00
8	1.20	.00	1.20	.00
9	1.30	.00	1.30	.00
10	1.40	.00	1.40	.00
11	1.50	.00	1.50	.00
12	1.60	.00	1.60	.00
13	1.70	.00	1.70	.00
14	1.80	.00	1.80	.00
15	1.90	.00	1.90	.00
16	2.00	.00	2.00	.00

```
ENTER (1) TO MAKE ANOTHER ENTIRE RUN
ENTER (2) TO CHANGE SOURCE, RECEPTOR, AND MET DATA
ENTER (3) TO CHANGE ONLY RECEPTOR AND MET DATA
ENTER (4) TO CHANGE ONLY MET DATA
ENTER (5) TO END
          5
```

141-END

PRINT COMPLETED AT 13:42:19 FOR USER: B1955934 DIST: BLANCHE

END-141

Plant Yates

Paticulates

Short-Term

PTMTP Model

Case 2

** VM/SP SERVICE LEVEL 0411 **** CPU SERIAL 000019 CPU MODEL 0580 **

B1955934	B1955934	USERID	ORIGIN
BLANCHE	VMRBHMC1	DISTCODE	SYSTEM
PM251	REPORT	FILENAME	FILETYPE
03/17/89	13:11:55	FILE CREATION DATE	
4102	00000885	SPOOLID	COUNT
03/17/89	13:42:05	FILE PRINT DATE	
R	0500	CLASS	DEVICE
STANDARD		FORMS	

140

AMDAHL
470 V/8
32 Megabytes

Southern Company
Services, Inc.

Information Services
Birmingham

For Assistance,
Call ISC at 7378

VM/SP HPO
Release 4.2

TAG DATA: VMRBHMC1 SYSTEM

B1955934

BLANCHE

```
 ENTER A 66 CHARACTER TITLE
PLANT YATES - SHORT-TERM - CASE B: UNITS 2-5 AND UNIT 1 - SET 1

 ENTER NUMBER OF SOURCES, UP TO 10
          2

 ENTER (1) TO ENTER SOURCE INFORMATION FROM FILE.
          0

 ENTER Q(G/S),HP(M),TS(DEG K),VS(M/S),D(M),R(KM)(X-COORD),S(KM)(Y-COORD)
       FOR SOURCE NUMBER  1
   164.80/    251.46/    412.80/     28.10/      7.07/       .00/       .00

 ENTER Q(G/S),HP(M),TS(DEG K),VS(M/S),D(M),R(KM)(X-COORD),S(KM)(Y-COORD)
       FOR SOURCE NUMBER  2
     4.60/     76.20/    338.81/     14.00/      3.96/       .00/       .00

 THIRTY:(1); INDIVIDUAL:(2); RANGE&SPACE:(3)  ?
          3

 ENTER X-COORD OF FIRST RECEPTOR IN KM
       .5000

 ENTER X-COORD OF LAST RECEPTOR IN KM
      2.0000

 ENTER SPACING OF RECEPTORS IN KM
       .1000

 ENTER (1) TO ENTER 1-HOUR OF MET DATA, ENTER (2) TO ACCESS MET DATA FILE
          1

 ENTER MET DATA: THETA(DEG),U(M/SEC),KST,HL(M),T(DEG K)
   270.0000/      1.0000/           1/   5000.0000/    289.9400

 ALL PARTIALS:(1); AVER.PTS.:(2); NO PTS.:(3)  ?
          2

 ENTER (1) IF YOU WANT METEOROLOGY LISTED; ENTER (2) IF NOT
          1



  PLANT YATES - SHORT-TERM - CASE B: UNITS 2-5 AND UNIT 1 - SET 1

 H=HF


 * * * S O U R C E S * * *
 NO.     Q          HP       TS       VS       D       VF        R       S
      (G/SEC)      (M)    (DEG K)  (M/SEC)    (M)  (CU M/SEC)  (KM)    (KM)
```

1.	164.80	251.46	412.80	28.10	7.07	1103.15	.000	.000
2.	4.60	76.20	338.81	14.00	3.96	172.43	.000	.000

* * * M E T E O R O L O G Y * * *

NO.	THETA (DEG)	U (M/SEC)	KST	HL (M)	T (DEG K)
2	270.	1.00	1	5000.00	289.9

AVERAGE CONCENTRATIONS FOR 1 HOURS

* * * R E C E P T O R N U M B E R * * *

SOURCE	1.	2.	3.	4.	5.	6.
PARTIAL CONCENTRATIONS (G/CU M)						
1.	0.000E+00	0.000E+00	1.867E-22	1.610E-14	1.751E-10	2.744E-08
2.	1.596E-09	3.461E-07	2.503E-06	5.268E-06	6.686E-06	6.776E-06
TOTAL CONCENTRATIONS (G/CU M)						
	1.596E-09	3.461E-07	2.503E-06	5.268E-06	6.686E-06	6.804E-06

* * * R E C E P T O R N U M B E R * * *

SOURCE	7.	8.	9.	10.	11.	12.
PARTIAL CONCENTRATIONS (G/CU M)						
1.	4.919E-07	2.708E-06	7.581E-06	1.417E-05	2.063E-05	2.564E-05
2.	6.186E-06	5.377E-06	4.573E-06	3.858E-06	3.252E-06	2.749E-06
TOTAL CONCENTRATIONS (G/CU M)						
	6.678E-06	8.085E-06	1.215E-05	1.803E-05	2.388E-05	2.838E-05

* * * R E C E P T O R N U M B E R * * *

SOURCE	13.	14.	15.	16.
PARTIAL CONCENTRATIONS (G/CU M)				
1.	2.874E-05	3.010E-05	3.012E-05	2.922E-05
2.	2.335E-06	1.994E-06	1.713E-06	1.481E-06
TOTAL CONCENTRATIONS (G/CU M)				
	3.107E-05	3.209E-05	3.183E-05	3.070E-05

PLANT YATES - SHORT-TERM - CASE B: UNITS 2-5 AND UNIT 1 - SET 1

MAXIMUM 1 HOUR CONCENTRATION

****

RECEPTOR NUMBER	X-COORD. (KMS)	Y-COORD. (KMS)	DOWNWIND DIST.(KMS)	CONCENTRATION (MUGS/M3)
1	.50	.00	.50	.00

2	.60	.00	.60	.35
3	.70	.00	.70	2.50
4	.80	.00	.80	5.27
5	.90	.00	.90	6.69
6	1.00	.00	1.00	6.80
7	1.10	.00	1.10	6.68
8	1.20	.00	1.20	8.08
9	1.30	.00	1.30	12.15
10	1.40	.00	1.40	18.03
11	1.50	.00	1.50	23.88
12	1.60	.00	1.60	28.38
13	1.70	.00	1.70	31.07
14	1.80	.00	1.80	32.09
15	1.90	.00	1.90	31.83
16	2.00	.00	2.00	30.70

```
ENTER (1) TO MAKE ANOTHER ENTIRE RUN
ENTER (2) TO CHANGE SOURCE, RECEPTOR, AND MET DATA
ENTER (3) TO CHANGE ONLY RECEPTOR AND MET DATA
ENTER (4) TO CHANGE ONLY MET DATA
ENTER (5) TO END
          4

ENTER (1) TO ENTER 1-HOUR OF MET DATA, ENTER (2) TO ACCESS MET DATA FILE
          1

ENTER MET DATA: THETA(DEG),U(M/SEC),KST,HL(M),T(DEG K)
   270.0000/     1.5000/        1/   5000.0000/    289.9400

ALL PARTIALS:(1); AVER.PTS.:(2); NO PTS.:(3)  ?
          2

ENTER (1) IF YOU WANT METEOROLOGY LISTED; ENTER (2) IF NOT
          1
```

PLANT YATES - SHORT-TERM - CASE B: UNITS 2-5 AND UNIT 1 - SET 1

H=HF

* * * S O U R C E S * * *

NO.	Q (G/SEC)	HP (M)	TS (DEG K)	VS (M/SEC)	D (M)	VF (CU M/SEC)	R (KM)	S (KM)
1.	164.80	251.46	412.80	28.10	7.07	1103.15	.000	.000
2.	4.60	76.20	338.81	14.00	3.96	172.43	.000	.000

```
 * * * M E T E O R O L O G Y * * *
NO.    THETA      U      KST    HL        T
       (DEG)   (M/SEC)          (M)    (DEG K)

 2      270.     1.50     1   5000.00   289.9

 AVERAGE CONCENTRATIONS FOR  1 HOURS

 * * * R E C E P T O R   N U M B E R * * *
                1.        2.        3.        4.        5.        6.
 SOURCE       PARTIAL CONCENTRATIONS (G/CU M)
    1.      0.000E+00 8.930E-22 2.739E-13 2.184E-09 1.956E-07 2.120E-06
    2.      2.203E-07 2.714E-06 6.021E-06 7.283E-06 6.942E-06 5.999E-06
             TOTAL CONCENTRATIONS (G/CU M)
            2.203E-07 2.714E-06 6.021E-06 7.285E-06 7.137E-06 8.119E-06

 * * * R E C E P T O R   N U M B E R * * *
                7.        8.        9.        10.       11.       12.
 SOURCE       PARTIAL CONCENTRATIONS (G/CU M)
    1.      7.845E-06 1.624E-05 2.418E-05 2.965E-05 3.231E-05 3.274E-05
    2.      4.984E-06 4.086E-06 3.347E-06 2.753E-06 2.281E-06 1.905E-06
             TOTAL CONCENTRATIONS (G/CU M)
            1.283E-05 2.033E-05 2.753E-05 3.240E-05 3.459E-05 3.464E-05

 * * * R E C E P T O R   N U M B E R * * *
               13.       14.       15.       16.
 SOURCE       PARTIAL CONCENTRATIONS (G/CU M)
    1.      3.168E-05 2.978E-05 2.748E-05 2.508E-05
    2.      1.604E-06 1.361E-06 1.164E-06 1.002E-06
             TOTAL CONCENTRATIONS (G/CU M)
            3.328E-05 3.114E-05 2.865E-05 2.608E-05
```

PLANT YATES - SHORT-TERM - CASE B: UNITS 2-5 AND UNIT 1 - SET 1

MAXIMUM 1 HOUR CONCENTRATION

****

RECEPTOR NUMBER	X-COORD. (KMS)	Y-COORD. (KMS)	DOWNWIND DIST.(KMS)	CONCENTRATION (MUGS/M3)
1	.50	.00	.50	.22
2	.60	.00	.60	2.71
3	.70	.00	.70	6.02
4	.80	.00	.80	7.29
5	.90	.00	.90	7.14
6	1.00	.00	1.00	8.12

7	1.10	.00	1.10	12.83
8	1.20	.00	1.20	20.33
9	1.30	.00	1.30	27.53
10	1.40	.00	1.40	32.40
11	1.50	.00	1.50	34.59
12	1.60	.00	1.60	34.64
13	1.70	.00	1.70	33.28
14	1.80	.00	1.80	31.14
15	1.90	.00	1.90	28.65
16	2.00	.00	2.00	26.08

```
ENTER (1) TO MAKE ANOTHER ENTIRE RUN
ENTER (2) TO CHANGE SOURCE, RECEPTOR, AND MET DATA
ENTER (3) TO CHANGE ONLY RECEPTOR AND MET DATA
ENTER (4) TO CHANGE ONLY MET DATA
ENTER (5) TO END
          4

ENTER (1) TO ENTER 1-HOUR OF MET DATA, ENTER (2) TO ACCESS MET DATA FILE
          1

ENTER MET DATA: THETA(DEG),U(M/SEC),KST,HL(M),T(DEG K)
   270.0000/      2.0000/          1/   5000.0000/    289.9400

ALL PARTIALS:(1); AVER.PTS.:(2); NO PTS.:(3)  ?
          2

ENTER (1) IF YOU WANT METEOROLOGY LISTED; ENTER (2) IF NOT
          1
```

PLANT YATES - SHORT-TERM - CASE B: UNITS 2-5 AND UNIT 1 - SET 1

H=HF

* * * S O U R C E S * * *

NO.	Q (G/SEC)	HP (M)	TS (DEG K)	VS (M/SEC)	D (M)	VF (CU M/SEC)	R (KM)	S (KM)
1.	164.80	251.46	412.80	28.10	7.07	1103.15	.000	.000
2.	4.60	76.20	338.81	14.00	3.96	172.43	.000	.000

* * * M E T E O R O L O G Y * * *

NO.	THETA (DEG)	U (M/SEC)	KST	HL (M)	T (DEG K)

2 270. 2.00 1 5000.00 289.9

AVERAGE CONCENTRATIONS FOR 1 HOURS

* * * R E C E P T O R N U M B E R * * *

SOURCE	1.	2.	3.	4.	5.	6.
	PARTIAL CONCENTRATIONS (G/CU M)					
1.	0.000E+00	3.197E-15	8.173E-10	1.550E-07	2.327E-06	9.328E-06
2.	1.235E-06	5.156E-06	7.327E-06	7.191E-06	6.153E-06	5.007E-06
	TOTAL CONCENTRATIONS (G/CU M)					
	1.235E-06	5.156E-06	7.328E-06	7.346E-06	8.479E-06	1.433E-05

* * * R E C E P T O R N U M B E R * * *

SOURCE	7.	8.	9.	10.	11.	12.
	PARTIAL CONCENTRATIONS (G/CU M)					
1.	1.918E-05	2.759E-05	3.247E-05	3.404E-05	3.330E-05	3.127E-05
2.	4.015E-06	3.220E-06	2.600E-06	2.119E-06	1.744E-06	1.450E-06
	TOTAL CONCENTRATIONS (G/CU M)					
	2.320E-05	3.081E-05	3.508E-05	3.616E-05	3.505E-05	3.272E-05

* * * R E C E P T O R N U M B E R * * *

SOURCE	13.	14.	15.	16.
	PARTIAL CONCENTRATIONS (G/CU M)			
1.	2.865E-05	2.587E-05	2.317E-05	2.067E-05
2.	1.217E-06	1.030E-06	8.789E-07	7.558E-07
	TOTAL CONCENTRATIONS (G/CU M)			
	2.987E-05	2.690E-05	2.405E-05	2.142E-05

PLANT YATES - SHORT-TERM - CASE B: UNITS 2-5 AND UNIT 1 - SET 1

MAXIMUM 1 HOUR CONCENTRATION

****

RECEPTOR NUMBER	X-COORD. (KMS)	Y-COORD. (KMS)	DOWNWIND DIST.(KMS)	CONCENTRATION (MUGS/M3)
1	.50	.00	.50	1.23
2	.60	.00	.60	5.16
3	.70	.00	.70	7.33
4	.80	.00	.80	7.35
5	.90	.00	.90	8.48
6	1.00	.00	1.00	14.33
7	1.10	.00	1.10	23.20
8	1.20	.00	1.20	30.81
9	1.30	.00	1.30	35.08
10	1.40	.00	1.40	36.16
11	1.50	.00	1.50	35.05

12	1.60	.00	1.60	32.72
13	1.70	.00	1.70	29.87
14	1.80	.00	1.80	26.90
15	1.90	.00	1.90	24.05
16	2.00	.00	2.00	21.42

```
ENTER (1) TO MAKE ANOTHER ENTIRE RUN
ENTER (2) TO CHANGE SOURCE, RECEPTOR, AND MET DATA
ENTER (3) TO CHANGE ONLY RECEPTOR AND MET DATA
ENTER (4) TO CHANGE ONLY MET DATA
ENTER (5) TO END
          4

ENTER (1) TO ENTER 1-HOUR OF MET DATA, ENTER (2) TO ACCESS MET DATA FILE
          1

ENTER MET DATA: THETA(DEG),U(M/SEC),KST,HL(M),T(DEG K)
   270.0000/    2.5000/         1/  5000.0000/    289.9400

ALL PARTIALS:(1); AVER.PTS.:(2); NO PTS.:(3)  ?
          2

ENTER (1) IF YOU WANT METEOROLOGY LISTED; ENTER (2) IF NOT
          1
```

PLANT YATES - SHORT-TERM - CASE B: UNITS 2-5 AND UNIT 1 - SET 1

H=HF

* * * S O U R C E S * * *

NO.	Q (G/SEC)	HP (M)	TS (DEG K)	VS (M/SEC)	D (M)	VF (CU M/SEC)	R (KM)	S (KM)
1.	164.80	251.46	412.80	28.10	7.07	1103.15	.000	.000
2.	4.60	76.20	338.81	14.00	3.96	172.43	.000	.000

* * * M E T E O R O L O G Y * * *

NO.	THETA (DEG)	U (M/SEC)	KST	HL (M)	T (DEG K)
2	270.	2.50	1	5000.00	289.9

AVERAGE CONCENTRATIONS FOR 1 HOURS

```
* * * R E C E P T O R   N U M B E R * * *
              1.         2.         3.         4.         5.         6.
SOURCE         PARTIAL CONCENTRATIONS (G/CU M)
   1.       2.555E-21 4.805E-12 2.502E-08 1.154E-06 7.214E-06 1.776E-05
   2.       2.676E-06 6.538E-06 7.451E-06 6.593E-06 5.347E-06 4.223E-06
             TOTAL CONCENTRATIONS (G/CU M)
            2.676E-06 6.538E-06 7.476E-06 7.747E-06 1.256E-05 2.199E-05

* * * R E C E P T O R   N U M B E R * * *
              7.         8.         9.        10.        11.        12.
SOURCE         PARTIAL CONCENTRATIONS (G/CU M)
   1.       2.739E-05 3.296E-05 3.457E-05 3.355E-05 3.114E-05 2.817E-05
   2.       3.327E-06 2.640E-06 2.117E-06 1.717E-06 1.409E-06 1.168E-06
             TOTAL CONCENTRATIONS (G/CU M)
            3.072E-05 3.560E-05 3.669E-05 3.527E-05 3.254E-05 2.934E-05

* * * R E C E P T O R   N U M B E R * * *
             13.        14.        15.        16.
SOURCE         PARTIAL CONCENTRATIONS (G/CU M)
   1.       2.512E-05 2.224E-05 1.963E-05 1.731E-05
   2.       9.787E-07 8.275E-07 7.056E-07 6.063E-07
             TOTAL CONCENTRATIONS (G/CU M)
            2.610E-05 2.307E-05 2.033E-05 1.792E-05
```

PLANT YATES - SHORT-TERM - CASE B: UNITS 2-5 AND UNIT 1 - SET 1

MAXIMUM 1 HOUR CONCENTRATION

****

RECEPTOR NUMBER	X-COORD. (KMS)	Y-COORD. (KMS)	DOWNWIND DIST.(KMS)	CONCENTRATION (MUGS/M3)
1	.50	.00	.50	2.68
2	.60	.00	.60	6.54
3	.70	.00	.70	7.48
4	.80	.00	.80	7.75
5	.90	.00	.90	12.56
6	1.00	.00	1.00	21.99
7	1.10	.00	1.10	30.72
8	1.20	.00	1.20	35.60
9	1.30	.00	1.30	36.69
10	1.40	.00	1.40	35.27
11	1.50	.00	1.50	32.54
12	1.60	.00	1.60	29.34
13	1.70	.00	1.70	26.10
14	1.80	.00	1.80	23.07
15	1.90	.00	1.90	20.33
16	2.00	.00	2.00	17.92

```
ENTER (1) TO MAKE ANOTHER ENTIRE RUN
ENTER (2) TO CHANGE SOURCE, RECEPTOR, AND MET DATA
ENTER (3) TO CHANGE ONLY RECEPTOR AND MET DATA
ENTER (4) TO CHANGE ONLY MET DATA
ENTER (5) TO END
          4

ENTER (1) TO ENTER 1-HOUR OF MET DATA, ENTER (2) TO ACCESS MET DATA FILE
          1

ENTER MET DATA: THETA(DEG),U(M/SEC),KST,HL(M),T(DEG K)
   270.0000/      3.0000/          1/   5000.0000/    289.9400

ALL PARTIALS:(1); AVER.PTS.:(2); NO PTS.:(3)  ?
          2

ENTER (1) IF YOU WANT METEOROLOGY LISTED; ENTER (2) IF NOT
          1
```

PLANT YATES - SHORT-TERM - CASE B: UNITS 2-5 AND UNIT 1 - SET 1

H=HF

* * * S O U R C E S * * *

NO.	Q (G/SEC)	HP (M)	TS (DEG K)	VS (M/SEC)	D (M)	VF (CU M/SEC)	R (KM)	S (KM)
1.	164.80	251.46	412.80	28.10	7.07	1103.15	.000	.000
2.	4.60	76.20	338.81	14.00	3.96	172.43	.000	.000

* * * M E T E O R O L O G Y * * *

NO.	THETA (DEG)	U (M/SEC)	KST	HL (M)	T (DEG K)
2	270.	3.00	1	5000.00	289.9

AVERAGE CONCENTRATIONS FOR 1 HOURS

* * * R E C E P T O R N U M B E R * * *

PARTIAL CONCENTRATIONS (G/CU M)

SOURCE	1.	2.	3.	4.	5.	6.
1.	2.451E-17	3.016E-10	1.979E-07	3.453E-06	1.307E-05	2.434E-05
2.	3.972E-06	7.114E-06	7.134E-06	5.945E-06	4.675E-06	3.629E-06

```
           TOTAL CONCENTRATIONS (G/CU M)
          3.972E-06 7.114E-06 7.332E-06 9.399E-06 1.775E-05 2.797E-05

 * * * R E C E P T O R   N U M B E R * * *
             7.        8.        9.       10.       11.       12.
SOURCE      PARTIAL CONCENTRATIONS (G/CU M)
   1.     3.182E-05 3.456E-05 3.393E-05 3.151E-05 2.837E-05 2.512E-05
   2.     2.830E-06 2.231E-06 1.782E-06 1.441E-06 1.180E-06 9.776E-07
           TOTAL CONCENTRATIONS (G/CU M)
          3.465E-05 3.679E-05 3.571E-05 3.295E-05 2.955E-05 2.610E-05

 * * * R E C E P T O R   N U M B E R * * *
            13.       14.       15.       16.
SOURCE      PARTIAL CONCENTRATIONS (G/CU M)
   1.     2.207E-05 1.932E-05 1.690E-05 1.481E-05
   2.     8.182E-07 6.913E-07 5.892E-07 5.061E-07
           TOTAL CONCENTRATIONS (G/CU M)
          2.288E-05 2.001E-05 1.749E-05 1.532E-05
```

PLANT YATES - SHORT-TERM - CASE B: UNITS 2-5 AND UNIT 1 - SET 1

MAXIMUM 1 HOUR CONCENTRATION

****

RECEPTOR NUMBER	X-COORD. (KMS)	Y-COORD. (KMS)	DOWNWIND DIST. (KMS)	CONCENTRATION (MUGS/M3)
1	.50	.00	.50	3.97
2	.60	.00	.60	7.11
3	.70	.00	.70	7.33
4	.80	.00	.80	9.40
5	.90	.00	.90	17.75
6	1.00	.00	1.00	27.97
7	1.10	.00	1.10	34.65
8	1.20	.00	1.20	36.79
9	1.30	.00	1.30	35.71
10	1.40	.00	1.40	32.95
11	1.50	.00	1.50	29.55
12	1.60	.00	1.60	26.10
13	1.70	.00	1.70	22.88
14	1.80	.00	1.80	20.01
15	1.90	.00	1.90	17.49
16	2.00	.00	2.00	15.32

ENTER (1) TO MAKE ANOTHER ENTIRE RUN
ENTER (2) TO CHANGE SOURCE, RECEPTOR, AND MET DATA

```
 ENTER (3) TO CHANGE ONLY RECEPTOR AND MET DATA
 ENTER (4) TO CHANGE ONLY MET DATA
 ENTER (5) TO END
          4

 ENTER (1) TO ENTER 1-HOUR OF MET DATA, ENTER (2) TO ACCESS MET DATA FILE
          1

 ENTER MET DATA: THETA(DEG),U(M/SEC),KST,HL(M),T(DEG K)
    270.0000/     5.0000/          4/   5000.0000/    289.9400

 ALL PARTIALS:(1); AVER.PTS.:(2); NO PTS.:(3)  ?
          2

 ENTER (1) IF YOU WANT METEOROLOGY LISTED; ENTER (2) IF NOT
          1


  PLANT YATES - SHORT-TERM - CASE B: UNITS 2-5 AND UNIT 1 - SET 1

 H=HF


 * * * S O U R C E S * * *
 NO.      Q          HP       TS        VS        D        VF         R        S
       (G/SEC)      (M)    (DEG K)  (M/SEC)     (M)  (CU M/SEC)    (KM)     (KM)


  1.    164.80    251.46  412.80    28.10     7.07    1103.15     .000     .000
  2.      4.60     76.20  338.81    14.00     3.96     172.43     .000     .000


 * * * M E T E O R O L O G Y * * *
NO.     THETA       U      KST     HL          T
        (DEG)   (M/SEC)            (M)      (DEG K)


 2       270.      5.00     4   5000.00     289.9

 AVERAGE CONCENTRATIONS FOR  1 HOURS

 * * * R E C E P T O R   N U M B E R * * *
             1.         2.         3.         4.         5.         6.
 SOURCE       PARTIAL CONCENTRATIONS (G/CU M)
    1.     0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
    2.     5.011E-16 3.582E-13 2.300E-11 3.803E-10 2.755E-09 1.172E-08
            TOTAL CONCENTRATIONS (G/CU M)
           5.011E-16 3.582E-13 2.300E-11 3.803E-10 2.755E-09 1.172E-08

 * * * R E C E P T O R   N U M B E R * * *
             7.         8.         9.        10.        11.        12.
```

```
SOURCE      PARTIAL CONCENTRATIONS (G/CU M)
   1.     0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
   2.     2.776E-08 5.507E-08 9.574E-08 1.506E-07 2.191E-07 2.998E-07
           TOTAL CONCENTRATIONS (G/CU M)
          2.776E-08 5.507E-08 9.574E-08 1.506E-07 2.191E-07 2.998E-07

* * * R E C E P T O R   N U M B E R * * *
            13.       14.       15.       16.
SOURCE      PARTIAL CONCENTRATIONS (G/CU M)
   1.     0.000E+00 3.302E-24 7.130E-23 1.081E-21
   2.     3.906E-07 4.891E-07 5.927E-07 6.991E-07
           TOTAL CONCENTRATIONS (G/CU M)
          3.906E-07 4.891E-07 5.927E-07 6.991E-07
```

PLANT YATES - SHORT-TERM - CASE B: UNITS 2-5 AND UNIT 1 - SET 1

MAXIMUM 1 HOUR CONCENTRATION

****

RECEPTOR NUMBER	X-COORD. (KMS)	Y-COORD. (KMS)	DOWNWIND DIST.(KMS)	CONCENTRATION (MUGS/M3)
1	.50	.00	.50	.00
2	.60	.00	.60	.00
3	.70	.00	.70	.00
4	.80	.00	.80	.00
5	.90	.00	.90	.00
6	1.00	.00	1.00	.01
7	1.10	.00	1.10	.03
8	1.20	.00	1.20	.06
9	1.30	.00	1.30	.10
10	1.40	.00	1.40	.15
11	1.50	.00	1.50	.22
12	1.60	.00	1.60	.30
13	1.70	.00	1.70	.39
14	1.80	.00	1.80	.49
15	1.90	.00	1.90	.59
16	2.00	.00	2.00	.70

```
ENTER (1) TO MAKE ANOTHER ENTIRE RUN
ENTER (2) TO CHANGE SOURCE, RECEPTOR, AND MET DATA
ENTER (3) TO CHANGE ONLY RECEPTOR AND MET DATA
ENTER (4) TO CHANGE ONLY MET DATA
ENTER (5) TO END
          4
```

```
 ENTER (1) TO ENTER 1-HOUR OF MET DATA, ENTER (2) TO ACCESS MET DATA FILE
          1

 ENTER MET DATA: THETA(DEG),U(M/SEC),KST,HL(M),T(DEG K)
    270.0000/      7.0000/           4/   5000.0000/    289.9400

 ALL PARTIALS:(1); AVER.PTS.:(2); NO PTS.:(3)  ?
          2

 ENTER (1) IF YOU WANT METEOROLOGY LISTED; ENTER (2) IF NOT
          1


  PLANT YATES - SHORT-TERM - CASE B: UNITS 2-5 AND UNIT 1 - SET 1

 H=HF


 * * * S O U R C E S * * *
 NO.     Q        HP      TS      VS       D       VF       R       S
      (G/SEC)    (M)   (DEG K) (M/SEC)    (M)  (CU M/SEC)  (KM)    (KM)

  1.   164.80   251.46  412.80   28.10    7.07   1103.15   .000    .000
  2.     4.60    76.20  338.81   14.00    3.96    172.43   .000    .000

 * * * M E T E O R O L O G Y * * *
 NO.    THETA     U     KST    HL        T
        (DEG)  (M/SEC)         (M)    (DEG K)

  2      270.     7.00    4  5000.00    289.9

 AVERAGE CONCENTRATIONS FOR  1 HOURS

 * * * R E C E P T O R   N U M B E R * * *
                1.         2.         3.         4.         5.         6.
 SOURCE          PARTIAL CONCENTRATIONS (G/CU M)
    1.       0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
    2.       1.831E-13 2.652E-11 6.101E-10 4.992E-09 2.180E-08 6.358E-08
              TOTAL CONCENTRATIONS (G/CU M)
             1.831E-13 2.652E-11 6.101E-10 4.992E-09 2.180E-08 6.358E-08

 * * * R E C E P T O R   N U M B E R * * *
                7.         8.         9.        10.        11.        12.
 SOURCE          PARTIAL CONCENTRATIONS (G/CU M)
    1.       0.000E+00 0.000E+00 0.000E+00 2.984E-25 1.785E-23 5.934E-22
    2.       1.191E-07 1.954E-07 2.904E-07 4.004E-07 5.210E-07 6.477E-07
              TOTAL CONCENTRATIONS (G/CU M)
             1.191E-07 1.954E-07 2.904E-07 4.004E-07 5.210E-07 6.477E-07
```

```
* * * R E C E P T O R   N U M B E R * * *
              13.        14.        15.        16.
SOURCE        PARTIAL CONCENTRATIONS (G/CU M)
  1.        1.227E-20 1.720E-19 1.749E-18 1.359E-17
  2.        7.765E-07 9.041E-07 1.028E-06 1.145E-06
             TOTAL CONCENTRATIONS (G/CU M)
            7.765E-07 9.041E-07 1.028E-06 1.145E-06
```

PLANT YATES - SHORT-TERM - CASE B: UNITS 2-5 AND UNIT 1 - SET 1

MAXIMUM 1 HOUR CONCENTRATION

****

RECEPTOR NUMBER	X-COORD. (KMS)	Y-COORD. (KMS)	DOWNWIND DIST. (KMS)	CONCENTRATION (MUGS/M3)
1	.50	.00	.50	.00
2	.60	.00	.60	.00
3	.70	.00	.70	.00
4	.80	.00	.80	.00
5	.90	.00	.90	.02
6	1.00	.00	1.00	.06
7	1.10	.00	1.10	.12
8	1.20	.00	1.20	.20
9	1.30	.00	1.30	.29
10	1.40	.00	1.40	.40
11	1.50	.00	1.50	.52
12	1.60	.00	1.60	.65
13	1.70	.00	1.70	.78
14	1.80	.00	1.80	.90
15	1.90	.00	1.90	1.03
16	2.00	.00	2.00	1.15

```
ENTER (1) TO MAKE ANOTHER ENTIRE RUN
ENTER (2) TO CHANGE SOURCE, RECEPTOR, AND MET DATA
ENTER (3) TO CHANGE ONLY RECEPTOR AND MET DATA
ENTER (4) TO CHANGE ONLY MET DATA
ENTER (5) TO END
          4

ENTER (1) TO ENTER 1-HOUR OF MET DATA, ENTER (2) TO ACCESS MET DATA FILE
          1

ENTER MET DATA: THETA(DEG),U(M/SEC),KST,HL(M),T(DEG K)
   270.0000/     10.0000/          4/   5000.0000/    289.9400
```

```
ALL PARTIALS:(1); AVER.PTS.:(2); NO PTS.:(3)  ?
          2

ENTER (1) IF YOU WANT METEOROLOGY LISTED; ENTER (2) IF NOT
          1


 PLANT YATES - SHORT-TERM - CASE B: UNITS 2-5 AND UNIT 1 - SET 1

H=HF


* * * S O U R C E S * * *
NO.      Q        HP      TS       VS       D       VF        R        S
      (G/SEC)    (M)   (DEG K) (M/SEC)    (M)  (CU M/SEC)   (KM)     (KM)

 1.   164.80   251.46  412.80   28.10     7.07   1103.15    .000     .000
 2.     4.60    76.20  338.81   14.00     3.96    172.43    .000     .000

* * * M E T E O R O L O G Y * * *
NO.    THETA      U      KST    HL        T
       (DEG)   (M/SEC)          (M)    (DEG K)

 2      270.    10.00     4   5000.00   289.9

AVERAGE CONCENTRATIONS FOR  1 HOURS

* * * R E C E P T O R   N U M B E R * * *
               1.         2.         3.         4.         5.         6.
SOURCE           PARTIAL CONCENTRATIONS (G/CU M)
   1.       0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
   2.       8.042E-12 4.039E-10 4.702E-09 2.412E-08 7.529E-08 1.709E-07
             TOTAL CONCENTRATIONS (G/CU M)
            8.042E-12 4.039E-10 4.702E-09 2.412E-08 7.529E-08 1.709E-07

* * * R E C E P T O R   N U M B E R * * *
               7.         8.         9.        10.        11.        12.
SOURCE           PARTIAL CONCENTRATIONS (G/CU M)
   1.       0.000E+00 1.350E-24 1.282E-22 5.765E-21 1.446E-19 2.278E-18
   2.       2.741E-07 3.963E-07 5.307E-07 6.704E-07 8.100E-07 9.449E-07
             TOTAL CONCENTRATIONS (G/CU M)
            2.741E-07 3.963E-07 5.307E-07 6.704E-07 8.100E-07 9.449E-07

* * * R E C E P T O R   N U M B E R * * *
              13.        14.        15.        16.
SOURCE           PARTIAL CONCENTRATIONS (G/CU M)
   1.       2.467E-17 1.965E-16 1.215E-15 6.075E-15
```

```
2.     1.072E-06 1.189E-06 1.296E-06 1.391E-06
        TOTAL CONCENTRATIONS (G/CU M)
       1.072E-06 1.189E-06 1.296E-06 1.391E-06
```

PLANT YATES - SHORT-TERM - CASE B: UNITS 2-5 AND UNIT 1 - SET 1

MAXIMUM 1 HOUR CONCENTRATION

****

RECEPTOR NUMBER	X-COORD. (KMS)	Y-COORD. (KMS)	DOWNWIND DIST.(KMS)	CONCENTRATION (MUGS/M3)
1	.50	.00	.50	.00
2	.60	.00	.60	.00
3	.70	.00	.70	.00
4	.80	.00	.80	.02
5	.90	.00	.90	.08
6	1.00	.00	1.00	.17
7	1.10	.00	1.10	.27
8	1.20	.00	1.20	.40
9	1.30	.00	1.30	.53
10	1.40	.00	1.40	.67
11	1.50	.00	1.50	.81
12	1.60	.00	1.60	.94
13	1.70	.00	1.70	1.07
14	1.80	.00	1.80	1.19
15	1.90	.00	1.90	1.30
16	2.00	.00	2.00	1.39

```
ENTER (1) TO MAKE ANOTHER ENTIRE RUN
ENTER (2) TO CHANGE SOURCE, RECEPTOR, AND MET DATA
ENTER (3) TO CHANGE ONLY RECEPTOR AND MET DATA
ENTER (4) TO CHANGE ONLY MET DATA
ENTER (5) TO END
          5
```

140-END

PRINT COMPLETED AT 13:42:12 FOR USER: B1955934 DIST: BLANCHE

END-140

Plant Yates

Particulates

Short-Term

PTMTP Model

Case 3

```
*****************************************************************************************************************
** VM/SP SERVICE LEVEL 0411 **** CPU SERIAL  000019  CPU MODEL  0580 *********************************************
```

B1955934	B1955934	USERID	ORIGIN
BLANCHE	VMRBHMC1	DISTCODE	SYSTEM
PM1	REPORT	FILENAME	FILETYPE
03/17/89	13:11:54	FILE CREATION DATE	
4101	00000849	SPOOLID	COUNT
03/17/89	13:41:58	FILE PRINT DATE	
R	0500	CLASS	DEVICE
STANDARD		FORMS	

135

```
                    S           Southern Company
                   SCS           Services, Inc.
                  SCSBS
                 SCSBSCS      Information Services
                SCSBSCSBS         Birmingham
                 SCSBSCSBS
     AMDAHL   SCSSCSBSS       For Assistance,
    470  V/8   SCSCSBSCS        Call ISC at 7378
  32 Megabytes  SCSBSCSBS
                 SCSBSCSBS
       SCSCSCS          SCS         VM/SP  HPO
      SSCSBSS         SCSBSCS       Release  4.2
     SCSBSCS       SCSBSCSBSCS
    SCSBSCS     SCSBSCSBSCSBSCSBS
   SCSCSCSCSCSCSCSCSCSCSCSCSCSCS
```

TAG DATA: VMRBHMC1 SYSTEM

B1955934

BLANCHE

```
 ENTER A 66 CHARACTER TITLE
PLANT YATES - SHORT-TERM - CASE B: UNITS 2-5 AND UNIT 1 - SET 1

 ENTER NUMBER OF SOURCES, UP TO 10
          1

 ENTER (1) TO ENTER SOURCE INFORMATION FROM FILE.
          0

 ENTER Q(G/S),HP(M),TS(DEG K),VS(M/S),D(M),R(KM)(X-COORD),S(KM)(Y-COORD)
       FOR SOURCE NUMBER  1
      4.60/     76.20/    338.81/     14.00/      3.96/       .00/       .00

 THIRTY:(1); INDIVIDUAL:(2); RANGE&SPACE:(3)  ?
          3

 ENTER X-COORD OF FIRST RECEPTOR IN KM
       .5000

 ENTER X-COORD OF LAST RECEPTOR IN KM
      2.0000

 ENTER SPACING OF RECEPTORS IN KM
       .1000

 ENTER (1) TO ENTER 1-HOUR OF MET DATA, ENTER (2) TO ACCESS MET DATA FILE
          1

 ENTER MET DATA: THETA(DEG),U(M/SEC),KST,HL(M),T(DEG K)
    270.0000/      1.0000/          1/   5000.0000/    289.9400

 ALL PARTIALS:(1); AVER.PTS.:(2); NO PTS.:(3)  ?
          2

 ENTER (1) IF YOU WANT METEOROLOGY LISTED; ENTER (2) IF NOT
          1


  PLANT YATES - SHORT-TERM - CASE B: UNITS 2-5 AND UNIT 1 - SET 1

 H=HF


 * * * S O U R C E S * * *
 NO.      Q          HP       TS       VS        D        VF        R        S
       (G/SEC)       (M)   (DEG K) (M/SEC)     (M)   (CU M/SEC)   (KM)     (KM)

  1.      4.60     76.20  338.81   14.00     3.96     172.43     .000     .000
```

```
 * * * M E T E O R O L O G Y * * *
NO.   THETA      U      KST    HL        T
      (DEG)   (M/SEC)         (M)     (DEG K)

 2     270.     1.00     1   5000.00    289.9

 AVERAGE CONCENTRATIONS FOR  1 HOURS

 * * * R E C E P T O R   N U M B E R * * *
               1.         2.         3.         4.         5.         6.
 SOURCE         PARTIAL CONCENTRATIONS (G/CU M)
    1.      1.596E-09 3.461E-07 2.503E-06 5.268E-06 6.686E-06 6.776E-06
             TOTAL CONCENTRATIONS (G/CU M)
            1.596E-09 3.461E-07 2.503E-06 5.268E-06 6.686E-06 6.776E-06

 * * * R E C E P T O R   N U M B E R * * *
               7.         8.         9.        10.        11.        12.
 SOURCE         PARTIAL CONCENTRATIONS (G/CU M)
    1.      6.186E-06 5.377E-06 4.573E-06 3.858E-06 3.252E-06 2.749E-06
             TOTAL CONCENTRATIONS (G/CU M)
            6.186E-06 5.377E-06 4.573E-06 3.858E-06 3.252E-06 2.749E-06

 * * * R E C E P T O R   N U M B E R * * *
              13.        14.        15.        16.
 SOURCE         PARTIAL CONCENTRATIONS (G/CU M)
    1.      2.335E-06 1.994E-06 1.713E-06 1.481E-06
             TOTAL CONCENTRATIONS (G/CU M)
            2.335E-06 1.994E-06 1.713E-06 1.481E-06
```

PLANT YATES - SHORT-TERM - CASE B: UNITS 2-5 AND UNIT 1 - SET 1

MAXIMUM 1 HOUR CONCENTRATION

****

RECEPTOR NUMBER	X-COORD. (KMS)	Y-COORD. (KMS)	DOWNWIND DIST.(KMS)	CONCENTRATION (MUGS/M3)
1	.50	.00	.50	.00
2	.60	.00	.60	.35
3	.70	.00	.70	2.50
4	.80	.00	.80	5.27
5	.90	.00	.90	6.69
6	1.00	.00	1.00	6.78
7	1.10	.00	1.10	6.19
8	1.20	.00	1.20	5.38
9	1.30	.00	1.30	4.57

10	1.40	.00	1.40	3.86
11	1.50	.00	1.50	3.25
12	1.60	.00	1.60	2.75
13	1.70	.00	1.70	2.33
14	1.80	.00	1.80	1.99
15	1.90	.00	1.90	1.71
16	2.00	.00	2.00	1.48

```
ENTER (1) TO MAKE ANOTHER ENTIRE RUN
ENTER (2) TO CHANGE SOURCE, RECEPTOR, AND MET DATA
ENTER (3) TO CHANGE ONLY RECEPTOR AND MET DATA
ENTER (4) TO CHANGE ONLY MET DATA
ENTER (5) TO END
          4

ENTER (1) TO ENTER 1-HOUR OF MET DATA, ENTER (2) TO ACCESS MET DATA FILE
          1

ENTER MET DATA: THETA(DEG),U(M/SEC),KST,HL(M),T(DEG K)
   270.0000/      1.5000/           1/   5000.0000/    289.9400

ALL PARTIALS:(1); AVER.PTS.:(2); NO PTS.:(3)  ?
          2

ENTER (1) IF YOU WANT METEOROLOGY LISTED; ENTER (2) IF NOT
          1
```

PLANT YATES - SHORT-TERM - CASE B: UNITS 2-5 AND UNIT 1 - SET 1

H=HF

* * * S O U R C E S * * *

NO.	Q (G/SEC)	HP (M)	TS (DEG K)	VS (M/SEC)	D (M)	VF (CU M/SEC)	R (KM)	S (KM)
1.	4.60	76.20	338.81	14.00	3.96	172.43	.000	.000

* * * M E T E O R O L O G Y * * *

NO.	THETA (DEG)	U (M/SEC)	KST	HL (M)	T (DEG K)
2	270.	1.50	1	5000.00	289.9

AVERAGE CONCENTRATIONS FOR 1 HOURS

```
* * * R E C E P T O R   N U M B E R * * *
                1.        2.        3.        4.        5.        6.
SOURCE          PARTIAL CONCENTRATIONS (G/CU M)
   1.       2.203E-07 2.714E-06 6.021E-06 7.283E-06 6.942E-06 5.999E-06
             TOTAL CONCENTRATIONS (G/CU M)
            2.203E-07 2.714E-06 6.021E-06 7.283E-06 6.942E-06 5.999E-06

* * * R E C E P T O R   N U M B E R * * *
                7.        8.        9.       10.       11.       12.
SOURCE          PARTIAL CONCENTRATIONS (G/CU M)
   1.       4.984E-06 4.086E-06 3.347E-06 2.753E-06 2.281E-06 1.905E-06
             TOTAL CONCENTRATIONS (G/CU M)
            4.984E-06 4.086E-06 3.347E-06 2.753E-06 2.281E-06 1.905E-06

* * * R E C E P T O R   N U M B E R * * *
               13.       14.       15.       16.
SOURCE          PARTIAL CONCENTRATIONS (G/CU M)
   1.       1.604E-06 1.361E-06 1.164E-06 1.002E-06
             TOTAL CONCENTRATIONS (G/CU M)
            1.604E-06 1.361E-06 1.164E-06 1.002E-06
```

PLANT YATES - SHORT-TERM - CASE B: UNITS 2-5 AND UNIT 1 - SET 1

MAXIMUM 1 HOUR CONCENTRATION

****

RECEPTOR NUMBER	X-COORD. (KMS)	Y-COORD. (KMS)	DOWNWIND DIST.(KMS)	CONCENTRATION (MUGS/M3)
1	.50	.00	.50	.22
2	.60	.00	.60	2.71
3	.70	.00	.70	6.02
4	.80	.00	.80	7.28
5	.90	.00	.90	6.94
6	1.00	.00	1.00	6.00
7	1.10	.00	1.10	4.98
8	1.20	.00	1.20	4.09
9	1.30	.00	1.30	3.35
10	1.40	.00	1.40	2.75
11	1.50	.00	1.50	2.28
12	1.60	.00	1.60	1.90
13	1.70	.00	1.70	1.60
14	1.80	.00	1.80	1.36
15	1.90	.00	1.90	1.16
16	2.00	.00	2.00	1.00

```
ENTER (1) TO MAKE ANOTHER ENTIRE RUN
ENTER (2) TO CHANGE SOURCE, RECEPTOR, AND MET DATA
ENTER (3) TO CHANGE ONLY RECEPTOR AND MET DATA
ENTER (4) TO CHANGE ONLY MET DATA
ENTER (5) TO END
          4

ENTER (1) TO ENTER 1-HOUR OF MET DATA, ENTER (2) TO ACCESS MET DATA FILE
          1

ENTER MET DATA: THETA(DEG),U(M/SEC),KST,HL(M),T(DEG K)
   270.0000/      2.0000/          1/   5000.0000/    289.9400

ALL PARTIALS:(1); AVER.PTS.:(2); NO PTS.:(3)  ?
          2

ENTER (1) IF YOU WANT METEOROLOGY LISTED; ENTER (2) IF NOT
          1
```

PLANT YATES - SHORT-TERM - CASE B: UNITS 2-5 AND UNIT 1 - SET 1

H=HF

* * * S O U R C E S * * *

NO.	Q (G/SEC)	HP (M)	TS (DEG K)	VS (M/SEC)	D (M)	VF (CU M/SEC)	R (KM)	S (KM)
1.	4.60	76.20	338.81	14.00	3.96	172.43	.000	.000

* * * M E T E O R O L O G Y * * *

NO.	THETA (DEG)	U (M/SEC)	KST	HL (M)	T (DEG K)
2	270.	2.00	1	5000.00	289.9

AVERAGE CONCENTRATIONS FOR 1 HOURS

* * * R E C E P T O R N U M B E R * * *

SOURCE	1.	2.	3.	4.	5.	6.
	PARTIAL CONCENTRATIONS (G/CU M)					
1.	1.235E-06	5.156E-06	7.327E-06	7.191E-06	6.153E-06	5.007E-06
	TOTAL CONCENTRATIONS (G/CU M)					
	1.235E-06	5.156E-06	7.327E-06	7.191E-06	6.153E-06	5.007E-06

* * * R E C E P T O R N U M B E R * * *

```
                7.        8.        9.        10.       11.       12.
SOURCE       PARTIAL CONCENTRATIONS (G/CU M)
   1.      4.015E-06 3.220E-06 2.600E-06 2.119E-06 1.744E-06 1.450E-06
             TOTAL CONCENTRATIONS (G/CU M)
           4.015E-06 3.220E-06 2.600E-06 2.119E-06 1.744E-06 1.450E-06

* * * R E C E P T O R   N U M B E R * * *
               13.       14.       15.       16.
SOURCE       PARTIAL CONCENTRATIONS (G/CU M)
   1.      1.217E-06 1.030E-06 8.789E-07 7.558E-07
             TOTAL CONCENTRATIONS (G/CU M)
           1.217E-06 1.030E-06 8.789E-07 7.558E-07
```

PLANT YATES - SHORT-TERM - CASE B: UNITS 2-5 AND UNIT 1 - SET 1

MAXIMUM 1 HOUR CONCENTRATION

****

RECEPTOR NUMBER	X-COORD. (KMS)	Y-COORD. (KMS)	DOWNWIND DIST.(KMS)	CONCENTRATION (MUGS/M3)
1	.50	.00	.50	1.23
2	.60	.00	.60	5.16
3	.70	.00	.70	7.33
4	.80	.00	.80	7.19
5	.90	.00	.90	6.15
6	1.00	.00	1.00	5.01
7	1.10	.00	1.10	4.01
8	1.20	.00	1.20	3.22
9	1.30	.00	1.30	2.60
10	1.40	.00	1.40	2.12
11	1.50	.00	1.50	1.74
12	1.60	.00	1.60	1.45
13	1.70	.00	1.70	1.22
14	1.80	.00	1.80	1.03
15	1.90	.00	1.90	.88
16	2.00	.00	2.00	.76

```
ENTER (1) TO MAKE ANOTHER ENTIRE RUN
ENTER (2) TO CHANGE SOURCE, RECEPTOR, AND MET DATA
ENTER (3) TO CHANGE ONLY RECEPTOR AND MET DATA
ENTER (4) TO CHANGE ONLY MET DATA
ENTER (5) TO END
          4

ENTER (1) TO ENTER 1-HOUR OF MET DATA, ENTER (2) TO ACCESS MET DATA FILE
```

```
          1

 ENTER MET DATA: THETA(DEG),U(M/SEC),KST,HL(M),T(DEG K)
    270.0000/     2.5000/          1/   5000.0000/    289.9400

 ALL PARTIALS:(1); AVER.PTS.:(2); NO PTS.:(3)  ?
          2

 ENTER (1) IF YOU WANT METEOROLOGY LISTED; ENTER (2) IF NOT
          1


  PLANT YATES - SHORT-TERM - CASE B: UNITS 2-5 AND UNIT 1 - SET 1

 H=HF


 * * * S O U R C E S * * *
 NO.      Q        HP      TS       VS        D       VF        R        S
       (G/SEC)     (M)   (DEG K) (M/SEC)    (M)  (CU M/SEC)   (KM)     (KM)

  1.     4.60    76.20  338.81   14.00    3.96    172.43    .000     .000

 * * * M E T E O R O L O G Y * * *
NO.    THETA      U      KST     HL        T
       (DEG)   (M/SEC)           (M)    (DEG K)

  2     270.     2.50     1   5000.00   289.9

 AVERAGE CONCENTRATIONS FOR  1 HOURS

 * * * R E C E P T O R   N U M B E R * * *
             1.        2.        3.        4.        5.        6.
 SOURCE       PARTIAL CONCENTRATIONS (G/CU M)
    1.     2.676E-06 6.538E-06 7.451E-06 6.593E-06 5.347E-06 4.223E-06
            TOTAL CONCENTRATIONS (G/CU M)
           2.676E-06 6.538E-06 7.451E-06 6.593E-06 5.347E-06 4.223E-06

 * * * R E C E P T O R   N U M B E R * * *
             7.        8.        9.       10.       11.       12.
 SOURCE       PARTIAL CONCENTRATIONS (G/CU M)
    1.     3.327E-06 2.640E-06 2.117E-06 1.717E-06 1.409E-06 1.168E-06
            TOTAL CONCENTRATIONS (G/CU M)
           3.327E-06 2.640E-06 2.117E-06 1.717E-06 1.409E-06 1.168E-06

 * * * R E C E P T O R   N U M B E R * * *
            13.       14.       15.       16.
 SOURCE       PARTIAL CONCENTRATIONS (G/CU M)
```

```
    1.     9.787E-07 8.275E-07 7.056E-07 6.063E-07
            TOTAL CONCENTRATIONS (G/CU M)
           9.787E-07 8.275E-07 7.056E-07 6.063E-07
```

PLANT YATES - SHORT-TERM - CASE B: UNITS 2-5 AND UNIT 1 - SET 1

MAXIMUM 1 HOUR CONCENTRATION

****

RECEPTOR NUMBER	X-COORD. (KMS)	Y-COORD. (KMS)	DOWNWIND DIST.(KMS)	CONCENTRATION (MUGS/M3)
1	.50	.00	.50	2.68
2	.60	.00	.60	6.54
3	.70	.00	.70	7.45
4	.80	.00	.80	6.59
5	.90	.00	.90	5.35
6	1.00	.00	1.00	4.22
7	1.10	.00	1.10	3.33
8	1.20	.00	1.20	2.64
9	1.30	.00	1.30	2.12
10	1.40	.00	1.40	1.72
11	1.50	.00	1.50	1.41
12	1.60	.00	1.60	1.17
13	1.70	.00	1.70	.98
14	1.80	.00	1.80	.83
15	1.90	.00	1.90	.71
16	2.00	.00	2.00	.61

```
ENTER (1) TO MAKE ANOTHER ENTIRE RUN
ENTER (2) TO CHANGE SOURCE, RECEPTOR, AND MET DATA
ENTER (3) TO CHANGE ONLY RECEPTOR AND MET DATA
ENTER (4) TO CHANGE ONLY MET DATA
ENTER (5) TO END
          4

ENTER (1) TO ENTER 1-HOUR OF MET DATA, ENTER (2) TO ACCESS MET DATA FILE
          1

ENTER MET DATA: THETA(DEG),U(M/SEC),KST,HL(M),T(DEG K)
   270.0000/     3.0000/         1/   5000.0000/    289.9400

ALL PARTIALS:(1); AVER.PTS.:(2); NO PTS.:(3)  ?
          2

ENTER (1) IF YOU WANT METEOROLOGY LISTED; ENTER (2) IF NOT
```

```
          1


 PLANT YATES - SHORT-TERM - CASE B: UNITS 2-5 AND UNIT 1 - SET 1

H=HF


* * * S O U R C E S * * *
NO.    Q         HP     TS      VS       D      VF      R       S
    (G/SEC)      (M)  (DEG K) (M/SEC)   (M)  (CU M/SEC)  (KM)    (KM)

 1.    4.60    76.20  338.81   14.00    3.96   172.43   .000    .000

* * * M E T E O R O L O G Y * * *
NO.    THETA      U      KST     HL       T
       (DEG)   (M/SEC)           (M)    (DEG K)

 2     270.     3.00      1   5000.00   289.9

AVERAGE CONCENTRATIONS FOR  1 HOURS

* * * R E C E P T O R   N U M B E R * * *
            1.         2.         3.         4.         5.         6.
SOURCE       PARTIAL CONCENTRATIONS (G/CU M)
   1.     3.972E-06 7.114E-06 7.134E-06 5.945E-06 4.675E-06 3.629E-06
           TOTAL CONCENTRATIONS (G/CU M)
          3.972E-06 7.114E-06 7.134E-06 5.945E-06 4.675E-06 3.629E-06

* * * R E C E P T O R   N U M B E R * * *
            7.         8.         9.        10.        11.        12.
SOURCE       PARTIAL CONCENTRATIONS (G/CU M)
   1.     2.830E-06 2.231E-06 1.782E-06 1.441E-06 1.180E-06 9.776E-07
           TOTAL CONCENTRATIONS (G/CU M)
          2.830E-06 2.231E-06 1.782E-06 1.441E-06 1.180E-06 9.776E-07

* * * R E C E P T O R   N U M B E R * * *
           13.        14.        15.        16.
SOURCE       PARTIAL CONCENTRATIONS (G/CU M)
   1.     8.182E-07 6.913E-07 5.892E-07 5.061E-07
           TOTAL CONCENTRATIONS (G/CU M)
          8.182E-07 6.913E-07 5.892E-07 5.061E-07



 PLANT YATES - SHORT-TERM - CASE B: UNITS 2-5 AND UNIT 1 - SET 1
```

MAXIMUM 1 HOUR CONCENTRATION

****

RECEPTOR NUMBER	X-COORD. (KMS)	Y-COORD. (KMS)	DOWNWIND DIST.(KMS)	CONCENTRATION (MUGS/M3)
1	.50	.00	.50	3.97
2	.60	.00	.60	7.11
3	.70	.00	.70	7.13
4	.80	.00	.80	5.95
5	.90	.00	.90	4.67
6	1.00	.00	1.00	3.63
7	1.10	.00	1.10	2.83
8	1.20	.00	1.20	2.23
9	1.30	.00	1.30	1.78
10	1.40	.00	1.40	1.44
11	1.50	.00	1.50	1.18
12	1.60	.00	1.60	.98
13	1.70	.00	1.70	.82
14	1.80	.00	1.80	.69
15	1.90	.00	1.90	.59
16	2.00	.00	2.00	.51

```
ENTER (1) TO MAKE ANOTHER ENTIRE RUN
ENTER (2) TO CHANGE SOURCE, RECEPTOR, AND MET DATA
ENTER (3) TO CHANGE ONLY RECEPTOR AND MET DATA
ENTER (4) TO CHANGE ONLY MET DATA
ENTER (5) TO END
          4

ENTER (1) TO ENTER 1-HOUR OF MET DATA, ENTER (2) TO ACCESS MET DATA FILE
          1

ENTER MET DATA: THETA(DEG),U(M/SEC),KST,HL(M),T(DEG K)
   270.0000/     5.0000/          4/   5000.0000/    289.9400

ALL PARTIALS:(1); AVER.PTS.:(2); NO PTS.:(3)  ?
          2

ENTER (1) IF YOU WANT METEOROLOGY LISTED; ENTER (2) IF NOT
          1
```

PLANT YATES - SHORT-TERM - CASE B: UNITS 2-5 AND UNIT 1 - SET 1

H=HF

* * * S O U R C E S * * *

NO.	Q (G/SEC)	HP (M)	TS (DEG K)	VS (M/SEC)	D (M)	VF (CU M/SEC)	R (KM)	S (KM)
1.	4.60	76.20	338.81	14.00	3.96	172.43	.000	.000

* * * M E T E O R O L O G Y * * *

NO.	THETA (DEG)	U (M/SEC)	KST	HL (M)	T (DEG K)
2	270.	5.00	4	5000.00	289.9

AVERAGE CONCENTRATIONS FOR 1 HOURS

* * * R E C E P T O R N U M B E R * * *

SOURCE	1.	2.	3.	4.	5.	6.
	PARTIAL CONCENTRATIONS (G/CU M)					
1.	5.011E-16	3.582E-13	2.300E-11	3.803E-10	2.755E-09	1.172E-08
	TOTAL CONCENTRATIONS (G/CU M)					
	5.011E-16	3.582E-13	2.300E-11	3.803E-10	2.755E-09	1.172E-08

* * * R E C E P T O R N U M B E R * * *

SOURCE	7.	8.	9.	10.	11.	12.
	PARTIAL CONCENTRATIONS (G/CU M)					
1.	2.776E-08	5.507E-08	9.574E-08	1.506E-07	2.191E-07	2.998E-07
	TOTAL CONCENTRATIONS (G/CU M)					
	2.776E-08	5.507E-08	9.574E-08	1.506E-07	2.191E-07	2.998E-07

* * * R E C E P T O R N U M B E R * * *

SOURCE	13.	14.	15.	16.
	PARTIAL CONCENTRATIONS (G/CU M)			
1.	3.906E-07	4.891E-07	5.927E-07	6.991E-07
	TOTAL CONCENTRATIONS (G/CU M)			
	3.906E-07	4.891E-07	5.927E-07	6.991E-07

PLANT YATES - SHORT-TERM - CASE B: UNITS 2-5 AND UNIT 1 - SET 1

MAXIMUM 1 HOUR CONCENTRATION

****

RECEPTOR NUMBER	X-COORD. (KMS)	Y-COORD. (KMS)	DOWNWIND DIST.(KMS)	CONCENTRATION (MUGS/M3)

1	.50	.00	.50	.00
2	.60	.00	.60	.00
3	.70	.00	.70	.00
4	.80	.00	.80	.00
5	.90	.00	.90	.00
6	1.00	.00	1.00	.01
7	1.10	.00	1.10	.03
8	1.20	.00	1.20	.06
9	1.30	.00	1.30	.10
10	1.40	.00	1.40	.15
11	1.50	.00	1.50	.22
12	1.60	.00	1.60	.30
13	1.70	.00	1.70	.39
14	1.80	.00	1.80	.49
15	1.90	.00	1.90	.59
16	2.00	.00	2.00	.70

```
ENTER (1) TO MAKE ANOTHER ENTIRE RUN
ENTER (2) TO CHANGE SOURCE, RECEPTOR, AND MET DATA
ENTER (3) TO CHANGE ONLY RECEPTOR AND MET DATA
ENTER (4) TO CHANGE ONLY MET DATA
ENTER (5) TO END
          4

ENTER (1) TO ENTER 1-HOUR OF MET DATA, ENTER (2) TO ACCESS MET DATA FILE
          1

ENTER MET DATA: THETA(DEG),U(M/SEC),KST,HL(M),T(DEG K)
   270.0000/      7.0000/          4/   5000.0000/    289.9400

ALL PARTIALS:(1); AVER.PTS.:(2); NO PTS.:(3)  ?
          2

ENTER (1) IF YOU WANT METEOROLOGY LISTED; ENTER (2) IF NOT
          1
```

PLANT YATES - SHORT-TERM - CASE B: UNITS 2-5 AND UNIT 1 - SET 1

H=HF

* * * S O U R C E S * * *

NO.	Q (G/SEC)	HP (M)	TS (DEG K)	VS (M/SEC)	D (M)	VF (CU M/SEC)	R (KM)	S (KM)
1.	4.60	76.20	338.81	14.00	3.96	172.43	.000	.000

1 REPORT A1 SOUTHERN COMPANY SERVICES-BIRMINGHAM

* M E T E O R O L O G Y * * *

THETA (DEG)	U (M/SEC)	KST	HL (M)	T (DEG K)
270.	7.00	4	5000.00	289.9

ERAGE CONCENTRATIONS FOR 1 HOURS

* * R E C E P T O R N U M B E R * * *

	1.	2.	3.	4.	5.	6.
OURCE	PARTIAL CONCENTRATIONS (G/CU M)					
1.	1.831E-13	2.652E-11	6.101E-10	4.992E-09	2.180E-08	6.358E-08
	TOTAL CONCENTRATIONS (G/CU M)					
	1.831E-13	2.652E-11	6.101E-10	4.992E-09	2.180E-08	6.358E-08

* * * R E C E P T O R N U M B E R * * *

	7.	8.	9.	10.	11.	12.
SOURCE	PARTIAL CONCENTRATIONS (G/CU M)					
1.	1.191E-07	1.954E-07	2.904E-07	4.004E-07	5.210E-07	6.477E-07
	TOTAL CONCENTRATIONS (G/CU M)					
	1.191E-07	1.954E-07	2.904E-07	4.004E-07	5.210E-07	6.477E-07

* * * R E C E P T O R N U M B E R * * *

	13.	14.	15.	16.
SOURCE	PARTIAL CONCENTRATIONS (G/CU M)			
1.	7.765E-07	9.041E-07	1.028E-06	1.145E-06
	TOTAL CONCENTRATIONS (G/CU M)			
	7.765E-07	9.041E-07	1.028E-06	1.145E-06

PLANT YATES - SHORT-TERM - CASE B: UNITS 2-5 AND UNIT 1 - SET 1

MAXIMUM 1 HOUR CONCENTRATION
****

RECEPTOR NUMBER	X-COORD. (KMS)	Y-COORD. (KMS)	DOWNWIND DIST.(KMS)	CONCENTRATION (MUGS/M3)
1	.50	.00	.50	.00
2	.60	.00	.60	.00
3	.70	.00	.70	.00
4	.80	.00	.80	.00
5	.90	.00	.90	.02
6	1.00	.00	1.00	.06
7	1.10	.00	1.10	.12
8	1.20	.00	1.20	.20

9	1.30	.00	1.30	.29
10	1.40	.00	1.40	.40
11	1.50	.00	1.50	.52
12	1.60	.00	1.60	.65
13	1.70	.00	1.70	.78
14	1.80	.00	1.80	.90
15	1.90	.00	1.90	1.03
16	2.00	.00	2.00	1.15

```
ENTER (1) TO MAKE ANOTHER ENTIRE RUN
ENTER (2) TO CHANGE SOURCE, RECEPTOR, AND MET DATA
ENTER (3) TO CHANGE ONLY RECEPTOR AND MET DATA
ENTER (4) TO CHANGE ONLY MET DATA
ENTER (5) TO END
          4

ENTER (1) TO ENTER 1-HOUR OF MET DATA, ENTER (2) TO ACCESS MET DATA FILE
          1

ENTER MET DATA: THETA(DEG),U(M/SEC),KST,HL(M),T(DEG K)
   270.0000/     10.0000/           4/   5000.0000/    289.9400

ALL PARTIALS:(1); AVER.PTS.:(2); NO PTS.:(3)  ?
          2

ENTER (1) IF YOU WANT METEOROLOGY LISTED; ENTER (2) IF NOT
          1
```

PLANT YATES - SHORT-TERM - CASE B: UNITS 2-5 AND UNIT 1 - SET 1

H=HF

* * * S O U R C E S * * *

NO.	Q (G/SEC)	HP (M)	TS (DEG K)	VS (M/SEC)	D (M)	VF (CU M/SEC)	R (KM)	S (KM)
1.	4.60	76.20	338.81	14.00	3.96	172.43	.000	.000

* * * M E T E O R O L O G Y * * *

NO.	THETA (DEG)	U (M/SEC)	KST	HL (M)	T (DEG K)
2	270.	10.00	4	5000.00	289.9

AVERAGE CONCENTRATIONS FOR 1 HOURS

```
* * * R E C E P T O R   N U M B E R * * *
                1.         2.         3.         4.         5.         6.
SOURCE        PARTIAL CONCENTRATIONS (G/CU M)
   1.      8.042E-12 4.039E-10 4.702E-09 2.412E-08 7.529E-08 1.709E-07
             TOTAL CONCENTRATIONS (G/CU M)
           8.042E-12 4.039E-10 4.702E-09 2.412E-08 7.529E-08 1.709E-07

* * * R E C E P T O R   N U M B E R * * *
                7.         8.         9.        10.        11.        12.
SOURCE        PARTIAL CONCENTRATIONS (G/CU M)
   1.      2.741E-07 3.963E-07 5.307E-07 6.704E-07 8.100E-07 9.449E-07
             TOTAL CONCENTRATIONS (G/CU M)
           2.741E-07 3.963E-07 5.307E-07 6.704E-07 8.100E-07 9.449E-07

* * * R E C E P T O R   N U M B E R * * *
               13.        14.        15.        16.
SOURCE        PARTIAL CONCENTRATIONS (G/CU M)
   1.      1.072E-06 1.189E-06 1.296E-06 1.391E-06
             TOTAL CONCENTRATIONS (G/CU M)
           1.072E-06 1.189E-06 1.296E-06 1.391E-06
```

PLANT YATES - SHORT-TERM - CASE B: UNITS 2-5 AND UNIT 1 - SET 1

MAXIMUM 1 HOUR CONCENTRATION

****

RECEPTOR NUMBER	X-COORD. (KMS)	Y-COORD. (KMS)	DOWNWIND DIST.(KMS)	CONCENTRATION (MUGS/M3)
1	.50	.00	.50	.00
2	.60	.00	.60	.00
3	.70	.00	.70	.00
4	.80	.00	.80	.02
5	.90	.00	.90	.08
6	1.00	.00	1.00	.17
7	1.10	.00	1.10	.27
8	1.20	.00	1.20	.40
9	1.30	.00	1.30	.53
10	1.40	.00	1.40	.67
11	1.50	.00	1.50	.81
12	1.60	.00	1.60	.94
13	1.70	.00	1.70	1.07
14	1.80	.00	1.80	1.19
15	1.90	.00	1.90	1.30
16	2.00	.00	2.00	1.39

```
ENTER (1) TO MAKE ANOTHER ENTIRE RUN
ENTER (2) TO CHANGE SOURCE, RECEPTOR, AND MET DATA
ENTER (3) TO CHANGE ONLY RECEPTOR AND MET DATA
ENTER (4) TO CHANGE ONLY MET DATA
ENTER (5) TO END
          5
```