Prevention of Significant Deterioration Application

Cherry Point Cogeneration Project

June 2006

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PREVENTION OF SIGNIFICANT DETERIORATION AMENDMENT APPLICATION

CHERRY POINT COGENERATION PROJECT ELECTRIC GENERATING FACILITY

Prepared for

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June 21, 2006

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1 INTRODUCTION

BP West Coast Products LLC (BP) obtained a Final PSD Permit authorizing construction and operation of a 720 MW natural-gas-fired combined-cycle combustion turbine cogeneration facility (Cherry Point Cogeneration Project) adjacent to the Cherry Point Refinery located near Blaine, Washington that became effective on June 21, 2005. The revised Application for that PSD Permit was submitted as part of BP's Revised Application for Site Certification to the Washington Energy Site Evaluation Council (EFSEC) dated April 2003 and is referred to herein as the "2003 Application.".

BP now seeks to amend the PSD permit to allow for the construction of an alternate configuration for the cogeneration facility at the same location, referred to herein as the "520MW Project", or the "Project." Like the permitted 720MW project, the smaller cogeneration facility will be designed and permitted to provide base load electric service and to operate year-round except for maintenance. Distribution of the electric power will be to the nearby transmission system with some electric power dedicated to the BP Cherry Point Refinery via existing internal transmission systems. Commercial operation is expected to begin in the 2nd calendar quarter of 2009.

At this time, BP is considering the purchase of combustion turbines (CTs) from either of two turbine manufacturers, namely: General Electric (GE) and Siemens. Depending on the final selection of combustion turbines (CTs) and the final size of the steam turbine (ST), the nominal generating capacity of the cogeneration facility will be in the range of 520 to 570 megawatts (MW) at ISO conditions.

The Project will consist of two combustion turbines (CTs), two associated heat recovery steam generators (HRSG) and one unfired steam turbine (ST). The HRSGs will be equipped with supplemental firing capability (duct burners). The Project will be operated only in combined-cycle mode. The CTs will be fired with natural gas. The duct burners will be fired with gaseous fuels such as natural gas or refinery fuel gas (RFG) treated to reduce total sulfur in the RFG to a level equivalent to that of natural gas. Each of the CT/HRSG combinations will have an associated stack with Best Available Control Technology (BACT) applied to control potential air emissions.

The Project will also include the installation and operation of the following:

- one diesel-driven generator approximately 1,500 kilowatt (kW) in size to supply emergency electric power to the facility for running essential facility equipment and systems when external power is not available from the grid and the CTs are not operating;

- one diesel-driven fire water pump; and,

- one multi-cell cooling tower.

The diesel engines will fire only low-sulfur distillate fuel oil with a maximum sulfur content of 0.05 percent (%).

Further discussion of Project equipment is provided in Section 2 of this document.

Operation of the Project will result in the emission of criteria pollutants such as particulate matter, oxides of nitrogen (NO_X), carbon monoxide (CO), sulfur dioxide (SO_2), volatile organic compounds (VOCs) and some toxic air pollutants (TAPs). For purposes of this analysis, all NO_X emissions are assumed to be 100 percent converted to nitrogen dioxide (NO_2) and all particulate matter is assumed to be fine particulate matter (PM_{10}).

U.S. Environmental Protection Agency (USEPA) guidance stipulates that the proposed Project will be considered as a

> "*fossil fuel fired steam electric plant of more than two hundred fifty (250) million British Thermal Units (mmBtu) per hour heat input*"

and is one of the 28 listed sources in the Washington Administrative Code (WAC), Section 173, Chapter 400 [WAC 173-400-030(40)(e)(xxvi)]. This Project will be considered a new major source of air emissions since the projected "potential-to-emit (PTE)" annual emission rate of oxides of nitrogen (NO_X) (a regulated criteria pollutant) is expected to exceed 100 tons per year (tpy).

The Project site area is considered to be in "attainment" (currently meeting the ambient air quality standards) for all criteria pollutants. No "non-attainment" areas exist within 50 kilometers of the Project site.

Based on the Project's PTE for NO_X and its location in an "attainment" area, the Project is subject to review under the Prevention of Significant Deterioration (PSD) regulations as presented in the Code of Federal Regulations (CFR), Title 40, Part 52, Subpart A, Section 52.21 (40 CFR 52.21) and the state of Washington Department of Ecology (Ecology) PSD permit program requirements outlined in WAC 173-400. An overview of the regulations relevant to the Project is presented in Section 3 of this document.

The EFSEC is the regulatory authority responsible for the PSD permit. During the preparation of the 2003 Application, the National Park Service (NPS) and Federal Land Manager (FLM) were included in discussions regarding the Project and the PSD air quality requirements. Included in the discussions with the regulatory agencies were the selection of BACT, the methodology for conducting the air quality analyses and the extent of air quality and other impact analyses required.

The cogeneration facility is designed to integrate with the BP refinery to increase the overall efficiency of electrical and steam generation. Operation of the cogeneration facility will minimize the need to obtain electricity from external generating and distribution sources and will avoid the operation of temporary natural-gas-fired turbine generators. The cogeneration

facility will also provide an average of approximately 510,000 pounds per hour (lbs/hr) of steam to the refinery, which will allow BP to shut down three older utility boilers.

The cogeneration facility will enable BP to shut down boilers and make other modifications at the refinery that are expected to result in a net reduction in overall criteria air emissions. These emissions reductions are largely ignored for purposes of this PSD permit application.

Based on the results of an evaluation of Best Available Control Technology (BACT) and an air quality impact analysis, BP will be able to select the CTs from either of the two vendors. Also, the plant will be able to operate at any load condition between 50 percent and base load (100 percent), with or without supplemental firing (duct burners) in the HRSG without causing any of the pollutant-specific significant impact levels (SILs) [WAC 173-400-113(3)] to be exceeded and without impairment to visibility.

The technical analysis information contained in this application presents significant evidence to demonstrate the following:

- PSD review is required for PM_{10}, NO_X, CO, SO_2, VOC, and sulfuric acid mist (H_2SO_4) emissions.
- BACT will be applied to control emissions. Dry low-NO_X combustors and Selective Catalytic Reduction (SCR) will be utilized in the HRSGs to reduce NO_X emissions. The combustion of clean-burning natural gas will minimize PM_{10} and SO_2 emissions. Good combustion controls in combination with oxidation catalyst will be BACT for CO, VOCs and toxic air pollutants.
- Air quality in the proposed site area will not be adversely affected by the operation of the proposed Project. Projected ambient impacts for all criteria pollutants will be below the SILs and well below the federal and state ambient air quality standards (AAQS).
- Projected impacts of toxic emissions will not exceed any of the Ecology-specified Acceptable Source Impact Levels (ASILs) listed in WAC 173-460.
- No non-attainment areas or sensitive PSD Class I areas will be adversely impacted by Project emissions.
- Predicted impacts will be well below applicable Class I and Class II PSD increments.

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The calculation of emissions (emission inventory) is discussed in Section 4. The selection of emission control technologies (BACT) is discussed in Section 5. The methodology used to conduct the air quality impact analyses is presented in Section 6 with the air quality impact analysis results presented in Section 7.

2 PROJECT DESCRIPTION

2.1 Site Description

The BP Cherry Point Refinery and the proposed Project site are located in the 6,500-acre area zoned for Heavy Impact Industrial use in the Whatcom County Comprehensive Plan issued May 20, 1997. Surrounding this area, the land is primarily rural and agricultural with some low-density residential areas. The Alcoa Aluminum plant and the Conoco-Phillips Northwest Refinery are located about 6 miles south-southeast of the Project site. By USEPA definition, the surrounding land is considered to be “flat or gently rolling terrain.” The ground-level elevation at the proposed Project site area is approximately 115 feet above mean sea level (MSL). Figure 2-1 shows the location of the BP Cherry Point Refinery on a regional basis and Figure 2-2 shows the refinery and its immediate surroundings.

BP proposes to locate the cogeneration facility immediately adjacent to the Cherry Point Refinery. The specific location and two alternate facility diagrams of the proposed power generating facility is illustrated in Figures 2-3 and 2-4. The "base case" has the steam turbine building located between the two CTs. In the “alternate case,” the steam turbine is located to the south to the two CTs. This configuration applies to either the GE or Siemens CTs.

Natural gas will be supplied to the site primarily through the existing refinery connections to the proprietary Ferndale Pipeline, which connects to the West Coast Energy Pipeline at the U.S./Canada border near Sumas.

2.2 Major Project Components

2.2.1 Combustion Turbines

BP proposes to install and operate up to two (2) General Electric (GE) 7FA combustion turbines (CTs) or two Siemens SGT6-5000F CTs in combined-cycle mode. The “power block” will consist of two CTs and generators, two HRSGs and one steam turbine and generator. The CTs will be fueled only with natural gas, whereas the HRSG duct burners will fire gaseous fuels such as natural gas, refinery fuel gas, or a mixture thereof. The refinery fuel gas would be treated before combustion to reduce the total sulfur in the gas to the same quantity of sulfur found in natural gas. The two combustion turbine generators (CTGs) and the steam turbine generator (STG) will provide the electric power production.

The combustion turbine is the heart of a combined-cycle electric power generating facility. First, ambient air is drawn through an air inlet then filtered and compressed. The compressed air is then mixed with natural gas and combusted in the turbine combustor. Heat input to the turbine combustor would be approximately 1,614 million British Thermal Units per hour

(mmBtu/hour) for the GE turbine and 1,826 mmBtu/hour for the Siemens turbine based on the lower heating value (LHV) and subject to load conditions and ambient temperature. Exhaust gas from the combustor is expelled through a power turbine that drives an electro-magnetic generator, thereby producing electricity. Exhaust gas exits the power turbine at approximately 1,100 degrees Fahrenheit (ºF) and is routed to the HRSG.

Each CT unit will consist of an air compressor, a fuel combustion system, a power turbine, and a 60-hertz (Hz) generator unit. The GE CT generator sets will be designed to produce approximately 173 MW each of electric power at base load and 50°F ambient temperature. The Siemens CT generator sets will be designed to produce approximately 198 MW each of electric power at base load and 50°F ambient temperature. Actual hourly production rates will depend on operating and ambient conditions such as load, ambient air temperature and ambient relative humidity. The generation of some air emissions, as well as the CT exhaust flow characteristics, are similarly affected by the operating load and ambient air conditions.

The CTs will be designed to operate 24 hours per day every day of the year. Based on potential power requirements, operation of the CTs at loads between 50 percent and 100 percent of base load is anticipated. Operation at less than 50 percent of base load is not anticipated for significant periods of time and will be associated with CT startup or shutdown periods.

2.2.2 HRSG With Supplemental Heat Input (Duct Burners)

Since the exhaust gas exiting the CT is at a temperature significantly above the original air inlet conditions, it will be routed to an HRSG system for heat extraction (individual HRSGs for each CT). Each HRSG will be a three-pressure (high, intermediate, and low pressure steam generation) natural circulation design and will have the capability of supplemental firing (duct burners). The HRSG extracts heat from the CT exhaust and includes the following:

- High, intermediate and low pressure superheaters
- High, intermediate and low pressure evaporators
- High and intermediate pressure economizers
- Condensate/feedwater preheater

Exhaust gas will enter the HRSG at approximately 1,100°F and will be cooled to approximately 175°F to 195°F by the time it is routed to the HRSG exhaust stack. The extracted heat will be used to generate high-pressure steam, intermediate pressure steam, and low-pressure steam. The steam from the HRSG system will then be routed to a steam turbine.

Duct burners in the HRSG will be used to add heat, up to a maximum of 600 mmBTU/hour on an LHV basis, to the HRSG when additional steam or electric power production is required. The duct burners will fire only gaseous fuels (natural gas, refinery fuel gas, or a mixture of the two).

2.2.3 Steam Turbine

The Project will include one condensing steam turbine (ST) designed for variable pressure operation. The high-pressure portion of the ST will receive high-pressure superheated steam from the HRSG. Similarly, the intermediate-pressure and low-pressure portions of the ST will receive intermediate- and low-pressure steam from the HRSG. The ST will be provided with a surface condenser, comprised of a shell, tubes, a water box, and a hot well. Cooling water for the surface condenser will be supplied from a multi-cell cooling tower described below.

Although the final capacity of the steam turbine is not yet finalized, it will drive an electro-magnetic generator (STG) that will be capable of generating approximately 200 MW of electric power.

The ST is not an air emissions source.

2.2.4 Diesel Generator and Diesel Firewater Pump

One diesel-driven emergency generator about 1,500 kW in size will be installed to provide support system power to critical plant instrument and lubrication systems in the event that electric power is not available from the grid. A diesel-driven firewater pump will be used to maintain firewater pressure in the event that electric power is not available or firewater pressure is inadequate. The diesel firewater pump is currently anticipated to be a John Deere Model 6081A engine (or equivalent) rated at 265 brake horsepower (bhp).

The diesel engines will be of latest design, which minimize the NO_X, CO, VOC, and PM emissions by using good combustion controls. The SO_2 emissions from the diesel engines will be minimized by using 0.05 weight percent sulfur (0.05% S) diesel fuel.

Maintenance and readiness testing checks of the diesel engines are necessary to ensure the reliability of the engines. It is anticipated that the emergency diesel generator and the firewater pump would be operated about one to two hours per week for maintenance and readiness testing purposes. However, up to a total of about 250 hours per year is evaluated in the air quality analysis. They will also operate as needed in emergency situations.

2.2.5 Cooling Cycle

Water plant cooling needs will be supplied from an induced-draft, counter-flow, multi-cell cooling tower. Fans at the top of each cooling tower cell will maintain a flow of air through the cooling tower. Circulating water pumps will move the water from the tube side of the condenser, where it picks up heat, to the top of the cooling tower. At the top of the cooling tower, the warm water is distributed onto a perforated deck. The water will fall through the perforations and will be cooled by evaporation as it falls through baffles (called “fill”) to a basin at the bottom of the tower. Cool water from the cooling tower basin will be returned to the condenser via the circulating water pumps. Cooling tower components will include the basin, fans, fan deck, drift eliminators, fill, and other necessary components.

Emissions from the cooling tower are expected to consist only of PM_{10}. These emissions originate from the dissolved solids that crystallize and form airborne particulates as the cooling water vaporizes. High efficiency drift eliminators with a drift rate of 0.001 percent will be installed.

2.2.6 Emission Control Systems

The CTs will emit the criteria pollutants NO_X, CO, VOCs, SO_2, and PM_{10}, as well as a variety of other air emissions from the combustion of natural gas. Combusting only natural gas in the CTs will minimize pollutant emissions associated with proposed operations.

The CTs will be equipped with lean pre-mix dry low-NO_X combustors. These combustors have been developed to minimize the formation of NO_X. A Selective Catalytic Reduction (SCR) catalyst bed and ammonia injection grids for the control of NO_X emissions will be installed in the HRSG as well as a catalytic oxidation bed for the control of CO emissions. The oxidation catalyst will also control some of the VOC emissions. Good combustion controls and operating practices will minimize combustion pollutants such as VOC, PM_{10} and toxic air pollutants. Sulfur dioxide will be controlled by the use of natural gas, which is inherently low in sulfur.

More in-depth discussions of the emission calculations and the emission control technologies associated with the Project are included in the Emission Inventory (Section 4) and BACT evaluation (Section 5) within this document.

2.2.7 Process Control System

An integrated microprocessor based control system will be provided for power block control, data acquisition, and data analysis. The control system will be used for startup, shutdown, monitoring and control of emissions, and for protection of personnel and equipment.

2.2.8 Facility Exhaust Stacks

The exhaust flow from each CT/HRSG combination will vent through a separate stack. The stack height for each CT/HRSG combination will be 150 feet.

2.2.9 Other Facility Structures and Equipment

The Project would include the following other structures, facilities and equipment:

- Steam turbine area, including foundations and support structures, for the steam turbine and its associated surface condenser
- One pressurized storage vessel for storage of anhydrous ammonia

- A warehouse area housing a workshop, a maintenance area, and offices
- Air compressor system for each unit
- Raw water storage tank
- Demineralized water storage tank
- An electrical substation and associated transformers, switches, and protective devices to step the voltage of the generated power from generator voltage to transmission line voltage.

Permanent paved on-site parking will be provided to accommodate all employees in addition to maintenance crews, visitors, and deliveries.

3 REGULATORY OVERVIEW

The USEPA and Ecology have developed air quality regulations and guidelines that require all new or modified "major sources" of air emissions to undergo a rigorous permitting process prior to commencing construction. The federal program is called New Source Review (NSR). Imbedded within the overall federal NSR program is the Prevention of Significant Deterioration (PSD) program. The provisions of the federal PSD program are contained in the Code of Federal Regulations (CFR), Title 40, Part 52, Subpart A, Section 52.21 (otherwise noted as 40 CFR 52.21). Ecology, in conjunction with Region X of the USEPA, is the regulatory authority generally responsible for review of submitted PSD applications in Washington. Since this Project is in excess of 350 MW in electric generating capacity, the facility is subject to the EFSEC regulations and EFSEC is the agency responsible for the issuance of the air permit.

The following regulatory requirements are discussed in this section:

- New Source Review (NSR)
- New Source Performance Standards (NSPS)
- Prevention of Significant Deterioration (PSD)
- National Emission Standards for Hazardous Air Pollutants (NESHAPS)
- Acid Rain Program (Title IV of the 1990 Clean Air Act Amendments [CAAA])
- Air Operating Permit Program (Title V of the 1990 CAAA)
- Risk Management Plan – (Title III of the 1990 CAAA)

In addition to the above, the facility will be subject to various Ecology and EFSEC rules and regulations. The specific provisions for obtaining a PSD permit in the state of Washington are contained in WAC 173-400. Other permitting provisions are cross-referenced in the included sections of WAC 173-400 and also will apply to the new facility. Other permitting requirements are similarly cross-referenced in the Ecology and EFSEC regulations.

3.1 New Source Review

The NSR program applies to new or modified sources that could cause a significant increase in emissions of air pollutants. The objectives of the NSR process are to demonstrate that air emissions from the new source will not significantly impact ambient air quality near the facility and that state-of-the-art emission controls will be applied.

To satisfy the general NSR requirements, the following information must be submitted:

- Notice of Construction Application Form and associated information. This application form is included at the front of the PSD application.

- PSD Applicability Analysis. The specific requirements of the PSD regulations are discussed in Section 3.3. An Ecology-required PSD Applicability Form is included at the front of this PSD application.

- "Top-down" BACT Analysis. Discussed in Section 5 of this application.

- Toxic Air Pollutant Review (WAC 173-460). Discussed in Section 3.4 of this application.

- Air Quality Modeling Analysis. Discussed in Sections 6 and 7 of this application.

3.2 Emission Standards (NSPS)

The USEPA has adopted federal emission standards applicable to various combustion sources. These emission standards are referred to as the "New Source Performance Standards (NSPS)." USEPA promulgated the NSPS for stationary CTs in 40 CFR 60, Subpart GG, dated September 1979. Ecology has adopted the federal NSPS (WAC 173-400-115). The NSPS applicable to the proposed Project are summarized in Table 3-1.

A review of the federal requirements for CTs indicates that NSPS exist for NO_X and SO_2. The NO_X emission rate proposed for this Project (see Section 4, Emissions Inventory) is considerably less than the calculated 103 ppm NSPS value. For SO_2, both of the NSPS values given in Table 3-1 will be met through the combustion of natural gas.

The duct burners are subject to the NSPS for steam generating units in 40 CFR 60, Subpart Db. The NO_X emission limit for the duct burners is 0.20 lb/mmBtu.

For visible emissions (opacity), the Ecology requirement is an average of 20 percent opacity in any three (3) minute period.

There are no other NSPS emissions standards applicable to this electric power generating facility.

3.3 Prevention of Significant Deterioration (PSD)

3.3.1 Attainment/Non-Attainment

The Clean Air Act (CAA) and subsequent amendments require both the USEPA and the individual states to evaluate whether areas within a state are in attainment with the AAQS. To make this assessment on a regional basis, Air Quality Control Regions (AQCRs) were established. Each AQCR is characterized into one of the following three types:

- In attainment (meeting all ambient air quality standards)

- Unclassifiable (thought to be meeting ambient air quality standards but lacking sufficient data confirmation)

- Non-attainment (measurements indicate ambient air quality standards have been or are being exceeded)

Areas are classified on a pollutant-specific basis. Unclassifiable areas are treated as being in attainment until sufficient data are collected to make a determination and the State Implementation Plan (SIP) is amended.

PSD review applies only to sources located in an attainment area or in an area designated as unclassifiable. Ecology officially designates the area around the BP Cherry Point Refinery as being in attainment for all regulated pollutants. No state of Washington designated non-attainment areas exist within 50 kilometers of the Project site.

3.3.2 Applicability

For a new or modified source to be located in an "attainment" area, applicability to the PSD provisions is determined by the type of source and the quantity of air pollutants a source emits or has the "potential-to-emit (PTE)" with control equipment in operation. If a "new" source has the potential to emit more than 100 tons per year of any pollutant subject to regulation under the CAA and if it can be classified as one of the 28 source types listed in WAC 173-400-030(40)(e), then, for purposes of the federal PSD regulations, the source is considered to be a "major source" [40 CFR 52.21(b)(23)(i)]. A "new" source is also considered "major" if the "potential-to-emit" is 250 tons per year or more of any criteria pollutant, but is not one of the 28 listed sources.

The proposed cogeneration Project is considered a new "major" source because the projected annual emissions of NO_X, CO and PM_{10} exceed the 100 tpy major source threshold. Therefore, the Project is subject to PSD for NO_X, CO and PM_{10} emissions. Also, the projected (potential-to-emit) annual emissions of VOC, SO_2, and H_2SO_4 exceed the individual significant emission rate (SER) thresholds listed in WAC 173-400-030(67). Therefore, the Project is also subject to PSD review for those pollutants.

3.3.3 General Review Requirements

Since the Project is subject to PSD review, the extent of analysis necessary to demonstrate compliance with the regulations must be individually determined for each pollutant.

According to the federal PSD and Ecology requirements, a new major source with projected annual emissions increases of any listed pollutant in excess of specified SER thresholds [WAC 173-400-030(67)] (see also Table 3-2) is required to provide the following demonstrations for each subject pollutant:

- That the appropriate emission control technologies are applied

- An evaluation of the existing ambient air quality in the area of the Project site
- That the projected impact of facility emissions do not exceed pollutant-specific ambient air quality standards and/or PSD increments
- That there is no adverse impact to visibility, soils, vegetation and growth

Based on the annual emissions data presented in Section 4, the Project is subject to the above evaluations for the criteria pollutants NO_X, CO, VOCs, SO_2, PM_{10}, and sulfuric acid mist. Further review is not required for any other air emission type listed in WAC 173-400-030(67).

An emission inventory, and possibly dispersion modeling, is also required for toxic air pollutants (TAPs) that are also VOCs or PM_{10}. TAP air quality evaluations are not regulated through the PSD program but, are required by Ecology through the implementation of regulation WAC 173-460.

3.3.4 Best Available Emission Control Technology (BACT)

In the state of Washington, a BACT analysis is required for each air pollutant that is projected to have an increase in emissions (regardless of the amount of emissions). A BACT analysis is provided for CO, NO_X, VOCs, SO_2, PM_{10}, and sulfuric acid mist as well as for TAPs. A full discussion of BACT is presented in Section 5 of this application document.

3.3.5 Ambient Air Quality Impacts Analysis Requirements

The 1970 CAA mandated ambient air quality standards for certain pollutants, based upon possible identifiable effects on the public health and welfare. Applicants seeking to obtain an air permit must demonstrate, through the use of the appropriate air quality dispersion models, that the national and state Ambient Air Quality Standards (AAQS) as well as the pollutant-specific PSD increments will not be exceeded.

Criteria pollutants are those pollutants with an associated AAQS. Currently, AAQS exist for six criteria pollutants: sulfur dioxide (SO_2), fine particulate matter (PM_{10}), nitrogen dioxide (NO_2), carbon monoxide (CO), photochemical oxidants as ozone (O_3), and lead (Pb) (see Table 3-4). The total suspended particulate (TSP) standard was replaced by the PM_{10} standard in 1987.

3.3.5.1 Significant Impact Level Analysis

Dispersion modeling for PSD applications typically first focuses on comparing the dispersion model results for the new source alone to the established significant impact levels (SILs) and determining if further modeling (PSD increment and multi-source cumulative) is required (also called identification of significant impact area). The SILs are typically 1 to 5 percent of the AAQS and are well below any levels that could lead to adverse health or welfare impacts. The SILs are presented in Table 3-5.

Used in air quality impact analyses, the SILs are a screening-level tool to determine the extent of air quality analysis required to demonstrate compliance with the AAQS and PSD increments. According to USEPA and Ecology guidance, if the modeled maximum ("worst-case") concentrations are below the SILs, no significant impact area exists and no further modeling, taking into account other nearby increment consuming or existing sources of air emissions, is required to demonstrate compliance with the PSD increments and the AAQS. Projected (modeled) pollutant concentrations below the SILs are considered to be inconsequential relative to the PSD increments and the maintenance of the ambient air quality standards.

Based on the results of the dispersion modeling impact analyses for this Project, all modeled concentrations, for all air criteria air emissions, are below their respective SILs. Therefore, further air quality modeling analyses are not necessary to demonstrate compliance with all ambient air quality standards and PSD increments (see discussion in Section 7).

3.3.5.2 PSD Increment and AAQS Consumption Analysis

If a SIL is projected to be exceeded for a given pollutant, then a significant impact area exists for that pollutant. The USEPA and Ecology then require an applicant to model the cumulative impacts of all "increment consuming" and "existing" sources of that pollutant at locations where predicted concentrations attributable to the proposed facility are above the SIL (within the significant impact area). The air quality analyses then change from being focused on the SILs to being focused on demonstrating compliance with PSD increments and ambient air quality standards.

PSD increments have been established for NO_2, PM_{10}, and SO_2 and are interpreted as the maximum allowable ground-level concentration increases of the subject pollutant. PSD increment consumption is evaluated both spatially and temporally. Comparison to the PSD increments is made by summing the contributions to the predicted ground-level pollutant concentration at a particular location from all increment consuming sources (existing and new). The dispersion modeling analysis must take into account all emission sources constructed or modified after a pollutant-specific baseline date. All emission increases (and decreases) are considered to consume (or reduce) PSD increment. The amount of PSD increment available to a new source depends on the contribution of other PSD-subject sources to the total increment consumption.

Based on the results of the dispersion modeling analyses, further evaluation to demonstrate compliance with the PSD increments is not necessary. The PSD increments are presented in Table 3-3.

Cumulative modeling for the AAQS evaluation must also include major existing sources located within the proposed source's pollutant-specific significant impact area as well as those sources which have been permitted, but which are not yet operational. Major sources located outside the proposed source's significant impact area, but which have a significant impact within the significant impact area of the proposed new source, also must be included in the cumulative modeling analysis. To account for regional background levels and other sources not included in the modeling analysis, a measured representative background

concentration is added to the predicted concentration for each subject pollutant. This total concentration, per subject pollutant, is then compared to the respective ambient air quality standards to assess compliance.

Based on the results of the dispersion modeling analyses, further evaluation to demonstrate compliance with the ambient air quality standards is not necessary.

3.3.5.3 Other Impacts Analyses

PSD review and Ecology guidance require that other impacts be documented. Such other analyses include the following:

- Commercial, residential, and other growth that could occur in the area as a result of the Project
- The impairment to soils and vegetation
- The impact on PSD Class I areas including visibility, deposition and concentration
- The requirement for pre-construction ambient air quality monitoring

Two PSD Class I-designated areas are within a 100 kilometer radius of the proposed electric generating facility site, namely:

- North Cascades National Park (located approximately 80 kilometers to the east)
- Olympic National Park (approximately 100 kilometers to the southwest)

Other nearby PSD Class I areas (within 200 kilometers of the site) include the following:

- Glacier Peak Wilderness Area (approximately 115 kilometers to the southeast)
- Pasayten Wilderness Area (approximately 145 kilometers to the east)
- Alpine Lakes Wilderness Area (approximately 175 kilometers to the south-southeast)

During the preparation of the 2003 Application, a meeting was held at Ecology in which the National Park Service (NPS) and Federal Land Manager (FLM) requested that four areas be considered in the air quality impacts analyses. At the suggestion of the FLMs, the PSD Class I air quality/visibility impacts analyses include the North Cascades National Park, the Olympic National Park, Glacier Peak Wilderness Area, and the Alpine Lakes Wilderness Area. In addition, the FLM requested that, although not a PSD Class I area, the air quality impacts at the Mount Baker Wilderness Area be evaluated.

USEPA guidelines (USEPA, October 1990) specify an exemption from preconstruction ambient air quality monitoring if projected (modeled) maximum pollutant concentrations are below the pollutant-specific *de-minimus* values presented in Table 3-6. Based on the results

of the air quality impact analyses, preconstruction ambient air quality monitoring is not required for this project.

3.4 Toxic Air Pollutant Review

Ecology's toxic air pollutant regulations are contained in WAC 173-460. More than 500 toxic compounds are regulated by Ecology. Each new or modified source of toxic air pollutants (TAPs) must be evaluated under the NSR requirements.

As part of the NSR, BACT must be satisfied for TAP emissions estimated to increase as a result of the installation of the proposed Project. An acceptable source impact level (ASIL) has been developed for each compound and is intended to represent the one-in-one-million (1:1,000,000) risk level. The ASIL is expressed as a concentration in micrograms per cubic meter ($\mu g/m^3$) in ambient air. To determine if a toxic compound exceeds its ASIL, air quality modeling is typically performed. Alternatively, the emission rates from the proposed new source or modification can be compared on a pounds per year or pounds per hour basis to the small quantity emission rate (SQER) exemptions listed in WAC 173-460. If the impact of a TAP is above an ASIL, refined dispersion modeling or a detailed health impact assessment (HIA) may be required.

In this application, each identified toxic air pollutant emission rate is compared to the SQER. If it is below the SQER, no further action is taken. If the SQER is exceeded, dispersion modeling to compare against the ASIL is performed. The results of the toxic air pollutant review are discussed in Section 7.

3.5 Other Clean Air Act Requirements

3.5.1 Hazardous Air Pollutants/NESHAPS

By USEPA Interpretive Rule (Federal Register (65 FR 21363), this type of facility is not categorically exempt from “case-by-case” MACT determinations (CAAA Sections 112[g] and 112[j]). However, as no individual HAP will have an emission rate greater than 10 tons per year (tpy) and no combination of HAPs will have a total cumulative annual emission rate of greater than 25 tpy, the facility is not subject to the MACT requirements.

No current National Emission Standards for Hazardous Air Pollutants (NESHAPs), for sources regulated under 40 CFR 61, are applicable to the proposed facility. Therefore, no current or proposed NESHAP, for sources regulated under 40 CFR Part 63, apply to the proposed facility.

3.5.2 Title IV - Acid Rain

Title IV of the Clean Air Act (the so-called “acid rain” rules) applies to utility units that commence commercial operation on or after November 15, 1990, produce electricity for sale

and do not fall into one of the regulatory exemptions. These rules are contained in 40 CFR Parts 72, 75, and 76 and have been adopted into WAC 173-406. The "acid rain" rules will apply to the Project's CTs and duct burners because these units will be utility units serving one or more generators with a nameplate capacity of greater than 25 MW.

The Title IV program consists of three primary requirements.

1. The Project will need to submit an "acid rain" permit application at least 24 months before the anticipated date for start of operations.

2. The proposed facility will be subject to requirements for continuous emissions monitoring for NO_X and diluents gas (O_2 or CO_2).

3. The proposed facility will be subject to the "acid rain" recordkeeping and reporting requirements, including the requirement to obtain and document SO_2 allowances.

As this CAAA requirement will be fulfilled independent of the PSD process, no further discussions of this issue are included in this document.

3.5.3 Title V – Air Operating Permit

The proposed facility will be subject to the federal Part 70 – Title V air operating permit program. An application must be filed within 12 months after facility operations commence. The appropriate permit documentation will be filed under separate cover and independent of the PSD process. As this CAAA requirement will be fulfilled independent of the PSD process, no further discussions of this issue are included in this document.

3.5.4 Title III – Prevention of Accidental Release

The Project will use aqueous ammonia in the SCR system and could potentially become subject to the Prevention of Accidental Release provisions of the 1990 CAAA, Section 112(r). The handling and transport of ammonia could present environmental risks such as potential spills and subsequent evaporation of ammonia gas to the atmosphere. If the facility is determined to be subject to these provisions and prior to receiving the first shipment of ammonia at the facility, a Risk Management Plan (RMP) covering the storage, handling, and use of ammonia at the facility will be prepared and submitted to the appropriate regulatory authority. This is not part of the PSD or NOC process and would be addressed separately and prior to operation of the facility.

4 EMISSIONS INVENTORY

In accordance with direction provided by Ecology, the projected emissions of the expected pollutants (criteria and toxics) from the turbine configurations have been evaluated. Criteria pollutant emissions and operating parameter information for the CTs were provided by the turbine manufacturers. This information is contained in Appendix A for the GE CTs and in Appendix B for the Siemens CTs.

For the GE 7FA CTs, no change in engine performance characteristics and the calculation of emissions is expected from those presented in the 2003 Application. The engine performance characteristics and calculation of emissions for the Siemens CTs have been added. Also, the duct firing rate has been increased from the 2003 Application to a maximum of 600 mmBTU/hour on an LHV basis. A summary of the calculated criteria pollutant emissions and the emission calculations for the toxic air pollutants are provided in Appendix C. A description of the operating scenarios and emission calculation methodology is presented below.

4.1 Operating Scenarios

The combustion turbine is an internal combustion engine with emissions varying with ambient temperature and load condition. Since turbine operating parameters are directly affected by the ambient temperature, the ambient temperatures of 5°F, 50°F, and 85°F are considered in the emission calculations. These temperatures are chosen to represent one winter condition (5°F), an annual average condition (50°F), and one hot summer condition (85°F). Turbine emissions are higher at lower ambient temperatures. For each of these temperatures, three load conditions are considered: 100 percent (base load), 75 and 50 percent load. It is conservatively assumed that the gas turbines will operate 24 hours per day, 7 days per week.

The proposed emission units for this Project are as follows:

- Two (2) General Electric Frame 7FA combustion turbines (approximately 1,614 mmBtu/hour lower heating value (LHV) for each turbine at 50°F and base load conditions) or two (2) Siemens SGT6-5000F combustion turbines (approximately 1,826 mmBtu/hr LHV)
- One diesel-driven emergency generator, about 1,500 kW in size
- One diesel-driven firewater pump, about 265 hp in size
- One multi-cell cooling tower

For each of the ambient temperatures, the following operating scenarios are considered:

- Base load on natural gas for up to 8,760 hours per year (2 CT's at 100 percent load, no duct firing)
- Base load on natural gas with duct burners operating on natural gas or refinery fuel gas at a maximum rate of 600 mmBTU/hour LHV for up to 8,760 hours per year (2 CT's at 100 percent load, 600 mmBTU/hour duct firing)
- Startup scenarios which include 95 days with daytime only operation, weekday only operation, and a three week maintenance shutdown. The remaining hours at base load with duct burners operating on natural gas or refinery fuel gas at a maximum rate of 600 mmBTU/hour LHV.
- An emergency diesel generator operating for testing and maintenance purposes for approximately two hours a week on any given day and up to a maximum of 250 hours per year.
- The diesel generator operating in an emergency (external power not available and turbine not operating) for any given 24-hour period. Turbines would not be operating.
- A firewater pump operating for testing and maintenance purposes for approximately of two hours a week on any given day and up to a maximum of 250 hours per year.
- The firewater pump operating in an emergency for any given 24-hour period. Turbines may be operating at the time.
- A cooling tower (PM_{10} only) operating at peak capacity 24 hours per day, 7 days per week, 52 weeks per year.

The calculation of the emissions rates is discussed in the following sections.

4.2 Criteria Air Pollutant Emissions

4.2.1 Combustion Turbine/HRSG Emissions

The criteria air pollutant emissions estimates for the CTs are provided by the turbine manufacturers and are based on the emissions for a single turbine. The flue gas data for each of the ambient temperatures and load conditions are also provided. The combustion turbine manufacturer information is presented in Appendix A for the GE turbine and in Appendix B for the Siemens turbine as well as the stack emissions information provided by the Project design team. Summaries of the calculated criteria and toxic pollutant emissions for the CTs are provided in Appendix C. For the GE 7FA CT, no change in operating characteristics or emissions is expected from those presented in the 2003 Application. The operating characteristics and emissions for the Siemens SGT6-5000F CT are also now presented.

The emission rates of NO_X and CO are controlled and include approximate removal efficiencies of 72 to 80 percent of NO_X by the SCR for the GE and Siemens turbines and 72 to 87 percent of CO for the GE turbines and 52 to 80 percent of CO for the Siemens turbines by the oxidation catalysts. Based on information from the catalyst vendor, the VOC emission rates include a reduction of approximately 30 percent by use of the oxidation catalyst.

Sulfur dioxide emissions are calculated from the maximum expected sulfur content of the natural gas as approximately 0.8 grains/100 standard cubic feet of natural gas for 24-hour and annual averages and 1.6 grains/100 standard cubic feet of natural gas for 1-hour and 3-hour averages. These values are suggested by Alan Newman (Newman, March 2002) of Ecology and include the addition of 0.3 grains/100 standard cubic feet for odorant.

The use of HRSGs, duct burners, and SCR and CO catalyst systems cause part of the SO_2 that is formed in the combustion process to convert to SO_3. The conversion rate is assumed to be 20 percent of the total SO_2 as suggested by Alan Newman (Newman, March 2002) of Ecology. These assumptions are then used to estimate the formation of ammonium sulfate, which is formed due to the use of ammonia in the SCR catalyst system. For this Project, it is assumed that 100 percent of the SO_3 forms ammonium sulfate. The ammonium sulfate is then added to the PM_{10} emissions estimate.

Some of the SO_3 is also expected to form sulfuric acid. Therefore, this application uses an assumption that 20 percent of the total SO_2 is converted to SO_3 and then forms sulfuric acid. Also note that sulfuric acid is not included in the PM_{10} emissions since it is regulated by itself for purposes of both PSD and WAC 173-460.

Due to the lack of actual source test information on the amount of SO_2 to SO_3 conversion and the distribution of sulfuric acid and ammonium sulfate, the emissions estimates for this Project account for the same amount of sulfur several times, which results in very conservative estimates of PM_{10} and sulfuric acid emissions.

Duct firing will use gaseous fuels (natural gas, refinery fuel gas, or a combination of each). The refinery fuel gas would be treated before combustion to reduce the total sulfur in the gas to the same quantity of sulfur found in natural gas. The same emission factors are used for each fuel for every pollutant. Therefore, the emissions will be the same for either fuel or the combinations thereof.

Estimates of startup and shutdown emissions were obtained from the turbine manufacturer. Startup emissions are classified into three types of startups; hot starts, warm starts, and cold starts. Hot starts are those starts that occur less than 8 hours after the turbine has been shut down. Warm starts are when the turbine is restarted after being shut down for 8 to 48 hours. Cold starts are when the turbine is restarted after being shut down for more than 48 hours.

Annual emissions are calculated using the higher of two methods. The first method assumes operation at base load with maximum duct firing for the entire year (8,760 hours.) The second method uses a conservative scenario in which the turbines are not operating constantly. This scenario includes 95 days with daytime only operation (16 hours per day), weekday only operation (offline for 28 hours or 52 hours on a three day weekend), and a

three week maintenance shutdown. It includes 338.5 hours of startup, 144 hours of shutdown, 2,469.5 hours where the turbines are offline, and 5,808 hours with the turbines operating with maximum duct firing. Both of these methods are very conservative because they assume that whenever the turbines are operating they are operating a full load with maximum duct firing, even though it is expected that there will be periods when the turbines are operating at base load with no duct firing or at partial loads. These periods have lower emissions for all pollutants and their inclusion would result in lower values for annual emissions. Every pollutant except CO has higher emissions for the first method, full-time operation. CO emissions are higher during startups, therefore the second method is the better method to show the potential annual emissions for CO.

A complete listing of the criteria pollutant hourly emissions for each operating scenario is presented in Appendix C. A summary of hourly emission rates for criteria pollutants for the CT units (on a per unit basis) is shown in Tables 4-1 for the GE turbines and 4-2 for the Siemens turbines. Calculations for the annual emissions are also presented in Appendix C. A summary of the annual emission rates for the facility is presented in Tables 4-4 and 4-5.

4.2.2 Auxiliary Emission Units

The emission factors for the emergency generator and the firewater pump were obtained from the manufacturers. Cooling tower PM_{10} emissions are based on the projected operation of the cooling tower and the total dissolved and suspended solids of the make-up water and based on a drift rate of 0.001 percent. A complete listing of the hourly emissions for the criteria pollutants from the auxiliary equipment is presented in Appendix C. A summary of hourly emission rates is shown in Table 4-3 and annual emission rates along with facility emissions are presented in Tables 4-4 and 4-5.

4.3 Toxic Air Pollutant Emissions

4.3.1 Combustion Turbines

As the toxic air pollutant emissions are a subset of VOC and PM_{10} emissions, they also vary with inlet temperature and load condition. The emission factors used are either weight percentages of PM_{10} and/or VOC or based on a fuel input. Since the toxic emissions for the CTs vary with operating condition, the emissions are presented at the highest load and lowest temperature, which generally represent worst-case conditions. It is then assumed that these conditions occur for the entire year (i.e., the annual average toxic emissions are over-estimated to obtain a conservative estimate that is then used in the modeling analysis). Full load operation with maximum duct firing is used for the hourly emissions. Full load operation with maximum duct firing for 365 days is used for annual emissions.

Emission factors for PM_{10} and VOC toxic compounds are obtained from two different sources. Emissions factors are obtained from the speciation tables provided by the USEPA (USEPA, January 1990) and the California Air Resources Board (CARB, August 1991) for internal combustion sources. Both agencies have published tables that speciate toxic

compounds found in PM_{10} and VOC emissions from various emission sources (both the USEPA and CARB tables are based on source testing data from the same sources).

The EPA and CARB emission factors are presented as a weight fraction of VOC or PM_{10}. Therefore, the PM_{10} and VOC emission rates must be known in order to use the emission factors. The VOC emission factors are adjusted to a non-methane, non-ethane factor as the VOC emissions are presented on a non-methane, non-ethane basis. The PM_{10} emission rate used in calculating the particulate toxics is for the gas turbine alone. The addition of ammonium sulfates to the total PM_{10} emission rate should not be used when calculating the particulate toxics since ammonium sulfate is not a toxic compound and would erroneously over-estimate the particulate toxics.

Emission factors from AP-42 are also used to supplement the EPA and CARB speciation tables. Section 3.1 of AP-42 is used for natural gas combustion in the CTs and Section 1.4 of AP-42 is used for natural gas combustion in the duct burners.

Sulfuric acid emissions are calculated based on the sulfur dioxide emissions as is previously discussed in Section 4.2 of this document. It is assumed that 20 percent of the total sulfur dioxide emissions are converted to sulfuric acid.

A complete list of toxic emissions for the CTs is presented in Appendix C and a summary of toxic emissions for the CTs that require modeling is presented in Table 4-6 and 4-7.

4.3.2 Auxiliary Equipment

The VOC toxic emissions for the emergency generator and the firewater pump are calculated using emission factors from AP-42 (USEPA, October 1996). Section 3.3 of AP-42 is used for the diesel-driven firewater pump and Section 3.4 is used for the auxiliary diesel generator. These emission factors are based on the heat input to the engines. The PM toxic emissions are calculated using CARB speciation tables for diesel engines (CARB, August 1991) and are emission factors that are based on the hourly PM emission rate. Emissions estimates are presented in Appendix C and Table 4-6 and 4-7.

5 BEST AVAILABLE CONTROL TECHNOLOGY

5.1 Introduction

Ecology requires the application of BACT for the control of each regulated pollutant emitted (in any amount) from a new source located in an attainment area. The BP CT units are subject to BACT with respect to NO_X, CO, VOC, SO_2, sulfuric acid mist (H_2SO_4), PM_{10}, and toxic air pollutants. For purposes of PSD, the SERs are exceeded for NO_X, CO, SO_2, PM_{10} and H_2SO_4.

BACT is defined in WAC 173-400-030(12) as follows:

> *"An emission limitation based on the maximum degree of reduction for each air pollutant subject to regulation under the Chapter 70.94 RCW emitted from or which results from any new or modified stationary source which the permitting authority, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such source or modification through application of production processes and available methods, systems, and techniques, including fuel cleaning or treatment, clean fuels, or innovative fuel combustion techniques for control of each such pollutant. In no event shall application of best available control technology result in emissions of any pollutant which will exceed the emissions allowed by any applicable standard under 40 CFR Part 60 and Part 61. Emissions from any source utilizing clean fuels, or any other means, to comply with this paragraph shall not be allowed to increase above levels that would have been required under the definition of BACT in the Federal Clean Air Act as it existed prior to enactment of the Clean Air Act Amendments of 1990.*

The annual average controlled and uncontrolled emissions for Case 7B (50ºF, 100 percent load, and maximum duct firing) have been used throughout the BACT analysis.

5.1.1 Previous BACT/LAER Determinations

A list of previous BACT/LAER determinations for combustion turbines is presented in Appendix D. The summary includes determinations for NO_X, CO, VOC, SO_2, PM_{10}, and some toxic compounds. The USEPA's RACT/BACT/LAER Clearinghouse (RBLC) keeps a listing of RBLC determinations by governmental agencies for various types of air emission sources. The determinations are available on the USEPA's Technology Transfer Network's (TTN) web page. The RBLC listings in Appendix D cover information from 2001 until present and include determinations throughout the United States. It should be noted that not all BACT determinations made in the U.S. are included in the database as the completeness of the list is dependent on the submittal of recent determinations by the regulatory authorities.

5.1.2 Top-down BACT Approach

The BACT requirements are intended to ensure that a proposed facility incorporates control systems that reflect the latest techniques used in a particular industry, allow for future growth in the vicinity of the proposed facility, and do not result in the exceedance of a National Ambient Air Quality Standard (NAAQS) or other standards imposed on the state level. The BACT evaluation requires the documentation of performance levels achievable for each air pollution control technology applicable to a natural-gas-fired combustion turbine facility.

USEPA and Ecology recommend that a top-down approach be taken when evaluating available air pollution controls. The top-down BACT evaluation process is described in the USEPA document New Source Review Workshop Manual (USEPA, October 1990). The five steps involved in a top-down BACT evaluation are as follows:

- Identify all available control options with practical potential for application to the emission unit and the regulated pollutant under evaluation
- Eliminate technically infeasible options
- Rank remaining control technologies by control effectiveness
- Evaluate most effective controls and document results; if the top option is not selected as the BACT, evaluate the second most effective control option
- Select the BACT, which will be the most effective option not rejected based on energy, environmental, and economic impacts

The top down approach is used in this analysis to evaluate available pollution controls for the Project.

5.1.3 Economic Analysis

An economic analysis of each BACT alternative was performed to compare capital and annual costs (i.e., dollars per ton of pollutant removed). Capital costs include the initial cost of components intrinsic to the complete control system (reactors, piping, rotating equipment, instrumentation, monitoring equipment, and supports) and installation costs. Annual operating costs consist of the financial requirements to operate the control system on an annual basis. They include overhead, maintenance, labor, raw materials, and utility costs. Manufacturer quotes and economic calculations can be found in Appendix E.

This analysis has updated the original analysis by using the same manufacturer quotes and increasing the amounts to account for inflation. The original quotes were from 2001. The inflation rate was obtained from the U.S. Department of Labor and is assumed to be a factor of 1.08 for the period of 2001 through 2005 (the last full year with data.)

5.1.3.1 Capital Costs

The capital cost estimating technique used in this analysis is based on a factored method of determining direct and indirect installation expenses. The technique is a modified version of the "Lang Method" whereby installation costs are expressed as a function of known equipment fees. This method is consistent with the latest USEPA guidance manual *OAQPS Control Cost Manual* (USEPA, December 1995), on estimating control technology costs. The estimation factors used to calculate total capital costs are shown in Table 5-1.

Purchased equipment costs represent the delivered cost of the control equipment, the auxiliary equipment, and the instrumentation. Auxiliary equipment consists of all structural, mechanical, and electrical components required for efficient operation of the device. These include such items as fuel storage, supply piping, and exhaust gas ductwork. Auxiliary equipment costs are taken as a straight percentage of the basic equipment cost, the percentage being based on the average requirements of typical systems and their auxiliary equipment (USEPA, December 1995). In this BACT evaluation, basic equipment costs were obtained directly from the equipment vendors or from BP. Instrumentation, usually not included in the basic equipment cost, is typically 10 to 15 percent of the basic equipment cost depending on the specific application.

Direct installation costs include materials and labor for site preparation, foundations, structural steel, erection of equipment, piping, electrical wiring, painting, and facilities. Indirect installation costs include engineering and supervision of contractors, construction and field expenses, construction fees, and contingencies. Direct installation costs are expressed as a function of the purchased equipment cost, based on average installation requirements for typical systems. Indirect installation costs are designated as a percentage of the total direct cost (the purchased equipment cost plus the direct installation cost) of the system. The factors are based on the assumption that the installation is performed by an outside contractor and not by facility personnel. Other indirect costs include equipment, startup and performance testing, working capital, and interest accrued during construction.

5.1.3.2 Annualized Costs

Annualized costs are comprised of direct and indirect operating expenses. Direct costs include labor, maintenance, replacement parts, raw materials, utilities, and waste disposal. Indirect operating costs include facility overhead, taxes, insurance, general administration, and capital charges. Factors used to estimate total annualized costs are listed in Table 5-1. These annualized cost factors were obtained from the USEPA's Control Cost Manual (USEPA, December 1995).

Direct operating labor costs vary according to the system operating mode and operating time. Labor supervision is estimated as 15 percent of operating labor. Maintenance costs are calculated as 3 percent of the total direct cost (TDC). Replacement part costs, such as the cost to replace spent catalyst, have been included where required. Raw material and utility costs are based upon estimated annual consumption, and the unit costs are summarized in Table 5-1. In this BACT evaluation, the SCR and oxidation catalyst is assumed to be replaced every 3 years. The SCONOx catalyst is assumed to be replaced every 5 years. The

cost of replacement catalyst is approximately 65 percent of the purchased equipment cost or given by the catalyst vendor. The cost of replacement catalyst is then annualized.

With the exception of overhead, indirect operating costs are calculated as a percentage of the total capital cost. The indirect capital costs are based on the capital recovery factor (CRF), defined as:

$$CRF = \frac{i(1+i)^n}{(1+i)^n - 1}$$

where "i" is the annual interest rate and "n" is the equipment economic life (years). A control system's economic life is typically 10 to 20 years (USEPA, December 1995). In this analysis, a 10 year equipment economic life of each available control technology is used. The average interest rate is assumed to be 7 percent (USEPA, December 1995). The CRF is calculated to be 0.142.

5.1.3.3 Cost-effectiveness

The cost-effectiveness of an available control technology is based on the annualized cost of the available control technology and its annual pollutant emission reduction. Cost-effectiveness is calculated by dividing the annualized cost of the available control technology by the tons of pollutant removed for that control technology each year. The annual pollutant emission reduction for each pollutant is presented in Table 5-2 for the GE turbines and Table 5-3 for the Siemens turbines. The annual emission reductions are based on the turbines operating 60% of the time with duct burners and 40% of the time without duct burners. It does not include periods where the turbines operate at part load, are starting up, shutting down, or offline. The bases for determining the uncontrolled emissions, controlled emissions, energy and environmental impacts, and control technology cost-effectiveness for each pollutant are summarized in the following subsections.

5.2 BACT for Nitrogen Oxides

5.2.1 Formation

NO_X is formed in two ways in the combustion processes:

- the combination of elemental nitrogen and oxygen in the combustion air within the high temperature environment of the combustor (thermal NO_X); and,
- the oxidation of nitrogen chemically bound in the fuel (fuel-bound NO_X).

Natural gas does not contain a significant amount of fuel-bound nitrogen. Therefore, the bulk of NO_X emissions will originate as thermal NO_X.

The rate of formation of thermal NO_X is a function of the residence time, free oxygen, and peak flame temperature. "Front-end" NO_X control techniques such as the design of the CT combustor are aimed at controlling one or more of these variables. Other control methods, such as SCR, are known as "back-end" controls and remove NO_X from the exhaust gas stream after it is formed.

5.2.2 Review of Previous BACT Determinations for NO_X

The RBLC database was searched for natural gas-fired "large combustion turbines" that are combined cycle or cogeneration (process code 15.210). The period from 2001 to May 2006 was searched.

The lowest NO_X emission for CTs of similar size listed in USEPA's RBLC (See Appendix D) is 2 ppm for 16 facilities. According to the RBLC listing, three of these represent LAER and the rest represent BACT. Since 2003, nearly every facility has been permitted in the 2 to 3.5 ppm range. Every facility utilizes SCR as a control technology. None of the facilities listed is a cogeneration facility with the variable steam demands of an oil refinery.

Ten other plants listed in the RBLC are in the Pacific Northwest. These include, in order of increasing NO_X limit, Sumas Generation in Washington and Wanapa Energy in Oregon which are listed at 2 ppm; Cob Energy, Klamath Generation, the Port Westward Plant in Oregon, Wallula Generation, Satsop Combustion Turbine project, Longview Energy in Washington and Garnet Energy in Idaho which are all listed at 2.5 ppm; and Chehalis Generation in Washington at 3 ppm. These facilities are all located in attainment areas for NO_X and, therefore, represent BACT. All of the above named facilities are using Selective Catalytic Reduction (SCR) catalyst systems for control of NO_X emissions.

In connection with the original PSD permitting decision for the 720MW Cogeneration Project, EFSEC and EPA considered whether it would be appropriate to limit NOx emissions to 2.0 ppm as in some of the facilities listed above. EFSEC and EPA concluded that a 2.5 ppm limit was appropriate given the unique features of the project. They summarized:

> The Project's CTs and DBs will be fired under variable load conditions to adjust for continuous swings in steam demand across multiple process units at the BP Cherry Point Refinery. Variable DB and CT firing rates will generate greater NOx emissions (exit gas NOx concentrations) and therefore limit the Project's ability to reduce emissions below 2 ppm NOx. Stand-alone combined cycle power generation plants and cogeneration facilities with more predictable and steady-state steam loads simply enjoy more favorable operating conditions to control NOx emissions below 2 ppm.

PSD/NOC Permit No. EFSEC/2002-01, Responsiveness Summary 8 (Sep. 24, 2004). The proposal to construct a smaller 2x1 cogeneration project rather than the original 3x1 project does not affect this analysis. The Project will still be operated under variable load conditions with fluctuating and unanticipated changes in steam demand. Accordingly, a 2.5 ppm NOx emissions limit continues to be appropriate for the use of SCR.

5.2.3 Potentially Available Control Techniques

A review of the information available at the USEPA's RBLC (See Appendix D) was conducted. In addition, vendors of potentially available NO_X control techniques were contacted as well as regulatory agencies in the Pacific Northwest.

Selective Catalytic Reduction (SCR) is a control technique that has been used for more than ten years in a large number of power generation applications, mainly for large gas turbine applications. In an SCR system, ammonia is injected into the exhaust gas where it reacts with NO_X at a catalyst bed. The catalyst lowers the activation energy of the chemical reactions that take place in order to reduce ammonia and NO_X to nitrogen gas and water. SCR can provide 80 to 90 percent NO_X control when initially installed and recent projects have been permitted with NO_X emission limitations as low as 2.0 or 2.5 ppmvd stack outlet concentration.

$SCONO_X$™ (SCONOx) is a control technology that has been given consideration by USEPA and state regulatory agencies as a potential emission control technology. $SCONO_X$ is a catalytic technique that simultaneously oxidizes CO to CO_2, NO to NO_2 and then absorbs NO_2 onto the surface of a catalyst through the use of a potassium carbonate absorber coating. VOCs are also removed by the catalyst system. This control technique does not use ammonia. According to EmeraChem (formerly Goal Line Environmental Technologies), the vendor of SCONOx, SCONOx can achieve NO_X emissions of less than 2 ppm in some experimental applications but, this has only been demonstrated on smaller combustion turbines (approximately 1 to 40 MW) in California and Massachusetts. To date, there have not been any SCONOx systems installed on large CT applications.

The USEPA Environmental Appeals Board and the California Energy Commission (CEC), on May 30, 2001, issued simultaneous rulings on another project that the SCONOx technology is not technically feasible for turbines of the size being considered for the proposed 520MW Project. In that ruling, the CEC confirmed there are several operational requirements associated with the SCONOx technology that makes it impractical as an emission control technology for 'F' Class turbines. It is further stated that all routine operating conditions were not covered in the SCONOx technology guarantee and that the guarantee would be voided if liquid water came into contact with the catalyst [*Three Mountain Power, LLC CEC Decision and EPA PSD Appeal No. 01-05* (May 31, 2001)]. This would be an impractical limitation for a catalyst bed situated downstream of boiler tubes, such as are in the HRSG. These decisions confirm the fact that the SCONOx technology is technically infeasible for a combined-cycle system of the size of the proposed facility. However, as requested by the regulatory agencies, a discussion of the SCONOx technology is included as part of this BACT determination.

XONON is a catalytic process that reduces NO_X emissions within the turbine combustion zone by lowering the combustion temperature and hence the NO_X formation. XONON has not yet been scaled up for use on larger combustion turbines and has only been demonstrated on small CTs (1.5 MW). Because XONON has not yet been developed for the GE 7FA or Siemens STG6-5000F combustors, it is not considered technically feasible for this Project and is eliminated from further consideration as BACT.

Selective non-catalytic reduction (SNCR), such as Thermal $DeNO_X$ and NO_XOUT, has also been considered for NO_X removal. SNCR does not use a catalyst and injects ammonia or urea directly in to the flue gas after the turbine. This technique requires temperatures of at least 1,600ºF and up to 2,200ºF. This technique can be used on boilers where the exhaust gas can reach these high temperatures but, has not been used in any CT applications where the exhaust gas maximum temperature is about 1,200ºF. Therefore, SNCR is not technically feasible for this Project and is eliminated from further consideration as BACT.

Some catalyst manufacturers also market non-selective catalytic reduction systems but, they do not work on sources that have high oxygen levels in the exhaust gas (such as CTs) and are, therefore, not technically feasible.

For the above reasons, only SCR and SCONOx are discussed in the following sections as add-on controls to the dry low-NO_X combustor.

5.2.4 SCONOx

EmeraChem (formerly Goal Line Environmental Technologies) developed and offers the SCONOx catalyst system (which it now calls EMx™) for combustion turbines. A cost quote was obtained directly from EmeraChem for the 720MW project in 2001.

As of June 2006, no SCONOx (EMx) systems have actually been installed and operated on any large CT applications. SCONOx has only been operated on a 34 MW facility in California since 1996 and a 5 MW facility in Massachusetts since 1999. As noted in Section 5.2.3 above, the CEC has determined that SCONOx is not technically feasible for large CT installations. The CEC decision has been upheld by the USEPA Environmental Appeals Board. SCONOx (EMx) cannot be claimed to be a proven technology, much less a technology that is as reliable as SCR, as SCRs have been used successfully on large combustion turbine applications for more than 10 years.

SCONOx is a highly mechanical system with dampers, seals, and louvers that all must function properly. The risk of mechanical failures is high with this type of system, especially since parts of it operates at a vacuum. If the vacuum is lost, the entire plant must be shut down, and power generation is lost. It is estimated that at least one unscheduled outage of the SCONOx system will occur annually where the turbine must be shut down. It is estimated that the outage would last for five days with a corresponding need to buy electricity from the commercial grid during this period. Therefore, the cost of a five day downtime has been added to the annualized costs (see the economic analysis).

The capital and operating costs of SCONOx are also extremely high compared to an SCR system. The capital cost and annualized costs per turbine are approximately five times higher than for SCR. Even though SCONOx is not considered technically feasible, further discussion and evaluation is provided.

5.2.4.1 Technical Analysis

Oxidation/Absorption Cycle. The SCONOx catalyst works by simultaneously oxidizing CO to CO_2, NO to NO_2, and then absorbing NO_2 onto its surface through the use of a potassium carbonate absorber coating. These reactions are shown below.

$$CO + \tfrac{1}{2}O_2 \rightarrow CO_2$$

$$NO + \tfrac{1}{2}O_2 \rightarrow NO_2$$

$$2NO_2 + K_2CO_3 \rightarrow CO_2 + KNO_2 + KNO_3$$

The CO_2 in the above reactions exhausts through the stack. Note that during this cycle, the potassium carbonate coating reacts with nitrogen compounds to form potassium nitrites and nitrates, which are then present on the surface of the catalyst. The SCONOx catalyst must, therefore, be regenerated on a regular basis to maintain maximum NO_X absorption.

Regeneration Cycle. The regeneration of the SCONOx catalyst is accomplished by passing a controlled mixture of regeneration gases across the surface of the catalyst in the absence of oxygen. The regeneration gases react with nitrites and nitrates to form water and elemental nitrogen. Carbon dioxide in the regeneration gas reacts with potassium nitrites and nitrates to form potassium carbonate, which is the absorber coating that was on the surface of the catalyst before the oxidation/absorption cycle began. The relevant reaction is shown below.

$$KNO_2 + KNO_3 + 4H_2 + CO_2 \rightarrow K_2CO_3 + 4H_2O + N_2$$

Water (as steam) and elemental nitrogen are exhausted through the stack instead of NO_X and potassium carbonate is once again present on the surface of the catalyst allowing the oxidation/absorption cycle to begin again.

Because the regeneration cycle must take place in an oxygen free environment, a section of catalyst undergoing regeneration must be isolated from exhaust gases. This is accomplished using a set of louvers, one upstream of the section being regenerated and one downstream. During the regeneration cycle, these louvers close and a valve opens, allowing regeneration gas into the section. Tadpole seals on the isolation louvers provide a barrier against leaks during operation. At any given time, four of five of these sections are in the oxidation/absorption cycle and one of five is in the regeneration cycle. A regeneration cycle typically is set to last for 3 to 7 minutes, so each section is in the oxidation/absorption cycle for 12 to 28 minutes. This part of the system could cause significant downtime if there is a mechanical malfunction.

Production of Regeneration Gas. The technology for producing a regeneration gas containing a dilute concentration of hydrogen from natural gas can be accomplished in several ways. For installations operating at below 450°F, the SCONOx system uses an inert gas generator for the production of hydrogen and carbon dioxide. For installations with operating temperatures greater than 450°F, the catalyst can be regenerated by introducing a

small quantity of natural gas with a carrier gas, such as steam, over a steam reforming catalyst and then to the SCONOx catalyst. The reforming catalyst initiates the conversion of methane to hydrogen and the conversion is completed over the SCONOx catalyst. The reforming catalyst is placed upstream of the SCONOx catalyst in a steam reformer reactor.

Other Considerations. The SCONOx catalyst is reported to be very sensitive to sulfur in the exhaust. Sulfur must, therefore, be removed prior to the catalyst. According EmeraChem, a sulfur filter can be used. The sulfur filter is placed in the inlet natural gas feed prior to the regeneration production skid. The sulfur filter consists of impregnated granular activated carbon that is housed in a stainless steel vessel. Spent media is discarded as a non-hazardous waste.

The SCONOx catalyst system causes a pressure drop similar to SCR catalysts. This results in a loss in power output. An OAQPS cost control factor of 0.2 percent of the megawatt output is used to calculate the annual cost of this loss in power output.

The SCONOx catalyst needs to be replaced on a regular basis. In this analysis, the catalyst is assumed to be replaced every five years. The leading layer of catalyst is washed every year whereas the remaining catalyst is washed every third year, usually in conjunction with scheduled turbine outages.

Other requirements for the SCONOx system operation are steam for catalyst regeneration, electricity, and natural gas to compensate for power losses stemming from the pressure drop across the catalyst.

5.2.4.2 Environmental Impacts

According to EmeraChem, the SCONOx system does not contribute to particulate matter since there is no ammonia to aid in the formation of ammonium salts. Since the system does not use ammonia, there are no risks of accidental spills during storage, transport and handling. However, SCR has been considered BACT for NO_X control on large CT power plants for many years and the environmental impacts of ammonia due to SCR usage have been acceptable to the USEPA and state regulatory agencies.

5.2.4.3 Economic Impacts

The cost of SCONOx compared with a low-NO_X combustor is presented below. The combustion turbines are equipped with dry low-NO_X combustors that are guaranteed to achieve 9 ppmvd NO_X during natural gas firing at loads between 50 and 100 percent. The low-NO_X combustors are currently commercially available and do not incur additional cost.

The HRSG will be equipped with low-NO_X duct burners with a NO_X emission rate of 0.08 lb/mmBtu. The low-NO_X duct burners are commercially available and do not incur additional cost. Capital costs and annualized costs incurred from installing a SCONOx system were developed using the cost determination methodology described in Section 5.1.3.

Capital costs associated with operating a SCONOx system on each of the CTs are based on cost quotations obtained from EmeraChem (Davis, September 2001). The basic equipment

cost was obtained for a SCONOx catalyst system to control NO_X to 2 ppm, at least 90 percent removal of CO, and 90 percent removal of VOC at base load.

EmeraChem offers several price options, namely:

- The complete system can be purchased, which includes the mechanical equipment and the catalyst.
- The mechanical equipment can be purchased in conjunction with leasing the catalyst.
- The catalyst can be purchased by itself or leased by itself.

The latter two options allows the customer to obtain the mechanical equipment elsewhere. For this Project, only the complete system purchase and the mechanical system purchase in conjunction with leasing the catalyst are evaluated.

Complete System Purchase Option. This option allows the customer to buy all the SCONOx capital equipment including the catalyst module and reactor housing, regeneration gas system, and catalyst removal system. EmeraChem has not included the cost of installation, some necessary auxiliary equipment, catalyst washing, catalyst replacement, or maintenance of the system. The basic equipment cost for the complete system purchase option is approximately $10,959,800 per turbine. When installation costs are added, the total capital cost is $21,970,300. The capital costs are presented in Table 5-4.

Annualized costs are also shown in Table 5-4. They include additional labor, maintenance, and annual catalyst replacement costs. Utility costs, as well as other system replacement parts, are also listed. The cost of a five-day unscheduled outage is also added when BP would have to buy electricity from the commercial grid. The actual cost would be the differential cost to produce the electricity in the cogeneration plant and the cost to buy the electricity. This is estimated to be $10 per MWh. Spent catalyst would be returned to the vendor, who includes the catalyst disposal costs in the price of the catalyst. The total estimated annualized cost of the complete system purchase option on each CT is $7,071,550. The SCONOx catalyst system can remove approximately 309 tons/year of NO_X from the GE turbines and 343 tons/yr of NO_X from the Siemens turbines(about 90 percent removal efficiency), resulting in a costs of $22,900 and $20,600 per ton of NO_X removed, respectively.

Mechanical Purchase/Lease Option. The lease option allows the customer to buy the capital equipment with the exception of the catalyst. The catalyst is leased and, in the leasing price, the first catalyst charge and all required catalyst replacements are included. EmeraChem has not included the costs of installation, some necessary auxiliary equipment, catalyst washing, or maintenance of the system.

The basic equipment cost for the mechanical equipment is approximately $6,314,000 per turbine. When installation costs are added, the total capital cost is $12,728,500. The capital costs are presented in Table 5-5. Annualized costs for the lease option are the same as the

complete system purchase option except that the catalyst replacement is included in the lease price. The annualized costs are $4,780,550 and are also shown in Table 5-5. The same amount of NO_X is removed, which results in a costs of $15,500 and $13,900 per ton NO_X removed for GE and Siemens, respectively.

Comparison of SCONOx with SCR and oxidation catalyst. Since SCONOx can remove NO_X, CO, and VOC simultaneously, the cost per total pollutant removed using SCONOx is compared to SCR in combination with oxidation catalyst. The cost for total NO_X, CO, and VOC removed by SCONOx is $13,000 per ton and $13,400 per ton got the GE and Siemens turbines, respectively for the purchase option and $8,800 and $9,100 per ton for the lease option. The cost for total NO_X, CO, and VOC removed by SCR in combination with oxidation catalyst is $6,400 per ton for the GE turbine and $6,600 for the Siemens turbine as shown in Table 5-6.

Conclusion. The cost of both price options for SCONOx is significantly higher than what is considered reasonable for control of NO_X in Washington, which has typically been around $10,000 per ton of NO_X removed (Newman, May 2002). Since SCONOx is not yet a proven technology, it cannot be considered as reliable as SCR and the cost of downtime could be even higher than what is presented. In addition, when comparing SCONOx to SCR in combination with oxidation catalyst, the cost per total NO_X, CO, and VOC removed is not reasonable. Therefore, since the economic impacts are cost prohibitive and the technology is not proven, SCONOx cannot be considered BACT for control of NO_X.

5.2.5 Selective Catalytic Reduction

The formation of NO_X from the CTs is minimized by the use of dry low-NO_X combustors. According to the manufafcturers, these combustors control NO_X to 9 ppmvd for the GE 7FA and Siemens SGT6-5000F turbines under full load operating conditions and for loads down to 50 percent during natural gas firing. To achieve lower levels of NO_X, add-on control would be required such as SCONOx or SCR. In this section, SCR is evaluated.

5.2.5.1 Technical Analysis

SCR is a process that involves post-combustion removal of NO_X from the flue gas with a catalytic reactor. In the SCR process, ammonia injected into the combustion turbine exhaust gas reacts with nitrogen oxides and oxygen in the exhaust gas to form nitrogen and water. The chemical reactions are:

$$4\ NO + 4\ NH_3 + O_2 \longrightarrow 4\ N_2 + 6\ H_2O$$

and

$$6\ NO_2 + 8\ NH_3 \longrightarrow 7\ N_2 + 12\ H_2O$$

These reactions take place on the surface of the catalyst. The function of the catalyst is to lower the activation energy of the NO_X decomposition reaction effectively. Technical factors

related to this technology include the catalyst reactor design, optimum operating temperature, sulfur content of the fuel, and design of the NH_3 injection system.

The catalyst reactor is of fixed-bed design. In this reactor design, the catalyst bed is oriented perpendicular to the flue gas flow. The reactants are transported to the active catalyst sites through a combination of diffusion and convection. In this Project, where there is an HRSG used for heat recovery, the SCR unit will likely be installed between the superheater and the high pressure evaporator coils of the HRSG.

In recent years, there have been many advances to the catalyst formulation. The narrow range of catalyst operating temperatures used to be a disadvantage. SCR systems were rarely used in high temperature exhaust applications. New materials are constantly being developed and evaluated and there are several materials available for SCR catalysts. This Project would use a typical vanadium-titanium catalyst system, which has an operating temperature range of about 600 to 800°F.

Installation of a catalyst bed also causes a pressure drop of approximately 4 inches of water, which contributes to a loss in power output. An OAQPS cost control factor of 0.2 percent of the megawatt output is used to calculate the annual cost of this loss in power output.

Sulfur content of the fuel is an additional concern for systems that employ SCR. Catalyst systems promote oxidation of sulfur dioxide to sulfur trioxide (SO_3), which combines with water to form sulfuric acid or reacts with excess ammonia to form ammonium salts.

The SCR process is also subject to catalyst deactivation over time due to physical deactivation and chemical poisoning. Catalyst suppliers typically guarantee a three year catalyst life for combustion turbine applications.

In all SCR applications, there will be some unreacted ammonia emitted through the stack since the ammonia is injected in a slightly higher ratio than is stoichiometrically required. The ammonia slip design rate is a maximum of 5 ppm and is often lower in actual operation of the source.

5.2.5.2 Environmental Impacts

The potential environmental impacts associated with the use of SCR are:

- Small amounts of unreacted ammonia would be emitted to the atmosphere (ammonia slip)
- Small amounts of ammonium salts potentially could be emitted to the atmosphere

The use of SCR technology will result in ammonia emissions to the atmosphere due to unreacted ammonia leaving the SCR unit. BP proposes to operate the facility with a maximum 24-hour average concentration of 5 ppmvd (at 15 percent O_2). All of the emissions calculations and air quality evaluations are based on the 5 ppmvd limit.

Ammonium salts would be emitted to the atmosphere if SCR is used with sulfur-bearing fuels. The ammonium salts can be formed when sulfur trioxide reacts with ammonia to form ammonium sulfates. The potential ammonium sulfates from this Project have been quantified and included in the PM_{10} emissions and evaluated in the air quality modeling sections of the PSD application.

5.2.5.3 Economic Impacts

The cost of SCR compared with a low-NO_X combustor is presented below. The CTs will be equipped with dry low-NO_X combustors that will be guaranteed to achieve 9 ppmvd NO_X when firing natural gas at loads between 50 and 100 percent. The low-NO_X combustors are currently commercially available and do not incur additional cost. The HRSG will be equipped with low-NO_X duct burners with a NO_X emission rate of 0.08 lb/mmBtu. Capital costs and annualized costs for installing an SCR system are developed using the cost determination methodology described in Section 5.1.3.

Capital costs associated with operating an SCR system on each of the CT/HRSG systems are based on cost quotations obtained from Envirokinetics in connection with the 2003 Application (Crites, July 2001). These costs have been inflation-adjusted to represent 2005 values, the most current available. The overall removal efficiency is approximately 72 to 80 percent to achieve a NO_X level of 2.5 ppm. SCR capital equipment includes the catalyst, reactor, ammonia storage tanks, SCR control systems and instrumentation, and ammonia delivery system. These items represent the basic equipment, including the cost of the initial catalyst, which is estimated at $2,291,900 in 2001 dollars and $2,475,300 in 2005 dollars. When the direct and indirect installation costs are added, the total capital cost is estimated at approximately $4,974,700 for each turbine. The capital costs are presented in Table 5-7 on a per-turbine-basis.

Annualized costs for SCR are also shown in Table 5-7. They include additional operating labor (2 hours per shift) and supervisory labor. Replacement parts include an annual catalyst replacement cost as well as other system replacement parts. Spent catalyst would be returned to the vendor, who typically includes the catalyst disposal costs in the price of the catalyst.

Other annualized costs include ammonia at an estimated cost of $300 per ton, an output penalty due to pressure drop across the catalyst, and indirect operating costs (overhead, taxes, insurance, capital recovery). Total estimated annualized costs of the SCR system on each CT are shown in Table 5-3.

The annual pollutant emission reduction for NO_X from an SCR is based on base load operation with maximum duct firing rate. This is a conservative assumption that will result in the maximum amount of controlled emissions and therefore the lowest cost per ton. The emission reduction is 391 tons per year per turbine and is presented in Table 5-7.

The cost, per CT, of adding an SCR system to the dry low-NO_X combustor is $5,900 per ton of NO_X removed (assuming a NO_X emission concentration of 2.5 ppmvd) for the GE turbine and $5,400 for the Siemens turbine. The cost is representative of BACT for NO_X control on the CTs.

5.2.6 NO_X BACT Conclusions

BACT for NO_X from the CTs and duct burners is proposed based upon the use of SCR and turbines/duct burners equipped with low-NO_X combustors. The BACT emission limitation is determined to be 2.5 ppmvd (corrected to 15 percent O_2) during steady state operations, based on an annual average. Ammonia slip associated with the SCR will be limited to a maximum 24-hour average of 5 ppmvd.

5.3 BACT for Carbon Monoxide

5.3.1 Formation

Carbon monoxide (CO) is formed as a result of incomplete combustion of fuel. CO is controlled by providing adequate fuel residence time and high temperature in the combustion device to ensure complete combustion. These control factors, however, also result in high emission rates of NO_X. Conversely, a low NO_X emission rate achieved through flame temperature control (by low-NO_X combustors) can result in higher levels of CO emissions. Thus, a compromise is established whereby the flame temperature reduction is set to achieve the lowest NO_X emission rate possible while keeping the CO emission rates at acceptable levels.

5.3.2 Review of Previous BACT Determinations for CO

A review of USEPA's RBLC database from 2001 to May 2006 (See Appendix D) and contacts with combustion turbine manufacturers indicate that the most common add-on control for CO is catalytic oxidation. However, since low CO emissions can be achieved by combustion control alone, some entries in the RBLC quote good combustion control as the BACT control option.

The lowest CO level listed in the RBLC is the CVP Warren project in Virginia at 1.8 ppm. It is unclear in the RBLC database whether this represents LAER or BACT. There are many facilities listed at 2 ppm as BACT. Permitted limits range up to 10 ppm or higher for several facilities.

Nine other plants listed in the RBLC are in the Pacific Northwest. These include, in order of increasing CO limits, Wanapa Energy, Sumas Generation, Wallula Generation, and Longview Energy in Washington, Cob Energy in Oregon and Garnet Energy in Idaho at 2 ppm; Port Westward Plant in Oregon at 2.5 ppm; Satsop Combustion Turbine project in Washington at 3 ppm; and Klamath Generation in Oregon, at 5 ppm. These facilities are all located in attainment areas for NO_X and, therefore, represent BACT.

The 2 ppm annual CO emission rate proposed for this Project is equal to, or even more stringent than, recent BACT determinations for similar size CT facilities.

5.3.3 Potentially Available CO Control Techniques

CO emissions from the CTs are a function of oxygen availability (excess air), flame temperature, residence time at flame temperature, combustion zone design, and turbulence. These factors can be controlled by efficient design and good operational controls. Combustion control is the most common method to minimize CO emissions from combustion turbines.

Catalytic oxidation is technically available and has been used extensively to control CO in many power plant applications. Catalytic oxidation can also remove some VOC. Therefore, catalytic oxidation for CO control is evaluated in the following sections.

SCONOx can also remove CO by about 90 percent although its technical feasibility as a control option for large CTs is questionable at this time. Nevertheless, SCONOx is discussed below as an emission control technology for control of CO emissions.

5.3.4 Catalytic Oxidation for CO Control

According to the manufacturer, the GE 7FA turbine can achieve 9 ppmvd at loads between 50 and 100 percent when firing natural gas without additional controls. According to the manufacturer, the Siemens SGT6-5000F turbine can achieve 4 ppmvd at 100 percent load and 10 ppm at lower loads. Both turbines will, with the implementation of a CO catalyst system, achieve an annual average CO emission rate of 2.0 ppmvd.

5.3.4.1 Technical Analysis

As with SCR catalyst technology for NO_X control, oxidation catalyst systems seek to remove pollutants from the turbine exhaust gas rather than limiting pollutant formation at the source. Unlike an SCR catalyst system, which requires the use of ammonia as a reducing agent, oxidation catalyst technology does not require the introduction of additional chemicals for the reaction to proceed. Rather, the oxidation of CO to CO_2 uses the excess air present in the turbine exhaust. The activation energy required for the reaction to proceed is lowered in the presence of the catalyst. Technical factors relating to this technology include the catalyst reactor design, optimal operating temperature, pressure loss to the system, and catalyst life.

Catalytic oxidation reactors have been applied successfully to various commercial sources. In combustion turbine applications, the catalyst bed is oriented perpendicular to the gas flow and is usually installed vertically in the HRSG.

Oxidation catalyst reactors operate in a relatively narrow temperature range. Optimum operating temperatures for these systems generally fall into the range of 700 to 1,100°F. At lower temperatures, CO conversion efficiency falls off rapidly. Above 1,200°F, catalyst sintering may occur, causing permanent damage to the catalyst.

The installation of a catalyst bed causes a pressure drop of approximately 1.5 inches of water, which contributes to a slight loss in power output. An OAQPS cost control factor of

0.2 percent of the megawatt output is used to calculate the annual cost of this loss in power output.

Catalyst systems are subject to loss of activity over time due to physical deactivation and chemical poisoning. Catalyst suppliers typically guarantee a three-year catalyst life for combustion turbine applications.

5.3.4.2 Economic Analysis

Capital and annual costs associated with installation of an oxidation catalyst system on each GE 7FA CT/HRSG system were obtained from Envirokinetics (Crites, July 2001) for the 2003 Application. These costs have been inflation-adjusted to represent 2005 values, the most current available. Costs for installing the system on the Siemens SGT6-5000F CT/HRSG system are assumed to be comparable.

The overall removal efficiency is approximately 72 to 87 percent to achieve a CO level of 2.0 ppm. Oxidation catalyst capital equipment includes the catalyst, reactor, control systems, and instrumentation. These items represent the basic equipment, including the cost of the initial catalyst, which is estimated at $2,162,900 in 2001 dollars and $2,335,900 in 2005 dollars. When the direct and indirect installation costs are added, the total capital cost is estimated at approximately $4,682,500 for each turbine. The capital costs are presented in Table 5-8 on a per-turbine basis.

Annual operating costs, also summarized in Table 5-8, include operating labor (two hours/shift), routine inspection and maintenance, spent catalyst replacement, and lost cycle efficiency due to the increased backpressure.

The annual pollutant emission reduction for CO from a CO catalyst is based on base load operation with maximum duct firing rate. This is a conservative assumption that will result in the maximum amount of controlled emissions and, therefore, the lowest cost per ton. The emission reduction is 314 tons per year per turbine and is presented in Table 5-2.

The cost, per CT, of adding a CO catalyst system is $7,200 per ton CO removed for the GE turbine and $9,300 for the Siemens turbine. This cost per ton of CO controlled is greater than the $5,000 considered reasonable by Ecology for CO control.

5.3.5 SCONOx

A technical analysis of SCONOx is presented in Section 5.2.5 of the NO_X BACT. See that section for a discussion of the SCONOx technical, environmental and economic impacts.

Tables 5-4 and 5-5 show the cost of CO removal for SCONOx. SCONOx results in a cost of $31,100 and $40,500 per ton CO removed for the complete system purchase option and $21,000 and $27,400 for the mechanical purchase/catalyst lease option for the GE and Siemens turbines, respectively. This is not a reasonable cost for CO removal and is, therefore, rejected as BACT. As was described in the above section on CO BACT, the use of oxidation catalyst is BACT for CO emissions for the CT/HRSG systems. The use of

SCONOx is rejected as BACT for this facility as SCONOx has not been demonstrated as a feasible option for this size CT.

5.3.6 CO BACT Conclusions

The use of an oxidation catalyst for control of CO from the CTs and duct burners is proposed. The CO emission rate is proposed to be 2.0 ppmvd (corrected to 15 percent O_2) during steady state operations.

5.4 BACT for Volatile Organic Compounds

5.4.1 Formation

Unburned hydrocarbons are emitted from CTs as a result of incomplete combustion of fuel. The volatile components of the unburned hydrocarbons are organic compounds that participate in atmospheric photochemical reactions. This excludes methane, ethane, CFCs, and other compounds that have negligible photochemical reactivity. Control of VOCs is accomplished by providing adequate fuel residence time and high temperature in the combustion device to ensure complete combustion and/or back-end control techniques such as catalytic oxidation to control VOCs after they are formed.

5.4.2 Potentially Available VOC Control Techniques

The most stringent VOC control level for large combustion turbines firing natural gas has been achieved using catalytic oxidation. Three turbine projects are listed in the RBLC as using oxidation catalyst and the permitted level is 2 to 4 ppm VOC. All the other combustion turbines listed in the RBLC list combustion control as BACT. The installation of catalyst system for the control of CO emissions is also an emission control measure for a variety of VOCs.

The use of combustion controls is the most common control for minimizing VOC emissions from combustion turbines. Good combustion control indicates that VOC emissions are minimized by optimizing fuel residence time, excess air, and combustion temperature to assure complete combustion of the fuel.

Since both catalytic oxidation and combustion controls are technically and commercially feasible for the turbines, these controls are evaluated in terms of VOC BACT.

5.4.3 Catalytic Oxidation for VOC Control

The same technical factors that apply to the use of oxidation catalyst technology for control of CO emissions (narrow operating range, loss of catalyst activity over time, and system

pressure losses) apply to the use of this technology for VOC control. Further discussion of these factors can be found in Section 5.3.4.

According to the CO oxidation catalyst vendor, an added benefit of the CO oxidation catalyst is that it can remove up to 30 percent of the methane, ethane, and propane. The CO oxidation catalyst could also remove up 70 percent of smaller VOC compounds. This analysis conservatively assumes that the CO oxidation catalyst removes up to 30 percent of the VOC emissions from the CT/HRSG systems.

If an additional oxidation catalyst were to be installed, one that was designed specifically for VOC control, it would be at least as expensive as a CO oxidation catalyst. With the small amount of VOC emitted from each CT/HRSG system, the cost would be approximately $100,000 per ton VOC removed. This analysis does not include an economic evaluation for such a catalyst since it is not an economically viable option. Therefore, a separate VOC oxidation catalyst is not considered further and the oxidation catalyst alternative addresses a dual CO/VOC catalyst.

The use of combustion controls as the second most stringent alternative is evaluated below.

5.4.4 Combustion Controls

Combustion controls are aimed at controlling the parameters that affect the formation of VOC. Optimizing the excess air, flame temperature, residence time at flame temperature, combustion zone design, and turbulence will result in reduced VOC formation. This is a proven technique and is listed as BACT for the majority of combustion turbines in the RBLC.

Combustion controls have no additional environmental impacts, do not result in increased emissions of other pollutants, and incur no additional cost for the turbines. By operating the turbines properly to ensure good combustion, the VOC emissions from the combustion turbines will be a maximum of 3 ppm at all considered loads while firing natural gas without duct firing. Therefore, combustion controls in combination with the CO oxidation catalyst are determined as BACT for VOC emissions from the CT/HRSG systems.

5.4.5 SCONOx

A technical analysis of SCONOx was presented in Section 5.2.5 of the NO_X BACT. See that section for a discussion of SCONOx technical, environmental and economic impacts.

Tables 5-4 and 5-5 show the costs associated with SCONOx. Compared to catalytic oxidation and combustion controls, SCONOx would be extremely expensive for VOC control alone and is, therefore, not an economically feasible option. Neither SCONOx catalyst, nor a specific VOC oxidation catalyst would be cost-effective for VOC removal. As was described in the above sections, combustion controls in combination with the CO oxidation catalyst are BACT for VOC emissions from the CT/HRSG systems.

5.4.6 VOC BACT Conclusions

BACT for VOC from the CTs and duct burners is proposed based upon the use of oxidation catalysts. The BACT emission limitation is determined to be 3.0 lbs/hour during steady state operations, based on a 24-hour averaging basis.

5.5 BACT for Particulate Matter

5.5.1 Formation

Particulate emissions from natural gas combustion sources consist of ash from the fuel and particulate of carbon and hydrocarbons resulting from incomplete combustion. Therefore, units firing fuels with low ash contents and high combustion efficiency exhibit correspondingly low particulate emissions.

5.5.2 Available PM_{10} Control Techniques

When the New Source Performance Standard (NSPS) for Stationary Combustion turbines (40 CFR 60, Subpart GG) was promulgated in 1979, the USEPA recognized that particulate emissions from stationary CTs are minimal, that particulate control devices typically are not installed on CTs, and acknowledged that the cost of installing a particulate control device is prohibitive. Performance standards for particulate control of stationary CTs are, therefore, neither proposed nor promulgated.

According to General Electric (Davie, February 2000), one of the CT manufacturers, the guaranteed particulate matter emission rate for a natural-gas-fired turbine is based on USEPA Method 5 measurements. However, these measurements produce an anomalous PM_{10} number because the actual emissions are so low. The PM_{10} emissions that are presented are a product of the test method rather than actual PM_{10} emissions. This is a fairly typical result when trying to measure very low emissions concentrations (e.g., ammonia slip also suffers from anomalous measurement methods).

The most stringent “front-end” particulate control method demonstrated for combustion turbines is the use of low-ash fuel and/or low-sulfur fuel and controlled combustion to minimize particulate formation. The RBLC lists some form of combustion control and/or low ash type fuel as the control method for particulate emissions.

Typical particulate control devices such as electrostatic precipitators (ESPs) and baghouse filters are not suitable for use with CTs due to both the extremely low particulate emission concentration and the physical characteristics of the particles. For ESPs, which operate on the principle of charge migration, the low particulate concentration would prevent significant charge buildup on particles, resulting in low migration of particles to the collecting plates.

ESP and baghouse filter vendors who were contacted indicated that they usually do not quote either of these units for natural-gas-fired CT applications. They stated that such sources

typically meet emission standards "without controls." For these turbines, the peak particulate emission concentration is on the order of 0.001 to 0.003 grains per standard cubic foot (gr/scf) during natural gas firing, which approaches concentrations that vendors are striving to achieve for particulate control in other applications (such as oil-fired or other fossil-fuel-fired boilers). The use of an ESP and/or baghouse filter is considered technically infeasible and not representative of BACT.

5.5.3 Cooling Tower

The cooling tower will be equipped with drift eliminators, which are listed in the RBLC as BACT for cooling towers. Therefore, the use of drift eliminators will satisfy BACT for the cooling tower.

5.5.4 PM_{10} BACT Conclusions

Given the lack of feasible alternatives, the use of low ash and low-sulfur fuel such as natural gas, and good combustion control can be concluded to represent BACT for PM_{10} control for the proposed CTs. The combination of low ash fuels and good combustion control is listed as the BACT for the majority of CTs listed in the RBLC.

5.6 BACT for Sulfur Dioxide and Sulfuric Acid Mist

5.6.1 Formation

Sulfur dioxide (SO_2) is formed exclusively by the oxidation of the sulfur present in fuel. The emission rate of SO_2 is a function of combustion efficiency of the source and the sulfur content of the fuel since virtually all fuel-bound sulfur is converted to SO_2. Some of the SO_2 may be converted to SO_3, which in turn can form H_2SO_4 (sulfuric acid mist).

Sulfuric acid mist is included in this BACT analysis. Sulfuric acid mist is most often controlled by wet scrubbers for other sources high in sulfur (e.g., such as coal-fired power plants). Since a wet scrubber is evaluated for SO_2 control, it can also be used for H_2SO_4 control.

5.6.2 Available Control Techniques

The most stringent "front-end" SO_2 control method demonstrated for combustion sources is the use of low-sulfur fuel, such as natural gas. "Back-end" controls, such as wet or dry scrubbers, are generally not applied to combustion turbines that combust low sulfur fuels due to the very low SO_2 emissions and the high cost of a scrubber. The RBLC does not list any add-on controls as BACT for combustion turbine combined-cycle plants, including those with duct burners. Wet and dry scrubbing has been listed in the RBLC as BACT for sources high in SO_2 emissions. Scrubbing would be technically feasible as SO_2 control although the

low SO_2 emissions and high flue gas flow rate would require an expensive scrubber. According to scrubber manufacturers contacted, a conservative estimate of control efficiency is 90 percent with an upper-bound estimate of 99 percent control. Wet scrubbing is considerably cheaper than dry scrubbing; therefore, an economic analysis is provided for wet scrubbing for SO_2 control. The use of low-sulfur fuel, such as natural gas, was evaluated as the second most stringent control option.

5.6.3 Economic Analysis of Wet Scrubber for SO_2 and H_2SO_4

Basic equipment costs associated with installing a wet scrubber on the combustion turbine/HRSG system were obtained from a scrubber manufacturer (Interel, July 1994), scaled to the size of the CT/HRSG system flue gas flow rate. The basic equipment cost is an average of $5.72 per cubic feet per minute (cfm) of flue gas; the original cost scaled up to account for inflation. The CT/HRSG system has an average potential flue gas flow rate of 1,000,000 actual cfm (acfm) out of the stack, resulting in a basic equipment cost of $5,720,000. The total capital cost of a wet scrubber on one CT/HRSG system is estimated at $16.0 million. The capital and annual costs are shown in Table 5-9.

Annual operating costs include operating labor (one hour per shift), routine inspection and maintenance, utilities, soda ash for pH control, wastewater treatment, and indirect operating costs. Estimated annual costs total $6.1 million. The control efficiency of the wet scrubber is estimated at 99 percent. The total amount of SO_2 and H_2SO_4 removed is estimated to be 21 tons per year for the GE turbine and 23 tons per year for the Siemens turbine. This technology results in a cost of $268,700 per ton of total SO_2 and H_2SO_4 removed. Therefore, a wet scrubber is not considered as BACT for the CT/HRSG systems.

5.6.4 Use of Low-Sulfur Fuel

The next most stringent control is the use of low-sulfur fuel such as natural gas. The natural gas is expected to have a maximum sulfur content of 1.6 grains per 100 standard cubic feet (scf) of gas and an average sulfur content of no more than 0.8 grains per 100 scf.

5.6.5 SO_2 and H_2SO_4 BACT Conclusions

The use of low sulfur fuel is listed as BACT for the CTs identified in the RBLC search. Therefore, the use of low-sulfur fuel is BACT for the CT/HRSG systems.

5.7 BACT for Auxiliary Equipment

The auxiliary equipment proposed for the Project is:

- One diesel-driven emergency generator, about 1,500 kW in size
- One diesel-driven firewater pump, about 265 bhp in size

These sources will have very low utilization throughout the year. The emergency generator will only be used to operate critical plant systems during periods when external electric power is not available. The firewater pump is available for use in the case of a fire.

BACT for the auxiliary equipment (diesel-fired engines) is good combustion control and low sulfur fuel as well as low annual usage with a limit of up to 250 hours per year for maintenance operation.

5.8 BACT for Toxic Air Pollutants

The toxic emissions from the facility are a subset of the PM_{10} and VOC emissions. As discussed in Section 5.4 and 5.5, add-on controls are not generally required for PM_{10} and VOC emissions from natural-gas-fired CT facilities. Therefore, the same controls that are considered for PM_{10} and VOC emissions are considered for toxic emissions.

Baghouses and electrostatic precipitators (ESPs) are frequently used to control PM_{10} emissions for non-natural gas burning facilities. However, the sources that use these controls are typically large emitters of PM_{10}, such as pulp and paper mills, coal-fired boilers, cement plants, and aluminum plants. Baghouses and ESPs were determined technically infeasible for PM_{10} control on natural-gas-fired turbines as the PM_{10} emissions are so low that neither baghouses nor ESPs can efficiently remove PM_{10}. In addition, the cost of a baghouse or ESP would be excessive due to the high flue gas flow rate. Control equipment is often sized based on flue gas flow rate, which can result in very high costs for sources with high flue gas flow rates.

VOC emissions can often be controlled by catalytic oxidation, regenerative thermal oxidation, or carbon adsorption. However, the VOC emission concentration must be much higher than what is available for the CT for regenerative thermal oxidation or carbon adsorption to be technically feasible. Sources that would use these types of controls are wood products facilities such as fiberboard, plywood, and oriented strandboard manufacturing, fiberglass manufacturing, and other organic chemical manufacturing plants.

Catalytic oxidation is technically feasible as was discussed for VOC control but a specific VOC oxidation catalyst would be cost-prohibitive since the VOC emissions are so low. The toxic portion of the VOCs is even lower, making the cost unreasonable for catalytic oxidation alone to be considered BACT for toxics. However, the CO oxidation catalyst can achieve approximately 30 percent reduction of VOC in addition to reducing CO. Therefore, a 30 percent reduction in the toxic VOCs is included in their emissions estimate.

BACT for the auxiliary equipment (diesel-fired engines) is combustion control and low sulfur fuel as well as low annual usage with a limit of up to 250 hours per year for maintenance operation.

5.8.1 TAP BACT Conclusions

Based on the above discussion on technical feasibility and cost of control, a top-down BACT analysis is not provided as it would show the same results as the BACT for PM_{10} and VOC. The control of toxics will, therefore, be the same as for PM_{10} and VOC; good combustion control in combination with the CO oxidation catalyst, and use of low-ash/low-sulfur fuel.

5.9 Summary of BACT

A summary of technologies determined to be representative of BACT is provided below. A table identifying each pollutant and summarizing the corresponding BACT as well as the cost per ton of pollutant removed is presented as Table 5-10. The requested BACT limits for the Project are listed in Table 5-11.

5.9.1 Nitrogen Oxides

The CTs will be equipped with dry low-NO_X combustors for the reduction of NO_X formation. Both of the turbine models will be able to achieve 9 ppmvd without add-on controls at all considered loads. With the application of SCR, the NO_X emissions will be controlled to 2.5 ppmvd annual average at 15 percent O_2. A lower limit of 2.0 ppmvd is not appropriate given the operational requirements and variable steam demand of the refinery.

SCONOx was also evaluated for control of NO_X. It has a similar capacity for NO_X removal as SCR, but at a considerably higher cost. SCONOx was eliminated as BACT since it is not technically feasible and due to the high capital cost and excessive cost per ton of pollutant removal.

5.9.2 Carbon Monoxide

Catalytic oxidation is the most stringent control considered for reducing CO emissions to 2.0 ppmvd on an annual average basis at 15 percent O_2.

SCONOx was also evaluated for control of CO. It has the same capacity for CO removal but at a considerably higher cost. SCONOx was eliminated as BACT due to high capital cost and excessive cost per ton of pollutant removal.

5.9.3 Volatile Organic Compounds

The installation of a specific VOC oxidation catalyst is technically feasible. However, the economic impacts would be excessive. Therefore, the oxidation catalyst, strictly for the control of VOC emissions, is rejected as BACT. VOC emissions will be reduced by approximately 30 percent with the application of the CO oxidation catalyst.

SCONOx was also evaluated for control of VOC. It has the same capacity for VOC removal as oxidation catalyst but at a considerably higher cost. SCONOx was eliminated as BACT due to the excessive capital and annualized costs.

Combustion will be optimized by controlling the parameters that affect VOC formation. These factors include oxygen, flame temperature, residence time, combustion zone design, and turbulence. This is consistent with the majority of gas-fired turbines in the RBLC. Combustion control, in combination with the CO oxidation catalyst, is determined as BACT for VOC emissions for the Project.

5.9.4 Particulate Matter

Particulate emissions from the CTs will consist of carbon and hydrocarbons (ash) resulting from incomplete combustion, and ammonium sulfate particulate. Baghouses and ESPs are considered technically infeasible as control for particulate from the combustion turbines. The most stringent particulate control method demonstrated for a combustion turbine is the use of low ash, low sulfur fuel such as natural gas, and efficient combustion design. This alternative is concluded to represent BACT for control of particulate from the CTs.

5.9.5 Sulfur Dioxide and Sulfuric Acid Mist

Sulfur dioxide and sulfuric acid mist emissions are directly proportional to the amount of sulfur in the fuel burned. The most stringent control demonstrated for SO_2 and H_2SO_4 emissions is the use of low-sulfur fuel such as natural gas. Back-end controls such as a wet scrubber would result in a cost of $265,400 per ton SO_2 and H_2SO_4 removed. Therefore, BACT for SO_2 and H_2SO_4 emissions from the Project is the use of a low-sulfur fuel.

5.9.6 Toxic Air Pollutants

The toxic emissions from the facility are a subset of the PM_{10} and VOC emissions. Therefore, the same controls that would be considered for PM_{10} and VOC emissions are considered for toxic emissions.

Baghouses and ESPs are determined technically infeasible for PM_{10} control on CTs as the PM_{10} emissions are so low that neither baghouses nor ESPs can remove PM_{10} in an efficient manner. In addition, the cost of a baghouse or ESP is excessive due to the high exhaust flow rates.

Catalytic oxidation is technically feasible for removal of VOC but it is very cost-prohibitive since the VOC emissions are so low. The toxic portion of the VOCs is even lower, making the cost unreasonable for catalytic oxidation for VOCs alone to be considered BACT for toxics.

The BACT for toxics will, therefore, be the same as for PM_{10} and VOC; good combustion control in combination with the CO oxidation catalyst, and use of low-ash/low-sulfur fuel.

6 AIR QUALITY MODELING METHODOLOGY

The methodologies and protocols used in the air quality impact analysis follow USEPA Guidelines and the requirements of Ecology and the Federal Land Manager (FLM). Dispersion modeling is used to simulate the projected impact of the facility's emissions on local and regional air quality levels. Protocols for the modeling performed in connection with the 2003 Application were submitted to EFSEC on October 29, 2001, copies of which are included in Appendix G. The same protocols were followed in conducting the modeling performed for this PSD permit amendment application.

6.1 Required Analyses

The PSD review in this application consists of the following analyses:

- A Significant Impact Levels (SILs) analysis of pollutant concentrations in Class I and Class II areas,
- A comparison of toxic air pollutant (TAP) concentrations with acceptable source impact levels (ASILs) in Class II areas, and
- A Class I area air quality related value (AQRV) analysis including an analysis of visibility and deposition.

These analyses are discussed in the following sections.

6.1.1 Significant Impact Levels Analysis

A PSD permit application is required to demonstrate, through air dispersion modeling, that the emissions increase from the proposed new facility will not cause or contribute significantly to any violations of allowable PSD increments within the Class I or Class II areas and will not cause a violation of ambient air quality standards (AAQS). SILs are established to determine an impact concentration which, when a facility's impacts are less than this level, will show that the maintenance of the PSD increments and AAQS are not threatened. If a facility's impacts are less than the SILs, additional analyses such as a PSD increment consumption analysis and multi-source, or cumulative, modeling analyses are not necessary to demonstrate compliance with PSD increments or the AAQS. The SILs for Class I and Class II areas are shown in Table 3-5.

6.1.2 Toxic Air Pollutants analysis

An analysis was conducted to evaluate the impact of potential toxic air pollutants (TAPs) using the guidance provided in WAC 173-460. Only toxic air pollutants with emission rates in excess of the small quantity emission rates listed in WAC 173-460-080(2)(e) were modeled with the exception of those TAPs that have Acceptable Source Impact Levels (ASILs) less than 0.001 micrograms per cubic meter ($\mu g/m^3$). Those TAPs are required to be modeled regardless of emission rate. Modeled impacts are compared to the ASILs. The small quantity emissions levels and ASILs are shown in Table 4-5. The emissions of ammonia from the SCR system were also modeled as required by WAC 173-460.

6.1.3 Class I Area AQRV Analyses

Federal Class I Areas are places of special national or regional value from a natural, scenic, recreational, or historic perspective. These areas were established as part of the PSD regulations included in the 1977 Clean Air Act Amendments. Federal Class I Areas are afforded the highest degree of protection among the types of areas classified under the PSD regulations.

It is the responsibility of the FLMs to identify AQRVs in each of the Class I Areas that may be affected by air pollution. AQRV indicators typically identified by the FLMs include visibility degradation and acidic deposition, both of which are analyzed in this application.

For the visibility analysis, the FLMs have established a significance level of 5 percent change in light extinction over background levels using 24-hour average impacts from the project to evaluate potential project impacts. Visibility results above this level may be acceptable to the FLMs with consideration of the number of days above the 5 percent criteria and the amount above 5 percent. Background extinction coefficients used in the postprocessor CalPost were obtained from the FLAG Phase I Report. These are 0.6 Mm^{-1} for hygroscopic components and 4.5 Mm^{-1} for non-hygroscopic components for all Class I areas evaluated.

Soils and aquatic resources in Class I areas are potentially influenced by nitrogen and sulfur deposition. Nitrogen and sulfur deposition occur through both wet and dry processes. A significance level of 5 grams per hectare per year (g/ha/yr) for both sulfur and nitrogen deposition was used.

6.2 Surrounding Terrain

The base elevation at the proposed Project site is about 115 feet above mean sea level (MSL). By USEPA definition, the terrain near the Project site can be classified as “simple terrain” and is essentially “flat or gently rolling.” The highest elevation within 15 kilometers of the Project site is 463 feet, approximately 348 feet above ground-level elevation at the site, which indicates that “complex” terrain would have to be included in the dispersion modeling.

6.3 ISC-Prime Modeling

Typically, for receptor locations that are less than 50 kilometers from a source, steady-state Gaussian dispersion models are used to determine the modeled impacts. An approved dispersion model for use in this air quality analysis for the Class II SIL analysis and the TAPs analysis is the USEPA-approved Industrial Source Complex - Short Term, Version 3 (ISCST3) dispersion model as specified in USEPA's *Guideline On Air Quality Models* (Guidelines) (USEPA 2000) and as discussed with Ecology personnel in the project meetings.

AirPermits.com utilizes the ISC-Prime dispersion model, which is the most recent variant of the ISCST3 dispersion model and incorporates updated building-wake (downwash) calculations. The suite of models, provided by Bowman Environmental Engineering (BEE), is called BEEST (Version 9.50) and includes the executable versions of the both the current ISCST3 model and its variant, the ISC-Prime model (BEE Version 03002). The model execution options, averaging periods, sources and emissions information, receptors and terrain, buildings and structures, and meteorology inputs of the ISC-Prime dispersion model are identical to those of the ISCST3 dispersion model. Ecology has indicated that the ISC-Prime model is an approved model for use in the BP modeling analyses (Bowman, 2006).

6.3.1 ISC-Prime Model Options

USEPA's Guidelines (USEPA 2000) lists the ISCST3 model as an approved model for evaluating simple and complex terrain impacts within a 50 kilometer radius of the Project site. Regulatory agency guidance mandates that, when performing modeling for regulatory purposes, certain options in the ISCST3 model be employed. The guidance requirements are also being applied to the ISC-Prime model. The required ISC-Prime input options are as follows and were used in the modeling analyses conducted for this Project:

- Final plume rise
- Stack tip downwash
- Buoyancy induced dispersion
- Default wind profile exponents
- Default temperature gradients
- Calm period policy

Based on the land use classification procedure of Auer (1978), land use in the region surrounding the Project site is greater than 50 percent rural. Therefore, rural dispersion coefficients were used in the modeling.

If modeled impacts exceed the pollutant-specific SIL, then the USEPA and the Ecology guidelines require more detailed (refined) dispersion modeling. This more detailed cumulative source modeling must include emissions for other existing sources and for other nearby sources that have been permitted, but are not yet operational. The purpose of cumulative source modeling is to evaluate the combined effect of the proposed facility, the

other contributing sources, and the existing ambient (background) levels on regional attainment of the PSD increments and the Ambient Air Quality Standards (AAQS). However, as will be shown in Section 7, all maximum predicted impacts that would result from operation of the proposed facility are below the pollutant-specific SILs. Thus, cumulative source modeling is not necessary to demonstrate compliance with the ambient air quality standards and PSD increments. The potential criteria pollutant emissions will have a negligible effect on the maintenance of the public health and welfare.

6.3.2 Buildings and Other Structures (Aerodynamic Downwash)

Regulatory agency guidelines require that the potential for building-induced aerodynamic downwash to affect the plume dispersion from the proposed stacks be considered in the modeling. The USEPA has established good engineering practice (GEP) stack height guidelines (*Guideline for Determination of Good Engineering Practice Stack Height* [USEPA, 1985], Stack Height Regulations [40 CFR 51], and current Model Clearinghouse guidance) to be used to determine the necessity for including aerodynamic downwash in the modeling analysis. The GEP formula stack height is defined as follows:

$$H_G = H_B + 1.5L$$

where: H_G = the GEP stack height
H_B = the height of the nearby structure
L = the lesser dimension (height or projected width) of the nearby structure

For a structure with a projected width greater than its height (i.e., a squat structure) the formula reduces to:

$$H_G = 2.5H_B$$

The facility site plan provided by BP for the base case (see Figure 2-3) was used to determine the horizontal dimensions of facility buildings and other obstacles near the stacks. The height of all buildings and structures used in the dispersion modeling analyses was obtained in discussions with BP. Figure 2-4 presents an alternative facility configuration that shows the steam turbine building located to the south of the CTs. This alternative configuration was also considered in the modeling analyses, as explained below.

Both the height and width of the nearby structures to be used in calculating the appropriate GEP stack height were determined by projecting the maximum crosswind dimension of the structures onto a plane perpendicular to the direction of the wind. If a stack is within five structure heights or widths, whichever is less, downwind from the closest edge of a structure, the stack is considered to be in the sphere of influence of the structure, and aerodynamic downwash must be considered in the modeling analyses. In the case where a stack is not influenced by nearby structures, the maximum stack height allowed in dispersion modeling is 65 meters (213 feet).

Aerodynamic downwash was included in the modeling analyses through the use of the USEPA-approved Building Profile Input Program (BPIP) software. The BPIP software is

integrated as part of the BEEST software package and the direction-specific building heights and widths were used in the ISC-Prime model. BPIP outputs were also input into to CalPuff model. Buildings and other structures are identified on the two site plans (See Figures 2-3 and 2-4). The stack and building dimensions are shown in Table 6-1.

6.3.3 ISC-Prime Meteorological Data

Actual hourly meteorological data representative of the Project site are available from the BP on-site meteorological measurements program. The BP meteorological measurements program is operated to collect PSD-grade data from a variety of meteorological sensors. Quarterly data reports and quarterly audit reports are available. The hourly meteorological data for the 1995, 1996, 1998, 1999 and 2000 calendar years was processed into a format suitable for use in the ISC-Prime and CalPuff dispersion models using the USEPA-approved MPRM meteorological preprocessor. To remain consistent with the dispersion modeling performed for the 2003 Application, the same meteorological data set was used for the current dispersion modeling analyses. Data for calendar year 1997 were excluded due to an abundance of missing on-site data and the difficulty of locating other suitable off-site data.

Upper air data for Quillayute, Washington, were used as it is the closest station to the site with upper air data. Data not available on-site, such as relative humidity, and any other missing data, were obtained from other nearby sites such as Bellingham, Vancouver Airport, or Seattle.

6.3.4 ISC-Prime Receptor Grid

The comprehensive receptor grid developed for the ISC-Prime dispersion modeling includes hypothetical receptors placed on both flat and elevated terrain, where appropriate. The grid is designed to allow for the simultaneous evaluation of the impacts of all CT/HRSG stacks, the diesel generator, the firewater pump, and the cooling tower. UTM coordinates were used throughout the ISC-Prime modeling. The receptor grid consists of receptors at the following locations.

- Around the property fence line in 50 meter increments,
- Fine grids of 50-meter-spaced receptors extending to approximately 1 kilometer from the property line and 100-meter-spaced receptors extending to approximately 2 kilometers from the site property line,
- Medium grids of 250-meter-spaced receptors extending to approximately 4 kilometers from the site property line and 500-meter-spaced receptors extending to approximately 8 kilometers from the site property line, and
- A coarse grid of 1,000-meter-spaced receptors that extends to approximately 12 kilometers from the site property line.

Receptor elevations used in the ISC-Prime modeling analyses were interpolated from Digital Elevation Model (DEM) data obtained from the U.S. Geological Survey (USGS). The DEM data consist of arrays of regularly spaced elevations and correspond to the 1:24,000 scale

topographic quadrangle map series. The array elevations are at 30-meter intervals and the elevation at each ISC-Prime receptor was interpolated using the BEEST software to determine elevations at the defined 50-meter, 100-meter, 250-meter, 500-meter, and 1,000-meter receptor intervals. Data obtained from the DEM files were checked for completeness and spot-checked for accuracy against elevations on corresponding USGS 1:24,000 scale topographical quadrangle maps. No missing or erroneous data from the DEM files were found.

6.3.5 ISC-Prime Modeling Scenarios

Since combustion turbines exhibit some variation in emission rate and exhaust flow depending on the ambient temperature, emissions and flow information were provided by the turbine vendors for ambient temperatures of 5°F, 50°F, and 85°F. These temperatures represent operations on a cold day, an average day, and a hot day, respectively and were determined from a temperature distribution from the five-year on-site meteorological data set. It is appropriate to model the 5°F turbine operating parameters only during the colder seasons of the year. It is similarly not appropriate to model the 85°F conditions during the colder winter months. For the annual average period modeling, the 50°F scenarios are more representative of annual impacts than are the 5°F and 85°F cases and these cases are modeled as representative of annual average conditions. For short-term averaging periods, all temperatures, turbine loads, and duct firing rates were modeled.

The CTs were modeled at the operating scenarios listed in Tables 6-2 and 6-3. Stack flow and temperature for all of the modeled scenarios and facility equipment are also listed in Tables 6-2 and 6-3. Based on the review of the GE model results, additional dispersion modeling was conducted for annual NO_X and PM_{10} as well as 24-hour PM_{10} to evaluate the effects that the alternate building configuration scenario of placing the steam turbine building immediately to the south of the two turbine stacks (see Figure 2-4) would have on the projected ground-level impacts. NO_X and PM_{10} were selected from the model results to evaluate the alternate building scenario since no other criteria pollutant or toxic air pollutant had a projected concentration approaching the value of it's respective SIL.

Also, for comparative purposes to the GE model results, the Siemens CT/HRSG emissions were modeled for annual NO_X and 24-hour PM_{10} in order to compare the results to those obtained for the GE turbine. Even though the GE and Siemens CT/HRSG emissions are different and their operating characteristics are different, because the modeled GE and Siemens results were comparable, separate Siemens modeling was not performed on all of the potential operating conditions.

Criteria pollutant emission rates, as modeled, are listed in Tables 6-4 and 6-5. CT emissions were modeled assuming that they operate full time (i.e., 8,760 hours per year for both duct burning and non-duct burning cases). For short-term averaging times, it is assumed that the turbines operate full time (i.e. 24 hours in a 24-hour period). Since there are two potential site configurations for the steam turbine building, the two CT/HRSG stacks were modeled as individual stacks.The emission rates for TAPs are listed in Table 4-5 and are based on the

worst-case scenarios emissions for VOC and PM_{10} emissions. TAP impacts were modeled in the same manner as the criteria pollutants.

Auxiliary equipment (diesel engines and cooling tower) was modeled using the stack flow, temperature data, and criteria pollutant emissions listed on Table 6-4. Maximum hourly criteria pollutant emission rates are listed in Table 4-2 and the toxics emission rates are listed in Table 4-4.

The emergency generator and the firewater pump are each assumed to operate up to 250 hours per year and up to 2 hours per week for maintenance and testing. Annual emissions were calculated by multiplying the peak hourly emission rates by the 250 operating hours per year. For the PM_{10}, SO_2, and CO short-term averaging periods (24-hours or less), the peak hourly diesel engine emissions are used and adjusted in the model to account for the proposed 2 hour per day operations. This is accomplished by using the capability of the ISC-Prime model to distribute and "factor" source emissions by the hour of the day.

The testing of the emergency generator and the firewater pump is expected to take place no more than once each week during the day between the hours of 09:00 a.m. (0900) and 4:00 p.m. (1600). To simulate the impact of the emissions from the diesel engines, the peak hourly emissions for the diesel engines are turned on during the 0900 through 1600 period (modeled hours 10 through 16) for each day of the year by using the "hour of day" capability of the ISC-Prime dispersion model. The multiplication "factors" applied to the peak hourly emissions are 0.09785, 0.2857, 0.2857, 0.6667, and 1.0 for the 24-hour, 8-hour, 3-hour, and 1-hour averaging periods, respectively (e.g., annual = 250/7/365; 24-hour and 8-hour = 2/7; 3-hour = 2/3). For other hours of the day, the "factor" was zero, which turns off the emissions during that hour.

Since the emergency generator and the firewater pump could also be operated over any given 24-hour period during an emergency, the modeling analyses included modeling these sources individually as if the equipment were operated continuously over the 24-hour period. During an emergency, the CTs and cooling tower would not be operating.

The 10 cell cooling tower is assumed to be operating full time when the CTs are in operation. Therefore, the cooling tower PM_{10} emissions were modeled using the continuous peak hourly emission rate. For dispersion modeling purposes, the 10 cooling tower cells were modeled as 4 individual cells, each with one-quarter of the total hourly cooling tower PM_{10} emissions.

6.4 CalPuff Modeling

Most steady-state Gaussian plume models are not considered accurate for predicting ambient pollutant impacts at receptors that are greater than 50 kilometers in distance from the emissions source. USEPA's *Guideline On Air Quality Models* (Guidelines) (USEPA, 2000) lists the CalPuff model as a preferred model for evaluating impacts beyond 50 kilometers. As all of the Class I areas are more than 50 kilometers from the proposed project, CalPuff was used for the Class I SIL analysis and AQRV analysis.

CalPuff is a multi-layer, multi-species, non-steady-state puff dispersion model that simulates the effects of time and space-varying meteorological conditions on pollutant transport, transformation, and removal. CalPuff version 5.4, provided by Earth Tech Inc., was used.

The CalPuff modeling was performed on emissions from the proposed 720 MW cogeneration facility in connection with the 2003 Application. The results of that modeling are presented in the 2003 Application. The emissions in this two turbine configuration are 85 to 95 percent of the three turbine configuration of the 2003 Application while the stack parameters are similar. All CalPuff modeling results are expected to be lower for the 520MW Project with two turbines than the 720 MW three turbine configuration, regardless of whether the GE or Siemens turbines are used. Therefore, further CalPuff modeling was not performed.

6.4.1 CalPuff Model Options

Modeling was performed for the 2003 Application in accordance with the guidelines set forth in the *Interagency Workgroup on Air Quality Modeling (IWAQM) Phase 2 Summary Report and Recommendations for Modeling Long Range Transport Impacts* and the *Federal Land Manager's Air Quality Related Values Workgroup (FLAG) Phase I Report*. Guideline options were used such as Gaussian distribution, partial-puff-height adjustment, stack tip downwash, Pasquill-Gifford dispersion coefficients and partial plume penetration of an elevated inversion.

The primary pollutants to impact haze are ammonium sulfate and ammonium nitrate. These compounds are formed through atmospheric reactions involving NO_2 and SO_2, which are products of combustion. NO_2 absorbs light (causing a brown color) and can also impact visibility, although to a lesser degree than ammonium sulfate and ammonium nitrate. In addition, PM, which is also emitted from the turbines and duct burners, can contribute to haze. CalPuff uses the MESOPUFF-II chemical transformation algorithms where the concentrations of the five previously mentioned pollutants, plus nitric acid, are tracked.

There are two user-selected input parameters that affect the MESOPUFF-II chemical transformation: namely, ammonia and ozone concentrations. The IWAQM Phase 2 report recommends using ammonia concentration values of 0.5 ppb for forests, 1.0 ppb for arid lands, and 10 ppb for grasslands. Since the land use in the study domain is mixed, 10 ppb is a conservative value to assure that the conversion of NO_X to ammonium sulfate is not ammonia limited.

An ozone concentration of 28 ppb was suggested by officials of GVRD during a meeting and teleconference held on July 12, 2001. To verify this figure, ambient ozone data was obtained from GVRD and analyzed. Data from the nearest two ozone monitoring stations to the Cogeneration Project site at Surrey and Langley from 1999 to 2001 was obtained and analyzed. The results of this analysis indicated:

- The maximum annual average O_3 concentration at these monitoring stations was approximately 20 ppb.

- The maximum 24-hour O_3 concentration measured at either of these locations was 48 ppb and the 98th percentile concentration was 39 ppb.

- The maximum 24-hour O_3 concentration measured on the day with the maximum calculated visibility change within the time period studied was 15 ppb.

Since these monitoring stations are within the Vancouver urban area, and ozone concentrations are expected to decrease with distance away from the urban areas, the 28 ppb O_3 concentration is a conservative, but reasonable value for background ozone concentrations in the areas between the project site and the Class I areas. For Class I SIL modeling, the chemical transformation option was not used. NO_X, PM_{10}, and SO_2 are the only pollutants that need to be modeled for Class I areas.

6.4.2 Buildings and Other Structures (Aerodynamic Downwash)

The building downwash information used in the ISC-Prime modeling was also used with all CalPuff modeling analyses. BPIP output was input directly into the CalPuff model.

6.4.3 CalPuff Meteorological Data

One year of MM5 data from April of 1998 through February of 1999 was used in conjunction with data from 25 National Weather Service (NWS) surface meteorological stations to develop the meteorological field using CalMet, which is part of the CalPuff modeling system. The MM5 data is numerical meteorological forecast generated by the Department of Atmospheric Sciences at the University of Washington using the Penn State/NCAR mesoscale model version 3.4 (MM5 v3.4). This data was obtained by AirPermits.com from the Department of Ecology who had obtained it from the University of Washington. The CalMet meteorological processor combines information from multiple surface and upper air meteorological stations as well as topography and land use data to compile a three-dimensional meteorological field. Based on recommendations found in the IWAQM Phase 2 report, the meteorological domain, which is equal to the CalPuff modeling domain, was determined by extending 50 kilometers beyond the outer receptors and sources considered in the analysis. This resulted in a grid that is approximately 504 kilometers by 408 kilometers. A 12 kilometer by 12 kilometer resolution was used for the domain.

Upper air data and precipitation data were obtained from the MM5 data. Pseudo upper air meteorological stations and precipitation stations were created at intervals of 96 kilometers and 48 kilometers, respectively. This resulted in the use of 20 upper air stations and 63 precipitation stations in the development of the meteorological file.

Terrain data and land use data needed for the CalMet program were obtained from USGS digital data from the USGS website at http://edc.usgs.gov/geodata/. 1:250,000 data were used. The data were reformatted into a form suitable for use by CalMet utility programs that are available with the CalPuff modeling system.

6.4.4 CalPuff Receptors

Lambert Conformal Coordinates (LCC) were used as the grid system throughout the CalPuff modeling since it is more appropriate for a modeling area of this size and the MM5 data are in these coordinates. A 2.5 kilometer spaced discrete receptor grid within each Class I area was used to determine concentrations and deposition values. Receptors with closer spacing were determined to be unnecessary due to the large distances from the source to the receptors.

6.4.5 CalPuff Modeling Scenarios

In the CalPuff modeling performed for the 2003 Application, one case from each scenario group (Cases 1AA to 1CC, 2A to 2C, and 6A to 6C) were used in the Class I modeling. The 100 percent load at 5°F for each scenario group (Cases 1AA, 2A, and 6A) have the highest emissions and were, therefore, used in the Class I modeling. All of the cases considered are shown in Table 6-2.

The source emissions used in the visibility and deposition modeling differs from those used in the SIL analysis. Ammonium sulfate is double counted in the SIL analysis as SO_2 and PM_{10} as a conservative assumption. In the CalPuff model, ammonium sulfate can be input as sulfates. Since the visibility calculation includes impacts from sulfates and particulates, it is not necessary to include the ammonium sulfate in both categories. PM_{10} emissions are therefore, modeled without the addition of atmospheric conversion of sulfur to ammonium sulfate as described in Section 4. Also, since the CalPuff model performs chemical transformation of SO_2 to SO_4, only a 5 percent conversion was used to calculate SO_4 emissions to conservatively account for any in-stack transformation. The remaining 95 percent of the sulfur was modeled as SO_2. The emissions, as modeled in the AQRV analysis, are presented in Table 6-4.

The CalPuff modeling performed for the 2003 Application combined the three CT stacks into one, thus, were conservatively modeled in CalPuff.

The visibility modeling includes the reduction of emissions from three utility boilers to be decommissioned due to the construction and operation of the power plant. The visibility modeling, including the reduction in emissions from the utility boilers, is presented to show a more realistic analysis of the effects on visibility for this Project.

Since CalPuff cannot accept negative emissions (reductions in emissions) from any source, the reduction in emissions expected from the curtailment or elimination of operations at the Refinery utility boilers was modeled in a separate CalPuff model run. The model results for the utility boilers were subtracted from those of the power plant using the CalSum utility program, which is included with the CalPuff modeling package. The utility boiler emissions are presented in Table 6-6.

6.4.6 Post Processing

Post processing of the CalPuff output was performed using the CalPost program. Post processing is necessary to process raw CalPuff output files and produce tabulations that summarize the results. For visibility modeling, CalPost calculates the extinction coefficients based on the concentrations and relative humidity calculated in CalPuff. CalPost model runs were performed for the 2003 Application for all three scenarios for each pollutant in the SIL analysis, visibility, and deposition for nitrogen and sulfur. Visibility and deposition are also calculated for each Class I area.

Extinction coefficients used in the CalPost model were obtained from the FLAG report. PM_{10} is classified as a combination of 17 percent elemental carbon, 42 percent organic carbon, and 41 percent soil. The combined extinction coefficient is 3.8 (Wien, 2002).

Before subjecting the deposition model runs to the CalPost postprocessor, the deposition results from CalPuff were input into the Postutil program that is included in the CalPuff modeling package. Postutil combines each wet and dry deposition component into total nitrogen and sulfur deposition.

7 IMPACT ANALYSIS

The results of the air quality impact analyses performed for the proposed 520MW Project are presented in this section and are summarized in a series of tables. In accordance with the requirements, all modeling input and output files will be submitted in an electronic format. Summary tables of the dispersion modeling modeled emissions and results are presented in Appendix H. A sample ISC-Prime output file is included in Appendix I. CalPuff output files are very large and are not presented in this report. Sample CalMet and CalPuff input files and CalPost output files are included in Appendix J. ISC-Prime and CalPuff input and output files are included on compact disk.

As discussed in Section 6, CalPuff modeling of Class I concentration, visibility, and deposition has not been performed for this two turbine scenario. Modeling was performed for 720 MW project and the results presented in the 2003 Application.

7.1 Significant Impact Level Modeling Analysis

The results of the dispersion modeling analyses for Class I and Class II pollutant concentrations for each air emission modeled are presented in Tables 7-1 and 7-2 (for Class I and Class II areas, respectively). As can be clearly seen from the table, no Class I or Class II SIL is expected to be exceeded under the "worst-case" emission scenarios. No further dispersion modeling is necessary to demonstrate compliance with air quality standards and PSD increments. The summary tables also contain the results of the alternate building configuration scenario and the modeling results for the Siemens CTs.

7.2 PSD Increments

The projected concentrations of all air emissions with an associated PSD increment are below their respective significant impact levels, therefore, a PSD increment consumption analysis is not required.

7.3 Ambient Air Quality Standards

The projected concentrations of all air emissions with an associated ambient air quality standard are below their respective SILs. Therefore, a dispersion modeling analysis, one taking into account other existing or permitted sources of air emissions, is not required for this analysis to demonstrate that the projected facility emissions will not have an adverse effect on the air quality levels in the region or the maintenance of the ambient air quality standards or the public health and welfare.

7.4 Toxic Air Pollutants (TAPs)

Based on the emission inventory for non-carcinogenic and carcinogenic TAPs (see Section 4.3), 13 TAPs are anticipated to be emitted in a quantity in excess of the screening emission levels presented in WAC 173-460. Therefore, a comparison to Ecology-published ASILs is required for those compounds. The results of the dispersion modeling for toxic compounds are summarized in Table 7-3.

From the dispersion modeling results, it is evident that none of the toxic compounds expected to be emitted will result in any of the respective annual or 24-hour ASILs being exceeded.

7.5 Visibility

The results of the CalPuff modeling for visibility impacts performed for the 720 MW, three turbine facility were presented in the 2003 Application and are summarized in Table 7-4 of this document. Visibility impacts for the two turbine scenario are expected to be lower because the emissions are lower. The maximum visibility change associated with the 720 MW facility, when subtracting the emissions for the three utility boilers, is 2.3 percent. Since this is less than the regulatory significance level of 5 percent and is not perceptible, the proposed Project and associated utility boiler decommissioning will not have a significant impact on the visibility of the surrounding Class I areas.

If the reductions in emissions associated with decommissioning the refinery boilers are not included, the CalPuff modeling results for the 720 MW facility showeda maximum change in visibility in a Class I area of 6.0 percent. Only one day in the modeled period was above 5 percent in all of the modeled Class I areas. By scaling the emissions from three to two turbines, the maximum visbility change is expected to be 5.25 percent. This is predicted to occur on one day, with all other days having less than a 5 percent visbility change. This analysis is shown in Appendix F.

7.6 Deposition

Emissions from the proposed Project will not result in significant sulfur and nitrogen deposition in the surrounding Class I areas considered in this analysis. The CalPuff modeling results for the three turbine facility in the 2003 Application show that sulfur and nitrogen deposition will be below the significance level of 5 g/ha/yr for both sulfur and nitrogen. Maximum sulfur deposition is 0.73 g/ha/yr and the maximum nitrogen deposition is 0.67 g/ha/yr. The results of the dispersion modeling for deposition impacts are summarized in Table 7-4. Impacts for two turbines are expected to be lower.

7.7 Other Impacts

7.7.1 Impact On Non-Attainment Areas

No state of Washington-designated non-attainment area exists within 50 kilometers of the Project site. As all projected "worst-case" concentrations are anticipated to be below the SILs, no adverse impact on any non-attainment area is expected.

7.7.2 Soils and Vegetation

Based on the results of the dispersion modeling analyses, facility emissions are expected to have a negligible effect on soils and vegetation. The Project will combust only low-sulfur natural gas or refinery fuel gas, thus minimizing the emission of sulfur compounds. For emissions of NO_X (assuming full conversion to NO_2), potential plant damage could begin to occur with 24-hour NO_2 concentrations of 15 to 50 parts per billion (ppb) (USFS 1992). From the modeling results, the maximum annual concentration of NO_2 is below 1.0 microgram per cubic meter (μ/m^3) (about 1.1 ppb). The potential impact on local agriculture is expected to be negligible.

7.7.3 Ambient Air Quality Monitoring

Based on the results of the dispersion modeling analyses, preconstruction ambient air quality monitoring for this Project is not required. All projected concentrations are well below the "*de-minimus*" levels presented in Table 3-6.

7.7.4 Odor

The operation of the proposed facility is not expected to create any nuisance odor conditions.

Aqueous ammonia will be used in the selective catalytic reduction (SCR) system for the control of NO_X emissions. Ammonia is commonly perceived as having an odor (e.g., household cleaners, etc.). However, in the quantity to be released through the stack (the SCR system uses ammonia as a reaction agent and is present in the HRSG exhaust gas flow), an ammonia odor should not be detectable. In fact, the dispersion modeling conducted for ammonia at a rate of 5 ppm (a maximum of 13.5 lbs/hour per turbine and about 119 tons/year total) from the exhaust stacks indicate that the public exposure to ammonia (approximately 2.2 $\mu g/m^3$ or 0.003 ppm) will be well below the accepted range where an ammonia odor could be detected (5 to 53 ppm) (Clayton, 1993). Relative to the public health exposure of ammonia, the maximum projected ground-level impact of the ammonia emissions is about 2 percent of the 100 $\mu g/m^3$ 24-hour health-based standard identified in WAC 173-460. The storage and the potential for an accidental release of ammonia is not part of the PSD program.

No other odors are anticipated from the cogeneration facility. No odors are typically associated with the combustion of natural gas in CTs.

7.7.5 Population Growth

The Project site is within an area already zoned for Heavy Impact Industrial Use. During the anticipated 2-year construction period, the peak construction work force could be about 670 people. For daily operation and maintenance of the facility, about 30 full time staff may be required. Air quality and visibility impacts due to growth-related activities associated with the proposed facility are expected to be negligible.

7.7.6 Fugitive and Secondary Emissions

A very low amount of secondary emissions are expected during construction at the site and installation of the combustion turbines with a small potential increase in fugitive dust and exhaust from motor vehicles and other construction equipment. Fugitive emissions after installation is complete will also be negligible. Air quality impacts from any potential sources of fugitive or secondary emissions are expected to be negligible.

8 SUMMARY AND CONCLUSIONS

Based on information presented in this air permit application, the following are demonstrated:

- All applicable provisions and requirements of the PSD program are satisfied.
- All applicable provisions and requirements of WAC 173-400 are satisfied.
- The proposed emission controls represent BACT for each applicable pollutant given the technical feasibility, energy, environmental, and economic considerations.
- Criteria and toxic emissions from the proposed Project will not cause any significant air quality impacts under any potential operating scenario. All projected impacts will be below the federal and state Class I and Class II pollutant concentration SILs and ASILs for toxic emissions.
- National and State ambient air quality standards will not be exceeded.
- The applicable Class I and Class II PSD increments will not be exceeded.
- No perceptible effects on soils and vegetation are expected.
- The Project will not adversely affect population growth in the area.
- The Air Quality Related Values in PSD Class I areas will be protected.

The assessment of the air quality impacts of the proposed facility is conducted in accordance with the requirements set forth in the USEPA Guidelines and the Ecology requirements. The results of the dispersion modeling indicate that the proposed installation and operation of the combustion turbines will have less than significant (inconsequential) impacts on the local and regional air quality levels.

Based on the results of the impact analysis, it is concluded that the Project will not pose an adverse threat to the maintenance of the local or regional ambient air quality standards, the health and welfare of the general public, or the maintenance of the Air Quality Related Values in the sensitive PSD Class I areas. Therefore, the preparation and issuance of the air permit should proceed.

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LIMITATIONS

The services described in this report were performed consistent with generally accepted professional consulting principles and practices. No other warranty, express or implied, is made. These services were performed consistent with our agreement with our client. This report is solely for the use and information of our client unless otherwise noted. Any reliance on this report by a third party is at such party's sole risk.

Opinions and recommendations contained in this report apply to conditions existing when services were performed and are intended only for the client, purposes, locations, time frames, and project parameters indicated. We are not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to performance of services. We do not warrant the accuracy of information supplied by others, or the use of segregated portions of this report.

TABLES

Table 3-1

Emission Standards and Other Limitations

Source	Pollutant	Emission or Other Limit	Regulatory Citation
Combustion turbines	NO_X	103 ppmvd at 50 ºF and full load operation	40 CFR 60.332(a)(1). NSPS for stationary combustion turbines with a heat input greater than 100 mmBtu/hr
	SO_2	150 ppmvd at 15% O_2 and/or 0.8% by weight sulfur in fuel	40 CFR 60.333(a), (b). NSPS for stationary combustion turbines with a heat input greater than 10 mmBtu/hr
Duct Burners	NO_X	0.20 lb/mmBtu	40 CFR 60.44b(a)(4)(i)
All Fuel Burning Sources	Opacity	Shall not exceed 20% for more than three minutes in any one hour.	WAC 173-400-040(1). General standards for all sources.

Table 3-2

Significant Emission Rates

Pollutant	Emission Rate (tons/year)
Carbon Monoxide (CO)	100
Nitrogen Oxides (NO_X)	40
Sulfur Dioxide (SO_2)	40
Particulate Matter (PM)	25
Fine Particulate Matter (PM_{10})	15
Volatile Organic Compounds (VOC)	40
Lead	0.6
Asbestos [a]	0.007
Beryllium [a]	0.0004
Mercury [a]	0.1
Vinyl Chloride [a]	1
Fluorides	3
Sulfuric Acid Mist	7
Hydrogen Sulfide (H_2S) [a]	10
Total Reduced Sulfur (Including H_2S)	10
Reduced Sulfur Compounds (Including H_2S)	10

NOTE: Source: WAC 173-400-030(67) and 40 CFR 52.21(b)(23)(I)

[a] Exempted from federal PSD review under the Clean Air Act Amendments (CAAA) of 1990. These pollutants are now regulated as Hazardous Air Pollutants pursuant to Section 112(g) (Title III) of the CAAA. However, they are retained in the Washington rules (WAC 173-460).

Table 3-3

PSD Increments

Pollutant and Averaging Period	Class I Increment ($\mu g/m^3$)	Class II Increment ($\mu g/m^3$)
Sulfur Dioxide		
Annual Arithmetic Average	2	20
24-hour	5	91
3-hour	25	512
Particulate Matter		
Annual Geometric Average	5	19
24-hour	10	37
Nitrogen Dioxide		
Annual Arithmetic Average	2.5	25

NOTE: Source: 40 CFR 52.21(c).

Table 3-4

Ambient Air Quality Standards

Pollutant	Averaging Period [a]	National Standards ($\mu g/m^3$)		Washington ($\mu g/m^3$)
		Primary	Secondary	
Sulfur Dioxide	Annual Average	80	---	53
	24-hour Average	365	---	260
	3-hour Average	---	1,300	---
	1-hour Average	---	---	1,065
Total Suspended Particulates	Annual Geometric Mean	---	---	60
	24-hour Average	---	---	150
PM_{10}	Annual Average	50	50	50
	24-hour Average	150	150	150
$PM_{2.5}$[1]	Annual Average	15	15	---
	24-hour Average	65	65	---
Carbon Monoxide	8-hour Average	10,000	10,000	10,000
	1-hour Average	40,000	40,000	40,000
Ozone	1-hour Average	235	235	235
	8-hour Average[1]	157	157	---
Nitrogen Dioxide	Annual Average	100	100	100
Lead	Quarterly Average	1.5	1.5	1.5

1. As of April, 2003, the $PM_{2.5}$ and ozone 8-hour standards are not being enforced until a nation-wide assessment of which areas are in attainment and non-attainment is made.

Table 3-5

Significant Impact Levels

Pollutant	Averaging Time				
	Annual	24-hour	8-hour	3-hour	1-hour
Class I					
SO_2	0.1 μg/m^3	0.2 μg/m^3	---	1.0 μg/m^3	---
PM_{10}	0.2 μg/m^3	0.3 μg/m^3	---	---	---
NO_2	0.1 μg/m^3	---	---	---	---
Class II					
SO_2	1.0 μg/m^3	5.0 μg/m^3	---	25 μg/m^3	---
PM_{10}	1.0 μg/m^3	5.0 μg/m^3	---	---	---
NO_2	1.0 μg/m^3	---	---	---	---
CO	---	---	500 μg/m^3	---	2,000 μg/m^3

Source: Robert Bachman, USFS, Memo on 1/22/2002 for Class I and WAC 173-400-113(3) for Class II

Table 3-6

DeMinimus Monitoring Concentrations

Pollutant	Concentration (µg/m3)
Carbon Monoxide (CO)	575
Nitrogen Oxides (NO_X)	14
Sulfur Dioxide (SO_2)	13
Total Suspended Particulate (TSP)	10
Fine Particulate Matter (PM_{10})	10
Ozone (O_3)	None
Lead	0.1
Beryllium	0.001
Mercury	0.25
Vinyl Chloride	15
Fluorides	0.25
Sulfuric Acid Mist	7
Hydrogen Sulfide (H_2S)	0.2
Total Reduced Sulfur (Including H_2S)	10
Reduced Sulfur Compounds (Including H_2S)	10

NOTE: Source: 40 CFR 52.21(b)(23)(i)

Table 4-1

Hourly Criteria Pollutant Emission Rates
General Electric 7FA Turbine

Operating Scenario	Operating Parameters			Hourly Emissions (lb/hr)					
	Inlet Temperature (°F)	Load (%)	Duct Burning (mmBtu /hr)	NO_X	CO (2 ppm annual average)	VOC	PM_{10}	SO_2 (0.8 gr S annual average)	SO_2 (1.6 gr S short-term average)
1AA	5	100	0	17.5	8.5	2.2	18.7	4.2	8.3
1AB	50	100	0	16.3	8.0	2.0	18.6	3.9	7.7
1AC	85	100	0	15.0	7.3	1.9	18.5	3.5	7.1
1BA	5	75	0	14.1	6.8	1.7	18.4	3.4	6.7
1BB	50	75	0	13.1	6.4	1.6	18.3	3.1	6.3
1BC	85	75	0	12.2	5.9	1.5	18.2	2.9	5.8
1CA	5	50	0	11.0	5.4	1.4	18.1	2.7	5.3
1CB	50	50	0	10.4	5.1	1.3	18.0	2.5	5.0
1CC	85	50	0	9.6	4.7	1.3	18.0	2.3	4.7
7A	5	100	600	23.8	11.6	6.8	29.2	5.6	11.2
7B	50	100	600	22.6	11.0	6.6	29.1	5.3	10.6
7C	85	100	600	21.2	10.3	6.5	29.0	5.0	10.0

Table 4-2

Hourly Criteria Pollutant Emission Rates
Siemens SGT6-5000F Turbine

Operating Scenario	Operating Parameters			Hourly Emissions (lb/hr)					
	Inlet Temperature (°F)	Load (%)	Duct Burning (mmBtu /hr)	NO_X	CO (2 ppm annual average)	VOC	PM_{10}	SO_2 (0.8 gr S annual average)	SO_2 (1.6 gr S short-term average)
1AA	5	100	0	20.4	9.9	2.0	11.0	4.8	9.6
1AB	50	100	0	18.6	9.1	1.9	10.8	4.4	8.8
1AC	85	100	0	16.9	8.2	1.7	9.6	4.0	7.9
1BA	5	75	0	16.3	7.9	1.6	9.6	3.8	7.7
1BB	50	75	0	14.8	7.2	1.5	9.4	3.5	7.0
1BC	85	75	0	13.5	6.6	1.3	9.3	3.2	6.3
1CA	5	50	0	13.8	6.7	6.9	9.3	3.2	6.5
1CB	50	50	0	12.6	6.1	6.3	9.2	3.0	5.9
1CC	85	50	0	11.5	5.6	5.7	9.1	2.7	5.4
7A	5	100	600	26.5	12.9	6.7	21.5	6.2	12.5
7B	50	100	600	24.7	12.0	6.5	21.3	5.8	11.6
7C	85	100	600	23.0	11.2	6.3	20.1	5.4	10.8

Table 4-3

Hourly Criteria Pollutant Emission Rates
Auxiliary Equipment

	Hourly Emissions (lb/hr)				
Operating Unit	NO_X	CO	VOC	PM_{10}	SO_2
Diesel Generator	27.5	6.9	1.3	0.7	0.80
Firewater Pump	3.33	0.17	0.14	0.05	0.105
Cooling Tower	0	0	0	1.63	0

Table 4-4

Criteria Pollutant Potential Annual Emission Rates
General Electric 7FA Turbines

Operating Scenario	Annual Emissions (tons/yr)					
	Hours per year[a]	NO_X	CO	VOC	PM_{10}	SO_2
Case 7B	8,760 (5808)	197.6	63.8	58.2	254.8	46.6
Hot Start	0 (190)		28.0			
Warm Start	0 (144)		33.1			
Cold Start	0 (4.5)		0.4			
Shutdown	0 (144)		32.2			
Offline	0 (2469.5)	0	0	0	0	0
Total Turbines[b]	8,760	197.6	157.5	58.2	254.8	46.6
Auxiliary Equipment						
Emergency Generator	250	3.4	0.9	0.16	0.09	0.10
Firewater Pump	250	0.42	0.021	0.018	0.006	0.013
Cooling Tower	8,760	0	0	0	7.1	0
Total[b]		201.4	158.4	58.4	262.0	46.7

a. Full time operation at maximum duct firing was used for calculating annual emissions for all pollutants except CO. For CO, maximum annual emissions were higher when emission from startups are included in the calculation. Hours per year for the startup scenarios used in the CO annual emissions calculations are in parentheses.
b. Totals may not equal sum of individual components due to rounding.

Table 4-5

Criteria Pollutant Potential Annual Emission Rates
Siemens SGT6-5000F Turbines

Operating Scenario	Annual Emissions (tons/yr)					
	Hours per year[a]	NO_X	CO	VOC	PM_{10}	SO_2
Case 7B	8,760 (5,752)	216.5	69.3	57.0	186.6	51.0
Hot Start	0 (190)		15.2			
Warm Start	0 (101)		9.5			
Cold Start	0 (4.5)		0.3			
Shutdown	0 (145)		6.4			
Offline	0 (2567.5)	0	0	0	0	0
Total Turbines[b]	8,760	216.5	100.7	57.0	186.6	51.0
Auxiliary Equipment						
Emergency Generator	250	3.4	0.9	0.16	0.09	0.10
Firewater Pump	250	0.42	0.021	0.018	0.006	0.013
Cooling Tower	8,760	0	0	0	7.1	0
Total[b]		220.3	101.6	57.2	193.8	51.1

a. Full time operation at maximum duct firing was used for calculating annual emissions for all pollutants except CO. For CO, maximum annual emissions were higher when emission from startups are included in the calculation. Hours per year for the startup scenarios used in the CO annual emissions calculations are in parentheses.
b. Totals may not equal sum of individual components due to rounding.

Table 4-6

Toxic Emissions that Require Modeling
General Electric 7FA Turbines

Toxic Compound	Emission Rate for 2 CTs (lbs/hr)	Emission Rate for Emergency Generator (lbs/hr)	Emission Rate for Firewater Pump (lbs/hr)	Total Annual Emissions (lbs/yr)	Maximum Hourly Emissions (lbs/hr)	SQER (lbs/yr)	SQER (lbs/hr)	ASIL ($\mu g/m^3$)	Class A or B Toxic Compound	
Acetaldehyde	0.044	0.00039	0.0016	384.2	0.046	50	NA	0.45	A	annual
Acrolein	0.025	0.00012	0.00019	218.1	0.025	175	0.02	0.02	B	24-hr
Ammonia[1]	27.1	0	0	237,228	27.1	17,500	2.0	100	B	24-hr
Benzene	0.049	0.012	0.0019	430.5	0.063	20	NA	0.12	A	annual
1,3-Butadiene	0.0017	0	0.000079	14.7	0.0018	0.5	NA	0.0036	A	annual
Formaldehyde	1.26	0.0012	0.0024	11,013	1.26	20	NA	0.077	A	annual
PAH	0.0086	0.0033	0.00034	76.6	0.012	NA	NA	0.00048	A	annual
Arsenic	0.00020	0.0037	0.00027	2.7	0.0042	NA	NA	0.00023	A	annual
Beryllium	0.000012	0	0	0.10	0.000012	NA	NA	0.00042	A	annual
Cadmium	0.0011	0.00035	0.000025	9.7	0.0015	NA	NA	0.00056	A	annual
Chromium	0.018	0.0037	0.00027	162.1	0.022	175	0.02	1.7	B	24-hr
Nickel	0.019	0.00035	0.000025	167.3	0.019	0.5	NA	0.0021	A	annual
Sulfuric Acid[1]	6.9	0.24	0.032	60136	7.13	175	0.02	3.3	B	24-hr

NOTES:
1. Not an USEPA Classified HAP

SQER = Small Quantity Emission Rate
ASIL = Acceptable Source Impact Level
The maximum hourly toxics emissions are calculated from Case 6A. These represent worst-case toxic emissions.

Table 4-7

Toxic Emissions that Require Modeling
Siemens SGT6-5000F Turbines

Toxic Compound	Emission Rate for 2 CTs (lbs/hr)	Emission Rate for Emergency Generator (lbs/hr)	Emission Rate for Firewater Pump (lbs/hr)	Total Annual Emissions (lbs/yr)	Maximum Hourly Emissions (lbs/hr)	SQER (lbs/yr)	SQER (lbs/hr)	ASIL ($\mu g/m^3$)	Class A or B Toxic Compound	
Acetaldehyde	.013	0.00039	0.0016	115.1	0.015	50	NA	0.45	A	annual
Acrolein	0.029	0.00012	0.00019	252.2	0.029	175	0.02	0.02	B	24-hr
Ammonia[1]	29.5	0	0	258,320	29.5	17,500	2.0	100	B	24-hr
Benzene	0.056	0.012	0.0019	494.4	0.070	20	NA	0.12	A	annual
1,3-Butadiene	0.0019	0	0.000079	17.0	0.0020	0.5	NA	0.0036	A	annual
Formaldehyde	0.43	0.0012	0.0024	3,748	0.43	20	NA	0.077	A	annual
PAH	0.010	0.0033	0.00034	88.3	0.014	NA	NA	0.00048	A	annual
Arsenic	0.00020	0.0037	0.00027	2.7	0.00417	NA	NA	0.00023	A	annual
Beryllium	0.000012	0	0	0.10	0.000012	NA	NA	0.00042	A	annual
Cadmium	0.0011	0.00035	0.000025	9.7	0.00147	NA	NA	0.00056	A	annual
Chromium	0.010	0.0037	0.00027	92.0	0.014	175	0.02	1.7	B	24-hr
Nickel	0.011	0.00035	0.000025	97.2	0.011	0.5	NA	0.0021	A	annual
Sulfuric Acid[1]	6.2	0.24	0.032	54,355	6.47	175	0.02	3.3	B	24-hr

NOTES:
1. Not an USEPA Classified HAP
SQER = Small Quantity Emission Rate
ASIL = Acceptable Source Impact Level
The maximum hourly toxics emissions are calculated from Case 6A. These represent worst-case toxic emissions.

Table 5-1

Capital Cost Estimation Factors

CAPITAL COSTS	
DIRECT COSTS	
1. Purchased	
a. Basic Equipment Cost (BEC)	1a
b. Auxiliary Equipment	0.35 x (1a)
c. Instrumentation	0.10 x (1a)
d. Structural Support	0.10 x (1a)
e. Taxes & Freight	0.08 x (1a+1b+1c+1d)
2. Direct Installation	0.30 x (1a+1b+1c+1d+1e)
Total Direct Cost (TDC)	1+2
INDIRECT COSTS	
3. Indirect Installation Cost	
a. Engineering and Supervision	0.10 x (TDC)
b. Construction and Field Expenses	0.10 x (TDC)
c. Construction Fee	0.10 x (TDC)
d. Contingencies	0.10 x (TDC)
4. Other Indirect	
a. Startup and Testing	0.10 x (TDC)
b. Working Capital	30 days O&M cost
Total Indirect Cost (TIC)	3+4
TOTAL CAPITAL COST (TCC)	TDC+TIC
ANNUALIZED COSTS	
DIRECT OPERATING COSTS:	
1. Operating Labor	$35 per man-hour
2. Supervisory	0.15 x (1)
3. Maintenance	0.03 x (TDC)
4. Replacement	
a. Catalyst	0.65 x BEC or provided by manufacturer
b. Other	0.10 x BEC
5. Ammonia	$300/ton aqueous
INDIRECT OPERATING COSTS	
6. Overhead	0.30 x (1+2) + 0.12 x (3)
7. Property Tax	0.01 x TCC
8. Insurance	0.01 x TCC
9. Administration	0.02 x TCC
10. Capital	CRF[a] x TCC (0.142 x TCC)
ANNUALIZED COST	Total of Costs 1 through 11

Source of cost factors: OAQPS Cost Control Manual (USEPA, January 1995)

A CRF = Capital Recovery Factor (see text)

Table 5-2

Annual Pollutant Emission Reduction
GE 7FA Turbine

	Uncontrolled Emissions			Controlled Emissions			Emission Reduction	
	with Duct Burning	without duct burning	weighted average	with Duct Burning	without duct burning	weighted average		
	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	tpy
NO_X from SCR or $SCONO_X$	111.8	59	90.7	22.6	16.3	20.1	70.6	309
CO from CO Catalyst or $SCONO_X$	82.8	30	61.7	11	8	9.8	51.9	227
SO_2 from Wet Scrubber	5.3	3.9	4.7	0.053	0.039	0.047	4.7	21
VOC from CO Catalyst or $SCONO_X$	9.5	2.9	6.9	6.6	2	4.8	2.1	9

Weighted average based on 60% of hours fired with duct burning and 40% fired without duct burning.

Table 5-3

Annual Pollutant Emission Reduction
Siemens SGT6-5000F Turbine

	Uncontrolled Emissions			Controlled Emissions			Emission Reduction	
	with Duct Burning	without duct burning	weighted average	with Duct Burning	without duct burning	weighted average		
	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	tpy
NO_X from SCR or $SCONO_X$	121.8	69	100.7	24.7	18.6	22.3	78.4	343
CO from CO Catalyst or $SCONO_X$	71.8	19	50.7	12	9.1	10.8	39.8	174
SO_2 from Wet Scrubber	5.8	4.4	5.2	0.058	0.044	0.052	5.2	23
VOC from CO Catalyst or $SCONO_X$	9.3	2.7	6.7	6.5	1.9	4.7	2.0	9

Weighted average based on 60% of hours fired with duct burning and 40% fired without duct burning.

Table 5-4

Cost Associated with SCONOx – Complete System Purchase

CAPITAL COSTS	
DIRECT COSTS	
1. Purchased Equipment	
a. Basic Equipment (A)	$10,959,800
b. Auxiliary Equipment (0.35 A)	(included in basic equipment)
c. Instrumentation (0.10 A)	(included in basic equipment)
d. Structural Support (0.10 A)	1,096,000
e. Taxes & Freight (0.08 (a + b))	876,800
Total Purchased Equipment Cost (B)	$12,932,600
2. Direct Installation (0.30 B)	3,879,800
Total Direct Cost (TDC) (1+2)	$16,812,400
INDIRECT COSTS	
3. Indirect Installation Cost	
a. Engineering and Supervision (0.10 TDC)	$1,681,200
b. Construction and Field Expenses (0.10 TDC)	1,681,200
c. Construction Fee (0.05 TDC)	840,600
d. Contingencies (0.03 TDC)	504,400
4. Other Indirect Costs	
a. Startup and Testing (0.01 TDC)	168,100
b. Working Capital (30 days O&M cost)	248,800
Total Indirect Cost (TIC) (3+4):	$5,124,300
Capital cost for demineralized water plant	$33,600
TOTAL CAPITAL COST (TCC) (1+2+3+4)	$21,970,300
ANNUALIZED COSTS	
DIRECT OPERATING COSTS:	
1. Operating Labor (C) ($35/man-hr)	$76,650
2. Supervisory Labor (0.15 C)	11,500
3. Maintenance (0.03 TDC)	504,400
4. Replacement Parts	
a. Catalyst replacement ($4,301,700/5 yrs)	929,200
b. Other (0.1 A)	1,096,000
5. Utilities	
a. Output penalty (0.2% of MW output, $42/MWh)	132,500
b. Demineralized water (8.4 GPM)	6,600
c. Natural gas for regeneration (1800 scf/hr)	13,100
6. Unscheduled outage (5 days/yr, $10/MWh)	216,000
7. Disposal Costs (included in catalyst replacement cost)	0
INDIRECT OPERATING COSTS	
8. Overhead (0.3 (1+2) + 0.12 (3))	$87,000
9. Property Tax (0.01 TCC)	219,700
10. Insurance (0.01 TCC)	219,700
11. Administration (0.02 TCC)	439,400
12. Capital Recovery (0.142 TCC)	3,119,800
ANNUALIZED COST ($/yr)	$7,071,550

	GE 7FA Turbine	**Siemens SGT6-5000F Turbine**
NO_X Controlled (ton/yr)	309	343
Cost per ton of NO_X controlled ($/ton)	**$22,900**	**$20,600**
CO Controlled (ton/yr)	227	174
Cost per ton of CO controlled ($/ton)	**$31,100**	**$40,500**
NO_X , CO, and VOC Controlled (ton/yr)	546	527
Cost per ton of pollutants controlled ($/ton)	**$13,000**	**$13,400**

Table 5-5

Costs Associated with SCONOx Mechanical System Purchase/Catalyst Lease

CAPITAL COSTS		
DIRECT COSTS		
1. Purchased Equipment		
a. Basic Equipment (A)		$6,314,000
b. Auxiliary Equipment (0.35 A)		(included in basic equipment)
c. Instrumentation (0.10 A)		(included in basic equipment)
d. Structural Support (0.10 A)		$631,400
e. Taxes & Freight (0.08 (a + b))		$505,100
Total Purchased Equipment Cost (B)		$6,898,600
2. Direct Installation (0.30 B)		$2,235,200
Total Direct Cost (TDC) (1+2)		$9,685,700
INDIRECT COSTS		
3. Indirect Installation Cost		
a. Engineering and Supervision (0.10 TDC)		$896,800
b. Construction and Field Expenses (0.10 TDC)		$896,800
c. Construction Fee (0.05 TDC)		$484,300
d. Contingencies (0.03 TDC)		$290,600
4. Other Indirect Costs		
a. Startup and Testing (0.01 TDC)		$89,700
b. Working Capital (30 days O&M cost)		$188,200
Total Indirect Cost (TIC) (3+4):		$3,009,200
Capital cost for demineralized water plant		$33,600
TOTAL CAPITAL COST (TCC) (1+2+3+4)		$11,790,700
ANNUALIZED COSTS		
DIRECT OPERATING COSTS:		
1. Operating Labor (C) ($35/man-hr)		$76,650
2. Supervisory Labor (0.15 C)		$11,500
3. Maintenance (0.03 TDC)		$290,600
4. Replacement Parts		
a. Catalyst lease cost ($79,035/month)		$1,024,300
b. Other (0.1 A)		$631,400
5. Utilities		
a. Output penalty (0.2% of MW output, $42/MWh)		$132,500
b. Demineralized water (8.4 GPM)		$6,600
c. Natural gas for regeneration (1800 scf/hr)		$13,100
6. Unscheduled outage (5 days/yr, $10/MWh)		$216,000
7. Disposal Costs (included in catalyst replacement cost)		
INDIRECT OPERATING COSTS		
8. Overhead (0.3 (1+2) + 0.12 (3))		$61,300
9. Property Tax (0.01 TCC)		$127,300
10. Insurance (0.01 TCC)		$127,300
11. Administration (0.02 TCC)		$254,600
12. Capital Recovery (0.142 TCC)		$1,807,400
ANNUALIZED COST ($/yr)		$4,780,550
	GE 7FA Turbine	**Siemens SGT6-5000F Turbine**
NO_X Controlled (ton/yr)	309	343
Cost per ton of NO_X controlled ($/ton)	**$15,500**	**$13,900**
CO Controlled (ton/yr)	227	175
Cost per ton of CO controlled ($/ton)	**$21,000**	**$27,400**
NO_X , CO, and VOC Controlled (ton/yr)	546	527

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Cost per ton of pollutants controlled ($/ton)	**$8,800**	**$9,100**

Table 5-6

Costs Associated with SCR and Oxidation Catalysts for NO_X, CO, and VOC Control

ANNUALIZED COST ($/yr)		$3,490,200
	GE 7FA Turbine	**Siemens SGT6-5000F Turbine**
NO_X, CO andVOC Controlled	546	527
Cost per ton of pollutants controlled ($/ton)	**$6,400**	**$6,600**

Table 5-7

Costs Associated with SCR for NO_X Control

CAPITAL COSTS		
DIRECT COSTS		
1. Purchased Equipment		
a. Basic Equipment (A)		$2,475,300
b. Auxiliary Equipment (0.35 A)		(included in basic equipment)
c. Instrumentation (0.10 A)		(included in basic equipment)
d. Structural Support (0.10 A)		$247,500
e. Taxes & Freight (0.08 (a + b))		$198,000
Total Purchased Equipment Cost (B)		$2,920,800
2. Direct Installation (0.30 B)		$876,200
Total Direct Cost (TDC) (1+2)		$3,797,000
INDIRECT COSTS		
3. Indirect Installation Cost		
a. Engineering and Supervision (0.10 TDC)		$379,700
b. Construction and Field Expenses (0.10 TDC)		$379,700
c. Construction Fee (0.05 TDC)		$189,900
d. Contingencies (0.03 TDC)		$113,900
4. Other Indirect Costs		
a. Startup and Testing (0.01 TDC)		$38,000
b. Working Capital (30 days O&M cost)		$76,500
Total Indirect Cost (TIC) (3+4):		$1,177,700
TOTAL CAPITAL COST (TCC) (1+2+3+4)		$4,974,700
ANNUALIZED COSTS		
DIRECT OPERATING COSTS:		
1. Operating Labor (C) ($35/man-hr)		$76,650
2. Supervisory Labor (0.15 C)		$11,500
3. Maintenance (0.03 TDC)		$113,900
4. Replacement Parts		
a. Catalyst (609,000/3 yrs)		$219,200
b. Other (0.1 A)		$247,500
5. Utilities		$132,500
a. Output penalty (0.2% of MW output, $42/MWh)		$117,300
6. Ammonia Cost ($300/ton)		0
7. Disposal Costs (included in catalyst replacement cost)		
INDIRECT OPERATING COSTS		
8. Overhead (0.3 (1+2) + 0.12 (3))		$40,100
9. Property Tax (0.01 TCC)		$49,700
10. Insurance (0.01 TCC)		$49,700
11. Administration (0.02 TCC)		$99,500
12. Capital Recovery (0.142 TCC)		$706,400
ANNUALIZED COST ($/yr)		$1,863,950
	GE 7FA Turbine	**Siemens SGT6-5000F Turbine**
NO_X Controlled (ton/yr)	309	344
Cost Per Ton of NO_X Controlled ($/ton)	**$5,900**	**$5,400**

Table 5-8

Costs Associated with Catalytic Oxidation for CO Control

CAPITAL COSTS		
DIRECT COSTS		
1. Purchased Equipment		
a. Basic Equipment (A)		$2,335,900
b. Auxiliary Equipment (0.35 A)		0
c. Instrumentation (0.10 A)		0
d. Structural Support (0.10 A)		$233,600
e. Taxes & Freight (0.08 (a + b))		$186,900
Total Purchased Equipment Cost (B)		
2. Direct Installation (0.30 B)		$826,900
Total Direct Cost (TDC) (1+2)		$3,583,300
INDIRECT COSTS		
3. Indirect Installation Cost		
a. Engineering and Supervision (0.10 TDC)		$358,300
b. Construction and Field Expenses (0.10 TDC)		$358,300
c. Construction Fee (0.05 TDC)		$179,200
d. Contingencies (0.03 TDC)		$107,500
4. Other Indirect Costs		
a. Startup and Testing (0.01 TDC)		$35,800
b. Working Capital (30 days O&M cost)		$61,200
Total Indirect Cost (TIC) (3+4):		$1,100,300
TOTAL CAPITAL COST (TCC) (1+2+3+4)		$4,683,600
ANNUALIZED COSTS		
DIRECT OPERATING COSTS:		
1. Operating Labor (C) ($35/man-hr)		$76,650
2. Supervisory Labor (0.15 C)		$11,500
3. Maintenance (0.03 TDC)		$107,500
4. Replacement Parts		
a. Catalyst (480,000/3 yrs)		$172,800
b. Other (0.1 A)		$233,600
5. Utilities		
a. Output penalty (0.2% of MW output, $42/MWh)		$132,500
6. Disposal Costs (included in catalyst replacement cost)		0
INDIRECT OPERATING COSTS		
7. Overhead (0.3 (1+2) + 0.12 (3))		$39,300
8. Property Tax (0.01 TCC)		$46,800
9. Insurance (0.01 TCC)		$46,800
10. Administration (0.02 TCC)		$93,700
11. Capital Recovery (0.142 TCC)		$665,100
ANNUALIZED COST ($/yr)		$1,626,250
	GE 7FA Turbine	**Siemens SGT6-5000F Turbine**
CO Controlled (ton/yr)	227	175
Cost Per Ton of CO Controlled ($/ton)	**$7,200**	**$9,300**

Table 5-9

Costs Associated with Wet Scrubber for SO_2 and H_2SO_4 Control

CAPITAL COSTS		
DIRECT COSTS		
1. Purchased Equipment		
a. Basic Equipment (A)		$5,720,000
b. Auxiliary Equipment (0.35 A)		$2,002,000
c. Instrumentation (0.10 A)		$572,000
d. Structural Support (0.10 A)		$572,000
e. Taxes & Freight (0.08 (a + b))		$617,800
Total Purchased Equipment Cost (B)		$9,483,800
2. Direct Installation (0.30 B)		$2,845,100
Total Direct Cost (TDC) (1+2)		$12,328,900
INDIRECT COSTS		
3. Indirect Installation Cost		
a. Engineering and Supervision (0.10 TDC)		$1,232,900
b. Construction and Field Expenses (0.10 TDC)		$1,232,900
c. Construction Fee (0.05 TDC)		$616,400
d. Contingencies (0.03 TDC)		$369,900
4. Other Indirect Costs		
a. Startup and Testing (0.01 TDC)		$123,300
b. Working Capital (30 days O&M cost)		$119,000
Total Indirect Cost (TIC) (3+4):		$3,694,400
TOTAL CAPITAL COST (TCC) (1+2+3+4)		$16,023,300
ANNUALIZED COSTS		
DIRECT OPERATING COSTS:		
1. Operating Labor (C) ($35/man-hr)		$76,650
2. Supervisory Labor (0.15 C)		$11,500
3. Maintenance (0.03 TDC)		$369,900
4. Replacement Parts		
b. Other (0.1 A)		$572,000
5. Electricity		$175,300
6. Soda Ash		$223,000
7. Wastewater Treatment		$1,689,300
INDIRECT OPERATING COSTS		
7. Overhead (0.3 (1+2) + 0.12 (3))		$70,800
8. Property Tax (0.01 TCC)		$160,200
9. Insurance (0.01 TCC)		$160,200
10. Administration (0.02 TCC)		$320,500
11. Capital Recovery (0.142 TCC)		$2,275,300
ANNUALIZED COST ($/yr)		$6,104,650
	GE 7FA Turbine	**Siemens SGT6-5000F Turbine**
SO_2 AND H_2SO_4 Controlled (ton/yr)	21	23
Cost Per Ton Of Pollutants Controlled ($/ton)	**$297,000**	**$268,700**

Table 5-10

Summary of BACT

Pollutant	Control Technology	Cost ($/ton pollutant removed)	
		GE 7FA	**Siemens SGT6-5000F**
NO_X	**SCR**	$5,900	$5,400
	SCONOx – complete purchase	$22,900	$20,600
	SCONOx – lease	$15,500	$13,900
CO	**CO Oxidation Catalyst**	$7,200	$9,300
	SCONOx – complete purchase	$31,100	$40,500
	SCONOx – lease	$21,000	$27,400
VOC	**Good combustion control in combination with CO oxidation catalyst**	0	0
NO_X, CO, VOC total	**SCR and oxidation catalyst**	$6,400	$6,600
NO_X, CO, VOC total	SCONOx – complete purchase	$13,000	$13,400
NO_X, CO, VOC total	SCONOx – lease	$8,800	$9,100
PM_{10}	**Low sulfur/low ash fuel and good combustion control**	0	0
SO_2 and H_2SO_4	**Low sulfur/low ash fuel and good combustion control**	0	0
	Wet Scrubber	$297,000	$268,700
Toxic Air Pollutants	**Low sulfur/low ash fuel and good combustion control in combination with CO oxidation catalyst**	0	0
Control technologies in bold are those that have been selected as BACT.			

Table 5-11

Requested Maximum Emission Limits – Per CT/HRSG System

Loads/ Temperatures	NO_X	CO	VOC	PM_{10}	SO_2[1]	Ammonia
50 – 100% loads with or without duct burners firing NG or RFG/any ambient inlet temperature	2.5 ppmdv three hour average	2.0 ppmdv three hour average	6.9 lb/hr 24-hour average	29.2 lb/hr 24-hour average	12.5 lb/hr 24-hour average	5 ppm 24-hour average

Notes:
1. SO2 emissions based on 1.6 gr S.

Table 6-1

Stack and Building Dimensions

Source or Structure	Height (ft)	Length or Diameter (ft)	Width (ft)
CT/HRSG stacks	150	19[1]	NA
Emergency Generator	11.7	0.67[1]	NA
Firewater Pump	11.7	0.5[1]	NA
Cooling Tower Cells	75	30.0[1]	NA
HRSGs	95	130	23
Cooling Tower	60	430	55
Steam Turbine Enclosure	60	210	110
Admin/Warehouse Building	30	335	72
Emergency Generator Building	11	30	13
Firewater Pump Building	20	30	13
Fire/Raw Water Tank	40	50[1]	NA
Boiler Feedwater Tank	60	42[1]	NA
Demineralized Water Tank	60	40[1]	NA

NOTE:
1. Diameter
2. All dimensions are approximate until final design.

Table 6-2

Operating Load, Temperature and Flow Rate Conditions
General Electric 7FA Turbines

Case	Ambient Temp. (°F)	Turbine Load (%)	Duct Burner (MMBtu/hr)	Volume Flow (1000 acfm)	Velocity (ft/sec)	Temp (°F)
1AA	5	100	0	1,109	65.2	195
1AB	50	100	0	1,029	60.5	195
1AC	85	100	0	949	55.8	195
1BA	5	75	0	855	50.3	190
1BB	50	75	0	811	47.7	190
1BC	85	75	0	772	45.4	190
1CA	5	50	0	681	40.0	180
1CB	50	50	0	660	38.8	180
1CC	85	50	0	638	37.5	180
7A	5	100	600	1,146	67.4	190
7B	50	100	600	1,065	62.6	190
7C	85	100	600	983	57.8	190
Emer. Gen.	All	All	NA	12.7	602	899
Fire Pump	All	All	NA	1.4	119	840
Cooling Tower	All	All	NA	10.1	2.15	90

Table 6-3

Operating Load, Temperature and Flow Rate Conditions
Siemens SGT6-5000F Turbines

Case	Ambient Temp. (°F)	Turbine Load (%)	Duct Burner (MMBtu/hr)	Volume Flow (1000 acfm)	Velocity (ft/sec)	Temp (°F)
1AA	5	100	0	1,289	75.8	195
1AB	50	100	0	1,200	70.5	195
1AC	85	100	0	1,100	64.6	195
1BA	5	75	0	1,065	62.6	190
1BB	50	75	0	992	58.3	190
1BC	85	75	0	910	53.5	190
1CA	5	50	0	935	53.0	180
1CB	50	50	0	874	51.4	180
1CC	85	50	0	808	47.5	180
7A	5	100	600	1,275	74.9	190
7B	50	100	600	1,188	69.8	190
7C	85	100	600	1,090	64.1	190
Emer. Gen.	All	All	NA	12.7	602	899
Fire Pump	All	All	NA	1.4	119	840
Cooling Tower	All	All	NA	10.1	2.15	90

Table 6-4

Modeled Emission Rates
General Electric 7FA Turbines

Case	Ambient Temp °F	Gas Turbine Load %	Duct Burning MMBtu/hr	Concentration Modeling					Visibility Modeling		
				NO_X[1] lb/hr	CO lb/hr	PM_{10} Lb/hr	SO_2[2] lb/hr	SO_2[3] lb/hr	PM_{10}[4] lb/hr	SO_2[5] lb/hr	SO_4[6] lb/hr
1AA	5	100	0	17.5	8.5	18.7	4.2	8.3	17.0	3.9	0.3
1AB	50	100	0	16.3	8.0	18.6	3.9	7.7	17.0	3.7	0.3
1AC	85	100	0	15.0	7.3	18.5	3.5	7.1	17.0	3.4	0.3
1BA	5	75	0	14.1	6.8	18.4	3.4	6.7	17.0	3.2	0.3
1BB	50	75	0	13.1	6.4	18.3	3.1	6.3	17.0	3.0	0.2
1BC	85	75	0	12.2	5.9	18.2	2.9	5.8	17.0	2.8	0.2
1CA	5	50	0	11.0	5.4	18.1	2.7	5.3	17.0	2.5	0.2
1CB	50	50	0	10.4	5.1	18.0	2.5	5.0	17.0	2.4	0.2
1CC	85	50	0	9.6	4.7	18.0	2.3	4.7	17.0	2.2	0.2
7A	5	100	600	23.8	11.6	29.2	5.6	11.2	26.9	5.3	0.4
7B	50	100	600	22.6	11.0	29.1	5.3	10.6	26.9	5.0	0.4
7C	85	100	600	21.2	10.3	29.0	5.0	10.0	26.9	4.7	0.4
Generator[7,8]	All	All	NA	27.5	6.9	0.7	0.8	0.8	0.058	0.0019	0.00015
Fire Pump[7,8]	All	All	NA	3.3	0.2	0.1	0.1	0.1	0.0042	0.00025	0.000020
Cooling Tower	All	All	NA	NA	NA	1.628	NA	NA	1.628	0.0	0.0

NOTES:
Emissions are for each of two turbines.
1. NO_X values are used for concentration and visibility modeling.
2. SO_2 is calculated using 0.8 gr S/100scf natural gas
3. SO_2 is calculated using 1.6 gr S/100scf natural gas
4. PM_{10} emissions for CalPuff visibility modeling do not include ammonium sulfate emissions that are included in the ISC-Prime modeling.
5. SO_2 emissions for CalPuff visibility modeling are calculated by subtracting the 5% sulfur converted to SO_4.
6. SO_4 emissions for CalPuff visibility modeling are calculated by assuming a 5% conversion from SO_2 and multiplying by the ratio of molecular weights (96/64).
7. Emission rates modeled are adjusted from these values to specific averaging period based on 2 hours per day operation.
8. Emission rates based on the use of 0.05% S fuel.

Table 6-5

Modeled Emission Rates
Siemens SGT6-5000F Turbines

Case	Ambient Temp °F	Gas Turbine Load %	Duct Burning MMBtu/hr	Concentration Modeling				
				NO_X lb/hr	CO lb/hr	PM_{10} Lb/hr	SO_2[1] lb/hr	SO_2[2] lb/hr
1AA	5	100	0	20.4	9.9	11.0	4.8	9.6
1AB	50	100	0	18.6	9.1	10.8	4.4	8.8
1AC	85	100	0	16.9	8.2	9.6	4.0	7.9
1BA	5	75	0	16.3	7.9	9.6	3.8	7.7
1BB	50	75	0	14.8	7.2	9.4	3.5	7.0
1BC	85	75	0	13.5	6.6	9.3	3.2	6.3
1CA	5	50	0	13.8	6.7	9.3	3.2	6.5
1CB	50	50	0	12.6	6.1	9.2	3.0	5.9
1CC	85	50	0	11.5	5.6	9.1	2.7	5.4
7A	5	100	600	26.5	12.9	21.5	6.2	12.5
7B	50	100	600	24.7	12.0	21.3	5.8	11.6
7C	85	100	600	23.0	11.2	20.1	5.4	10.8
Generator[3,4]	All	All	NA	27.5	6.9	0.7	0.8	0.8
Fire Pump[3,4]	All	All	NA	3.3	0.2	0.1	0.1	0.1
Cooling Tower	All	All	NA	NA	NA	1.628	NA	NA

NOTES:
Emissions are for each of two turbines.
1. SO_2 is calculated using 0.8 gr S/100scf natural gas
2. SO_2 is calculated using 1.6 gr S/100scf natural gas
3. Emission rates modeled are adjusted from these values to specific averaging period based on 2 hours per day operation.
4. Emission rates based on the use of 0.05% S fuel.

Table 6-6

Boiler Emission Rates for Visibility Modeling

Operating Unit	Units	NO_X	CO	VOC	PM_{10}	SO_2
Annual Boiler Emissions	Tons/yr	184.0	11.0	0.0	3.0	26.0
Hourly Boiler Emissions	lb/hr	42.0	2.5	0.0	0.7	5.9

NOTE: Annual emissions are based on year 2000 operations. Hourly emissions calculation based on full time operation of 8,760 hours per year.

SO_2 emissions were modeled at 4.7 lb/hr, which is 80% of the above value. The remaining emissions were modeled as SO_4 at a level of 1.8 lb/hr.

Table 7-1

Significant Impact Level Modeling Analysis Results - Class II Areas

Pollutant	Maximum Predicted Concentration ($\mu g/m^3$)[1]					SIL ($\mu g/m^3$)[2]
	Annual[3]	24-hr	8-hr	3-hr	1-hr	
NO_X (GE)	0.80					1
NO_X (GE/Alternate STG)	0.63					1
NO_X (Siemens)	0.77					1
CO (GE)			10.9		83.0	500/2,000
PM_{10} (GE)	0.55	3.86				1/5
PM_{10} (GE/Alternate STG)	0.54	3.99				1/5
PM_{10} (Siemens)		3.79				1/5
SO_2 (GE)	0.06	0.8		5.0		1/5/25

1. Highest of all cases for 1995, 1996, 1998, 1999, 2000.
2. Significant Impact Level (SIL) for criteria pollutants.
3. Based on annual average ambient temperature of 50°F.

Table 7-2

Significant Impact Level Modeling Analysis Results - Class I Areas

Pollutant	Maximum Predicted Concentration ($\mu g/m^3$)[1]					SIL ($\mu g/m^3$)[2]
	Annual	24-hr	8-hr	3-hr	1-hr	
NO_X	0.0053					0.1
PM_{10}	0.0054	0.087				0.2/0.3
SO_2	0.001	0.021		0.048		0.1/0.2/1
CO [3]						

1. Highest of all cases for 1995, 1996, 1998, 1999, 2000.
2. Significant Impact Level (SIL).
3. Not modeled in Class I Areas.

Table 7-3

Significant Impact Level Modeling Analysis Results - Toxic Compounds

Pollutant	Maximum Predicted Concentration ($\mu g/m^3$) [4]		ASIL ($\mu g/m^3$)[3]	ASIL Exceeded (Yes/No)
	Annual[1]	24-hr[2]		
Acetaldehyde	0.00018	NA	0.45	No
Acrolein	NA	0.0021	0.02	No
Ammonia	NA	2.19	100	No
Arsenic	0.0001	NA	0.00023	No
1,3-Butadiene	0.00001	NA	0.0036	No
Benzene	0.00036	NA	0.12	No
Beryllium	< 0.00001	NA	0.00042	No
Cadmium	0.00001	NA	0.00056	No
Chromium	NA	0.0026	1.7	No
Formaldehyde	0.00499	NA	0.077	No
Nickel	0.00008	NA	0.0021	No
PAH	0.00009	NA	0.00048	No
Sulfuric Acid	NA	0.57	3.3	No

1. Highest of annual cases 1AB, 1BB, 1CB, 7B (all at 50°F).
2. Highest of all cases for 1995, 1996, 1998, 1999, 2000.
3. Acceptable source impact levels (ASIL).
4. Since no toxics were modeled for the Siemens CTs, this table refers to GE toxic impacts only.

Table 7-4

AQRV Modeling Analysis Results
General Electric 7FA Turbines
Modeling of 3 Turbines from 2003 Application

Operating Scenario	Class I area	N Deposition	S Deposition	Maximum Visibility Change	Number of days over 5%	Maximum Visibility Change including Boiler Emissions Reductions	Number of days over 5%
		(g/ha/yr)	(g/ha/yr)	(%)		(%)	
Case 1AA	Olympic National Park	0.09	0.11	5.5	1	1.6	0
	North Cascades National Park	0.44	0.31	2.5	0	1.4	0
	Alpine Lakes Wilderness Area	0.56	0.68	3.8	0	1.9	0
	Glacier Peak Wilderness Area	0.42	0.32	4.1	0	1.8	0
	Pasayten Wilderness Area	0.23	0.13	1.7	0	1.0	0
	Mt. Baker Wilderness Area	0.63	0.56	4.0	0	2.2	0
Case 2A	Olympic National Park	0.09	0.11	5.6	1	1.7	0
	North Cascades National Park	0.45	0.31	2.5	0	1.4	0
	Alpine Lakes Wilderness Area	0.57	0.70	3.9	0	2.0	0
	Glacier Peak Wilderness Area	0.42	0.32	4.2	0	1.9	0
	Pasayten Wilderness Area	0.23	0.13	1.7	0	1.1	0
	Mt. Baker Wilderness Area	0.64	0.57	4.0	0	2.3	0
Case 6A	Olympic National Park	0.09	0.12	6.0	1	1.9	0
	North Cascades National Park	0.47	0.32	2.6	0	1.5	0
	Alpine Lakes Wilderness Area	0.60	0.73	4.1	0	2.3	0
	Glacier Peak Wilderness Area	0.44	0.34	4.4	0	2.1	0
	Pasayten Wilderness Area	0.24	0.14	1.8	0	1.2	0
	Mt. Baker Wilderness Area	0.67	0.60	4.1	0	2.3	0
Case 6A – Maximum Sulfur in summer	All 6 Class I areas	--	--	1.0	0	--	---
Maximum		0.67	0.73	6.0	1	2.3	0

NOTES: Significance level for visibility is 5%.
Significance level for deposition is 5 g/ha/yr.
Case 6A is a maximum possible operation case. Case 2A is a normal operation case.
From May 15 to September 15, the fuel sulfur content may rise from 0.8 gr/100 scf to 1.6 gr/100 scf. Case 6A was modeled during this period with this sulfur content.
Case 6A visibility change was scaled down to reflect impacts from 2 turbines. The calculated maximum visibility change is 5.25%

APPENDICES

APPENDIX A

VENDOR PROVIDED COMBUSTION TURBINE EMISSIONS INFORMATION (GE TURBINES)

Manufacturer's Emission Estimates - GE 7FA

Air Emissions Summary (1)(2)

												2x1 600	2x1 600	2x1 600
CASE			**1AA**	**1AB**	**1AC**	**1BA**	**1BB**	**1BC**	**1CA**	**1CB**	**1CC**	**7A**	**7B**	**7C**
Ambient Temp.	Deg F.		5	50	85	5	50	85	5	50	85	5	50	85
Ambient Relative Humid.	%		80	65	45	80	65	45	80	65	45	80	80	80
Gas Turbine Load	Percent		100	100	100	75	75	75	50	50	50	100	100	100
Turbine Fuel	Type		NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG
Duct Burner Fuel	Type		-	-	-	-	-	-	-	-	-	NG	NG	NG
GAS TURBINE INPUT (Per Turbine)														
Fuel (7)	Type		NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG
Fuel Sulfur - Annual Average	ppmv		13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5
Fuel Sulfur - Annual Average	grains/100 scf		0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
SO2 Emission factor - Annual Average (LHV)	lb/MM Btu		0.00240	0.00240	0.00240	0.00240	0.00240	0.00240	0.00240	0.00240	0.00240	0.00240	0.00240	0.00240
Fuel Sulfur - Short Term Average	ppmv		27.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1
Fuel Sulfur - Short Term Average	grains/100 scf		1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
SO2 Emission factor - Short Term Average	lb/MM Btu		0.00480	0.00480	0.00480	0.00480	0.00480	0.00480	0.00480	0.00480	0.00480	0.00480	0.00480	0.00480
Fuel Heating Value (LHV)	Btu/lb		21,325	21,325	21,325	21,325	21,325	21,325	21,325	21,325	21,325	21,325	21,325	21,325
Fuel Heating Value (LHV)	Btu/scf		952	952	952	952	952	952	952	952	952	952	952	952
Fuel Temperature	Deg F		365	365	365	365	365	365	365	365	365	365	365	365
Turbine Output (Gross @ Generator Terminals)	kW		188,300	172,500	152,700	141,200	129,400	114,600	94,200	86,200	76,400	188,300	172,500	152,700
Heat Rate (LHV)	Btu/kWh		9,195	9,355	9,680	9,930	10,120	10,620	11,810	12,140	12,680	9,195	9,355	9,680
Heat Consumption (LHV)	MM Btu/h		1,731.4	1,613.7	1,478.1	1,402.1	1,309.5	1,217.1	1,112.5	1,046.5	968.8	1,731.4	1,613.7	1,478.1
GAS TURBINE EMISSIONS (Per Turbine) - Uncontrolled														
Exhaust Flow	lb/h		3,953,000	3,660,000	3,362,000	3,069,000	2,905,000	2,755,000	2,485,000	2,402,000	2,314,000	3,953,000	3,660,000	3,362,000
Exhaust Presure	inches Water		22.0	19.3	16.5	13.7	12.4	11.3	9.2	8.6	8.0	22.0	19.3	16.5
Exhaust Temp.	Deg F.		1059	1109	1150	1129	1159	1187	1182	1200	1200	1059	1109	1150
NOx	ppmvd @ 15% O2		9	9	9	9	9	9	9	9	9	9	9	9
NOx as NO2	lb/h		63	59	54	51	47	44	40	38	35	63	59	54
SO2 - Annual Average	ppmvd @ 15% O2		0.27	0.27	0.27	0.27	0.27	0.27	0.28	0.28	0.28	0.27	0.27	0.27
SO2 - Annual Average	lb/h		4.2	3.9	3.5	3.4	3.1	2.9	2.7	2.5	2.3	4.2	3.9	3.5
SO2 - Short Term Average	ppmvd @ 15% O2		0.54	0.54	0.54	0.54	0.54	0.54	0.56	0.56	0.56	0.54	0.54	0.54
SO2 - Short Term Average	lb/h		8.3	7.7	7.1	6.7	6.3	5.8	5.3	5.0	4.7	8.3	7.7	7.1
CO	ppmvd		9	9	9	9	9	9	9	9	9	9	9	9
CO	lb/h		32	30	27	25	24	22	20	20	19	32	30	27
VOC	ppmvw		1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
VOC as CH4	lb/h		3.1	2.9	2.7	2.4	2.3	2.2	2.0	1.9	1.8	3.1	2.9	2.7
Particulates (PM10 front- and back-half)	lb/h		17	17	17	17	17	17	17	17	17	17	17	17
Argon	% VOL	39.95	0.90	0.89	0.88	0.91	0.90	0.88	0.89	0.90	0.90	0.90	0.89	0.88
Nitrogen	% VOL	28	75.17	74.67	73.90	75.08	74.63	73.92	75.17	74.75	74.08	75.17	74.67	73.90
Oxygen	% VOL	32	12.87	12.70	12.54	12.61	12.61	12.59	12.86	12.95	13.07	12.87	12.70	12.54
Carbon Dioxide	% VOL	44	3.71	3.73	3.70	3.83	3.77	3.68	3.72	3.61	3.46	3.71	3.73	3.70
Water	% VOL	18	7.35	8.01	8.98	7.58	8.10	8.93	7.36	7.80	8.50	7.35	8.01	8.98
Exhaust MW			28.48	28.41	28.30	28.47	28.41	28.30	28.48	28.43	28.34	28.48	28.41	28.30
DUCT BURNER INPUT (Per HRSG) (2)(3) - **Uncontrolled**														
Fuel (4)	Type		NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG
Fuel Heating Value (LHV)	Btu/lb		21,325	21,325	21,325	21,325	21,325	21,325	21,325	21,325	21,325	21,325	21,325	21,325
Heat Consumption (LHV)	MM Btu/h		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	600.0	600.0	600.0
Heat Consulption (HHV)	MM Btu/h													
NOx	lb/hr	0.08										52.8	52.8	52.8
SO2	lb/hr											1.44	1.44	1.44
CO	lb/hr	0.08										52.8	52.8	52.8
VOC	lb/hr	0.01										6.6	6.6	6.6
PM10	lb/hr	0.015										9.90	9.90	9.90
Addition to Exhaust Flow	lb/hr											28,136.0	28,136.0	28,136.0
COMBINED GAS TURBINE AND DUCT BURNER EMISSIONS (Per Turbine/HRSG) - Uncontrolled														
Exhaust Flow	lb/h		3,953,000	3,660,000	3,362,000	3,069,000	2,905,000	2,755,000	2,485,000	2,402,000	2,314,000	3,981,136	3,688,136	3,390,136
NOx	ppmvd @ 15% O2		9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0			
NOx - AirPermits calculated	ppmvd @ 15% O2		8.9	9.0	9.0	8.9	8.8	8.9	8.8	8.9	8.9	12.2	12.4	12.6
NOx AS NO2	lb/h		63.0	59.0	54.0	51.0	47.0	44.0	40.0	38.0	35.0	115.8	111.8	106.8
SO2 - Annual Average	ppmvd @ 15% O2		0.27	0.27	0.27	0.27	0.27	0.27	0.28	0.28	0.28			
SO2 - Annual Average	lb/h		4.2	3.9	3.5	3.4	3.1	2.9	2.7	2.5	2.3	5.6	5.3	5.0

SO2 - Short Term Average	ppmvd @ 15% O2		0.54	0.54	0.54	0.54	0.54	0.54	0.56	0.56	0.56			
SO2 - Short Term Average	lb/h		8.3	7.7	7.1	6.7	6.3	5.8	5.3	5.0	4.7	11.2	10.6	10.0
CO	ppmvd		9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0			
CO - AirPermits calculated	ppmvd		10.1	10.4	10.4	10.1	10.4	10.3	9.9	10.4	10.5	26.6	28.3	30.1
CO - AirPermits calculated	ppmvd @ 15% O2		7.5	7.5	7.4	7.2	7.4	7.3	7.2	7.7	7.9	14.7	15.1	15.5
CO	lb/h		32.0	30.0	27.0	25.0	24.0	22.0	20.0	20.0	19.0	84.8	82.8	79.8
VOC	ppmvw		1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	4.3	4.5	4.8
VOC as CH4	lb/h		3.1	2.9	2.7	2.4	2.3	2.2	2.0	1.9	1.8	9.7	9.5	9.3
Particulates (PM10 front- and back-half)	lb/h		17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	26.9	26.9	26.9
Argon	% VOL	39.95	0.90	0.89	0.88	0.91	0.90	0.88	0.89	0.90	0.90	0.89	0.88	0.87
Nitrogen	% VOL	28	75.17	74.67	73.90	75.08	74.63	73.92	75.17	74.75	74.08	74.23	73.66	72.82
Oxygen	% VOL	32	12.87	12.70	12.54	12.61	12.61	12.59	12.86	12.95	13.07	10.21	9.84	9.44
Carbon Dioxide	% VOL	44	3.71	3.73	3.70	3.83	3.77	3.68	3.72	3.61	3.46	4.91	5.03	5.10
Water	% VOL	18	7.35	8.01	8.98	7.58	8.10	8.93	7.36	7.80	8.50	9.76	10.60	11.77
Exhaust MW			28.48	28.41	28.30	28.47	28.41	28.30	28.48	28.43	28.34	28.32	28.24	28.12
Exhaust MW dry			27.05	26.86	26.58	27.00	26.84	26.59	27.05	26.91	26.70	26.46	26.23	25.90
STACK EMISSIONS (Per Turbine/HRSG)														
Stack Flow	lb/h		3,953,000	3,660,000	3,362,000	3,069,000	2,905,000	2,755,000	2,485,000	2,402,000	2,314,000	3,981,136	3,688,136	3,390,136
Stack Temp.	Deg F.		195	195	195	190	190	190	180	180	180	180	180	180
Stack Flow	acfm		1,109,118	1,029,463	949,296	854,903	811,008	771,866	681,285	659,851	637,675	1,145,741	1,064,491	982,715
Stck Velocity	ft/s											67.4	62.6	57.8
Stck Flow	scfm		723,725	660,543	593,457	567,697	530,204	491,606	464,447	441,839	415,302	731,809	671,565	608,643
Stack Flow	scfm @ 15% O2		985,002	918,042	840,899	797,662	744,981	692,414	632,907	595,359	551,155	1,326,345	1,259,385	1,182,242
NOx	ppmvd @ 15% O2		2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
NOx Emission Control Efficiency	%		72.0%	72.1%	72.1%	72.0%	71.6%	71.8%	71.7%	71.9%	71.8%	79.5%	79.8%	80.2%
NOx AS NO2	lb/h		17.5	16.3	15	14.1	13.1	12.2	11.0	10.4	9.6	23.8	22.6	21.2
SO2 - Annual Average	ppmvd @ 15% O2		0.27	0.27	0.27	0.27	0.27	0.27	0.28	0.28	0.28			
SO2 - Annual Average	lb/h		4.2	3.9	3.5	3.4	3.1	2.9	2.7	2.5	2.3	5.6	5.3	5.0
SO2 - Short Term Average	ppmvd @ 15% O2		0.54	0.54	0.54	0.54	0.54	0.54	0.56	0.56	0.56			
SO2 - Short Term Average	lb/h		8.3	7.7	7.1	6.7	6.3	5.8	5.3	5.0	4.7	11.2	10.6	10.0
CO annual average	ppmvd @ 15% O2		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
CO Emission Control Efficiency	%		73.2%	73.3%	72.8%	72.2%	72.9%	72.6%	72.4%	74.0%	74.7%	86.4%	86.7%	87.1%
CO annual average	lb/h		8.5	8.0	7.3	6.8	6.4	5.9	5.4	5.1	4.7	11.6	11.0	10.3
CO 1-hr average (not in permit)	ppmvd @ 15% O2		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
CO 1-hr average (not in permit)	lb/h		21.3	20.0	18.3	17.0	16.0	14.8	13.5	12.8	11.8	28.9	27.5	25.8
VOC	ppmvd @ 15% O2	30%	0.8	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	1.8	1.8	1.9
VOC as CH4	lb/h	30%	2.2	2.0	1.9	1.7	1.6	1.5	1.4	1.3	1.3	6.8	6.6	6.5
Particulates (PM10 front- and back-half)	lb/h		18.7	18.6	18.5	18.4	18.3	18.2	18.1	18.0	18.0	29.2	29.1	29.0
Particulates minus sulfates	lb/h		17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	26.9	26.9	26.9
Argon	% VOL	39.95	0.90	0.89	0.88	0.91	0.90	0.88	0.89	0.90	0.90	0.89	0.88	0.87
Nitrogen	% VOL	28	75.17	74.67	73.90	75.08	74.63	73.92	75.17	74.75	74.08	74.23	73.66	72.82
Oxygen	% VOL	32	12.87	12.70	12.54	12.61	12.61	12.59	12.86	12.95	13.07	10.21	9.84	9.44
Carbon Dioxide	% VOL	44	3.71	3.73	3.70	3.83	3.77	3.68	3.72	3.61	3.46	4.91	5.03	5.10
Water	% VOL	18	7.35	8.01	8.98	7.58	8.10	8.93	7.36	7.80	8.50	9.76	10.60	11.77
Exhaust MW			28.48	28.41	28.30	28.47	28.41	28.30	28.48	28.43	28.34	28.32	28.24	28.12
Exhaust MW dry			27.05	26.86	26.58	27.00	26.84	26.59	27.05	26.91	26.70	26.46	26.23	25.90
Ammonia Slip	ppmvd		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Ammonia Slip	lb/h		13.2	12.3	11.4	10.2	9.7	9.3	8.3	8.0	7.8	13.5	12.7	11.8
Sulfate Conversion (Atmospheric)	%		20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
Sulfate Particulates (Atmospheric)	lb/hr		1.7	1.6	1.5	1.4	1.3	1.2	1.1	1.0	1.0	2.31	2.19	2.06
Sulfate Conversion (In-stack)	%		5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Sulfate Conversion (In-Stack)	lb/hr		0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.2	0.6	0.5	0.5

SITE CONDITIONS														
Elevation	ft.		115	115	115	115	115	115	115	115	115	115	115	115
Stack Height	ft.		150	150	150	150	150	150	150	150	150	150	150	150
Stack Diameter	ft.		19	19	19	19	19	19	19	19	19	19	19	19
Site Pressure	psia		14.64	14.64	14.64	14.64	14.64	14.64	14.64	14.64	14.64	14.64	14.64	14.64

1. Gas turbine performance and emission estimates are based on GE PG7241 (FA) turbine with dry low-NOx buners.
2. Duct burner emission estimates are based on the following emission factors.

NOx	0.080 lb/MM Btu (HHV)
CO	0.080 lb/MM Btu (HHV)
VOC	0.010 lb/MM Btu (HHV)
PM10 (front & back half)	0.015 lb/MM Btu (HHV)

3. Case 2 is the firing rate that produces a temperature of 1600 F downstream of the duct burner. This firing rate corresponds to maximum firing rate for conventional HRSG design.
4. Emission estimates are based on the following gas compositions and properties.

Constituent	Percent Composition				
H2	0.0	C3H8	0.5	MW, lb/lbmole	16.64
N2	0.3	C4H8	0.0	Btu/scf (LHV)	952
CO2	0.0	IC4H10	0.1	Btu/scf (HHV)	1,047
CH4	96.9	NC4H10	0.1		
C2H4	0.0	IC5H12	0.0		
C2H6	2.0	NC5H12	0.0		
C3H6	0.0	C5+	0.1		
		Total	99.2		

APPENDIX B

VENDOR PROVIDED COMBUSTION TURBINE EMISSIONS INFORMATION (SIEMENS TURBINES)

Manufacturer's Emission Estimates - Siemens SGT6-5000F

Air Emissions Summary (2)

			Case 1	Case 6	Case 11	Case 3	Case 8	Case 13	Case 4	Case 9	Case 14	**2x1 600**	**2x1 600**	**2x1 600**
CASE			**1AA**	**1AB**	**1AC**	**1BA**	**1BB**	**1BC**	**1CA**	**1CB**	**1CC**	**7A**	**7B**	**7C**
Ambient Temp.	Deg F.		5	50	85	5	50	85	5	50	85	5	50	85
Ambient Relative Humid.	%		80%	80%	77%	80%	80%	77%	80%	80%	77%	80%	80%	77%
Gas Turbine Load	Percent		BASE	BASE	BASE	75.0%	75.0%	75.0%	60.0%	60.0%	60.0%	BASE	BASE	BASE
Turbine Fuel	Type		NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG
Duct Burner Fuel	Type		-	-	-	-	-	-	-	-	-	NG	NG	NG
GAS TURBINE INPUT (Per Turbine)														
Fuel (7)	Type		NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG
Fuel Sulfur - Annual Average	ppmv		13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5
Fuel Sulfur - Annual Average	grains/100 scf		0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
SO2 Emission factor - Annual Average	lb/MM Btu		0.00240	0.00240	0.00240	0.00240	0.00240	0.00240	0.00240	0.00240	0.00240	0.00240	0.00240	0.00240
Fuel Sulfur - Short Term Average	ppmv		27.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1
Fuel Sulfur - Short Term Average	grains/100 scf		1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
SO2 Emission factor - Short Term Average	lb/MM Btu		0.00480	0.00480	0.00480	0.00480	0.00480	0.00480	0.00480	0.00480	0.00480	0.00480	0.00480	0.00480
Fuel Heating Value (LHV)	Btu/lb		21,325	21,325	21,325	21,325	21,325	21,325	21,325	21,325	21,325	21325	21325	21325
Fuel Heating Value (LHV)	Btu/scf		952	952	952	952	952	952	952	952	952	952	952	952
Fuel Temperature	Deg F		365	365	365	365	365	365	365	365	365	365	365	365
Turbine Output (Gross @ Generator Terminals)	kW		223935	198830	172579	167654	148775	129046	133811	118688	102887	223935	198830	172579
Heat Rate (LHV)	Btu/kWh		8939	9182	9584	9511	9783	10234	10110	10432	10995	8939	9182	9584
Heat Consumption (LHV)	MM Btu/h		2002	1826	1654	1595	1455	1321	1353	1238	1131	2002	1826	1654
GAS TURBINE EMISSIONS (Per Turbine) - Uncontrolled														
Exhaust Flow	lb/h		4400719	4086935	3715853	3639080	3380202	3074790	3197211	2979118	2732691	4400719	4086935	3715853
Exhaust Presure	inches Water													
Exhaust Temp.	Deg F.		1059	1087	1124	1059	1087	1124	1059	1087	1124	1059	1087	1124
NOx	ppmvd @ 15% O2		9	9	9	9	9	9	9	9	9	9	9	9
NOx as NO2	lb/h		75	69	62	60	55	50	51	47	43	75	69	62
SO2 - Annual Average	ppmvd @ 15% O2													
SO2 - Annual Average	lb/h		4.8	4.4	4.0	3.8	3.5	3.2	3.2	3.0	2.7	4.8	4.4	4.0
SO2 - Short Term Average	ppmvd @ 15% O2													
SO2 - Short Term Average	lb/h		9.6	8.8	7.9	7.7	7.0	6.3	6.5	5.9	5.4	9.6	8.8	7.9
CO	ppmvd @ 15% O2		4	4	4	4	4	4	10	10	10	4	4	4
CO	lb/h		21	19	17	17	15	14	35	32	29	21	19	17
VOC	ppmvd @ 15% O2		1	1	1	1	1	1	5	5	5	1	1	1
VOC as CH4	lb/h		2.9	2.7	2.4	2.3	2.1	1.9	9.8	9	8.2	2.9	2.7	2.4
Particulates (PM10 front- and back-half)	lb/h		9	9	8	8	8	8	8	8	8	9	9	8
Argon	% VOL	39.95	0.88	0.87	0.86	0.88	0.88	0.86	0.88	0.88	0.86	0.88	0.87	0.86
Nitrogen	% VOL	28	75.09	74.52	72.92	75.19	74.62	73.01	75.29	74.71	73.11	75.09	74.52	72.92
Oxygen	% VOL	32	12.59	12.60	12.25	12.89	12.89	12.53	13.17	13.15	12.81	12.59	12.6	12.25
Carbon Dioxide	% VOL	44	3.83	3.75	3.71	3.69	3.62	3.58	3.57	3.50	3.46	3.83	3.75	3.71
Water	% VOL	18	7.61	8.26	10.26	7.34	8.00	10.02	7.09	7.76	9.77	7.61	8.26	10.26
Exhaust MW			28.46	28.38	28.16	28.47	28.40	28.17	28.49	28.42	28.19	28.46	28.38	28.16
DUCT BURNER INPUT (Per HRSG) (2)(3) - **Uncontrolled**														
Fuel (4)	Type		NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG
Fuel Heating Value (LHV)	Btu/lb		21,325	21,325	21,325	21,325	21,325	21,325	21,325	21,325	21,325	21325	21325	21325
Heat Consumption (LHV)	MM Btu/h		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	600.0	600.0	600.0
NOx	lb/hr	0.08										52.8	52.8	52.8
SO2	lb/hr											1.44	1.44	1.44
CO	lb/hr	0.08										52.8	52.8	52.8
VOC	lb/hr	0.01										6.6	6.6	6.6
PM10	lb/hr	0.015										9.90	9.90	9.90
Addition to Exhaust Flow	lb/hr											28,136.0	28,136.0	28,136.0
COMBINED GAS TURBINE AND DUCT BURNER EMISSIONS (Per Turbine/HRSG) - Uncontrolled														
Exhaust Flow	lb/h		4,400,719	4,086,935	3,715,853	3,639,080	3,380,202	3,074,790	3,197,211	2,979,118	2,732,691	4,428,855	4,115,071	3,743,989
NOx - AirPermits calculated	ppmvd @ 15% O2		9.2	9.3	9.2	9.2	9.3	9.3	9.2	9.3	9.3	12.1	12.3	12.5
NOx AS NO2	lb/h		75.0	69.0	62.0	60.0	55.0	50.0	51.0	47.0	43.0	127.8	121.8	114.8
SO2 - Annual Average	ppmvd @ 15% O2		0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4			
SO2 - Annual Average	lb/h		4.8	4.4	4.0	3.8	3.5	3.2	3.2	3.0	2.7	6.2	5.8	5.4
SO2 - Short Term Average	ppmvd @ 15% O2		0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8			
SO2 - Short Term Average	lb/h		9.6	8.8	7.9	7.7	7.0	6.3	6.5	5.9	5.4	12.5	11.6	10.8
CO - AirPermits calculated	ppmvd		6.0	5.9	6.1	5.8	5.6	6.1	13.7	13.7	14.2	20.7	22.0	24.2
CO - AirPermits calculated	ppmvd @ 15% O2		4.2	4.2	4.1	4.3	4.2	4.3	10.4	10.4	10.3	11.4	11.9	12.5
CO	lb/h		21.0	19.0	17.0	17.0	15.0	14.0	35.0	32.0	29.0	73.8	71.8	69.8

VOC	ppmvd @ 15% O2		1.0	1.0	1.0	1.0	1.0	1.0	5.1	5.1	5.1	3.8	4.0	4.2
VOC as CH4	lb/h		2.9	2.7	2.4	2.3	2.1	1.9	9.8	9.0	8.2	9.5	9.3	9.0
Particulates (PM10 front- and back-half)	lb/h		9.0	9.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	18.9	18.9	17.9
Argon	% VOL	39.95	0.88	0.87	0.86	0.88	0.88	0.86	0.88	0.88	0.86	0.87	0.86	0.85
Nitrogen	% VOL	28	75.09	74.52	72.92	75.19	74.62	73.01	75.29	74.71	73.11	74.25	73.62	71.96
Oxygen	% VOL	32	12.59	12.60	12.25	12.89	12.89	12.53	13.17	13.15	12.81	10.20	10.04	9.46
Carbon Dioxide	% VOL	44	3.83	3.75	3.71	3.69	3.62	3.58	3.57	3.50	3.46	4.91	4.91	4.98
Water	% VOL	18	7.61	8.26	10.26	7.34	8.00	10.02	7.09	7.76	9.77	9.77	10.57	12.76
Exhaust MW			28.46	28.38	28.16	28.47	28.40	28.17	28.49	28.42	28.19	28.32	28.23	28.00
Exhaust MW dry			26.99	26.79	26.21	27.05	26.86	26.27	27.11	26.91	26.33	26.46	26.23	25.60
STACK EMISSIONS (Per Turbine/HRSG)														
Stack Flow	lb/h		4,400,719	4,086,935	3,715,853	3,639,080	3,380,202	3,074,790	3,197,211	2,979,118	2,732,691	4,428,855	4,115,071	3,743,989
Stack Temp.	Deg F.		195	195	195	195	195	195	195	195	195	195	195	195
Stack Flow	acfm		1,288,672	1,200,100	1,099,721	1,065,123	991,846	909,530	935,142	873,775	807,769	1,303,328	1,214,756	1,114,376
Stck Velocity	ft/s		75.8	70.5	64.6	62.6	58.3	53.5	55.0	51.4	47.5	76.6	71.4	65.5
Stck Flow	scfm		808,639	738,439	641,817	668,375	609,709	529,748	587,503	536,180	469,252	816,195	749,471	661,252
Stack Flow	scfm @ 15% O2		1,138,948	1,038,821	940,969	907,404	827,757	751,524	769,729	704,304	643,432	1,480,291	1,380,164	1,282,312
NOx	ppmvd @ 15% O2		2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
NOx Emission Control Efficiency	%		72.8%	73.0%	72.8%	72.9%	73.0%	73.1%	73.0%	73.2%	73.2%	79.3%	79.7%	80.0%
NOx AS NO2	lb/h		20.4	18.6	16.9	16.3	14.8	13.5	13.8	12.6	11.5	26.5	24.7	23.0
SO2 - Annual Average	ppmvd @ 15% O2		0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42			
SO2 - Annual Average	lb/h		4.8	4.4	4.0	3.8	3.5	3.2	3.2	3.0	2.7	6.2	5.8	5.4
SO2 - Short Term Average	ppmvd @ 15% O2		0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85			
SO2 - Short Term Average	lb/h		9.6	8.8	7.9	7.7	7.0	6.3	6.5	5.9	5.4	12.5	11.6	10.8
CO annual average	ppmvd @ 15% O2		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
CO Emission Control Efficiency	%		52.7%	52.3%	51.7%	53.4%	51.9%	53.2%	80.8%	80.8%	80.6%	82.5%	83.2%	84.0%
CO annual average	lb/h		9.9	9.1	8.2	7.9	7.2	6.6	6.7	6.1	5.6	12.9	12.0	11.2
CO 1-hr average (not in permit)	ppmvd @ 15% O2		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
CO 1-hr average (not in permit)	lb/h		24.8	22.7	20.5	19.8	18.1	16.4	16.8	15.4	14.0	32.3	30.1	28.0
VOC	ppmvd @ 15% O2	30%	0.5	0.5	0.5	0.6	0.6	0.5	2.9	2.9	2.8	1.6	1.6	1.7
VOC as CH4	lb/h	30%	2.0	1.9	1.7	1.6	1.5	1.3	6.9	6.3	5.7	6.7	6.5	6.3
Particulates (PM10 front- and back-half)	lb/h		11.0	10.8	9.6	9.6	9.4	9.3	9.3	9.2	9.1	21.5	21.3	20.1
Particulates minus sulfates	lb/h		9.0	9.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	18.9	18.9	17.9
Argon	% VOL	39.95	0.88	0.87	0.86	0.88	0.88	0.86	0.88	0.88	0.86	0.87	0.86	0.85
Nitrogen	% VOL	28	75.09	74.52	72.92	75.19	74.62	73.01	75.29	74.71	73.11	74.25	73.62	71.96
Oxygen	% VOL	32	12.59	12.60	12.25	12.89	12.89	12.53	13.17	13.15	12.81	10.20	10.04	9.46
Carbon Dioxide	% VOL	44	3.83	3.75	3.71	3.69	3.62	3.58	3.57	3.50	3.46	4.91	4.91	4.98
Water	% VOL	18	7.61	8.26	10.26	7.34	8.00	10.02	7.09	7.76	9.77	9.77	10.57	12.76
Exhaust MW			28.46	28.38	28.16	28.47	28.40	28.17	28.49	28.42	28.19	28.32	28.23	28.00
Exhaust MW dry			26.99	26.79	26.21	27.05	26.86	26.27	27.11	26.91	26.33	26.46	26.23	25.60
Ammonia Slip	ppmvd		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Ammonia Slip	lb/h		14.7	13.7	12.8	12.1	11.3	10.5	10.6	10.0	9.3	15.1	14.1	13.2
Sulfate Conversion (Atmospheric)	%		20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
Sulfate Particulates (Atmospheric)	lb/hr		2.0	1.8	1.6	1.6	1.4	1.3	1.3	1.2	1.1	2.58	2.40	2.23
Sulfate Conversion (In-stack)	%		5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Sulfate Conversion (In-Stack)	lb/hr		0.5	0.5	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.6	0.6	0.6
SITE CONDITIONS														
Elevation	ft.		115	115	115	115	115	115	115	115	115	115	115	115
Stack Height	ft.		150	150	150	150	150	150	150	150	150	150	150	150
Stack Diameter	ft.		19	19	19	19	19	19	19	19	19	19	19	19
Site Pressure	psia		14.64	14.64	14.64	14.64	14.64	14.64	14.64	14.64	14.64	14.64	14.64	14.64

2. Duct burner emission estimates are based on the following emission factors.

NOx	0.080 lb/MM Btu (HHV)
CO	0.080 lb/MM Btu (HHV)
VOC	0.010 lb/MM Btu (HHV)
PM10 (front & back half)	0.015 lb/MM Btu (HHV)

3. Case 2 is the firing rate that produces a temperature of 1600 F downstream of the duct burner. This firing rate corresponds to maximum firing rate for conventional HRSG design.
4. Emission estimates are based on the following gas compositions and properties.

Constituent	Percent Composition				
H2	0.0	C3H8	0.5	MW, lb/lbmole	16.64
N2	0.3	C4H8	0.0	Btu/scf (LHV)	952
CO2	0.0	IC4H10	0.1	Btu/scf (HHV)	1,047
CH4	96.9	NC4H10	0.1		
C2H4	0.0	IC5H12	0.0		
C2H6	2.0	NC5H12	0.0		
C3H6	0.0	C5+	0.1		
		Total	99.2		

APPENDIX C

CRITERIA AND TOXIC POLLUTANT EMISSION SUMMARY (GE TURBINES)

Modeled Emissions
GE 7FA Combustion Turbines with Duct Firing
Fuel in Turbine: Natural Gas
Fuel in Duct Burner: Natural Gas or Refinery Fuel Gas

Hourly emissions out of stack for each turbine

Case	Turbine Inlet Temperature	Load	Duct Burning	NO_X	CO	PM_{10}	SO_2 (0.8 gr S)	SO_2 (1.6 gr S)	NO_X	SO_2[3]	SO_4[4]	PM_{10}[5]	Stack Flow Rate	Stack Exit Temperature	Stack Velocity
									Emissions for CalPuff visibility modeling						
	F	%	MM Btu/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	acfm	F	ft/s
1AA	5	100	0	17.5	8.5	18.7	4.2	8.3	17.5	3.9	0.3	17.0	1,109,118	195	65.20
1AB	50	100	0	16.3	8.0	18.6	3.9	7.7	16.3	3.7	0.3	17.0	1,029,463	195	60.51
1AC	85	100	0	15.0	7.3	18.5	3.5	7.1	15.0	3.4	0.3	17.0	949,296	195	55.80
1BA	5	75	0	14.1	6.8	18.4	3.4	6.7	14.1	3.2	0.3	17.0	854,903	190	50.25
1BB	50	75	0	13.1	6.4	18.3	3.1	6.3	13.1	3.0	0.2	17.0	811,008	190	47.67
1BC	85	75	0	12.2	5.9	18.2	2.9	5.8	12.2	2.8	0.2	17.0	771,866	190	45.37
1CA	5	50	0	11.0	5.4	18.1	2.7	5.3	11.0	2.5	0.2	17.0	681,285	180	40.05
1CB	50	50	0	10.4	5.1	18.0	2.5	5.0	10.4	2.4	0.2	17.0	659,851	180	38.79
1CC	85	50	0	9.6	4.7	18.0	2.3	4.7	9.6	2.2	0.2	17.0	637,675	180	37.48
7A	5	100	600	23.8	11.6	29.2	5.6	11.2	23.8	5.3	0.4	26.9	1,145,741	180	67.35
7B	50	100	600	22.6	11.0	29.1	5.3	10.6	22.6	5.0	0.4	26.9	1,064,491	180	62.57
7C	85	100	600	21.2	10.3	29.0	5.0	10.0	21.2	4.7	0.4	26.9	982,715	180	57.77
Generator	NA	NA	NA	27.5	6.9	0.7	0.8	0.8	2.3	0.063	0.0050	0.058	12,745	899	602
Firepump	NA	NA	NA	3.3	0.2	0.1	0.1	0.1	0.28	0.0083	0.00066	0.0042	1,404	840	119
Cooling Tower	NA	NA	NA	0.0	0.0	1.6	0.0	0.0	0.0	0.0	0.0	1.6	101,167	90	2.15

Notes:

Diameter = 19 feet

1. Annual SO_2 emissions are calculated using 0.8 gr S/100scf natural gas
2. Short-term SO_2 emissions are calculated using 1.6 gr S/100scf natural gas
3. SO_2 emissions for CalPuff visibility modeling are calculated using 0.8 gr S/100scf natural gas and by subtracting the 5% sulfur converted to SO_4.
4. SO_4 emissions for CalPuff visibility modeling are calculated using 0.8 gr S/100scf natural gas and by assuming a 5% conversion from SO_2 and multiplying by the ratio of molecular weights (96/64).
5. PM_{10} emissions for CalPuff visibility modeling do not include ammonium sulfate emissions that are included in the ISCST3 modeling.
6. Emissions from the generator and firepump for CalPuff visibility modeling are divided by 12 to account for only 2 hours run in a 24-hour period.

Cherry Point Cogeneration Project
Annual Emissions Budget - GE 7FA DLN 6.2 Turbines, 6x16 Schedule*

Plant Emissions
(does not include auxilliary equipment)

Annual Emissions Tons/Year	2x1 Project Full Operation	2x1 Project Partial Dispatch	2x1 Project Full Dispatch	Maximum	Maximum with Auxillay Equipment
NOx	198	153	187	198	201
CO	96	158	92	158	158
VOC	58	50	55	58	58
PM	255	172	241	255	262
SO2 (1)	47	32	44	47	47

Short Term Emissions Lbs/Hr	2x1 Project 600 MMBtu/hr
NOx	45.1
CO	22.0
VOC	13.3
PM	58.2
SO2 (2)	10.6

Turbine Emissions

GE 7FA emissions from one turbine	Turbine Emissions 600 MMBtu/hr	Req'd SCR/CO Cat Efficiency At Max DB	Controlled Emissions per Event			
			Hot Start	Warm start	Cold Start	Shutdown
	Lbs/hr		Lbs/Start	Lbs/Start	Lbs/Start	Lbs/Shutdown
Margin	0%		50%	50%	50%	50%
NOx	22.6	80%	101.0	141.0	245.8	34.7
CO	11.0	87%	294.8	688.6	442.8	223.7
VOC	6.6		41.5	83.7	55.8	26.9
PM	29.1		14.0	24.0	52.3	6.8
SO2	5.3		3.2	5.5	11.9	1.5
Hours/event			1.0	1.4	2.5	0.5

Full time operation

Assumptions	
Hours per Year	8,760
Number of turbines:	2
Plant Starts Allowed	0
Duct Burner Duty/Train, MMBTU/HR HHV	600

24 Hour/Day Run

			Operating Mode					
			Shutdown	Hours Down	Startup	Run	Total	Hours/Year
		Start End				22:00 Day 1 22:00 Day 2		
Events/Yr	365.0	Hours/Event	0.0	0.0	0.0	24.0	24.0	8760
		Compound					Total lbs/Event	Tons/Year
		NOx	0.0		0.0	1083	1083	197.6
		CO	0.0		0.0	527	527	96.2
		VOC	0.0		0.0	319	319	58.2
		PM	0.0		0.0	1396	1396	254.8
		SO2	0.0		0.0	255	255	46.6

Partial Dispatch/Full Dispatch

Assumptions	
Hours per Year	8,760
Number of turbines:	2
Plant Starts Allowed	143
Duct Burner Duty/Train, MMBTU/HR HHV	600
Calculated Percent Dispatch for Partial Case	66%

Operating Modes

24 Hour/Day Run

			Operating Mode					
			Shutdown	Hours Down	Startup	Run	Total	Hours/Year
		Start End				22:00 Day 1 22:00 Day 2		
Events/Yr	146.0	Hours/Event	0.0	0.0	0.0	24.0	24.0	3504
		Compound					Total lbs/Event	Tons/Year
		NOx	0.0		0.0	1082.7	1082.7	79
		CO	0.0		0.0	527.4	527.4	38
		VOC	0.0		0.0	318.7	318.7	23
		PM	0.0		0.0	1396.4	1396.4	102
		SO2	0.0		0.0	255.1	255.1	19

Daily Peak Operation Only - 16 Hr Run				(Hot Start)				
			Operating Mode					
			Shutdown	Hours Down	Startup	Run	Total	Hours/Year
		Start	22:00 Day 1	23:00 Day 1	04:00 Day 2	06:00 Day 2		
		End	23:00 Day 2	04:00 Day 2	06:00 Day 2	22:00 Day 2		
Events/Yr	95.0	Hours/Event	1.0	5.0	2.0	16.0	24.0	2280
		Compound					Total lbs/Event	Tons/Year
		NOx	69.5		201.9	721.8	993.1	47
		CO	447.5		589.7	351.6	1388.7	66
		VOC	53.7		83.0	212.5	349.1	17
		PM	13.6		28.1	931.0	972.6	46
		SO2	3.1		6.4	170.1	179.6	9

Weekend Shutdown - Peak Operation Only				(Warm Start)				
			Operating Mode					
			Shutdown	Hours Down	Startup	Run	Total	Hours/Year
		Start	22:00 Sat	23:00 Sat	03:00 Mon	06:00 Mon		
		End	23:00 Sat	03:00 Mon	06:00 Mon	22:00 Mon		
Events/Yr	42	Hours	1.0	28.0	3.0	16.0	48.0	2016
		Compound					Total lbs/Event	Tons/Year
		NOx	69.5		282.0	721.8	1073.2	23
		CO	447.5		1377.2	351.6	2176.2	46
		VOC	53.7		167.4	212.5	433.6	9
		PM	13.6		48.0	931.0	992.6	21
		SO2	3.1		10.9	170.1	184.1	4

NERC Holiday Weekend Shutdown				(Warm Start)				
			Operating Mode					
			Shutdown	Hours Down	Startup	Run	Total	Hours/Year
		Start	22:00 Sat	23:00 Sat	03:00 Tues	06:00 Tues		
		End	23:00 Sat	03:00 Tues	06:00 Tues	22:00 Tues		
Events/Yr	6	Hours	1.0	52.0	3.0	16.0	72.0	432
		Compound					Total lbs/Event	Tons/Year
		NOx	69.5		282.0	721.8	1073.2	3
		CO	447.5		1377.2	351.6	2176.2	7
		VOC	53.7		167.4	212.5	433.6	1
		PM	13.6		48.0	931.0	992.6	3
		SO2	3.1		10.9	170.1	184.1	1

Maintenance Outage				(Cold Start)				
			Operating Mode					
			Shutdown	Hours Down	Startup	Run	Total	Hours/Year
		Start	22:00	23:00	01:30	06:00		
		End	23:00	01:30	06:00	22:00		
Days/Yr	21	Hours	1.0	506.5	4.5	16.0	528.00	528.0
		Compound					Total lbs/Event	Tons/Year
		NOx	69.5		491.7	721.8	1282.9	1
		CO	447.5		885.5	351.6	1684.6	1
		VOC	53.7		111.6	212.5	377.8	0
		PM	13.6		104.6	931.0	1049.1	1
		SO2	3.1		23.8	170.1	197.0	0

Hours per category					
	Shutdown	Hours Down	Startup	Run	total
24 Hour/Day Run	0	0	0	3504	
Daily Peak Operation Only	95	475	190	1520	
Weekend Shutdown	42	1176	126	672	
NERC Holiday Weekend Shu	6	312	18	96	
Maintenance Outage	1	507	5	16	
Total	144.0	2469.5	338.5	5808.0	8760

Tons/category						
	Shurdown	Hotstart	Warm Start	Coldstart	Run	
NOx	5.0	9.6	6.8	0.2	131.0	152.6
CO	32.2	28.0	33.1	0.4	63.8	157.5
VOC	3.9	3.9	4.0	0.1	38.6	50.4
PM	1.0	1.3	1.2	0.1	169.0	172.5
SO2	0.2	0.3	0.3	0.0	30.9	31.7

ESTIMATED PLANT STARTUP EMISSIONS

S/U Emission Estimates for S207FA (2-on-1 configuration)

Approximate Emission Distribution								
	Percent of Total Plant S/U & S/D Emission (2) (4)							
	Hot Start		Warm Start		Cold Start		Shutdown	
	CTG 1	CTG 2	CTG 1	CTG 2	CTG 1	CTG 2	CTG 1	CTG 2
NOx	63	37	54	46	56	44	50	50
CO	50	50	80	20	74	26	50	50
VOC	50	50	75	25	72	28	50	50

Approximate Uncontrolled Emission per Train per Event								Total Plant Emission (2 CTGs) (1)			
	Hot Start		Warm Start		Cold Start		Shutdown	**Startup**			**Shutdown**
	CTG 1	CTG 2	CTG 1	CTG 2	CTG 1	CTG 2	CTG1 or CTG2	Hot	Warm	Cold	
S/U Total Duration (min)	62	52	102	70	210	90	30	84	124	241	30
S/U Emissions Duration (min)	38	28	67	46	167	79	16	66	113	246	16
NOx (lb)	93	65	129	130	335	169	46	158	259	504	93
CO (lb)	332	323	1382	378	882	396	298	655	1761	1278	597
VOC (lb)	28	27	81	31	45	30	18	55	112	74	36

S/U Emission Estimates for S307FA (3-on-1 configuration)

Approximate Uncontrolled Emission per Train per Event											Total Plant Emission		
	Hot Start			Warm Start			Cold Start			Shutdown	**(3 CTG startup & shutdown)**		
	CTG 1	CTG 2	CTG 3	CTG 1	CTG 2	CTG 3	CTG 1	CTG 2	CTG 3		Hot	Warm	Cold
NOx (lb)	93	65	65	129	130	130	335	169	169	46.3	362	528	812
CO (lb)	332	323	323	1382	378	378	882	396	396	298.3	1873	3034	2569
VOC (lb)	28	27	27	81	31	31	45	30	30	17.9	136	196	158

ASSUMED Average Catalyst Removal Efficiencies During S/U & SD (3)										
	Hot Start			Warm Start			Cold Start			Shutdown
	CTG 1	CTG 2	CTG 3	CTG 1	CTG 2	CTG 3	CTG 1	CTG 2	CTG 3	
SCR (%)	25	0	0	30	25	25	40	25	25	50
CO ox cat (%)	40	40	40	50	40	40	60	40	40	50

Approximate Controlled Emission per Train per Event													
	Hot Start			Warm Start			Cold Start			Shutdown			
	CTG 1	CTG 2	CTG 3	CTG 1	CTG 2	CTG 3	CTG 1	CTG 2	CTG 3				
NOx (lb)	70	65	65	91	98	98	201	127	127	23	269	355	524
CO (lb)	199	194	194	691	227	227	353	238	238	149	1034	1592	1275

Notes:
(1) Uncontrolled S207FA plant startup and shutdown emission estimates furnished by GE.
(2) Distribution of total emissions for 2-on-1 plant between the two CTGs estimated from cumulative emission curves developed by GE for a previous project.
(3) Average overall efficiency of SCR and oxidation catalysts during statup and shutdown are assumed, to be confirmed by HRSG supplier.
VOC control efficiency is conservatively assumed to be zero.
(4) Hot, warm, and cold starts as defined by GE.

Emissions of pollutants not supplied by the turbine manufacturer											Total Plant Emission		
	Hot Start			Warm Start			Cold Start			Shutdown			
	CTG 1	CTG 2	CTG 3	CTG 1	CTG 2	CTG 3	CTG 1	CTG 2	CTG 3				
PM10 (lb)	10.8	7.9	7.9	19.0	13.0	13.0	47.3	22.4	22.4	4.5	40	59	106
SO2 (lb)	2.5	1.8	1.8	4.3	3.0	3.0	10.8	5.1	5.1	1.0	9	13	24

Notes:
(1) PM10 emissions are calculated assuming full load emissions and the fraction of the minutes of startup or shutdown in an hour.
(2) SO2 emissions are calculated using a fuel use of half that of Case 1AB and the fraction of the minutes of startup or shutdown in an hour.

	Hotstart per turbine per start lbs	Warm Start per turbine per start lbs	Cold Start per turbine per start lbs	Shutdown per turbine er shutdown lbs
NOx	67	94	164	23
CO	197	459	295	149
VOC	28	56	37	18
PM	9	16	35	5
SO2	2	4	8	1
min (avg)	57	86	150	30

Criteria Pollutant Emissions Summary For Auxiliary Equipment

Sulfur content of distillate oil = 0.0500 weight % SO_2 emission factor (lb/MMBtu) = 0.0518 Based on HHV

Equipment	Fuel	Annual Operating Hours		Capacity	Heat Input
			kW	hp	MMBtu/hr
Emergency Generator (1500 kW)	Diesel	250	1,500	2,011	15.36
Firewater Pump (265 HP)	Diesel	250	n/a	265	2.02

Hourly Emission Rates (lb/hr)

Equipment	NO_X	CO	VOC	PM_{10}	SO_2	H_2SO_4	
Emergency Generator	27.5	6.9	1.3	0.7	0.796	0.2437	Source: Southworth-Milton, Inc.
Firewater Pump	3.33	0.17	0.14	0.05	0.1049	0.0321	Source: Clarke Fire Protection Products

H_2SO_4 Emissons are calculated based on a 20% conversion rate

Annual Emissions (tons/yr)

Equipment	NO_X	CO	VOC	PM_{10}	SO_2	H_2SO_4
Emergency Generator	3.4	0.9	0.16	0.09	0.0995	0.03046
Firewater Pump	0.42	0.021	0.018	0.006	0.01311	0.004015

Stack Information

Equipment	Flow Rate (acfm)	Temp. (deg. F)	Stack Height (ft)	Stack Diameter (ft)	Velocity (ft/s)
Emergency Generator	12,745	899	11.67	0.67	602
Firewater Pump	1,404	840	12	0.50	119

Cooling Tower PM10 Calculation				
Measure	**Value**	**Units**	**Comments**	**Calculation**
Drift	0.001%		% of Circ. Water Lost as Drift	Mfg. Guarantee
Circ Water Flow	143400	gpm	Total Circulating Water Flow Rate	System Design Requirement
Drift Flow	1.434	gpm	Total Water Lost as Drift, gpm	(Drift %) X (Circ Water Flow)
Drift Flow	716.7	lb/hr	Hourly Total Water Lost as Drift	(Drift Flow)gal/min X 8.33lb/gal X 60min/hr
Drift Flow	17201	lb/day	Daily Total Water Lost as Drift	(Drift Flow)gal/min X 8.33lb/gal X 1440min/day
CT Cycles	15		CT Cycles of Concentration	Maximum Expected
TDS	2193	ppm	Total Dissolved Solids	
TSS	78	ppm	Total Suspended Solids	
TS	2271	ppm	Circulating Water Total Solids	(TDS)+(TSS)
TS wt%	0.2271%		% by Weight	(TS)ppm X 1,000,000
PM10 per hour	1.628	lb/hr	Hourly TS Lost Through Drift	(TS wt%) X (Drift Flow)lb/hr
PM10 per year	7.129	tons/yr	Hourly TS Lost Through Drift	lb/hr X 8,760 hrs / 2,000 lb/ton

Summary of Toxic Emissions

Toxic Compound	Maximum Emission Rate for 2 GTs (lb/hr)	Emission Rate for Emergency Generator (lb/hr)	Emission Rate for Fire Pump (lb/hr)	Maximum Hourly Emissions (lb/hr)	Small Quantity Emission Rate (lb/hr)	Total Annual Emissions (lb/yr)	Small Quantity Emission Rate (lb/yr)	Modeling Required (Yes/No)	ASIL ($\mu g/m^3$)	Class A or B Toxic Compound		EPA Classified HAP (Yes/No)
VOC												
Acetaldehyde	0.044	0.00039	0.001553	0.046	NA	384.2	50	Yes	0.45	A	annual	Yes
Acrolein	0.025	0.000121	0.0001872	0.025	0.02	218.1	175	Yes	0.02	B	24-hr	Yes
Benzene	0.049	0.01192	0.001889	0.063	NA	430.5	20	Yes	0.12	A	annual	Yes
1,3-Butadiene	0.0017	0	0.0000791	0.0018	NA	14.7	0.5	Yes	0.0036	A	annual	Yes
Butane (isomers)	2.47	0	0	2.47	5.0	21,614	43,748	No	6,300	B	24-hr	No
Cyclohexane	0.0146	0	0	0.0146	5.0	127.9	43,748	No	3,400	B	24-hr	No
Cyclopentane	0.0292	0	0	0.029	5.0	255.8	43,748	No	5,700	B	24-hr	No
Ethylbenzene	0.0146	0	0	0.0146	5.0	127.9	43,748	No	1,000	B	24-hr	Yes
Formaldehyde	1.26	0.00121	0.00239	1.26	NA	11,013	20	Yes	0.077	A	annual	Yes
Heptane (isomers)	0.088	0	0	0.088	5.0	767.4	43,748	No	5,500	B	24-hr	No
N-Hexane	0.0292	0	0	0.029	2.6	255.8	22,750	No	200	B	24-hr	Yes
Hexane (isomers)	1.82	0	0	1.82	5.0	15,919	43,748	No	5,900	B	24-hr	Yes
Methylcyclohexane	0.0292	0	0	0.029	5.0	255.8	43,748	No	5,400	B	24-hr	No
Naphthalene	0.0057	0.00200	0	0.0077	2.6	50.1	22,750	No	170	B	24-hr	Yes
Nonane	0.0292	0	0	0.029	5.0	255.8	43,748	No	3,500	B	24-hr	No
Octane (isomers)	0.058	0	0	0.058	5.0	511.6	43,748	No	4,700	B	24-hr	No
PAH	0.0086	0.00326	0.000340	0.012	NA	76.6	NA	Yes	0.000480	A	annual	Yes
Pentane (isomers)	2.96	0	0	2.96	5.0	25,950	43,748	No	6,000	B	24-hr	No
Toluene	0.062	0.00432	0.000828	0.067	5.0	542.5	43,748	No	400	B	24-hr	Yes
1,2,3-Trimethylbenzene	0.058	0	0	0.058	5.0	511.6	43,748	No	420	B	24-hr	No
Xylene	0.058	0.00296	0.000577	0.062	5.0	512.5	43,748	No	1,500	B	24-hr	Yes
PM												
Arsenic	0.00020	0.003710	0.000265	0.00417	NA	2.7	NA	Yes	0.00023	A	annual	Yes
Barium	0.0044	0	0	0.00437	0.02	38.3	175	No	1.7	B	24-hr	No
Beryllium	0.000012	0	0	0.000012	NA	0.10	NA	Yes	0.00042	A	annual	Yes
Cadmium	0.0011	0.000350	0.0000250	0.00147	NA	9.7	NA	Yes	0.00056	A	annual	Yes
Chromium	0.018	0.003710	0.000265	0.022	0.02	162.1	175	Yes	1.7	B	24-hr	Yes
Cobalt	0.017	0	0	0.017	0.02	149.7	175	No	0.17	B	24-hr	Yes
Copper	0.018	0	0	0.018	0.02	156.3	175	No	0.67	B	24-hr	No
Manganese	0.017	0	0	0.017	0.02	152.2	175	No	0.4	B	24-hr	Yes
Mercury	0.00026	0	0	0.00026	0.02	2.3	175	No	0.17	B	24-hr	Yes
Molybdenum	0.0011	0	0	0.00109	0.20	9.6	1,750	No	17	B	24-hr	No
Nickel	0.019	0.000350	0.0000250	0.019	NA	167.3	0.5	Yes	0.0021	A	annual	Yes
Selenium	0.000024	0.000350	0.0000250	0.00040	0.02	0.30	175	No	0.67	B	24-hr	No
Vanadium	0.0023	0	0	0.00228	0.02	20.0	175	No	0.17	B	24-hr	No
Zinc	0.046	0.003850	0.000275	0.050	0.2	402.3	1750	No	17	B	24-hr	No
Ammonia	27.1	0	0	27.1	2.0	237,228	17,500	Yes	100	B	24-hr	No
Sulfuric Acid	6.9	0.2437	0.0321	7.13	0.02	60136	175	Yes	3.3	B	24-hr	No
Total Annual Hours	8,760	250	250							Total HAPs (tons/yr)		15.10
Total Toxics (lbs/yr)						81,069						

NA = Not applicable

The maximum toxics emissions are calculated from Case 6A. These represent worst-case toxic emissions.

Hourly Toxic Emissions from One Gas Turbine and Duct Burner

Toxic Compound	Gas Turbine Emission Factors (lb/MMBtu) [a]	Gas Turbine Emissions (lb/hr)	Weight Fraction for Gas Turbine [b]	Emission Rate for Gas Turbine (lb/hr)	Emission Factor (lb/10^6 scf fuel gas input) [c]	Maximum Emission Rate for Duct Burner (lb/hr)	Average Emission Rate for Duct Burner (lb/hr)	Maximum Total Emission Rate for GT Plus DB (lb/hr)	Average Total Emission Rate for GT Plus DB (lb/hr)
VOC	**MMBtu/hr =**	**1,944.4**	**VOC =**	**6.8**	**10^6 scf NG input/hr =**	**0.4967**	**0.4967**		
Acetaldehyde	NA	0	0.003222	0.021900	NA	0	0	0.021900	0.021900
Acrolein	0.0000064	0.012444	NA	0	NA	0	0	0.012444	0.012444
Benzene	0.0000120	0.0233	NA	0	0.00210	0.0010430	0.0010430	0.024375	0.024375
1,3-Butadiene	0.00000043	0.000836	NA	0	NA	0	0	0.000836	0.000836
Butane (isomers)	NA	0	0.181525	1.233700	NA	0	0	1.234	1.234
Cyclohexane	NA	0	0.001074	0.007300	NA	0	0	0.007300	0.007300
Cyclopentane	NA	0	0.002148	0.014600	NA	0	0	0.014600	0.014600
Ethylbenzene	NA	0	0.001074	0.007300	NA	0	0	0.007300	0.007300
Formaldehyde	NA	0	0.087003	0.591300	0.0750	0.0372517	0.0372517	0.629	0.629
Heptane (isomers)	NA	0	0.006445	0.043800	NA	0	0	0.043800	0.043800
N-Hexane	NA	0	0.002148	0.014600	NA	0	0	0.014600	0.014600
Hexane (isomers)	NA	0	0.002148	0.014600	1.80	0.8940397	0.8940397	0.91	0.91
Methylcyclohexane	NA	0	0.002148	0.014600	NA	0	0	0.014600	0.014600
Naphthalene	0.0000013	0.002528	NA	0	0.000610	0.0003030	0.0003030	0.002831	0.002831
Nonane	NA	0	0.002148	0.014600	NA	0	0	0.014600	0.014600
Octane (isomers)	NA	0	0.004296	0.029200	NA	0	0	0.029200	0.029200
PAH	0.00000220	0.004278	NA	0	0.0000882	0.0000438	0.0000438	0.004322	0.004322
Pentane (isomers)	NA	0	0.027927	0.189800	2.60	1.2913907	1.2913907	1.48	1.481
Toluene	NA	0	0.004296	0.029200	0.00340	0.0016887	0.0016887	0.030889	0.030889
1,2,3-Trimethylbenzene	NA	0	0.004296	0.029200	NA	0	0	0.029200	0.029200
Xylene	NA	0	0.004296	0.029200	NA	0	0	0.029200	0.029200
PM	**MMBtu/hr =**	**1,944.4**	**PM =**	**17.0**	**10^6 scf NG input/hr =**	**0.4967**	**0.4967**		
Arsenic	NA	0	NA	0	0.000200	0.00009934	0.0000993	0.0000993	0.0000993
Barium	NA	0	NA	0	0.00440	0.00218543	0.0021854	0.0021854	0.0021854
Beryllium	NA	0	NA	0	0.0000120	0.00000596	0.0000060	0.0000060	0.0000060
Cadmium	NA	0	NA	0	0.00110	0.00054636	0.0005464	0.0005464	0.0005464
Chromium	NA	0	0.00050	0.008500	0.00140	0.00069536	0.0006954	0.0091954	0.0091954
Cobalt	NA	0	0.00050	0.008500	0.0000840	0.00004172	0.0000417	0.0085417	0.0085417
Copper	NA	0	0.00050	0.008500	0.000850	0.00042219	0.0004222	0.0089222	0.0089222
Manganese	NA	0	0.00050	0.008500	0.000380	0.00018874	0.0001887	0.0086887	0.0086887
Mercury	NA	0	NA	0	0.000260	0.00012914	0.0001291	0.0001291	0.0001291
Molybdenum	NA	0	NA	0	0.00110	0.00054636	0.0005464	0.0005464	0.0005464
Nickel	NA	0	0.00050	0.008500	0.00210	0.00104305	0.0010430	0.0095430	0.0095430
Selenium	NA	0	NA	0	0.0000240	0.00001192	0.0000119	0.0000119	0.0000119
Vanadium	NA	0	NA	0	0.00230	0.00114238	0.0011424	0.0011424	0.0011424
Zinc	NA	0	0.00050	0.008500	0.0290	0.01440397	0.0144040	0.0229040	0.0229040
Ammonia	NA	0	NA	0	NA	0	0	13.5	12.7
Sulfuric Acid [d]	NA	0	NA	0	NA	0	0	3.43	1.71
			0.0931						

NA = Not Applicable

The maximum toxics emissions are calculated from Case 6A. These represent worst-case toxic emissions.

a - USEPA, AP-42, Table 3.1-3, April 2000

b - The weight fractions of VOC have been corrected to a non-methane, non-ethane value by dividing with 0.0931 which is the non-methane, non-ethane fraction of the total sample reported in the EPA speciation table.

- The VOC weight fractions are from the EPA speciation table for natural gas fired internal combustion source.

USEPA, Air Emissions Species Manual, Vol I: Volatile Organic Compound Species Profile, January 1990. EPA-450/2-90-001a

- The PM weight fractions are from the CARB speciation table for natural gas fired internal combustion source. California Air Resources Board (CARB), Identification of Particulate Matter Species Profiles, ARB Speciation Manual, Second Edition, Vol. 2, August 1991.

c - The DB emission factors are from AP-42, Tables 1.4-3 and 1.4-4. It is assumed that RFG behaves similar to NG with respect to toxic emissions.

d - The emission rate for sulfuric acid was calculated by assuming 20% of the total SO_2 emissions are converted to sulfuric acid.

This assumption was suggested by Alan Newman of Washington Department of Ecology on March 21, 2002.

Toxic Emissions for Emergency Generator

Toxic Compound	Emission Factor (lb/MMBtu)	Emission Rate for One Emergency Generator (lb/hr)
VOC	**MMBtu/hr = 15.36**	
Acetaldehyde	0.0000252	0.00039
Acrolein	0.00000788	0.000121
Ammonia	NA	0
Benzene	0.000776	0.01192
1,3-Butadiene	NA	0
Butane (isomers)	NA	0
Cyclohexane	NA	0
Cyclopentane	NA	0
Ethylbenzene	NA	0
Formaldehyde	0.0000789	0.00121
Heptane (isomers)	NA	0
N-Hexane	NA	0
Hexane (isomers)	NA	0
Methylcyclohexane	NA	0
Naphthalene	0.000130	0.00200
Nonane	NA	0
Octane (isomers)	NA	0
PAH	0.0002120	0.00326
Pentane (isomers)	NA	0
Toluene	0.000281	0.00432
1,2,3-Trimethylbenzene	NA	0
Xylene	0.000193	0.00296
PM	**Emission Factor is Weight Fraction of PM; PM= 0.70**	
Arsenic	0.00530	0.003710
Barium	NA	0
Beryllium	NA	0
Cadmium	0.00050	0.000350
Chromium	0.00530	0.003710
Cobalt	NA	0
Copper	NA	0
Manganese	NA	0
Mercury	NA	0
Molybdenum	NA	0
Nickel	0.00050	0.000350
Selenium	0.00050	0.000350
Vanadium	NA	0
Zinc	0.00550	0.003850
Sulfuric Acid	NA	0.2437

NA = Not Applicable

- The VOC emission factors are from AP-42, Table 3.4-3 and 3.4-4, October 1996.
- The PM weight fractions are from the CARB speciation table for oil fired internal combustion source. California Air Resources Board (CARB), Identification of Particulate Matter Species Profiles, ARB Speciation Manual, Second Edition, Vol. 2, August 1991.
- The sulfuric acid emissions are calculated from the SO_2 emissions.

Toxic Emissions for Firewater Pump

Toxic Compound	Emission Factor (lb/MMBtu)	Emission Rate for One Firewater Pump (lb/hr)
VOC	**MMBtu/hr = 2.02**	
Acetaldehyde	0.000767	0.001553
Acrolein	0.0000925	0.0001872
Ammonia	NA	0
Benzene	0.000933	0.001889
1,3-Butadiene	0.0000391	0.0000791
Butane (isomers)	NA	0
Cyclohexane	NA	0
Cyclopentane	NA	0
Ethylbenzene	NA	0
Formaldehyde	0.00118	0.00239
Heptane (isomers)	NA	0
N-Hexane	NA	0
Hexane (isomers)	NA	0
Methylcyclohexane	NA	0
Naphthalene	NA	0
Nonane	NA	0
Octane (isomers)	NA	0
PAH	0.000168	0.000340
Pentane (isomers)	NA	0
Toluene	0.000409	0.000828
1,2,3-Trimethylbenzene	NA	0
Xylene	0.000285	0.000577
PM	**Emission Factor is Weight Fraction of PM; PM= 0.050**	
Arsenic	0.00530	0.000265
Barium	NA	0
Beryllium	NA	0
Cadmium	0.000500	0.0000250
Chromium	0.00530	0.000265
Cobalt	NA	0
Copper	NA	0
Manganese	NA	0
Mercury	NA	0
Molybdenum	NA	0
Nickel	0.000500	0.0000250
Selenium	0.000500	0.0000250
Vanadium	NA	0
Zinc	0.00550	0.000275
Sulfuric Acid	NA	0.0321

NA = Not Applicable

- The VOC emission factors are from AP-42, Table 3.3-2, October 1996.
- The PM weight fractions are from the CARB speciation table for oil fired internal combustion source. California Air Resources Board (CARB), Identification of Particulate Matter Species Profiles, ARB Speciation Manual, Second Edition, Vol. 2, August 1991.
- The sulfuric acid emissions are calculated from the SO_2 emissions.

APPENDIX D

CRITERIA AND TOXIC POLLUTANT EMISSION SUMMARY (SIEMENS TURBINES)

Emissions Summary
One Siemens SGT-6 5000FCombustion Turbine
Fuel in Turbine: Natural Gas
Fuel in Duct Burner: Natural Gas or Refinery Fuel Gas

Hourly emissions out of stack for one turbine

Case	Turbine Inlet Temperature	Load	Duct Burning	NO_X	CO (2 ppm)	PM_{10}	SO_2 (0.8 gr S)	SO_2 (1.6 gr S)	Stack Flow Rate	Stack Exit Temperature
	F	%	MM Btu/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	acfm	F
1AA	5	100	0	20.4	9.9	11.0	4.8	9.6	1,288,672	195
1AB	50	100	0	18.6	9.1	10.8	4.4	8.8	1,200,100	195
1AC	85	100	0	16.9	8.2	9.6	4.0	7.9	1,099,721	195
1BA	5	75	0	16.3	7.9	9.6	3.8	7.7	1,065,123	195
1BB	50	75	0	14.8	7.2	9.4	3.5	7.0	991,846	195
1BC	85	75	0	13.5	6.6	9.3	3.2	6.3	909,530	195
1CA	5	50	0	13.8	6.7	9.3	3.2	6.5	935,142	195
1CB	50	50	0	12.6	6.1	9.2	3.0	5.9	873,775	195
1CC	85	50	0	11.5	5.6	9.1	2.7	5.4	807,769	195
7A	5	100	600	26.5	12.9	21.5	6.2	12.5	1,274,788	180
7B	50	100	600	24.7	12.0	21.3	5.8	11.6	1,188,155	180
7C	85	100	600	23.0	11.2	20.1	5.4	10.8	1,089,974	180
Generator	NA	NA	NA	27.5	6.9	0.7	0.8	0.8	12,745	899
Firepump	NA	NA	NA	3.3	0.2	0.1	0.3	0.0	1,404	840
Cooling Tower	NA	NA	NA	0.0	0.0	0.0	0.0	0.0	101,167	90

Notes:
Diameter = 19 feet

1. Annual SO_2 emissions are calculated using 0.8 gr S/100scf natural gas
2. Short-term SO_2 emissions are calculated using 1.6 gr S/100scf natural gas
3. SO_2 emissions for CalPuff visibility modeling are calculated using 0.8 gr S/100scf natural gas and by subtracting the 5% sulfur converted to SO_4.
4. SO_4 emissions for CalPuff visibility modeling are calculated using 0.8 gr S/100scf natural gas and by assuming a 5% conversion from SO_2 and multiplying by the ratio of molecula
5. PM_{10} emissions for CalPuff visibility modeling do not include ammonium sulfate emissions that are included in the ISCST3 modeling.
6. Emissions from the generator and firepump for CalPuff visibility modeling are divided by 12 to account for only 2 hours run in a 24-hour period.

Cherry Point Cogeneration Project
Annual Emissions Budget - Siemens SGT-6 5000F Turbines, 6x16 Schedule

Plant Emissions
(does not include auxilliary equipment)

Annual Emissions Tons/Year	2x1 Project 8760 Hrs Operation	2x1 Project Full Dispatch*	2x1 Project Partial Dispatch	Maximum Case
NOx	217	204	157	216.5
CO	105	100	101	105.5
VOC	57	54	39	57.0
PM	187	176	137	186.6
SO2 (1)	51	48	38	51.0

* Includes downtime allowance for scheduled maintenance per below

Short Term Emissions Lbs/Hr	2x1 Project 620 MMBtu/hr DB
NOx	53.0
CO	25.8
VOC	13.3
PM	43.0
SO2 (2)	25.0

(1) 0.8 gr/100 cf annual average sulfur
(2) 1.6 gr/100 cf short term sulfur

Annual Average Emissions from one turbine	2x1 Project Emissions 620 MMBtu/hr	Controlled Emissions per Event (2 Turbines)				
		Hot Start	Warm Start 28 hours down	Warm Start 52 hours down	Cold Start	Shutdown
	Lbs/hr	Lbs/Start	Lbs/Start	Lbs/Start	Lbs/Start	Lbs/Shutdown
Margin	0%	20%	20%	20%	20%	20%
NOx	24.7	141.6	176.4	251.1	297.6	51.7
CO	12.0	319.5	388.8	524.3	533.9	87.7
VOC	6.5	12.4	12.0	16.3	33.6	7.6
PM	21.3	132.1	153.4	200.0	209.1	63.3
SO2	5.8	37.8	41.6	55.2	91.7	24.2
Hours/event		2.0	2.0	2.5	4.5	1.0

8760 Hrs Operation

Assumptions	
Hours per Year	8,760
Number of turbines:	2
Plant Starts Allowed	-
Duct Burner Duty/Train, MMBTU/HR HHV	600

24 Hour/Day Run

			Operating Mode					
			Shutdown	Hours Down	Startup	Run	Total	Hours/Year
		Start				22:00 Day 1		
		End				22:00 Day 2		
Events/Yr	365.0	Hours/Event	0.0	0.0	0.0	24.0	24.0	8760
		Compound					Total lbs/Event	Tons/Year
		NOx	0.0		0.0	1186	1186	217
		CO	0.0		0.0	578	578	105
		VOC	0.0		0.0	312	312	57
		PM	0.0		0.0	1023	1023	187
		SO2	0.0		0.0	280	280	51

Partial Dispatch

Assumptions	
Hours per Year	8,760
Number of turbines:	2
Plant Starts Allowed	145
Duct Burner Duty/Train, MMBTU/HR HHV	600
Calculated Percent Dispatch	66%

Operating Modes

24 Hour/Day Run

			Operating Mode					
			Shutdown	Hours Down	Startup	Run	Total	Hours/Year
		Start				22:00 Day 1		
		End				22:00 Day 2		
Events/Yr	143.0	Hours/Event	0.0	0.0	0.0	24.0	24.0	3432
		Compound					Total lbs/Event	Tons/Year
		NOx	0.0		0.0	1186.5	1186.5	85
		CO	0.0		0.0	577.9	577.9	41
		VOC	0.0		0.0	312.5	312.5	22
		PM	0.0		0.0	1022.5	1022.5	73
		SO2	0.0		0.0	279.6	279.6	20

Daily Peak Operation Only - 16 Hr Run					(Hot Start)			
			Operating Mode					
			Shutdown	Hours Down	Startup	Run	Total	Hours/Year
		Start	22:00 Day 1	23:00 Day 1	04:00 Day 2	06:00 Day 2		
		End	23:00 Day 2	04:00 Day 2	06:00 Day 2	22:00 Day 2		
Events/Yr	95.0	Hours/Event	1.0	5.0	2.0	16.0	24.0	2280
		Compound					Total lbs/Event	Tons/Year
		NOx	51.7		141.6	791.0	984.3	47
		CO	87.7		319.5	385.3	792.5	38
		VOC	7.6		12.4	208.3	228.3	11
		PM	63.3		132.1	681.7	877.1	42
		SO2	24.2		37.8	186.4	248.3	12

Weekend Shutdown - Peak Operation Only					(Warm Start 16 hrs)			
			Operating Mode					
			Shutdown	Hours Down	Startup	Run	Total	Hours/Year
		Start	22:00 Sat	23:00 Sat	03:00 Mon	06:00 Mon		
		End	23:00 Sat	03:00 Mon	06:00 Mon	22:00 Mon		
Events/Yr	43	Hours	1.0	29.0	2.0	16.0	48.0	2064
		Compound					Total lbs/Event	Tons/Year
		NOx	51.7		176.4	791.0	1019.1	22
		CO	87.7		388.8	385.3	861.9	19
		VOC	7.6		12.0	208.3	227.9	5
		PM	63.3		153.4	681.7	898.4	19
		SO2	24.2		41.6	186.4	252.1	5

NERC Holiday Weekend Shutdown					(Warm Start 48 hrs)			
			Operating Mode					
			Shutdown	Hours Down	Startup	Run	Total	Hours/Year
		Start	22:00 Sat	23:00 Sat	03:00 Tues	06:00 Tues		
		End	23:00 Sat	03:00 Tues	06:00 Tues	22:00 Tues		
Events/Yr	6	Hours	1.0	52.5	2.5	16.0	72.0	432
		Compound					Total lbs/Event	Tons/Year
		NOx	51.7		176.4	791.0	1019.1	3
		CO	87.7		388.8	385.3	861.9	3
		VOC	7.6		12.0	208.3	227.9	1
		PM	63.3		153.4	681.7	898.4	3
		SO2	24.2		41.6	186.4	252.1	1

Maintenance Outage					(Cold Start)			
			Operating Mode					
			Shutdown	Hours Down	Startup	Run	Total	Hours/Year
		Start	22:00	23:00	01:30	06:00		
		End	23:00	01:30	06:00	22:00		
Days/Yr	22	Hours	1.0	530.5	4.5	16.0	552.00	552.0
		Compound					Total lbs/Event	Tons/Year
		NOx	51.7		297.6	791.0	1140.3	1
		CO	87.7		533.9	385.3	1006.9	1
		VOC	7.6		33.6	208.3	249.5	0
		PM	63.3		209.1	681.7	954.2	0
		SO2	24.2		91.7	186.4	302.2	0

Hours per category					
	Shutdown	Hours Down	Startup	Run	total
24 Hour/Day Run	0	0	0	3432	
Daily Peak Operation Only	95	475	190	1520	
Weekend Shutdown	43	1247	86	688	
NERC Holiday Weekend Shu	6	315	15	96	
Maintenance Outage	1	531	5	16	
Total	145.0	2567.5	295.5	5752.0	8760

Tons/category						
	Shurdown	Hotstart	Warm Start	Coldstart	Run	
NOx	3.7	6.7	4.3	0.1	142.2	157.1
CO	6.4	15.2	9.5	0.3	69.3	100.6
VOC	0.5	0.6	0.3	0.0	37.4	38.9
PM	4.6	6.3	3.8	0.1	122.5	137.3
SO2	1.8	1.8	1.0	0.0	33.5	38.1

BP Cherry Point Cogeneration Project with Siemens SGT6 5000F CTGs
2x1 Reference Plant Hot Start (8 or less hour downtime)

ISO Conditions - Best Case, Consider Adding 10-20% Margin

CGT 1	Time start up	Dur-ation (min)	SCR Efficiency (%)	CO Catalyst Efficiency (%)	NOx as NO2 (lb/min)	NOx as NO2 uncont. (lb)	NOx as NO2 controlled (lb)	CO (lb/min)	CO uncont. (lb)	CO controlled (lb)	SO2 (lb/h)	SO2 (lb)	PM-10 (lb)	VOC as CH4 (lb/h)	VOC as CH4 (lb)
Aux online	-10 to 0	10													
Ramp to 60% load per Siemens table	0 to 48	48	0	0		50	50		131	131		2.0	9.0		53.0
Ramp to 70% load	48 to 53	5	75	75	0.8	4	1	0.4	2	0	3.3	0.3	0.7	5.5	0.5
Hold at 70% load	53 to 97	44	80	85	0.9	37	7	0.2	10	2	3.8	2.8	5.9	2.0	1.5
Ramp to 100% load	97 to 107	10	80	85	0.98	10	2	0.3	3	0	4.0	0.7	1.3	2.3	0.4
Sub Total		97				101	60		146	133		5.7	16.9		55

CGT 2	Time start up	Dur-ation (min)	SCR Efficiency (%)	CO Catalyst Efficiency (%)	NOx as NO2 (lb/min)	NOx as NO2 uncont. (lb)	NOx as NO2 controlled (lb)	CO (lb/min)	CO uncont. (lb)	CO controlled (lb)	SO2 (lb/h)	SO2 (lb)	PM-10 (lb)	VOC as CH4 (lb/h)	VOC as CH4 (lb)
Ramp to 60% load per Siemens table	18 to 65	47	0	0		50	50		131	131		2.0	9.0		53.0
Ramp to 70% load	65 to 70	5	75	75	0.8	4	1	0.4	2	0	3.3	0.3	0.7	5.5	0.5
Hold at 70% load	70 to 97	27	80	85	0.9	23	5	0.2	6	1	3.8	1.7	3.6	2.0	0.9
Ramp to 100% load	97 to 107	10	80	85	0.98	10	2	0.3	3	0	4.0	0.7	1.3	2.3	0.4
Sub Total		79				87	58		142	133		4.6	14.6		55
Totals						188	118		288	266		10	31		110

Summary, lbs/event	Uncontrolled	Controlled
NOx	188	118
CO	288	266
SO2	10	10
VOC	110	110
PM10	31	31

BP Cherry Point Cogeneration Project with Siemens SGT6 5000F CTGs
2x1 Reference Plant Warm Start (9-16 hour downtime)

ISO Conditions - Best Case, Consider Adding 10-20% Margin

CGT 1	Time start up	Dur-ation (min)	SCR Efficiency (%)	CO Catalyst Efficiency (%)	NOx as NO2 (lb/min)	NOx as NO2 uncont. (lb)	NOx as NO2 controlled (lb)	CO (lb/min)	CO uncont. (lb)	CO controlled (lb)	SO2 (lb/h)	SO2 (lb)	PM-10 (lb)	VOC as CH4 (lb/h)	VOC as CH4 (lb)
Aux online	-10 to 0	10													
Ramp to 60% load per Siemens table	0 to 59	59	0	0		65	65		160	160		2.0	11.0		62.0
Ramp to 70% load	59 to 64	5	75	75	0.8	4	1	0.4	2	0	3.3	0.3	0.7	5.5	0.5
Hold at 70% load	64 to 104	40	80	85	0.9	34	7	0.2	9	1	3.8	2.5	5.3	2.0	1.3
Ramp to 100% load	104 to 114	10	80	85	0.98	10	2	0.3	3	0	4.0	0.7	1.3	2.3	0.4
Sub Total		104				113	75		174	162		5.5	18.3		64

CGT 2	Time start up	Dur-ation (min)	SCR Efficiency (%)	CO Catalyst Efficiency (%)	NOx as NO2 (lb/min)	NOx as NO2 uncont. (lb)	NOx as NO2 controlled (lb)	CO (lb/min)	CO uncont. (lb)	CO controlled (lb)	SO2 (lb/h)	SO2 (lb)	PM-10 (lb)	VOC as CH4 (lb/h)	VOC as CH4 (lb)
Ramp to 60% load per Siemens table	18 to 74	56	0	0		65	65		160	160		2.0	11.0		62.0
Ramp to 70% load	74 to 79	5	75	75	0.8	4	1	0.4	2	0	3.3	0.3	0.7	5.5	0.5
Hold at 70% load	79 to 104	25	80	85	0.9	21	4	0.2	6	1	3.8	1.6	3.3	2.0	0.8
Ramp to 100% load	104 to 114	10	80	85	0.98	10	2	0.3	3	0	4.0	0.7	1.3	2.3	0.4
Sub Total		86				100	72		170	162		4.5	16.3		64
Totals						213	147		344	324		10	35		128

Summary, lbs/event	Uncontrolled	Controlled
NO x	213	147
CO	344	324
SO2	10	10
VOC	128	128
PM10	35	35

BP Cherry Point Cogeneration Project with Siemens SGT6 5000F CTGs
2x1 Reference Plant Warm Start (17-48 hour downtime)

ISO Conditions - Best Case, Consider Adding 10-20% Margin

CGT 1	Time start up	Dur-ation (min)	SCR Efficiency (%)	CO Catalyst Efficiency (%)	NOx as NO2 (lb/min)	NOx as NO2 uncont. (lb)	NOx as NO2 controlled (lb)	CO (lb/min)	CO uncont. (lb)	CO controlled (lb)	SO2 (lb/h)	SO2 (lb)	PM-10 (lb)	VOC as CH4 (lb/h)	VOC as CH4 (lb)
Aux online	-10 to 0	10													
Ramp to 60% load per Siemens table	0 to 78	78	0	0		94	94		216	216		3.0	15.0		81.0
Ramp to 70% load	78 to 83	5	75	75	0.8	4	1	0.4	2	0	3.3	0.3	0.7	5.5	0.5
Hold at 70% load	83 to 136	53	80	85	0.9	45	9	0.2	12	2	3.8	3.4	7.1	2.0	1.8
Ramp to 100% load	136 to 146	10	80	85	0.98	10	2	0.3	3	0	4.0	0.7	1.3	2.3	0.4
Sub Total		136				153	106		233	219		7.3	24.1		84

CGT 2	Time start up	Dur-ation (min)	SCR Efficiency (%)	CO Catalyst Efficiency (%)	NOx as NO2 (lb/min)	NOx as NO2 uncont. (lb)	NOx as NO2 controlled (lb)	CO (lb/min)	CO uncont. (lb)	CO controlled (lb)	SO2 (lb/h)	SO2 (lb)	PM-10 (lb)	VOC as CH4 (lb/h)	VOC as CH4 (lb)
Ramp to 60% load per Siemens table	18 to 94	76	0	0		94	94		216	216		3.0	15.0		81.0
Ramp to 70% load	94 to 99	5	75	75	0.8	4	1	0.4	2	0	3.3	0.3	0.7	5.5	0.5
Hold at 70% load	99 to 136	37	80	85	0.9	31	6	0.2	9	1	3.8	2.3	4.9	2.0	1.2
Ramp to 100% load	136 to 146	10	80	85	0.98	10	2	0.3	3	0	4.0	0.7	1.3	2.3	0.4
Sub Total		118				139	103		229	218		6.3	21.9		83
Totals						292	209		462	437		14	46		167

Summary, lbs/event	Uncontrolled	Controlled
NO x	292	209
CO	462	437
SO2	14	14
VOC	167	167
PM10	46	46

BP Cherry Point Cogeneration Project with Siemens SGT6 5000F CTGs
2x1 Reference Plant Cold Start (> 64 hour downtime)

ISO Conditions - Best Case, Consider Adding 10-20% Margin

CGT 1	Time start up	Dur-ation (min)	SCR Efficiency (%)	CO Catalyst Efficiency (%)	NOx as NO2 (lb/min)	NOx as NO2 uncont. (lb)	NOx as NO2 controlled (lb)	CO (lb/min)	CO uncont. (lb)	CO controlled (lb)	SO2 (lb/h)	SO2 (lb)	PM-10 (lb)	VOC as CH4 (lb/h)	VOC as CH4 (lb)
Aux online	-10 to 0	10													
Ramp to 60% load per Siemens table	0 to 78	78	0	0		94	94		216	216		3.0	15.0		81.0
Ramp to 70% load	78 to 83	5	75	75	0.8	4	1	0.4	2	0	3.3	0.3	0.7	5.5	0.5
Hold at 70% load	83 to 250	167	80	85	0.9	142	28	0.2	39	6	3.8	10.6	22.3	2.0	5.6
Ramp to 100% load	250 to 260	10	80	85	0.98	10	2	0.3	3	0	4.0	0.7	1.3	2.3	0.4
Sub Total		250				250	125		260	223		14.5	39.3		87

CGT 2	Time start up	Dur-ation (min)	SCR Efficiency (%)	CO Catalyst Efficiency (%)	NOx as NO2 (lb/min)	NOx as NO2 uncont. (lb)	NOx as NO2 controlled (lb)	CO (lb/min)	CO uncont. (lb)	CO controlled (lb)	SO2 (lb/h)	SO2 (lb)	PM-10 (lb)	VOC as CH4 (lb/h)	VOC as CH4 (lb)
Ramp to 60% load per Siemens table	18 to 94	76	0	0		94	94		216	216		3.0	15.0		81.0
Ramp to 70% load	94 to 99	5	75	75	0.8	4	1	0.4	2	0	3.3	0.3	0.7	5.5	0.5
Hold at 70% load	99 to 250	151	80	85	0.9	128	26	0.2	35	5	3.8	9.6	20.1	2.0	5.0
Ramp to 100% load	250 to 260	10	80	85	0.98	10	2	0.3	3	0	4.0	0.7	1.3	2.3	0.4
Sub Total		232				236	123		256	222		13.5	37.1		87
Totals						486	248		515	445		28	76		174

Summary, lbs/event	Uncontrolled	Controlled
NO x	486	248
CO	515	445
SO2	28	28
VOC	174	174
PM10	76	76

BP Cherry Point Cogeneration Project with Siemens SGT6 5000F CTGs
2x1 Reference Plant Shutdown Case

ISO Conditions - Best Case, Consider Adding 10-20% Margin

CGT 1	Time	Dur-ation (min)	SCR Efficiency (%)	CO Catalyst Efficiency (%)	NOx as NO2 (lb/min)	NOx as NO2 uncont. (lb)	NOx as NO2 controlled (lb)	CO (lb/min)	CO uncont. (lb)	CO controlled (lb)	SO2 (lb/h)	SO2 (lb)	PM-10 (lb)	VOC as CH4 (lb/h)	VOC as CH4 (lb)
Ramp to 60% load	0 to 16	16	80	85	0.9	15	3	0.3	4	1	3.8	1.0	2.1	2.2	0.6
Hold at 60% load	16 to 38	22	70	70	0.8	17	5	0.5	11	3	3.1	1.1	2.9	2.2	0.8
Shutdown per Siemens table	38 to 62	24	50	50		27	14		65	33		1.0	5.0		25.0
Sub Total		62				59	22		81	37		3.2	10.1		26

CGT 2	Time	Dur-ation (min)	SCR Efficiency (%)	CO Catalyst Efficiency (%)	NOx as NO2 (lb/min)	NOx as NO2 uncont. (lb)	NOx as NO2 controlled (lb)	CO (lb/min)	CO uncont. (lb)	CO controlled (lb)	SO2 (lb/h)	SO2 (lb)	PM-10 (lb)	VOC as CH4 (lb/h)	VOC as CH4 (lb)
Ramp to 60% load	0 to 16	16	80	85	0.9	15	3	0.3	4	1	3.8	1.0	2.1	2.2	0.6
Hold at 60% load	16 to 38	22	70	70	0.8	17	5	0.5	11	3	3.1	1.1	2.9	2.2	0.8
Shutdown per Siemens table	38 to 62	24	50	50		27	14		65	33		1.0	5.0		25.0
Sub Total		62				59	22		81	37		3.2	10.1		26
Totals						118	43		161	73		6	20		53

Summary, lbs/event	Uncontrolled	Controlled
NO x	118	43
CO	161	73
SO2	6	6
VOC	53	53
PM10	20	20

Criteria Pollutant Emissions Summary For Auxiliary Equipment

Sulfur content of distillate oil = 0.0500 weight % SO_2 emission factor (lb/MMBtu) = 0.0518 Based on HHV

Equipment	Fuel	Annual Operating Hours		Capacity	Heat Input
			kW	hp	MMBtu/hr
Emergency Generator (1500 kW)	Diesel	250	1,500	2,011	15.36
Firewater Pump (265 HP)	Diesel	250	n/a	265	2.02

Hourly Emission Rates (lb/hr)

Equipment	NO_X	CO	VOC	PM_{10}	SO_2	H_2SO_4	
Emergency Generator	27.5	6.9	1.3	0.7	0.796	0.2437	Source: Southworth-Milton, Inc.
Firewater Pump	3.33	0.17	0.14	0.05	0.1049	0.0321	Source: Clarke Fire Protection Products

H_2SO_4 Emissons are calculated based on a 20% conversion rate

Annual Emissions (tons/yr)

Equipment	NO_X	CO	VOC	PM_{10}	SO_2	H_2SO_4
Emergency Generator	3.4	0.9	0.16	0.09	0.0995	0.03046
Firewater Pump	0.42	0.021	0.018	0.006	0.01311	0.004015

Stack Information

Equipment	Flow Rate (acfm)	Temp. (deg. F)	Stack Height (ft)	Stack Diameter (ft)	Velocity (ft/s)
Emergency Generator	12,745	899	11.67	1.00	270
Firewater Pump	1,404	840	12	0.50	119

Cooling Tower PM10 Calculation				
Measure	**Value**	**Units**	**Comments**	**Calculation**
Drift	0.001%		% of Circ. Water Lost as Drift	Mfg. Guarantee
Circ Water Flow	143400	gpm	Total Circulating Water Flow Rate	System Design Requirement
Drift Flow	1.434	gpm	Total Water Lost as Drift, gpm	(Drift %) X (Circ Water Flow)
Drift Flow	716.7	lb/hr	Hourly Total Water Lost as Drift	(Drift Flow)gal/min X 8.33lb/gal X 60min/hr
Drift Flow	17201	lb/day	Daily Total Water Lost as Drift	(Drift Flow)gal/min X 8.33lb/gal X 1440min/day
CT Cycles	15		CT Cycles of Concentration	Maximum Expected
TDS	2193	ppm	Total Dissolved Solids	
TSS	78	ppm	Total Suspended Solids	
TS	2271	ppm	Circulating Water Total Solids	(TDS)+(TSS)
TS wt%	0.2271%		% by Weight	(TS)ppm X 1,000,000
PM10 per hour	1.628	lb/hr	Hourly TS Lost Through Drift	(TS wt%) X (Drift Flow)lb/hr
PM10 per year	7.129	tons/yr	Hourly TS Lost Through Drift	lb/hr X 8,760 hrs / 2,000 lb/ton

Summary of Toxic Emissions

Toxic Compound	Maximum Emission Rate for 2 GTs (lb/hr)	Emission Rate for Emergency Generator (lb/hr)	Emission Rate for Fire Pump (lb/hr)	Maximum Hourly Emissions (lb/hr)	Small Quantity Emission Rate (lb/hr)	Total Annual Emissions (lb/yr)	Small Quantity Emission Rate (lb/yr)	Modeling Required (Yes/No)	ASIL ($\mu g/m^3$)	Class A or B Toxic Compound		EPA Classified HAP (Yes/No)
VOC												
Acetaldehyde	0.013	0.00039	0.001553	0.015	NA	115.1	50	Yes	0.45	A	annual	Yes
Acrolein	0.029	0.000121	0.0001872	0.029	0.02	252.2	175	Yes	0.02	B	24-hr	Yes
Benzene	0.056	0.01192	0.001889	0.070	NA	494.4	20	Yes	0.12	A	annual	Yes
1,3-Butadiene	0.0019	0	0.0000791	0.0020	NA	17.0	0.5	Yes	0.0036	A	annual	Yes
Butane (isomers)	0.74	0	0	0.74	5.0	6,456	43,748	No	6,300	B	24-hr	No
Cyclohexane	0.0044	0	0	0.0044	5.0	38.2	43,748	No	3,400	B	24-hr	No
Cyclopentane	0.0087	0	0	0.009	5.0	76.4	43,748	No	5,700	B	24-hr	No
Ethylbenzene	0.0044	0	0	0.0044	5.0	38.2	43,748	No	1,000	B	24-hr	Yes
Formaldehyde	0.43	0.00121	0.00239	0.43	NA	3,748	20	Yes	0.077	A	annual	Yes
Heptane (isomers)	0.026	0	0	0.026	5.0	229.2	43,748	No	5,500	B	24-hr	No
N-Hexane	0.0087	0	0	0.009	2.6	76.4	22,750	No	200	B	24-hr	Yes
Hexane (isomers)	1.80	0	0	1.80	5.0	15,740	43,748	No	5,900	B	24-hr	Yes
Methylcyclohexane	0.0087	0	0	0.009	5.0	76.4	43,748	No	5,400	B	24-hr	No
Naphthalene	0.0065	0.00200	0	0.0084	2.6	57.0	22,750	No	170	B	24-hr	Yes
Nonane	0.0087	0	0	0.009	5.0	76.4	43,748	No	3,500	B	24-hr	No
Octane (isomers)	0.017	0	0	0.017	5.0	152.8	43,748	No	4,700	B	24-hr	No
PAH	0.0100	0.00326	0.000340	0.014	NA	88.3	NA	Yes	0.000480	A	annual	Yes
Pentane (isomers)	2.70	0	0	2.70	5.0	23,618	43,748	No	6,000	B	24-hr	No
Toluene	0.021	0.00432	0.000828	0.026	5.0	183.7	43,748	No	400	B	24-hr	Yes
1,2,3-Trimethylbenzene	0.017	0	0	0.017	5.0	152.8	43,748	No	420	B	24-hr	No
Xylene	0.017	0.00296	0.000577	0.021	5.0	153.7	43,748	No	1,500	B	24-hr	Yes
PM												
Arsenic	0.00020	0.003710	0.000265	0.00417	NA	2.7	NA	Yes	0.00023	A	annual	Yes
Barium	0.0044	0	0	0.00437	0.02	38.3	175	No	1.7	B	24-hr	No
Beryllium	0.000012	0	0	0.000012	NA	0.10	NA	Yes	0.00042	A	annual	Yes
Cadmium	0.0011	0.000350	0.0000250	0.00147	NA	9.7	NA	Yes	0.00056	A	annual	Yes
Chromium	0.010	0.003710	0.000265	0.014	0.02	92.0	175	No	1.7	B	24-hr	Yes
Cobalt	0.009	0	0	0.009	0.02	79.6	175	No	0.17	B	24-hr	Yes
Copper	0.010	0	0	0.010	0.02	86.2	175	No	0.67	B	24-hr	No
Manganese	0.009	0	0	0.009	0.02	82.1	175	No	0.4	B	24-hr	Yes
Mercury	0.00026	0	0	0.00026	0.02	2.3	175	No	0.17	B	24-hr	Yes
Molybdenum	0.0011	0	0	0.00109	0.20	9.6	1,750	No	17	B	24-hr	No
Nickel	0.011	0.000350	0.0000250	0.011	NA	97.2	0.5	Yes	0.0021	A	annual	Yes
Selenium	0.000024	0.000350	0.0000250	0.00040	0.02	0.30	175	No	0.67	B	24-hr	No
Vanadium	0.0023	0	0	0.00228	0.02	20.0	175	No	0.17	B	24-hr	No
Zinc	0.038	0.003850	0.000275	0.042	0.2	332.2	1750	No	17	B	24-hr	No
Ammonia	30.1	0	0	30.1	2.0	263,951	17,500	Yes	100	B	24-hr	No
Sulfuric Acid	7.7	0.2437	0.0321	7.93	0.02	67108	175	Yes	3.3	B	24-hr	No
Total Annual Hours	8,760	250	250							Total HAPs (tons/yr)		10.66
Total Toxics (lbs/yr)						52,693						

NA = Not applicable

The maximum toxics emissions are calculated from Case 6A. These represent worst-case toxic emissions.

Hourly Toxic Emissions from One Gas Turbine and Duct Burner

Toxic Compound	Gas Turbine Emission Factors (lb/MMBtu) [a]	Gas Turbine Emissions (lb/hr)	Weight Fraction for Gas Turbine [b]	Emission Rate for Gas Turbine (lb/hr)	Emission Factor (lb/10^6 scf fuel gas input) [c]	Maximum Emission Rate for Duct Burner (lb/hr)	Average Emission Rate for Duct Burner (lb/hr)	Maximum Total Emission Rate for GT Plus DB (lb/hr)	Average Total Emission Rate for GT Plus DB (lb/hr)
VOC	**MMBtu/hr =**	**2,248.2**	**VOC =**	**2.0**	**10^6 scf NG input/hr =**	**0.4967**	**0.4967**		
Acetaldehyde	NA	0	0.003222	0.006541	NA	0	0	0.006541	0.006541
Acrolein	0.0000064	0.014389	NA	0	NA	0	0	0.014389	0.014389
Benzene	0.0000120	0.0270	NA	0	0.00210	0.0010430	0.0010430	0.028022	0.028022
1,3-Butadiene	0.00000043	0.000967	NA	0	NA	0	0	0.000967	0.000967
Butane (isomers)	NA	0	0.181525	0.368496	NA	0	0	0.368	0.368
Cyclohexane	NA	0	0.001074	0.002180	NA	0	0	0.002180	0.002180
Cyclopentane	NA	0	0.002148	0.004361	NA	0	0	0.004361	0.004361
Ethylbenzene	NA	0	0.001074	0.002180	NA	0	0	0.002180	0.002180
Formaldehyde	NA	0	0.087003	0.176617	0.0750	0.0372517	0.0372517	0.214	0.214
Heptane (isomers)	NA	0	0.006445	0.013083	NA	0	0	0.013083	0.013083
N-Hexane	NA	0	0.002148	0.004361	NA	0	0	0.004361	0.004361
Hexane (isomers)	NA	0	0.002148	0.004361	1.80	0.8940397	0.8940397	0.90	0.90
Methylcyclohexane	NA	0	0.002148	0.004361	NA	0	0	0.004361	0.004361
Naphthalene	0.0000013	0.002923	NA	0	0.000610	0.0003030	0.0003030	0.003226	0.003226
Nonane	NA	0	0.002148	0.004361	NA	0	0	0.004361	0.004361
Octane (isomers)	NA	0	0.004296	0.008722	NA	0	0	0.008722	0.008722
PAH	0.00000220	0.004946	NA	0	0.0000882	0.0000438	0.0000438	0.004990	0.004990
Pentane (isomers)	NA	0	0.027927	0.056692	2.60	1.2913907	1.2913907	1.35	1.348
Toluene	NA	0	0.004296	0.008722	0.00340	0.0016887	0.0016887	0.010411	0.010411
1,2,3-Trimethylbenzene	NA	0	0.004296	0.008722	NA	0	0	0.008722	0.008722
Xylene	NA	0	0.004296	0.008722	NA	0	0	0.008722	0.008722
PM	**MMBtu/hr =**	**2,248.2**	**PM =**	**9.0**	**10^6 scf NG input/hr =**	**0.4967**	**0.4967**		
Arsenic	NA	0	NA	0	0.000200	0.00009934	0.0000993	0.0000993	0.0000993
Barium	NA	0	NA	0	0.00440	0.00218543	0.0021854	0.0021854	0.0021854
Beryllium	NA	0	NA	0	0.0000120	0.00000596	0.0000060	0.0000060	0.0000060
Cadmium	NA	0	NA	0	0.00110	0.00054636	0.0005464	0.0005464	0.0005464
Chromium	NA	0	0.00050	0.004500	0.00140	0.00069536	0.0006954	0.0051954	0.0051954
Cobalt	NA	0	0.00050	0.004500	0.0000840	0.00004172	0.0000417	0.0045417	0.0045417
Copper	NA	0	0.00050	0.004500	0.000850	0.00042219	0.0004222	0.0049222	0.0049222
Manganese	NA	0	0.00050	0.004500	0.000380	0.00018874	0.0001887	0.0046887	0.0046887
Mercury	NA	0	NA	0	0.000260	0.00012914	0.0001291	0.0001291	0.0001291
Molybdenum	NA	0	NA	0	0.00110	0.00054636	0.0005464	0.0005464	0.0005464
Nickel	NA	0	0.00050	0.004500	0.00210	0.00104305	0.0010430	0.0055430	0.0055430
Selenium	NA	0	NA	0	0.0000240	0.00001192	0.0000119	0.0000119	0.0000119
Vanadium	NA	0	NA	0	0.00230	0.00114238	0.0011424	0.0011424	0.0011424
Zinc	NA	0	0.00050	0.004500	0.0290	0.01440397	0.0144040	0.0189040	0.0189040
Ammonia	NA	0	NA	0	NA	0	0	15.1	15.1
Sulfuric Acid [d]	NA	0	NA	0	NA	0	0	3.83	3.83
			0.0931						

NA = Not Applicable

The maximum toxics emissions are calculated from Case 6A. These represent worst-case toxic emissions.

a - USEPA, AP-42, Table 3.1-3, April 2000

b - The weight fractions of VOC have been corrected to a non-methane, non-ethane value by dividing with 0.0931 which is the non-methane, non-ethane fraction of the total sample reported in the EPA speciation table.

- The VOC weight fractions are from the EPA speciation table for natural gas fired internal combustion source.

USEPA, Air Emissions Species Manual, Vol I: Volatile Organic Compound Species Profile, January 1990. EPA-450/2-90-001a

- The PM weight fractions are from the CARB speciation table for natural gas fired internal combustion source. California Air Resources Board (CARB), Identification of Particulate Matter Species Profiles, ARB Speciation Manual, Second Edition, Vol. 2, August 1991.

c - The DB emission factors are from AP-42, Tables 1.4-3 and 1.4-4. It is assumed that RFG behaves similar to NG with respect to toxic emissions.

d - The emission rate for sulfuric acid was calculated by assuming 20% of the total SO_2 emissions are converted to sulfuric acid.

This assumption was suggested by Alan Newman of Washington Department of Ecology on March 21, 2002.

Toxic Emissions for Emergency Generator

Toxic Compound	Emission Factor (lb/MMBtu)	Emission Rate for One Emergency Generator (lb/hr)
VOC	**MMBtu/hr = 15.36**	
Acetaldehyde	0.0000252	0.00039
Acrolein	0.00000788	0.000121
Ammonia	NA	0
Benzene	0.000776	0.01192
1,3-Butadiene	NA	0
Butane (isomers)	NA	0
Cyclohexane	NA	0
Cyclopentane	NA	0
Ethylbenzene	NA	0
Formaldehyde	0.0000789	0.00121
Heptane (isomers)	NA	0
N-Hexane	NA	0
Hexane (isomers)	NA	0
Methylcyclohexane	NA	0
Naphthalene	0.000130	0.00200
Nonane	NA	0
Octane (isomers)	NA	0
PAH	0.0002120	0.00326
Pentane (isomers)	NA	0
Toluene	0.000281	0.00432
1,2,3-Trimethylbenzene	NA	0
Xylene	0.000193	0.00296
PM	**Emission Factor is Weight Fraction of PM; PM= 0.70**	
Arsenic	0.00530	0.003710
Barium	NA	0
Beryllium	NA	0
Cadmium	0.00050	0.000350
Chromium	0.00530	0.003710
Cobalt	NA	0
Copper	NA	0
Manganese	NA	0
Mercury	NA	0
Molybdenum	NA	0
Nickel	0.00050	0.000350
Selenium	0.00050	0.000350
Vanadium	NA	0
Zinc	0.00550	0.003850
Sulfuric Acid	NA	0.2437

NA = Not Applicable

- The VOC emission factors are from AP-42, Table 3.4-3 and 3.4-4, October 1996.
- The PM weight fractions are from the CARB speciation table for oil fired internal combustion source. California Air Resources Board (CARB), Identification of Particulate Matter Species Profiles, ARB Speciation Manual, Second Edition, Vol. 2, August 1991.
- The sulfuric acid emissions are calculated from the SO_2 emissions.

Toxic Emissions for Firewater Pump

Toxic Compound	Emission Factor (lb/MMBtu)	Emission Rate for One Firewater Pump (lb/hr)
VOC	**MMBtu/hr = 2.02**	
Acetaldehyde	0.000767	0.001553
Acrolein	0.0000925	0.0001872
Ammonia	NA	0
Benzene	0.000933	0.001889
1,3-Butadiene	0.0000391	0.0000791
Butane (isomers)	NA	0
Cyclohexane	NA	0
Cyclopentane	NA	0
Ethylbenzene	NA	0
Formaldehyde	0.00118	0.00239
Heptane (isomers)	NA	0
N-Hexane	NA	0
Hexane (isomers)	NA	0
Methylcyclohexane	NA	0
Naphthalene	NA	0
Nonane	NA	0
Octane (isomers)	NA	0
PAH	0.000168	0.000340
Pentane (isomers)	NA	0
Toluene	0.000409	0.000828
1,2,3-Trimethylbenzene	NA	0
Xylene	0.000285	0.000577
PM	**Emission Factor is Weight Fraction of PM; PM= 0.050**	
Arsenic	0.00530	0.000265
Barium	NA	0
Beryllium	NA	0
Cadmium	0.000500	0.0000250
Chromium	0.00530	0.000265
Cobalt	NA	0
Copper	NA	0
Manganese	NA	0
Mercury	NA	0
Molybdenum	NA	0
Nickel	0.000500	0.0000250
Selenium	0.000500	0.0000250
Vanadium	NA	0
Zinc	0.00550	0.000275
Sulfuric Acid	NA	0.0321

NA = Not Applicable

- The VOC emission factors are from AP-42, Table 3.3-2, October 1996.
- The PM weight fractions are from the CARB speciation table for oil fired internal combustion source. California Air Resources Board (CARB), Identification of Particulate Matter Species Profiles, ARB Speciation Manual, Second Edition, Vol. 2, August 1991.
- The sulfuric acid emissions are calculated from the SO_2 emissions.

APPENDIX E

BACT/LAER CLEARINGHOUSE LISTINGS

RACT/BACT/LAER Clearinghouse Listings for Combustion Gas Turbines, Combined Cycle and Cogeneration (Process Code 15.210) for All EPA Regions 2001-2006

RBLCID	FACILITY NAME	CORPORATE OR COMPANYNAME	STATE	PERMIT DATE	PROCESS NAME	THRUPUT	UNITS	POLLUTANT	CTRLDESC	EMISSION LIMIT		BASIS
*CO-0056	ROCKY MOUNTAIN ENERGY CEN	CALPINE CORP.	CO	5/2/2006	NATURAL-GAS FIRED, COMBINED-CYCLE TURBINE	300	MW	CO	USE GOOD COMBUSTION CONTROL PRACTICES AND CATALISTIC	3	PPM @ 15% O2	BACT-PSD
NC-0101	FORSYTH ENERGY PLANT	FORSYTH ENERGY PROJECTS, LLC	NC	9/29/2005	TURBINE & DUCT BURNER, COMBINED CYCLE, NAT GAS, 3	1844.3	MMBTU/H	CO	GOOD COMBUSTION PRACTICES AND EFFICIENT PROCESS DESIGN	25.9	PPM @ 15% O2	BACT-PSD
NC-0101	FORSYTH ENERGY PLANT	FORSYTH ENERGY PROJECTS, LLC	NC	9/29/2005	TURBINE, COMBINED CYCLE, NATURAL GAS, (3)	1844.3	MMBTU/H	CO	GOOD COMBUSTION PRACTICES AND EFFICIENT PROCESS DESIGN.	11.6	PPM @ 15% O2	BACT-PSD
NV-0035	TRACY SUBSTATION EXPANSION	SIERRA PACIFIC POWER COMPANY	NV	8/16/2005	TURBINE, COMBINED CYCLE COMB. #1 WITH HRSG AND DUCT BURNER.	306	MW	CO	OXIDATION CATALYST	3.5	PPM @ 15% O2	BACT-PSD
NV-0035	TRACY SUBSTATION EXPANSION	SIERRA PACIFIC POWER COMPANY	NV	8/16/2005	TURBINE, COMBINED CYCLE COMB. #2 WITH HRSG AND DUCT BURNER.	306	MW	CO	OXIDATION CATALYST SYSTEM	3.5	PPM @ 15% O2	BACT-PSD
*OR-0041	WANAPA ENERGY CENTER	DIAMOND WANAPA I, L.P.	OR	8/8/2005	COMBUSTION TURBINE & HRSG	2384.1	MMBTU/H	CO	OXIDATION CATALYST.	2	PPMDV @ 15% O2	BACT-PSD
FL-0265	HINES POWER BLOCK 4	PROGRESS ENERGY	FL	6/8/2005	COMBINED CYCLE TURBINE	530	MW	CO	GOOD COMBUSTION	8	PPM	BACT-PSD
MI-0366	BERRIEN ENERGY, LLC	BERRIEN ENERGY, LLC	MI	4/13/2005	3 COMBUSTION TURBINES AND DUCT BURNERS	1584	MMBTU/H	CO	CATALYTIC OXIDATION.	2	PPMDV @ 15% O2	BACT-PSD
FL-0263	FPL TURKEY POINT POWER PLAI	FLORIDA POWER AND LIGHT	FL	2/8/2005	170 MW COMBUSTION TURBINE, 4 UNITS	170	MW	CO	CO WILL BE MINIMIZED BY THE EFFICIENT COMBUSTION OF	8	PPMVD @ 15 % O2	BACT-PSD
*WA-0328	BP CHERRY POINT COGENERATI	BP WEST COAST PRODUCTS, LLC	WA	1/11/2005	GE 7FA COMBUSTION TURBINE & HRSG	174	MW	CO	LEAN PRE-MIX CT BURNER & OXIDATION CATALYST	2	PPMDV	BACT-PSD
OH-0252	HANGING ROCK ENERGY FACILIT	DUKE ENERGY	OH	12/28/2004	TURBINES (4) (MODEL GE 7FA), DUCT BURNERS OFF	172	MW	CO		6	PPM @ 15% O2	BACT-PSD
OH-0252	HANGING ROCK ENERGY FACILIT	DUKE ENERGY	OH	12/28/2004	TURBINES (4) (MODEL GE 7FA), DUCT BURNERS ON	172	MW	CO		9	PPM @ 15% O2	BACT-PSD
AZ-0047	WELLTON MOHAWK GENERATIN	DOME VALLEY ENERGY PARTNERS	AZ	12/1/2004	COMBUSTION TURBINES AND HRSGs - GE7FA TURBINES OPTION	170	MW	CO	OXIDATION CATALYST	3	PPM @ 15% O2	BACT-PSD
AZ-0047	WELLTON MOHAWK GENERATIN	DOME VALLEY ENERGY PARTNERS	AZ	12/1/2004	COMBUSTION TURBINES AND HRSGs - SW501F TURBINES OPTION	180	MW	CO	OXIDATION CATALYST	3	PPM @ 15% O2	BACT-PSD
MS-0073	RELIANT ENERGY CHOCTAW CO	RELIANT ENERGY	MS	11/23/2004	EMISSION POINT AA-001 GEN. ELEC. COMBUST. TURBINE	230	MW	CO	SCR	18.36	PPMV @ 1`5% 02	BACT-PSD
NV-0033	EL DORADO ENERGY, LLC	EL DORADO ENERGY, LLC	NV	8/19/2004	COMBUSTION TURBINE, COMBINED CYCLE & COGEN(2)	475	MW	CO	OXIDATION CATALYST	2.6	PPM @ 15% O2	LAER
VA-0291	CPV WARREN LLC	CPV WARREN LLC	VA	7/30/2004	TURBINE, COMBINED CYCLE (2)	1717	mmbtu/h	CO	OXIDATION CATALYST. GOOD COMBUSTION PRACTICES.	1.3	PPMVD	
VA-0291	CPV WARREN LLC	CPV WARREN LLC	VA	7/30/2004	TURBINE, COMBINED CYCLE AND DUCT BURNER (2)	1717	mmbtu/h	CO	OXIDATION CATALYST, AND GOOD COMBUSTION PRACTICES.	1.8	PPMVD	
MN-0053	FAIRBAULT ENERGY PARK	MN MUNICIPAL POWER AGENCY	MN	7/15/2004	TURBINE, COMBINED CYCLE, NATURAL GAS (1)	1876	MMBTU/H	CO	GOOD COMBUSTION PRACTICES.	10	PPMVD @ 15% O2	BACT-PSD
*NE-0023	BEATRICE POWER STATION	NEBRASKA PUBLIC POWER DISTRICT	NE	6/22/2004	2-COMBUSTION TURBINES W/ DUCT BURNER	250	MW	CO	EMISSION LIMITS, NOT CONTROLS WERE SPECIFIED	18.4	LB/H	BACT-PSD
UT-0066	CURRANT CREEK	PACIFICORP	UT	5/17/2004	NATURAL GAS FIRED TURBINES AND HRSGs			CO	OXIDATINO CATALYST FOR COMBINED CYCLE MODE OF	3	PPMVD	BACT-PSD
NV-0037	COPPER MOUNTAIN POWER	SEMPRA ENERGY RESOURCES	NV	5/14/2004	LARGE COMBUSTION TURBINES, COMBINED CYCLE & COGENERATION	600	MW	CO	GOOD COMBUSTOR DESIGN AND AN OXIDATION CATALYST	3	PPMVD	LAER
VA-0289	WYTHE	DUKE ENERGY	VA	2/5/2004	TURBINE, COMBINED CYCLE, DUCT BURNER, NATURAL GAS	170	MW	CO	GOOD COMBUSTION PRACTICES	14.6	PPMVD	BACT-PSD
VA-0289	WYTHE	DUKE ENERGY	VA	2/5/2004	TURBINE, COMBINED CYCLE, NATURAL GAS	170	MW	CO	GOOD COMBUSTION PRACTICES.	9	PPMVD	BACT-PSD
OR-0039	COB ENERGY FACILITY, LLC	Peoples Energy Resources	OR	12/30/2003	TURBINE, COMBINED CYCLE, DUCT BURNER, NAT GAS, (4)	1150	MW	CO	CATALYTIC OXIDATION	2	PPMVD @ 15% O2	BACT-PSD
NV-0038	IVANPAH ENERGY CENTER, L.P.	IVANPAH ENERGY CENTER, L.P.	NV	12/29/2003	LARGE COMBUSTION TURBINES, COMBINED CYCLE & COGENERATION	500	MW	CO	GOOD COMBUSTION CONTROL AND CATALYTIC OXIDATION	4	PPMVD	LAER
MN-0054	MANKATO ENERGY CENTER		MN	12/4/2003	COMBUSTION TURBINE, LARGE 2 EACH	1827	MMBTU/H	CO	OXIDATION CATALYST AND GOOD COMBUSTION	4.8	PPMVD @15% 02	BACT-PSD
MN-0054	MANKATO ENERGY CENTER		MN	12/4/2003	COMBUSTION TURBINE, LARGE, 2 EACH	1916	MMBTU/H	CO	OXIDATION CATALYST AND GOOD COMBUSTION	4	PPMVD 15% 02	BACT-PSD
VA-0287	JAMES CITY ENERGY PARK	JAMES CITY ENERGY PARK LLC	VA	12/1/2003	TURBINE, COMBINED CYCLE, NATURAL GAS	1973	MMBTU/H	CO	GOOD COMBUSTION PRACTICES	9	PPM	BACT-PSD
VA-0287	JAMES CITY ENERGY PARK	JAMES CITY ENERGY PARK LLC	VA	12/1/2003	TURBINE, COMBINED CYCLE, NATURAL GAS,DUCT BURNER	1973	MMBTU/H	CO	GOOD COMBUSTION PRACTICES	12	PPM	BACT-PSD
AZ-0043	ARLINGTON VALLEY (AVEFII)	DUKE ENERGY	AZ	11/12/2003	TURBINE, COMBINED CYCLE	325	MW	CO	CATALYTIC OXIDIZER	2	PPM @ 15% O2	BACT-PSD
AZ-0043	ARLINGTON VALLEY (AVEFII)	DUKE ENERGY	AZ	11/12/2003	TURBINE, COMBINED CYCLE & DUCT BURNER	325	MW	CO	CATALYTIC OXIDIZER	3	PPM @ 15% O2	BACT-PSD
FL-0256	HINES ENERGY COMPLEX, POWE	PROGRESS ENERGY FLORIDA	FL	9/8/2003	COMBUSTION TURBINES, COMBINED CYCLE, NATURAL GAS,2	1830	MMBTU/H	CO	COMBUSTION DESIGN, GOOD COMBUSTION PRACTICES.	10	PPMVD @15% O2	BACT-PSD

*AZ-0049	LA PAZ GENERATING FACILITY	ALLEGHENY ENERGY SUPPLY LLC	AZ	9/4/2003	GE COMBUSTION TURBINES AND HRSGs	1040	MW	CO	OXIDATION CATALYST	3	PPMVD	BACT-PSD
*AZ-0049	LA PAZ GENERATING FACILITY	ALLEGHENY ENERGY SUPPLY LLC	AZ	9/4/2003	SIEMENS WESTINGHOUSE COMBUSTION TURBINES AND HRSGs	1080	MW	CO	OXIDATION CATALYST	3	PPMVD	BACT-PSD
CA-0997	SACRAMENTO MUNICIPAL UTILIT	SACRAMENTO MUNICIPAL UTILITY DI	CA	9/1/2003	GAS TURBINES, (2)	1611	MMBTU/H	CO	GOOD COMBUSTION CONTROL	4	PPM @ 15% O2	LAER
OH-0254	WASHINGTON COUNTY	DUKE ENERGY	OH	8/14/2003	TURBINES (2) (MODEL GE 7FA), DUCT BURNERS OFF	170	MW	CO		10	PPM @ 15% O2	BACT-PSD
OH-0254	WASHINGTON COUNTY	DUKE ENERGY	OH	8/14/2003	TURBINES (2) (MODEL GE 7FA), DUCT BURNERS ON	170	MW	CO		14	PPM @ 15% O2	BACT-PSD
OK-0096	REDBUD POWER PLANT	REDBUD ENERGY LP	OK	6/3/2003	COMBUSTION TURBINE AND DUCT BURNERS	1832	MMBTU/H	CO	GOOD COMBUSTION PRACTICES/DESIGN	17.2	PPMVD	BACT-PSD
NE-0017	BEATRICE POWER STATION	NEBRASKA PUBLIC POWER DISTRICT	NE	5/29/2003	TURBINE, COMBINED CYCLE, (2)	80	MW	CO	GOOD COMBUSTION & CATALYTIC OXIDATION. EMISSION LIMITS	18.4	LB/H	Other
CA-1096	VERNON CITY LIGHT & POWER	VERNON CITY LIGHT & POWER	CA	5/27/2003	GAS TURBINE: COMBINED CYCLE < 50 MW	43	MW	CO	SCR SYSTEM, AND OXIDATION CATALYST	2	PPMVD @ 15% O2	BACT-PSD
CA-1097	MAGNOLIA POWER PROJECT, SC	MAGNOLIA POWER PROJECT, SCPPA	CA	5/27/2003	GAS TURBINE: COMBINED CYCLE >= 50 MW	181	MW	CO	SCR SYSTEM AND OXIDATION CATALYST	2	PPMVD @ 15% O2	BACT-PSD
IN-0115	MIRANT SUGAR CREEK, LLC	MIRANT SUGAR CREEK, LLC	IN	4/23/2003	TURBINE, COMBINED CYCLE, STARTUP & SHUT DOWN, (4)	1490.5	MMBTU/H	CO	GOOD COMBUSTION PRACTICES, NATURAL GAS AS FUEL.	82.5	T/YR	BACT-PSD
MI-0362	MIDLAND COGENERATION (MCV)	MIDLAND COGENERATION VENTURE	MI	4/21/2003	TURBINE, COMBINED CYCLE, (1)	984	MMBTU/H	CO	GOOD COMBUSTION PRACTICE. ADDITIONAL ADD ON CONTROL WAS	12	PPM @ 15% O2	BACT-PSD
MI-0362	MIDLAND COGENERATION (MCV)	MIDLAND COGENERATION VENTURE	MI	4/21/2003	TURBINE, COMBINED CYCLE, (11)	984	MMBTU/H	CO	GOOD COMBUSTION TECHNIQUES. RETROFIT COSTS TO ADD CATALYTIC	12	PPM @ 15% O2	BACT-PSD
GA-0105	MCINTOSH COMBINED CYCLE FA	SAVANNAH ELECTRIC AND POWER C	GA	4/17/2003	TURBINE, COMBINED CYCLE, NATURAL GAS, (4)	140	MW	CO	CATALYTIC OXIDATION	2	PPM @ 15% O2	BACT-PSD
WA-0315	SUMAS ENERGY 2 GENERATION	SUMAS ENERGY 2 GENERATION FAC	WA	4/17/2003	TURBINES, COMBINED CYCLE, (2)	660	MW	CO	OXIDATION CATALYST	2	PPMVD	BACT-PSD
FL-0244	FPL MARTIN PLANT	FLORIDA POWER & LIGHT	FL	4/16/2003	TURBINE, COMBINED CYLE, NATURAL GAS, (4)	170	MW	CO	GOOD COMBUSTION DESIGN AND PRACTICES	10	PPMVD @ 15% O2	BACT-PSD
FL-0245	FPL MANATEE PLANT - UNIT 3	FLORIDA POWER & LIGHT	FL	4/15/2003	TURBINE, COMBINED CYCLE, NATURAL GAS (4)	170	MW	CO	GOOD COMBUSTION DESIGN AND PRACTICES	10	PPMVD @ 15% O2	BACT-PSD
WY-0061	BLACK HILLS CORP./NEIL SIMPSO	BLACK HILLS CORP.	WY	4/4/2003	TURBINE, COMBINED CYCLE, & DUCT BURNER	40	MW	CO	GOOD COMBUSTION PRACTICE	37.2	PPMV @ 15% O2	BACT-PSD
TX-0374	CHOCOLATE BAYOU PLANT	BP AMOCO CHEMICAL CO	TX	3/24/2003	(2) COGENERATION TRAINS 2 & 3, GT-2 & 3	70	MW, TOTAL	CO	GOOD COMBUSTION PRACTICES	24.4	PPM @ 15% O2S	BACT-PSD
OK-0090	STEPHENS ENERGY	DUKE ENERGY	OK	3/21/2003	TURBINES, COMBINED CYCLE (2)	1701	MMBTU/H	CO	COMBUSTION CONTROL	10	PPM @ 15% O2	BACT-PSD
OR-0040	KLAMATH GENERATION, LLC	KLAMATH GENERATION, LLC	OR	3/12/2003	TURBINE, COMBINED CYCLE, DUCT BURNER, NAT GAS (2)	480	MW	CO	CATALYTIC OXIDATION	5	PPMVD @ 15% O2	BACT-PSD
AZ-0039	SALT RIVER PROJECT/SANTAN G	SALT RIVER PROJECT/SANTAN GEN.	AZ	3/7/2003	TURBINE, COMBINED CYCLE, DUCT BURNER, NATURAL GAS	175	MW	CO	CATALYTIC OXIDIZER	3	PPM @ 15% O2	LAER
MI-0357	KALKASKA GENERATING, INC	KALKASKA GENERATING LLC	MI	2/4/2003	TURBINE, COMBINED CYCLE, (2)	605	MW	CO	OXIDATION CATALYST.	5	PPMVD @15% O2	BACT-PSD
MI-0361	SOUTH SHORE POWER LLC	SOUTH SHORE POWER LLC	MI	1/30/2003	TURBINE, COMBINED CYCLE, (2)	172	MW	CO	CATALYTIC OXIDATION AND USE OF GOOD COMBUSTION PRACTICES.	4	PPMVD @ 15% O2	BACT-PSD
MI-0365	MIRANT WYANDOTTE LLC	MIRANT WYANDOTTE LLC	MI	1/28/2003	TURBINE, COMBINED CYCLE, (2)	2200	MMBTU/H	CO	CATALYTIC OXIDATION SYSTEM.	3.8	PPM	BACT-PSD
MI-0363	BLUEWATER ENERGY CENTER L	BLUEWATER ENERGY CENTER LLC	MI	1/7/2003	TURBINE, COMBINED CYCLE, (3)	180	MW	CO	CATALYTIC AFTERBURNER	8	PPM @ 15% O2	BACT-PSD
WA-0291	WALLULA POWER PLANT	WALLULA GENERATION, LLC	WA	1/3/2003	TURBINE, COMBINED CYCLE, NATURAL GAS (4)	1300	MW	CO	OXIDATION CATALYST	2	PPMDV @ 15% 02	Other
TX-0352	BRAZOS VALLEY ELECTRIC GEN	BRAZOS VALLEY ENERGY LP	TX	12/31/2002	(2) HRSG/TURBINES, HRSG-001 & -002	175	MW, EA	CO	GOOD COMBUSTION CONTROLS	17	PPM @ 15% O2	BACT-PSD
TX-0352	BRAZOS VALLEY ELECTRIC GEN	BRAZOS VALLEY ENERGY LP	TX	12/31/2002	(2) HRSG/TURBINES, HRSG-003 & -004	175	MW	CO	GOOD COMBUSTION CONTROLS	17	PPM @ 15% O2	BACT-PSD
TX-0391	OXY COGENERATION FACILITY	OXY VINYLS LP	TX	12/20/2002	HRSG UNIT NO. 3	255	MMBTU/H	CO	GOOD COMBUSTION PRACTICES.	64.3	LB/H	Other
TX-0391	OXY COGENERATION FACILITY	OXY VINYLS LP	TX	12/20/2002	COMBINED-CYCLE GAS TURBINES (2)	87	MW (EACH)	CO	GOOD COMBUSTION PRACTICES	25	PPM @ 15% O2	BACT-PSD
TX-0391	OXY COGENERATION FACILITY	OXY VINYLS LP	TX	12/20/2002	HRSG UNITS 1 & 2 (2)	255	MMBTU/H	CO	GOOD COMBUSTION PRACTICES.	25	PPM @ 15% O2	BACT-PSD
TX-0428	HOUSTON OPS -- BATTLEGROUN	OXY VINYLS LP	TX	12/19/2002	TURBINE, COMBINED CYCLE & DUCT BURNER	87	mw	CO	GOOD COMBUSTION PRACTICES	25	PPMVD @ 15% O2	BACT-PSD
VA-0262	MIRANT AIRSIDE INDUSTRIAL PA	MIRANT DANVILLE, LLC	VA	12/6/2002	TURBINE, COMBINED CYCLE, (2)	170	MW	CO	GOOD COMBUSTION PRACTICES.	10.3	PPMVD @ 15% O2	BACT-PSD
TX-0407	STERNE ELECTRIC GENERATING	STEAG POWER LLC	TX	12/6/2002	TURBINES, COMBINED CYCLE, AND DUCT BURNERS (3)	190	MW	CO	GOOD COMBUSTION PRACTICES.	20.2	PPMVD @ 15% O2	BACT-PSD
VA-0260	HENRY COUNTY POWER	Cogentrix Energy Inc	VA	11/21/2002	TURBINE, COMBINED CYCLE, (4), 100% LOAD	171	MW	CO	CLEAN FUEL. GOOD COMBUSTION AND DESIGN.	8	PPM @ 15% O2	BACT-PSD
VA-0260	HENRY COUNTY POWER	Cogentrix Energy Inc	VA	11/21/2002	TURBINE, COMBINED CYCLE, (4), 70% LOAD	171	MW	CO	GOOD COMBUSTION AND DESIGN. CLEAN FUEL.	8	PPM @ 15% O2	BACT-PSD

VA-0255	VA POWER - POSSUM POINT	Virginia Power	VA	11/18/2002	TURBINE, COMBINED CYCLE, NATURAL GAS, DUCT BURNER	1937	MMBTU/H	CO		19.3	PPM @ 15% O2	BACT-PSD
VA-0255	VA POWER - POSSUM POINT	Virginia Power	VA	11/18/2002	TURBINE, NATURAL GAS, NO DUCT BURNER FIRING	1937	MMBTU/H	CO		9	PPM @ 15% O2	BACT-PSD
GA-0101	MURRAY ENERGY FACILITY	DUKE ENERGY MURRAY LLC	GA	10/23/2002	TURBINE, COMBINED CYCLE, (4)	173	MW	CO	GOOD COMBUSTION PRACTICE	12	PPM @ 15% O2	BACT-PSD
OH-0248	LAWRENCE ENERGY	CALPINE CORPORATION	OH	9/24/2002	TURBINES (3), COMBINED CYCLE, DUCT BURNERS OFF	180	MW	CO	GOOD COMBUSTION PRACTICES (GCP) AND OXIDATION CATALYST	2	PPM @ 15% O2	BACT-PSD
OH-0248	LAWRENCE ENERGY	CALPINE CORPORATION	OH	9/24/2002	TURBINES (3), COMBINED CYCLE, DUCT BURNERS ON	180	MW	CO	GOOD COMBUSTION PRACTICES (GCP) AND OXIDATION CATALYST	10	PPM @ 15% O2	BACT-PSD
MS-0059	PIKE GENERATION FACILITY	LSP-PIKE ENERGY, LLC	MS	9/24/2002	TURBINE AA-001 W/DUCT BURNER	2168	MMBTU/H	CO	EFFICIENT COMBUSTION PRACTICES	40	PPMV @ 15% O2	BACT-PSD
MS-0059	PIKE GENERATION FACILITY	LSP-PIKE ENERGY, LLC	MS	9/24/2002	TURBINE AA-004 W/ DUCT BURNER	2168	MMBTU/H	CO	EFFICIENT COMBUSTION PRACTICES	40	PPMV @ 15% O2	BACT-PSD
MS-0059	PIKE GENERATION FACILITY	LSP-PIKE ENERGY, LLC	MS	9/24/2002	TURBINE, AA-002 W /DUCT BURNER	2168	MMBTU/H	CO	EFFICIENT COMBUSTION PRACTICES	40	PPMV @ 15% O2	BACT-PSD
MS-0059	PIKE GENERATION FACILITY	LSP-PIKE ENERGY, LLC	MS	9/24/2002	TURBINE, AA-003 /DUCT BURNER	2168	MMBTU/H	CO	EFFICIENT COMBUSTION PRACTICES	40	PPMV @ 15% O2	BACT-PSD
WA-0299	SUMAS ENERGY 2 GENERATION	SUMAS ENERGY 2, INC.	WA	9/6/2002	TURBINES, COMBINED CYCLE, (2)	334.5	MW	CO	COMBUSTION CATALYSIS	2	PPM @ 15% O2	BACT-PSD
VA-0261	CPV CUNNINGHAM CREEK	COMPETITIVE POWER VENTURE	VA	9/6/2002	TURBINE, COMBINED CYCLE, (2)	2132	MMBTU/H	CO	GOOD COMBUSTION PRACTICES.	3.1	PPM @ 15% O2	BACT-PSD
AR-0070	GENOVA ARKANSAS I, LLC	GENOVA ARKANSAS I, LLC	AR	8/23/2002	TURBINE, COMBINED CYCLE, (2), (GE)	170	MW	CO	GOOD COMBUSTION PRACTICE	8.2	PPMVD @ 15% O2	BACT-PSD
AR-0070	GENOVA ARKANSAS I, LLC	GENOVA ARKANSAS I, LLC	AR	8/23/2002	TURBINE, COMBINED CYCLE, (2), (MHI)	170	MW	CO	GOOD COMBUSTION PRACTICE/CO OXIDATION CATALYST	10.2	PPMVD @ 15% O2	BACT-PSD
AR-0070	GENOVA ARKANSAS I, LLC	GENOVA ARKANSAS I, LLC	AR	8/23/2002	TURBINE, COMBINED CYCLE, (2), (SWH)	170	MW	CO	GOOD COMBUSTION PRACTICE	30	PPMVD @ 15% O2	BACT-PSD
CO-0052	ROCKY MOUNTAIN ENERGY CEN	ROCKY MOUNTAIN ENERGY CENTER,	CO	8/11/2002	TWO (2) NATURAL GAS FIRED, COMBINED-CYCLE, TURBINE	2311	MMBTU/H	CO	GOOD COMBUSTION CONTROL PRACTICES (PREVENTION) AND	9	PPMVD	BACT-PSD
IN-0114	MIRANT SUGAR CREEK LLC	MIRANT SUGAR CREEK LLC	IN	7/24/2002	TURBINE, COMBINED CYCLE AND DUCT BURNER, NAT GAS	1490.5	MMBTU/H	CO	GOOD COMBUSTION PRACTICE, NATURAL GAS AS FUEL.	14	PPMVD @ 15% O2	BACT-PSD
IN-0114	MIRANT SUGAR CREEK LLC	MIRANT SUGAR CREEK LLC	IN	7/24/2002	TURBINE, COMBINED CYCLE, NATURAL GAS (4)	1490.5	MMBTU/H	CO	GOOD COMBUSTION PRACTICES, NATURAL GAS AS FUEL.	9	PPMVD @ 15% O2	BACT-PSD
AL-0185	BARTON SHOALS ENERGY	BARTON SHOALS ENERGY, LLC	AL	7/12/2002	FOUR (4) COMBINED CYCLE COMBUSTION TURBINE UNITS	173	MW	CO	GOOD COMBUSTION PRACTICES	20	PPM @ 15% O2	BACT-PSD
TX-0437	HARTBURG POWER, LP	HARTBURG POWER, LP	TX	7/5/2002	TURBINE, COMBINED CYCLE & DUCT BURNER	277	mw	CO	GOOD COMBUSTION PRACTICES, DESIGN, PROPER OPERATION	15	PPM	BACT-PSD
NM-0044	CLOVIS ENERGY FACILITY	DUKE ENERGY CURRY LLC	NM	6/27/2002	TURBINES, COMBINED CYCLE, NATURAL GAS (4)	1515	MMBTU/H	CO	GOOD COMBUSTOR DESIGN. THIS FACILITY WILL ONLY COMBUST	10	PPM @ 15% O2	BACT-PSD
MS-0055	EL PASO MERCHANT ENERGY C	EL PASO MERCHANT ENERGY CO.	MS	6/24/2002	TURBINE, COMBINED CYCLE, DUCT BURNER, NAT GAS, (2)	1737	MMBTU/H	CO	GOOD COMBUSTION PRACTICE	13.8	PPMV @ 15% O2	BACT-PSD
OK-0070	GENOVA OK I POWER PROJECT	GENOVA OKLAHOMA LLC	OK	6/13/2002	GE COMBUSTION TURBINE & DUCT BURNERS	1705	MMBTU/H	CO	COMBUSTION CONTROL	8.2	PPM @ 15% O2	BACT-PSD
OK-0070	GENOVA OK I POWER PROJECT	GENOVA OKLAHOMA LLC	OK	6/13/2002	MHI COMBUSTION TURBINE & DUCT BURNERS	1767	MMBTU/H	CO	CATALYTIC OXIDATION	10.2	PPM @ 15% O2	BACT-PSD
MT-0019	SILVER BOW GEN	CONTINENTAL ENERGY SERVICES, IN	MT	6/7/2002	TURBINE, COMBINED CYCLE 1	500	MW	CO		5.27	PPM @ 15% O2	Other
MT-0019	SILVER BOW GEN	CONTINENTAL ENERGY SERVICES, IN	MT	6/7/2002	TURBINE, COMBINED CYCLE 2	500	MW	CO		5.27	PPM @ 15% O2	Other
NC-0095	MIRANT GASTONIA POWER FACI	MIRANT GASTONIA LLC	NC	5/28/2002	TURBINES, COMBINED CYCLE, GE	175	MW	CO	GOOD COMBUSTION PRACTICES	9	PPMVD	BACT-PSD
NC-0095	MIRANT GASTONIA POWER FACI	MIRANT GASTONIA LLC	NC	5/28/2002	TURBINES, COMBINED CYCLE, GE, DUCT BURNERS	175	MW	CO	GOOD COMBUSTION PRACTICES	20	PPMVD	BACT-PSD
NC-0095	MIRANT GASTONIA POWER FACI	MIRANT GASTONIA LLC	NC	5/28/2002	TURBINES, COMBINED CYCLE, MHI/SW	175	MW	CO	GOOD COMBUSTION PRACTICES	10	PPMVD	BACT-PSD
NC-0095	MIRANT GASTONIA POWER FACI	MIRANT GASTONIA LLC	NC	5/28/2002	TURBINES, COMBINED CYCLE, MHI/SW, DUCT BURNERS	175	MW	CO	GOOD COMBUSTION PRACTICES	20.6	PPMVD	BACT-PSD
OH-0264	NORTON ENERGY STORAGE, LL	NORTON ENERGY	OH	5/23/2002	COMBUSTION TURBINE (9), COMB CYCLE W/O DUCT BURNER	300	MW	CO	CATALYTIC OXIDATION WAS NOT CONSIDERED COST EFFECTIVE.	11	PPM @ 15% O2	BACT-PSD
OH-0264	NORTON ENERGY STORAGE, LL	NORTON ENERGY	OH	5/23/2002	COMBUSTION TURBINES (9), COMB CYCLE W DUCT BURNER	300	MW	CO	CATALYTIC OXIDATION WAS NOT CONSIDERED COST EFFECTIVE.	17	PPM @ 15% O2	BACT-PSD
AZ-0038	GILA BEND POWER GENERATIN	GILA BEND POWER GENERATING STA	AZ	5/15/2002	TURBINE, COMBINED CYCLE, DUCT BURNER, NATURAL GAS	170	MW	CO	OXIDATION CATALYST	4	PPM @ 15% O2	BACT-PSD
IA-0058	GREATER DES MOINES ENERGY	MIDAMERICAN ENERGY	IA	4/10/2002	COMBUSTION TURBINES - COMBINED CYCLE	350	MW	CO	CATALYTIC OXIDATION	5.4	PPM @ 15% O2	Other
PA-0226	LIMERICK POWER STATION	LIMERICK PARTNERS, LLC	PA	4/9/2002	TURBINE, COMBINED CYCLE	550	MW	CO		10	PPM @ 15% O2	BACT-PSD
AR-0051	JACKSON FACILITY	DUKE ENERGY	AR	4/1/2002	TURBINES, COMBINED CYCLE, NATURAL GAS, (2)	170	MW	CO	GOOD OPERATING PRACTICE	23.6	PPM @ 15% O2	BACT-PSD
PA-0188	FAIRLESS ENERGY LLC	FAIRLESS ENERGY LLC	PA	3/28/2002	TURBINE, COMBINED CYCLE	1190	MW	CO	OXIDATION CATALYST	3	PPMVD @ 15% O2	BACT-PSD

NJ-0043	LIBERTY GENERATING STATION	LIBERTY GENERATING STATION	NJ	3/28/2002	COMBINED CYCLE TURBINE (3)	2964	MMBTU/H	CO	CO CATALYST	2	PPMVD @ 15% O2	Other
NJ-0043	LIBERTY GENERATING STATION	LIBERTY GENERATING STATION	NJ	3/28/2002	COMBINED CYCLE TURBINE WITH DUCT BURNER	3202	MMBTU/H	CO	CO CATALYST	2	PPMVD @ 15% O2	Other
FL-0239	JEA/BRANDY BRANCH	JACKSONVILLE ELECTRIC AUTHORIT	FL	3/27/2002	TURBINES, COMBINED CYCLE, (2)	1911	MMBTU/H	CO	GOOD COMBUSTION	12.21	PPMVD	BACT-PSD
OH-0268	LIMA ENERGY COMPANY	Global Energy, Inc.	OH	3/26/2002	COMBUSTION TURBINE (2), COMBINED CYCLE	170	MW	CO	CATALYTIC OXIDATION PROVED NOT COST EFFECTIVE.	25	PPM @ 15% O2	BACT-PSD
TX-0411	AMELIA ENERGY CENTER	CALPINE	TX	3/26/2002	TURBINE, COMBINED CYCLE, & DUCT BURNER (3)	180	MW	CO	GOOD COMBUSTION PRACTICE	25	PPM @ 15% O2	BACT-PSD
TX-0351	WEATHERFORD ELECTRIC GENE	SEI TEXAS LLC	TX	3/11/2002	(2) GE7121EA GAS TURBINES, S-3&4	1079	MMBTU/H	CO	NONE INDICATED	25	PPM @ 15% O2	Other
*LA-0157	PERRYVILLE POWER STATION	PERRYVILLE ENERGY PARTNERS, LL	LA	3/8/2002	(2) GAS TURBINE/HRSG UNITS, EPNS 1-1, 1-2	170	MW	CO	GOOD OPERATING PRACTICES AND USE OF NATURAL GAS AS FUEL. BACT	108.2	LB/H*	BACT-PSD
*LA-0157	PERRYVILLE POWER STATION	PERRYVILLE ENERGY PARTNERS, LL	LA	3/8/2002	(2) GAS TURBINES, EPNS 1-1, 1-2			CO	GOOD OPERATING PRACTICES, USE OF CLEAN BURNING FUEL. BACT FOR	25	PPM @ 15 % O2	BACT-PSD
LA-0120	GEISMAR PLANT	SHELL CHEMICAL LP	LA	2/26/2002	(2) COGENERATION UNITS POINT # 720-99 AND 721-99	40	MW EACH	CO	GOOD COMBUSTION PRACTICES WITH NATURAL GAS AS FUEL.	24.8	PPM @ 15% O2	BACT-PSD
OK-0055	MUSTANG ENERGY PROJECT	MUSTANG POWER LLC	OK	2/12/2002	COMBUSTION TURBINES W/DUCT BURNERS	0		CO	COMBUSTION CONTROLS	40	PPM @ 15% 02	BACT-PSD
OK-0056	HORSESHOE ENERGY PROJECT	MUSTANG POWER LLC	OK	2/12/2002	TURBINES AND DUCT BURNERS	310	MW TOTAL	CO	GOOD COMBUSTION CONTROL	40	PPM @ 15% 02	BACT-PSD
TX-0388	SAND HILL ENERGY CENTER	AUSTIN ELECTRIC UTILITY	TX	2/12/2002	COMBINED CYCLE GAS TURBINE	164	MW	CO		17.5	PPM @ 15% O2	Other
TN-0144	HAYWOOD ENERGY CENTER, LL	CALPINE	TN	2/1/2002	TURBINE, COMBINED CYCLE, W/ DUCT FIRING	1990	MMBTU/H	CO	GOOD COMBUSTION PRACTICE	28.3	PPM @ 15% O2	BACT-PSD
TN-0144	HAYWOOD ENERGY CENTER, LL	CALPINE	TN	2/1/2002	TURBINE, COMBINED CYCLE, W/O DUCT FIRING	1990	MMBTU/H	CO	GOOD COMBUSTION PRACTICE	28.3	PPM @ 15% O2	BACT-PSD
LA-0164	ACADIA POWER STATION	ACADIA POWER PARTNERS	LA	1/31/2002	GAS TURBINE UNITS 1, 2, 3, 4	183	MW EACH	CO	GOOD DESIGN, PROPER OPERATING AND MAINTENANCE PRACTICES, AND	25	PPM @ 15% O2	BACT-PSD
TX-0350	ENNIS TRACTEBEL POWER	ENNIS-TRACTEBEL II LP	TX	1/31/2002	COMBUSTION TURBINE W/HRSG	350	MW	CO	NONE INDICATED	20	PPM @ 15% O2	Other
PA-0223	FAYETTE	DUKE ENERGY	PA	1/30/2002	TURBINE, COMBINED CYCLE, (2)	280	MW	CO	OXIDATION CATALYST	5	PPMVD @ 15% O2	BACT-PSD
FL-0241	CPV CANA	COMPETIVE POWER VENTURES CAN	FL	1/17/2002	TURBINE, COMBINED CYCLE, NATURAL GAS	1680	MMBTU/H	CO	COMBUSTION CONTROLS	8	PPMVD @ 15% O2	BACT-PSD
PA-0189	CONECTIV BETHLEHEM, INC.	CONECTIV BETHLEHEM, INC	PA	1/16/2002	TURBINE, COMBINED CYCLE, (6)	122	MW	CO	BACT FOR CO IS GOOD COMBUSTION PRACTICE	2.5	PPM @ 15% O2	Other
OR-0035	PORT WESTWARD PLANT	PORTLAND GENERAL ELECTRIC COM	OR	1/16/2002	(2) COMBUSTION TURBINES, WITH DUCT BURNER	325	MW, EACH	CO	CO CATALYST AND GOOD COMBUSTION PRACTICES.	4.9	PPM @ 15% O2	BACT-PSD
GA-0102	WANSLEY COMBINED CYCLE EN	OGLETHORPE POWER CORPORATIO	GA	1/15/2002	TURBINE, COMBINED CYCLE, (2)	167	MW	CO	GOOD COMBUSTION PRACTICE	2	PPM @ 15% O2	BACT-PSD
VA-0256	TENASKA FLUVANNA	TENASKA VIRGINIA PARTNERS, L. P.	VA	1/11/2002	TURBINES, COMBINED CYCLE, (3), NATURAL GAS	61200	MMSCF/YR	CO	BEST COMBUSTION CONTROL PRACTICES	21	PPMVD	BACT-PSD
NC-0086	FAYETTEVILLE GENERATION, LL	FAYETTEVILLE GENERATION, LLC	NC	1/10/2002	TURBINE, COMBINED CYCLE, NATURAL GAS, (2)	154	MW	CO	COMBUSTION CONTROL	9	PPMVD	BACT-PSD
NC-0094	GENPOWER EARLEYS, LLC	GENPOWER EARLEYS, LLC	NC	1/9/2002	TURBINES, COMBINED CYCLE, DUCT BURNERS, NAT GAS (2	1715	MMBTU/H	CO	GOOD COMBUSTION PRACTICE AND DESIGN	14	PPMVD	BACT-PSD
NC-0094	GENPOWER EARLEYS, LLC	GENPOWER EARLEYS, LLC	NC	1/9/2002	TURBINES, COMBINED CYCLE, NATURAL GAS (2)	1715	MMBTU/H	CO	GOOD COMBUSTION PRACTICES AND DESIGN	9	PPMVD	BACT-PSD
TX-0234	EDINBURG ENERGY LIMITED PA	EDINBURG ENERGY LIMITED PARTNE	TX	1/8/2002	(4) COMBINED CYCLE GAS TURBINE, ABB MODEL GT24	180	MW	CO	CO EMISSIONS SHALL NOT EXCEED 10 PPMVD WHEN CORRECTED TO	10	PPM @15%O2	BACT-PSD
OH-0257	JACKSON COUNTY POWER, LLC	JACKSON COUNTY POWER, LLC	OH	12/27/2001	COMBUSTION TURBINES, COMBINED CYCLE, (4)	305	MW	CO	GOOD COMBUSTION	9	PPM @ 15% O2	BACT-PSD
GA-0094	EFFINGHAM COUNTY POWER, LL	EFFINGHAM COUNTY POWER, LLC	GA	12/27/2001	TURBINE, COMBINED CYCLE, (2)	185	MW	CO	GOOD COMBUSTION PRACTICES	9	PPMVD @ 15% O2	BACT-PSD
*LA-0136	PLAQUEMINE COGENERATION F	VENTURES LEASE COMPANY, LLC	LA	12/26/2001	(4) GAS TURBINES/DUCT BURNERS	2876	MMBTU/H	CO	GOOD COMBUSTION PRACTICES	25	PPMVD @ 15% O2	BACT-PSD
WV-0014	PANDA CULLODEN GENERATING	PANDA CULLODEN POWER, L.P.	WV	12/18/2001	COMBUSTION TURBINE, 300 MW	300	MW	CO	USE OF STATE OF THE ART COMBUSTER DESIGN ALONG WITH	8.2	PPM	BACT-PSD
MS-0058	CHOCTAW GAS GENERATION, LL	CHOCTAW GAS GENERATION, LLC	MS	12/13/2001	TURBINE, COMBINED CYCLE, (2)	2737	MMBTU/H	CO	GOOD COMBUSTION PRACTICES	22.3	PPMVD @ 15% O2	BACT-PSD
AL-0180	DALE	DUKE ENERGY	AL	12/11/2001	2 GE 7FA GAS FIRED COMB. CYCLE W/568 MMBTU DUCT B	170	MW EACH	CO	EFFICIENT COMBUSTION	15	PPM @ 15% O2	BACT-PSD
IN-0095	ALLEGHENY ENERGY SUPPLY C	ALLEGHENY ENERGY SUPPLY	IN	12/7/2001	2 CMBND CYCLE COMBUST. TURBINE WESTINGHOUSE 501F	2071	MMBTU/H (HI	CO	GOOD COMBUSTION PRACTICES	6	PPM@15% O2	BACT-PSD
MS-0065	LONE OAK ENERGY CENTER, LL	LONE OAK ENERGY CENTER, LLC	MS	11/13/2001	AA-001 COMBUSTION TURBINE, COMBINED CYCLE	1837	MMBTU/H	CO	EFFICIENT COMBUSTION PRACTICES	30	PPMVD	BACT-PSD
MS-0065	LONE OAK ENERGY CENTER, LL	LONE OAK ENERGY CENTER, LLC	MS	11/13/2001	AA-002 COMBUSTION TURBINE, COMBINED CYCLE	1837	MMBTU/H	CO	EFFICIENT COMBUSTION PRACTICES	30	PPMVD	BACT-PSD
MS-0065	LONE OAK ENERGY CENTER, LL	LONE OAK ENERGY CENTER, LLC	MS	11/13/2001	AA-003 COMBUSTION TURBINE, COMBINED CYCLE	1837	MMBTU/H	CO	EFFICIENT COMBUSTION PRACTICES	30	PPMVD	BACT-PSD

MS-0051	BATESVILLE GENERATION FACIL	LSP	MS	11/13/2001	COMBINED CYCLE COMBUSTION TURBINE GENERATION (CTG)	2100	MMBTU/H	CO	NA	2.5	PPMVD@15%O2 (3HR	BACT-PSD
AR-0047	HOT SPRINGS POWER PROJECT	HOT SPRINGS POWER PROJECT	AR	11/9/2001	COMBUSTION TURBINE, HRSG, DUCT BURNER	700	MW	CO	CATALYTIC OXIDIZER.	12	PPMVD @ 15% O2	BACT-PSD
TX-0233	CHANNELVIEW COGENERATION	RELIANT ENERGY	TX	10/29/2001	TURBINE, COMBINED CYCLE, AND DUCT BURNER #1-#4	180	MW	CO	GOOD COMBUSTION PRACTICES.	23	PPM @ 15% O2	BACT-PSD
GA-0093	AUGUSTA ENERGY CENTER	AUGUSTA ENERGY CENTER	GA	10/28/2001	TURBINE, COMBINED CYCLE, (3)	750	MW	CO	CATALYTIC OXIDATION	2	PPM @ 15% O2	BACT-PSD
*NJ-0036	AES RED OAK LLC	AES RED OAK LLC	NJ	10/24/2001	THREE 501 F TURBINES WITH HRSG	1967	MMBTU/H AT	CO		12.2	PPM @ 15% O2	BACT-PSD
*WA-0292	SATSOP COMBUSTION TURBINE	GRAYS HARBOR ENERGY LLC	WA	10/23/2001	(2) NAT GAS COMBINED CYCLE COMBUSTION TURBINES	325	MW	CO	OXIDATION CATALYST	3	PPM @ 15% O2	BACT-PSD
AL-0181	AUTAUGA	DUKE ENERGY	AL	10/23/2001	2 GE COM. CYCLE UNITS W/HRSG & 550 MMBTU/HR DUCT B	2407	MMBTU/H (W	CO	EFFICIENT COMBUSTION.	15	PPM @ 15% O2	BACT-PSD
PA-0192	LOWER MOUNT BETHEL ENERGY	LOWER MOUNT BETHEL ENERGY, LL(	PA	10/20/2001	TURBINE, COMBINED CYCLE, (2)	370	MW	CO	OXIDATION CATALYST	6	PPMVD@ 15% O2	LAER
ID-0010	MIDDLETON FACILITY	GARNET ENERGY LLC	ID	10/19/2001	(2) GAS TURBINES WITH DUCT BURNERS, NAT GAS	2097	MMBTU/H	CO	NONE INDICATED	2	PPM @ 15% O2	BACT-PSD
ID-0012	GARNET ENERGY, MIDDLETON F	GARNET ENERGY LLC	ID	10/19/2001	TURBINE, COMBINED CYCLE, NATURAL GAS, (2)	1707	MMBTU/H	CO	OXIDATION CATALYST, GOOD COMBUSTION PRACTICE	2	PPM @ 15% O2	BACT-PSD
ID-0010	MIDDLETON FACILITY	GARNET ENERGY LLC	ID	10/19/2001	(2) GAS TURBINES ANNUAL EMISSION LIMITS, BOTH FUEL			CO	NONE INDICATED	2	PPM @ 15% O2	BACT-PSD
OH-0265	DRESDEN ENERGY LLC	Dresden Energy	OH	10/16/2001	COMBUSTION TURBINE (2), COMB. CYCLE W DUCT BURN	171.7	MW	CO	CATALYTIC OXIDATION NOT CONSIDERED COST EFFECTIVE.	13.5	PPM @ 15% O2	BACT-PSD
OH-0265	DRESDEN ENERGY LLC	Dresden Energy	OH	10/16/2001	COMBUSTION TURBINE (2), COMB. CYCLE W/O DUCT BURN	171.7	MW	CO	CATALYTIC OXIDATION NOT CONSIDERED COST EFFECTIVE	6	PPM @ 15% O2	BACT-PSD
AR-0057	TENASKA ARKANSAS PARTNERS	TENASKA ARKANSAS PARTNERS, LP	AR	10/9/2001	TURBINE, COMBINED CYCLE, NATURAL GAS	185	MW	CO	GOOD COMBUSTION PRACTICES.	19.7	PPMVD @ 15% 02	BACT-PSD
IN-0110	COGENTRIX LAWRENCE CO., LL(	COGENTRIX LAWRENCE CO., LLC	IN	10/5/2001	TURBINES, COMBINED CYCLE, & DUCT BURNERS, (3)	1944.1	MMBTU/H	CO	GOOD COMBUSTION PRACTICE, DUCT BURNERS SHALL NOT BE	9	PPMVD @ 15% O2	BACT-PSD
IN-0110	COGENTRIX LAWRENCE CO., LL(	COGENTRIX LAWRENCE CO., LLC	IN	10/5/2001	TURBINES, COMBINED CYCLE, (3)	1944.1	MMBTU/H	CO	GOOD COMBUSTION PRACTICE	6	PPMVD @ 15% O2	BACT-PSD
AL-0179	TALLADEGA GENERATING STATI	TENASKA ALABAMA IV PARTNERS, LF	AL	10/3/2001	COMBINED CYCLE COMB. TURB. UNITS W/ DUCT FIRING (6	170	MW	CO	EFFICIENT COMBUSTION	0.03	LB/MMBTU	BACT-PSD
MD-0033	KELSON RIDGE	FREE STATE ELECTRIC, LLC	MD	9/27/2001	COMBINED CYCLE COMBUSTION TURBINE W/ HRSG & DUCT	180	MW	CO	EXCLUSIVE USE OF NATURAL GAS, OXIDATION CATALYST, GOOD	2	PPMVD @ 15% O2	BACT-PSD
FL-0233	OUC STANTON ENERGY CENTER	ORLANDO UTILITIES COMMISSION (O	FL	9/21/2001	TURBINE, COMBINED CYCLE, NATURAL GAS, (2)	2402	MMBTU/H	CO	GOOD COMBUSTION	17	PPMVD	BACT-PSD
FL-0226	EL PASO MANATEE ENERGY CEN	EL PASO MERCHANT ENERGY CENTE	FL	9/11/2001	TURBINE, COMBINED CYCLE, NAT. GAS	1.79	MMCF/H	CO	COMBUSTION CONTROLS. 12 PPMVD @ 15% O2 POWER AUGMENTATION.	7.4	PPMVD @ 15% O2	BACT-PSD
FL-0227	EL PASO BELLE GLADE ENERGY	EL PASO MERCHANT ENERGY CENTE	FL	9/7/2001	TURBINE, COMBINED CYCLE, NAT. GAS	1.79	MMCF/H	CO	COMBUSTION CONTROLS. 12 PPMVD @ 15% O2 POWER AUGMENTED,	7.4	PPMVD @ 15% O2	BACT-PSD
WA-0288	LONGVIEW ENERGY DEVELOPME	LONGVIEW ENERGY DEVELOPMENT	WA	9/4/2001	COMBUSTION TURBINE, COMBINEDCYCLE (NG)	290	MW	CO	OXIDATION CATALYST.	2	PPMVD	Other
NJ-0058	LINDEN GENERATING STATION	PSEG FOSSILL LLC	NJ	8/24/2001	COMBUSTION GAS TURBINES(GE 7FA)(4 UNITS): COMBINED CYCLE	1651	MMBTU/H	CO	OXIDATION CATALYST(CO).	2	PPMVD@15%O2	BACT-PSD
TX-0344	DEER PARK ENERGY CENTER	DEER PARK ENERGY CENTER LP	TX	8/22/2001	(4) CTG1-4 & HRSG1-4, ST-1 THRU -4	180	MW, EA	CO	EFFICIENT & COMPLETE COMBUSTION	25	PPM @ 15% O2	BACT-PSD
FL-0225	EL PASO BROWARD ENERGY CE	EL PASO MERCHANT ENERGY COMP/	FL	8/17/2001	TURBINE, COMBINED CYCLE, NAT. GAS	1.79	MMCF/H	CO	COMBUSTION CONTROLS. 12 PPMVD @ 15% O2 POWER AUGMENTATION.	7.4	PPMVD @ 15% O2	BACT-PSD
OK-0044	SMITH POCOLA ENERGY PROJEC	SMITH COGENERATION OK INC	OK	8/16/2001	TURBINES, NATURAL GAS, (4)	171.5	MW	CO	GOOD OPERATING PRACTICE	9	PPM @ 15% O2	BACT-PSD
OK-0044	SMITH POCOLA ENERGY PROJEC	SMITH COGENERATION OK INC	OK	8/16/2001	TURBINES, COMBINED CYCLE, NATURAL GAS, (4)	171.5	MW	CO	GOOD OPERATING PRACTICE	11.5	PPM @ 15% O2	BACT-PSD
OK-0045	REDBUD POWER PLT	REDBUD ENERGY LP	OK	8/15/2001	TURBINE, COMBINED CYCLE, (4)	1698	MMBTU/H	CO	GOOD COMBUSTION PRACTICES	15	PPM @ 15% O2	BACT-PSD
FL-0252	FORT PIERCE REPOWERING	FORT PIERCE REPOWERING PROJEC	FL	8/15/2001	TURBINE, COMBINED CYCLE, NATURAL GAS	180	MW	CO	GOOD COMBUSTION AND OXIDATION CATALYST	3.5	PPMVD @ 15% O2	BACT-PSD
LA-0122	MANSFIELD MILL	INTERNATIONAL PAPER - MANSFIELD	LA	8/14/2001	GAS TURBINE/HRSG			CO	OPERATION/MAINTENANCE, VENDER GUARANTEE	2.2	LB/H	BACT-PSD
OH-0263	FREMONT ENERGY CENTER, LL(	CALPINE CORPORATION	OH	8/9/2001	COMBUSTION TURBINES (2), COMB CYCLE W DUCT BURNER	180	MW	CO	OXIDATION CATALYST SYSTEM	25	PPM @ 15% O2	BACT-PSD
OH-0263	FREMONT ENERGY CENTER, LL(	CALPINE CORPORATION	OH	8/9/2001	COMBUSTION TURBINES(2), COMB CYCLE W/O DUCT BURNER	180	MW	CO	OXIDATION CATALYST SYSTEM	5	PPM @ 15% O2	BACT-PSD
PA-0196	SWEC-FALLS TOWNSHIP	SWEC-FALLS TOWNSHIP	PA	8/7/2001	TURBINE, COMBINED CYCLE, NATURAL GAS	544	MW	CO	OXIDATION CATALYST	3	PPM@15% O2	LAER
FL-0240	CPV PIERCE	COMPETITIVE POWER VENTURES PIE	FL	8/7/2001	TURBINE, COMBINED CYCLE, NATURAL GAS	1680	MMBTU/H	CO	COMBUSTION CONTROLS	8	PPMVD @ 15% O2	BACT-PSD
MI-0303	MIDLAND COGENERATION	MIDLAND COGENERATION VENTURE	MI	7/26/2001	GAS TURBINE, COMBINED CYCLE, 2 EACH	262	MW	CO	24-HOUR AVERAGE. CATALYTIC OXIDATION NOT REQUIRED AT	15	PPMDV@ 15% O2	BACT-PSD
MI-0302	MIRANT WYANDOTTE LLC	MIRANT WYANDOTTE LLC	MI	7/25/2001	GAS TURBINES, COMBINED CYCLE, 2 EACH	2205	MMBTU/H	CO	CATALYTIC OXIDATION. LIMITS APPLY OVER 148 GMW; WITH STEAM	3.6	PPM @ 15% O2	BACT-PSD

PA-0228	SPRINGDALE TOWNSHIP STATIO	ALLEGHENY ENERGY SUPPLY CO., L.	PA	7/12/2001	TURBINE, COMBINED CYCLE	2094	MMBTU/H	CO	GOOD COMBUSTION PRACTICES	36	PPM @ 15% O2	BACT-PSD
TX-0343	MONTGOMERY COUNTY POWER	MC ENERGY PARTNERS LP	TX	6/27/2001	(2) CTG-HRSG STACKS, STACK1 & 2	660	MW, TOTAL	CO	GOOD COMBUSTION AND CO CATALYST	25	PPM @ 15% O2	BACT-PSD
NJ-0044	MANTUA CREEK GENERATING FA	MANTUA CREEK GENERATING FACILI	NJ	6/26/2001	COMBUSTION TURBINE WITH DUCT BURNER (3)	2181	MMBTU/H	CO	OXIDATION CATALYST	3.1	PPMVD @ 15% O2	N/A
PA-0197	RELIANT ENERGY HUNTERSTOW	RELIANT ENERGY	PA	6/15/2001	COMBUSTION TURBINE, COMBINED CYCLE, (3)	900	MW	CO		14	PPM @ 15% O2	LAER
KY-0081	TRAPP	KENTUCKY PIONEER ENERGY, LLC	KY	6/7/2001	TURBINES, COMBINED CYCLE, NATURAL GAS, (2)	1765	MMBTU/H	CO	GOOD COMBUSTION	25	PPM @ 15% O2	BACT-PSD
MI-0267	RENAISSANCE POWER LLC	RENAISSANCE POWER LLC	MI	6/7/2001	TURBINES, STATIONARY GAS, COMBINED CYCLE, 3 EACH	170	MW	CO	GOOD COMBUSTION PRACTICES. OXIDATION CATALYST. 0.0068	3	PPMDV @15% O2	BACT-PSD
IN-0085	PSEG LAWRENCEBURG ENERGY	PSEG LAWRENCEBURG ENERGY FAC	IN	6/7/2001	TURBINE, NATURAL GAS, COMBINED CYCLE FOUR	476.6	MMBTU/H	CO	GOOD COMBUSTION. EMISSION LIMITS ARE FOR EACH CT	6	PPMVD @ 15% 02	BACT-PSD
IN-0087	VIGO	DUKE ENERGY	IN	6/6/2001	TURBINE, NATURAL GAS, COMBINED CYCLE (2)	170	MW	CO	GOOD COMBUSTION. UNFIRED EMISSIONS = 6 PPMVD @ 15% O2 OR	9	PPMDV @15% O2	BACT-PSD
FL-0216	HINES ENERGY COMPLEX, POWE	PROGRESS ENERGY FLORIDA	FL	6/4/2001	TURBINES, COMBINED CYCLE, NATURAL GAS, 2	1915	MMBTU/H	CO	COMBUSTION DESIGN, GOOD COMBUSTION PRACTICES.	16	PPMVD @ 15% O2	BACT-PSD
CA-0949	MOUNTAINVIEW POWER	MOUNTAINVIEW POWER	CA	5/22/2001	TURBINE, COMBINED CYCLE, NATURAL GAS, (4)	175.7	MW	CO	OXIDATION CATALYST	6	PPMVD	LAER

*CO-0056	ROCKY MOUNTAIN ENERGY CEN	CALPINE CORP.	CO	5/2/2006	NATURAL-GAS FIRED, COMBINED-CYCLE TURBINE	300	MW	NOX	LOW NOX BURNERS AND SCR	3	PPM @ 15% O2	BACT-PSD
NC-0101	FORSYTH ENERGY PLANT	FORSYTH ENERGY PROJECTS, LLC	NC	9/29/2005	TURBINE, COMBINED CYCLE, NATURAL GAS, (3)	1844.3	MMBTU/H	NOX	DRY LOW-NOX COMBUSTORS AND SELECTIVE CATALYTIC REDUCTION	2.5	PPM @ 15% O2	BACT-PSD
NV-0035	TRACY SUBSTATION EXPANSION	SIERRA PACIFIC POWER COMPANY	NV	8/16/2005	TURBINE, COMBINED CYCLE COMB. #1 WITH HRSG AND DUCT BURNER.	306	MW	NOX	SELECTIVE CATALYST REDUCTION W/ AMMONIA INJECTION	2	PPM @ 15% O2	BACT-PSD
NV-0035	TRACY SUBSTATION EXPANSION	SIERRA PACIFIC POWER COMPANY	NV	8/16/2005	TURBINE, COMBINED CYCLE COMB. #2 WITH HRSG AND DUCT BURNER.	306	MW	NOX	SELECTIVE CATALYTIC REDUCTION WITH AMMONIA INJECTION	2	PPM @ 15% O2	BACT-PSD
*OR-0041	WANAPA ENERGY CENTER	DIAMOND WANAPA I, L.P.	OR	8/8/2005	COMBUSTION TURBINE & HRSG	2384.1	MMBTU/H	NOX	DRY LOW-NOX BURNERS AND SCR.	2	PPMDV @ 15% O2	BACT-PSD
FL-0265	HINES POWER BLOCK 4	PROGRESS ENERGY	FL	6/8/2005	COMBINED CYCLE TURBINE	530	MW	NOX	SCR	2.5	PPM	BACT-PSD
MI-0366	BERRIEN ENERGY, LLC	BERRIEN ENERGY, LLC	MI	4/13/2005	3 COMBUSTION TURBINES AND DUCT BURNERS	1584	MMBTU/H	NOX	DRY LOW NOX BURNERS AND SELECTIVE CATALYTIC REDUCTION.	2.5	PPMDV @ 15% O2	BACT-PSD
FL-0263	FPL TURKEY POINT POWER PLAI	FLORIDA POWER AND LIGHT	FL	2/8/2005	170 MW COMBUSTION TURBINE, 4 UNITS	170	MW	NOX	NOX EMISSIONS WILL BE REDUCED WITH DRY LOW-NOX (DLN)	2	PPMVD@ 15 % O2	BACT-PSD
*WA-0328	BP CHERRY POINT COGENERATI	BP WEST COAST PRODUCTS, LLC	WA	1/11/2005	GE 7FA COMBUSTION TURBINE & HRSG	174	MW	NOX	LEAN PRE-MIX DRY LOW-NOX BURNERS ON CT. LOW-NOX DUCT	2.5	PPMDV	BACT-PSD
OH-0252	HANGING ROCK ENERGY FACILIT	DUKE ENERGY	OH	12/28/2004	TURBINES (4) (MODEL GE 7FA), DUCT BURNERS OFF	172	MW	NOX	DRY LOW NOX (DLN) BURNERS AND SELECTIVE CATALYTIC	3	PPM @ 15% O2	BACT-PSD
OH-0252	HANGING ROCK ENERGY FACILIT	DUKE ENERGY	OH	12/28/2004	TURBINES (4) (MODEL GE 7FA), DUCT BURNERS ON	172	MW	NOX	DRY LOW NOX (DLN) BURNERS AND SELECTIVE CATALYTIC REDUCTION	3	PPM @ 15% O2	BACT-PSD
AZ-0047	WELLTON MOHAWK GENERATIN	DOME VALLEY ENERGY PARTNERS	AZ	12/1/2004	COMBUSTION TURBINES AND HRSGs - SW501F TURBINES OPTION	180	MW	NOX	LOW NOX BURNERS AND SELECTIVE CATALYTIC REDUCTION	2	PPM @ 15% O2	BACT-PSD
AZ-0047	WELLTON MOHAWK GENERATIN	DOME VALLEY ENERGY PARTNERS	AZ	12/1/2004	COMBUSTION TURBINES AND HRSGs - GE7FA TURBINES OPTION	170	MW	NOX	LOW NOX BURNERS AND SELECTIVE CATALYTIC REDUCTION	2	PPM AT 15% O2	BACT-PSD
MS-0073	RELIANT ENERGY CHOCTAW CO	RELIANT ENERGY	MS	11/23/2004	EMISSION POINT AA-001 GEN. ELEC. COMBUST. TURBINE	230	MW	NOX	SCR	3.5	PPMV @ 15% 02	BACT-PSD
NV-0033	EL DORADO ENERGY, LLC	EL DORADO ENERGY, LLC	NV	8/19/2004	COMBUSTION TURBINE, COMBINED CYCLE & COGEN(2)	475	MW	NOX	LOW NOX BURNER + SCR	3.5	PPM @ 15% O2	BACT-PSD
VA-0291	CPV WARREN LLC	CPV WARREN LLC	VA	7/30/2004	TURBINE, COMBINED CYCLE (2)	1717	mmbtu/h	NOX	TWO STAGE LEAN PERMIX DRY LOW NOX COMBUSTION SCR AND GOOD	2	PPM	BACT-PSD
MN-0053	FAIRBAULT ENERGY PARK	MN MUNICIPAL POWER AGENCY	MN	7/15/2004	TURBINE, COMBINED CYCLE, NATURAL GAS (1)	1876	MMBTU/H	NOX	SCR AND DLN.	3	PPMVD @ 15% 02	BACT-PSD
*NE-0023	BEATRICE POWER STATION	NEBRASKA PUBLIC POWER DISTRICT	NE	6/22/2004	2-COMBUSTION TURBINES W/ DUCT BURNER	250	MW	NOX	SPECIFIC CONTROLS WERE NOT MANDATED, JUST POLLUTANT	3.5	PPM @ 15% O2	BACT-PSD
UT-0066	CURRANT CREEK	PACIFICORP	UT	5/17/2004	NATURAL GAS FIRED TURBINES AND HRSGs			NOX	CONVENTIONAL SELECTIVE CATALYTIC REDUCTION SYSTEM	2.25	PPMVD	BACT-PSD
NV-0037	COPPER MOUNTAIN POWER	SEMPRA ENERGY RESOURCES	NV	5/14/2004	LARGE COMBUSTION TURBINES, COMBINED CYCLE & COGENERATION	600	MW	NOX	DRY LOW-NOX COMBUSTOR, STEAM INJECTION, AND SELECTIVE	2	PPMVD	BACT-PSD
VA-0289	WYTHE	DUKE ENERGY	VA	2/5/2004	TURBINE, COMBINED CYCLE, DUCT BURNER, NATURAL GAS	170	MW	NOX	SCR AND LOW NOX BURNERS; GOOD COMBUSTION PRACTICES	2.5	PPMVD	BACT-PSD
VA-0289	WYTHE	DUKE ENERGY	VA	2/5/2004	TURBINE, COMBINED CYCLE, NATURAL GAS	170	MW	NOX	SCR AND LOW NOX BURNERS. GOOD COMBUSTION PRACTICES.	2.5	PPMVD	BACT-PSD
OR-0039	COB ENERGY FACILITY, LLC	Peoples Energy Resources	OR	12/30/2003	TURBINE, COMBINED CYCLE, DUCT BURNER, NAT GAS, (4)	1150	MW	NOX	DLN COMBUSTORS, AND SCR	2.5	PPMVD @ 15% O2	BACT-PSD
NV-0038	IVANPAH ENERGY CENTER, L.P.	IVANPAH ENERGY CENTER, L.P.	NV	12/29/2003	LARGE COMBUSTION TURBINES, COMBINED CYCLE & COGENERATION	500	MW	NOX	DRY LOW NOX COMBUSTION CONTROL IN COMBINATION WITH	2	PPMVD	BACT-PSD
MN-0054	MANKATO ENERGY CENTER		MN	12/4/2003	COMBUSTION TURBINE, LARGE 2 EACH	1827	MMBTU/H	NOX	WATER INJECTION AND SCR	5.5	PPMVD @15% 02	BACT-PSD
MN-0054	MANKATO ENERGY CENTER		MN	12/4/2003	COMBUSTION TURBINE, LARGE, 2 EACH	1916	MMBTU/H	NOX	LEAN PRE-MIX COMBUSTION & SCR	3	PPMVD 15% 02	BACT-PSD
VA-0287	JAMES CITY ENERGY PARK	JAMES CITY ENERGY PARK LLC	VA	12/1/2003	TURBINE, COMBINED CYCLE, NATURAL GAS	1973	MMBTU/H	NOX	DRY LOW NOX BURNERS SCR WITH AMMONIA INJECTION AND CEM	2.5	PPM	BACT-PSD
VA-0287	JAMES CITY ENERGY PARK	JAMES CITY ENERGY PARK LLC	VA	12/1/2003	TURBINE, COMBINED CYCLE, NATURAL GAS,DUCT BURNER	1973	MMBTU/H	NOX	DRY LOW NOX BURNERS, SCR WITH AMMONIA INJECTION AND CEM	2.5	PPM	BACT-PSD
AZ-0043	ARLINGTON VALLEY (AVEFII)	DUKE ENERGY	AZ	11/12/2003	TURBINE, COMBINED CYCLE	325	MW	NOX	SCR	2	PPM @ 15% O2	BACT-PSD
AZ-0043	ARLINGTON VALLEY (AVEFII)	DUKE ENERGY	AZ	11/12/2003	TURBINE, COMBINED CYCLE & DUCT BURNER	325	MW	NOX	SCR	2	PPM @ 15% O2	BACT-PSD
FL-0256	HINES ENERGY COMPLEX, POWE	PROGRESS ENERGY FLORIDA	FL	9/8/2003	COMBUSTION TURBINES, COMBINED CYCLE, NATURAL GAS,2	1830	MMBTU/H	NOX	DRY LOW NOX COMBUSTORS & SELECTIVE CATALYTIC REDUCTION	2.5	PPMVD @15% O2	BACT-PSD
*AZ-0049	LA PAZ GENERATING FACILITY	ALLEGHENY ENERGY SUPPLY LLC	AZ	9/4/2003	GE COMBUSTION TURBINES AND HRSGs	1040	MW	NOX	LOW NOX BURNERS WITH SELECTIVE CATALYTIC REDUCTION	2	PPMVD	BACT-PSD
*AZ-0049	LA PAZ GENERATING FACILITY	ALLEGHENY ENERGY SUPPLY LLC	AZ	9/4/2003	SIEMENS WESTINGHOUSE COMBUSTION TURBINES AND HRSGs	1080	MW	NOX	LOW NOX BURNERS AND SELECTIVE CATALYTIC REDUCTION	2	PPMVD	BACT-PSD
CA-0997	SACRAMENTO MUNICIPAL UTILIT	SACRAMENTO MUNICIPAL UTILITY DI	CA	9/1/2003	GAS TURBINES, (2)	1611	MMBTU/H	NOX	SCR	2	PPM @ 15% O2	LAER
OH-0254	WASHINGTON COUNTY	DUKE ENERGY	OH	8/14/2003	TURBINES (2) (MODEL GE 7FA), DUCT BURNERS OFF	170	MW	NOX	DRY LOW-NOX (DLN) COMBUSTION BURNERS AND SELECTIVE	3.5	PPM @ 15% O2	BACT-PSD
OH-0254	WASHINGTON COUNTY	DUKE ENERGY	OH	8/14/2003	TURBINES (2) (MODEL GE 7FA), DUCT BURNERS ON	170	MW	NOX	DRY LOW-NOX (DLN) COMBUSTION BURNERS AND SELECTIVE	3.5	PPM @ 15% O2	BACT-PSD

OK-0096	REDBUD POWER PLANT	REDBUD ENERGY LP	OK	6/3/2003	COMBUSTION TURBINE AND DUCT BURNERS	1832	MMBTU/H	NOX	SELECTIVE CATALYTIC REDUCTION (SCR) WITH DRY LOW NOX BURNERS	3.5	PPMVD @ 15% O2	BACT-PSD
NE-0017	BEATRICE POWER STATION	NEBRASKA PUBLIC POWER DISTRICT	NE	5/29/2003	TURBINE, COMBINED CYCLE, (2)	80	MW	NOX	LOW-NOX BURNERS AND SELECTIVE CATALYTIC REDUCTION. EMISSION	3.5	PPM @ 15% O2	BACT-PSD
CA-1096	VERNON CITY LIGHT & POWER	VERNON CITY LIGHT & POWER	CA	5/27/2003	GAS TURBINE: COMBINED CYCLE < 50 MW	43	MW	NOX	SCR SYSTEM, AND OXIDATION CATALYST	2	PPMVD @ 15% O2	BACT-PSD
CA-1097	MAGNOLIA POWER PROJECT, SC	MAGNOLIA POWER PROJECT, SCPPA	CA	5/27/2003	GAS TURBINE: COMBINED CYCLE >= 50 MW	181	MW	NOX	SCR SYSTEM AND OXIDATION CATALYST	2	PPMVD @ 15% O2	BACT-PSD
IN-0115	MIRANT SUGAR CREEK, LLC	MIRANT SUGAR CREEK, LLC	IN	4/23/2003	TURBINE, COMBINED CYCLE, STARTUP & SHUT DOWN, (4)	1490.5	MMBTU/H	NOX	DRY LOW NOX BURNERS, GOOD COMBUSTION PRACTICES, NATURAL	64.9	T/YR	BACT-PSD
MI-0362	MIDLAND COGENERATION (MCV)	MIDLAND COGENERATION VENTURE	MI	4/21/2003	TURBINE, COMBINED CYCLE, (1)	984	MMBTU/H	NOX	LOW NOX BURNERS, RETROFIT AND RECONSTRUCTION COSTS TO	25	PPM @ 15% O2	BACT-PSD
MI-0362	MIDLAND COGENERATION (MCV)	MIDLAND COGENERATION VENTURE	MI	4/21/2003	TURBINE, COMBINED CYCLE, (11)	984	MMBTU/H	NOX	EXISTING STEAM INJECTION. RETROFIT AND RECONSTRUCTION	42	PPM @ 15% O2	BACT-PSD
GA-0105	MCINTOSH COMBINED CYCLE FA	SAVANNAH ELECTRIC AND POWER C	GA	4/17/2003	TURBINE, COMBINED CYCLE, NATURAL GAS, (4)	140	MW	NOX	DRY LOW NOX COMBUSTORS, SCR	2.5	PPM @ 15% O2	BACT-PSD
WA-0315	SUMAS ENERGY 2 GENERATION	SUMAS ENERGY 2 GENERATION FAC	WA	4/17/2003	TURBINES, COMBINED CYCLE, (2)	660	MW	NOX	DRY LOW NOX BURNERS, SCR	2	PPMVD	BACT-PSD
FL-0244	FPL MARTIN PLANT	FLORIDA POWER & LIGHT	FL	4/16/2003	TURBINE, COMBINED CYCLE WITH DUCT BURNER, NAT GAS	170	MW	NOX	DRY LOW NOX COMBUSTORS AND SCR	2.5	PPM @ 15% O2	BACT-PSD
FL-0244	FPL MARTIN PLANT	FLORIDA POWER & LIGHT	FL	4/16/2003	TURBINE, COMBINED CYLE, NATURAL GAS, (4)	170	MW	NOX	DRY LOW NOX COMBUSTORS AND SCR	2.5	PPMVD @ 15% O2	BACT-PSD
FL-0245	FPL MANATEE PLANT - UNIT 3	FLORIDA POWER & LIGHT	FL	4/15/2003	TURBINE, COMBINED CYCLE, NATURAL GAS (4)	170	MW	NOX	DRY LOW NOX COMBUSTORS WITH SCR	2.5	PPMVD @ 15% O2	BACT-PSD
WY-0061	BLACK HILLS CORP./NEIL SIMPSO	BLACK HILLS CORP.	WY	4/4/2003	TURBINE, COMBINED CYCLE, & DUCT BURNER	40	MW	NOX	DRY LOW NOX BURNERS AND SCR	2.5	PPM @ 15% O2	Other
TX-0374	CHOCOLATE BAYOU PLANT	BP AMOCO CHEMICAL CO	TX	3/24/2003	(2) COGENERATION TRAINS 2 & 3, GT-2 & 3	70	MW, TOTAL	NOX	DRY LOW NOX COMBUSTORS & SELECTIVE CATALYTIC REDUCTION	3.5	PPM @ 15% O2	Other
OK-0090	STEPHENS ENERGY	DUKE ENERGY	OK	3/21/2003	TURBINES, COMBINED CYCLE (2)	1701	MMBTU/H	NOX	SCR, DRY LOW NOX COMBUSTORS	3.5	PPM @ 15% O2	BACT-PSD
OR-0040	KLAMATH GENERATION, LLC	KLAMATH GENERATION, LLC	OR	3/12/2003	TURBINE, COMBINED CYCLE, DUCT BURNER, NAT GAS (2)	480	MW	NOX	DRY LOW NOX COMBUSTION, SCR	2.5	PPMVD @ 15% O2	BACT-PSD
AZ-0039	SALT RIVER PROJECT/SANTAN G	SALT RIVER PROJECT/SANTAN GEN.	AZ	3/7/2003	TURBINE, COMBINED CYCLE, DUCT BURNER, NATURAL GAS	175	MW	NOX	SCR	2	PPM @ 15% O2	LAER
MI-0357	KALKASKA GENERATING, INC	KALKASKA GENERATING LLC	MI	2/4/2003	TURBINE, COMBINED CYCLE, (2)	605	MW	NOX	SCR AND LOW-NOX BURNERS.	3	PPMVD @ 15% O2	BACT-PSD
MI-0361	SOUTH SHORE POWER LLC	SOUTH SHORE POWER LLC	MI	1/30/2003	TURBINE, COMBINED CYCLE, (2)	172	MW	NOX	DRY LOW NOX BURNERS AND SELECTIVE CATALYTIC REDUCTION	3	PPMVD @ 15% O2	BACT-PSD
MI-0365	MIRANT WYANDOTTE LLC	MIRANT WYANDOTTE LLC	MI	1/28/2003	TURBINE, COMBINED CYCLE, (2)	2200	MMBTU/H	NOX	DRY LOW NOX BURNERS AND SELECTIVE CATALYTIC REDUCTION.	3.5	PPM	BACT-PSD
TX-0365	TEXAS CITY OPERATIONS	UNION CARBIDE CORPORATION	TX	1/23/2003	GAS TURBINES 501-2&601-2 COMBINED STARTUP LIMITS	14.2	MW	NOX	LOW NOX COMBUSTORS	48	LB/H	Other
MI-0363	BLUEWATER ENERGY CENTER L	BLUEWATER ENERGY CENTER LLC	MI	1/7/2003	TURBINE, COMBINED CYCLE, (3)	180	MW	NOX	DRY LOW-NOX BURNERS AND SELECTIVE CATALYTIC REDUCTION.	4.5	PPMV	BACT-PSD
WA-0291	WALLULA POWER PLANT	WALLULA GENERATION, LLC	WA	1/3/2003	TURBINE, COMBINED CYCLE, NATURAL GAS (4)	1300	MW	NOX	SCR	2.5	PPMDV @15%02	Other
TX-0352	BRAZOS VALLEY ELECTRIC GEN	BRAZOS VALLEY ENERGY LP	TX	12/31/2002	(2) HRSG/TURBINES, HRSG-001 & -002	175	MW, EA	NOX	SELECTIVE CATALYTIC REDUCTION	3.5	PPM @ 15% O2	BACT-PSD
TX-0352	BRAZOS VALLEY ELECTRIC GEN	BRAZOS VALLEY ENERGY LP	TX	12/31/2002	(2) HRSG/TURBINES, HRSG-003 & -004	175	MW	NOX	SELECTIVE CATALYTIC REDUCTION	3.5	PPM @ 15% O2	BACT-PSD
TX-0391	OXY COGENERATION FACILITY	OXY VINYLS LP	TX	12/20/2002	COMBINED-CYCLE GAS TURBINES (2)	87	MW (EACH)	NOX	SCR AND NH3 INJECTION.	4	PPM @ 15% O2	BACT-PSD
TX-0391	OXY COGENERATION FACILITY	OXY VINYLS LP	TX	12/20/2002	HRSG UNIT NO. 3	255	MMBTU/H	NOX	SCR AND NH3 INJECTION.	16.9	LB/H	Other
TX-0391	OXY COGENERATION FACILITY	OXY VINYLS LP	TX	12/20/2002	HRSG UNITS 1 & 2 (2)	255	MMBTU/H	NOX	SCR AND NH3 INJECTION.	115	LB/H	BACT-PSD
TX-0428	HOUSTON OPS -- BATTLEGROUN	OXY VINYLS LP	TX	12/19/2002	TURBINE, COMBINED CYCLE & DUCT BURNER	87	mw	NOX	SCR	4	PPMVD @ 15% O2	BACT-PSD
TX-0407	STERNE ELECTRIC GENERATING	STEAG POWER LLC	TX	12/6/2002	TURBINES, COMBINED CYCLE, AND DUCT BURNERS (3)	190	MW	NOX	DRY LOW NOX COMBUSTORS FOR THE TURBINES AND LOW NOX	5	PPMVD @ 15% O2	BACT-PSD
VA-0262	MIRANT AIRSIDE INDUSTRIAL PA	MIRANT DANVILLE, LLC	VA	12/6/2002	TURBINE, COMBINED CYCLE, (2)	170	MW	NOX	LEAN PRE-MIX DRY LOW NOX AND GOOD COMBUSTION PRACTICES.	2.5	PPMVD @ 15% O2	BACT-PSD
VA-0260	HENRY COUNTY POWER	Cogentrix Energy Inc	VA	11/21/2002	TURBINE, COMBINED CYCLE, (4), 100% LOAD	171	MW	NOX	DRY LOW NOX COMBUSTION AND SCR W/AMMONIA INJECTION.	2.5	PPM @ 15% O2	BACT-PSD
VA-0260	HENRY COUNTY POWER	Cogentrix Energy Inc	VA	11/21/2002	TURBINE, COMBINED CYCLE, (4), 70% LOAD	171	MW	NOX	DRY LOW NOX COMBUSTION AND DESIGN. SCR W/AMMONIA INJECTION.	5	PPM @ 15% O2	BACT-PSD
VA-0255	VA POWER - POSSUM POINT	Virginia Power	VA	11/18/2002	TURBINE, COMBINED CYCLE, NATURAL GAS, DUCT BURNER	1937	MMBTU/H	NOX	WATER INJECTION, SELECTIVE CATALYTIC REDUCTION,AND	3.5	PPMVD @ 15% O2	LAER
VA-0255	VA POWER - POSSUM POINT	Virginia Power	VA	11/18/2002	TURBINE, NATURAL GAS, NO DUCT BURNER FIRING	1937	MMBTU/H	NOX	WATER INJECTION, SELECTIVE CATALYTIC REDUCTION, AND	3.5	PPMVD @ 15% O2	LAER
GA-0101	MURRAY ENERGY FACILITY	DUKE ENERGY MURRAY LLC	GA	10/23/2002	TURBINE, COMBINED CYCLE, (4)	173	MW	NOX	DRY LOW NOX BURNERS AND SELECTIVE CATALYTIC REDUCTION	3	PPM @ 15% O2	BACT-PSD

OH-0248	LAWRENCE ENERGY	CALPINE CORPORATION	OH	9/24/2002	TURBINES (3), COMBINED CYCLE, DUCT BURNERS OFF	180	MW	NOX	DRY LOW NOX BURNERS (DLN) & LOW NOX BURNERS (LNB) &	3	PPM @ 15% O2	BACT-PSD
OH-0248	LAWRENCE ENERGY	CALPINE CORPORATION	OH	9/24/2002	TURBINES (3), COMBINED CYCLE, DUCT BURNERS ON	180	MW	NOX	DRY LOW NOX BURNERS (DLN)& LOW NOX BURNERS(LNB)& SELECTIVE	3	PPM @ 15% O2	BACT-PSD
MS-0059	PIKE GENERATION FACILITY	LSP-PIKE ENERGY, LLC	MS	9/24/2002	TURBINE AA-001 W/DUCT BURNER	2168	MMBTU/H	NOX	DRY LOW NOX COMBUSTORS, SELECTIVE CATALYTIC REDUCTION	3.5	PPMV @ 15% O2	BACT-PSD
MS-0059	PIKE GENERATION FACILITY	LSP-PIKE ENERGY, LLC	MS	9/24/2002	TURBINE AA-004 W/ DUCT BURNER	2168	MMBTU/H	NOX	DRY LOW NOX COMBUSTORS , SELECTIVE CATALYTIC REDUCTION	3.5	PPMV @ 15% O2	BACT-PSD
MS-0059	PIKE GENERATION FACILITY	LSP-PIKE ENERGY, LLC	MS	9/24/2002	TURBINE, AA-002 W /DUCT BURNER	2168	MMBTU/H	NOX	DRY LOW NOX COMBUSTORS, SELECTIVE CATALYTIC REDUCTION	3.5	PPMV @ 15% O2	BACT-PSD
MS-0059	PIKE GENERATION FACILITY	LSP-PIKE ENERGY, LLC	MS	9/24/2002	TURBINE, AA-003 /DUCT BURNER	2168	MMBTU/H	NOX	DRY LOW NOX COMBUSTORS, SELECTIVE CATALYTIC REDUCTION	3.5	PPMV @ 15% O2	BACT-PSD
VA-0261	CPV CUNNINGHAM CREEK	COMPETITIVE POWER VENTURE	VA	9/6/2002	TURBINE, COMBINED CYCLE, (2)	2132	MMBTU/H	NOX	LOW NOX BURNERS AND GOOD COMBUSTION PRACTICE. SELECTIVE	2.5	PPM @ 15% O2	BACT-PSD
WA-0299	SUMAS ENERGY 2 GENERATION	SUMAS ENERGY 2, INC.	WA	9/6/2002	TURBINES, COMBINED CYCLE, (2)	334.5	MW	NOX	SCR	27	PPM @ 15% O2	BACT-PSD
AR-0070	GENOVA ARKANSAS I, LLC	GENOVA ARKANSAS I, LLC	AR	8/23/2002	TURBINE, COMBINED CYCLE, (2), (GE)	170	MW	NOX	DRY LOW NOX COMBUSTOR/SCR	3.5	PPMVD @ 15% O2	BACT-PSD
AR-0070	GENOVA ARKANSAS I, LLC	GENOVA ARKANSAS I, LLC	AR	8/23/2002	TURBINE, COMBINED CYCLE, (2), (MHI)	170	MW	NOX	DRY LOW NOX COMBUSTOR/SCR	3.5	PPMVD @ 15% O2	BACT-PSD
AR-0070	GENOVA ARKANSAS I, LLC	GENOVA ARKANSAS I, LLC	AR	8/23/2002	TURBINE, COMBINED CYCLE, (2), (SWH)	170	MW	NOX	DRY LOW NOX COMBUSTOR/SCR	3.5	PPMVD @ 15% O2	BACT-PSD
CO-0052	ROCKY MOUNTAIN ENERGY CEN	ROCKY MOUNTAIN ENERGY CENTER,	CO	8/11/2002	TWO (2) NATURAL GAS FIRED, COMBINED-CYCLE, TURBINE	2311	MMBTU/H	NOX	LOW NOX COMBUSTION SYSTEM (POLLUTION PREVENTION) AND	3	PPM @ 15% O2	BACT-PSD
IN-0114	MIRANT SUGAR CREEK LLC	MIRANT SUGAR CREEK LLC	IN	7/24/2002	TURBINE, COMBINED CYCLE AND DUCT BURNER, NAT GAS	1490.5	MMBTU/H	NOX	LOW NOX BURNERS, SCR, NATURAL GAS FUEL	3	PPMVD @ 15% O2	BACT-PSD
IN-0114	MIRANT SUGAR CREEK LLC	MIRANT SUGAR CREEK LLC	IN	7/24/2002	TURBINE, COMBINED CYCLE, NATURAL GAS (4)	1490.5	MMBTU/H	NOX	DRY LOW NOX BURNERS AND SCR. NATURAL GAS IS ONLY FUEL.	3	PPMVD @ 15% O2	BACT-PSD
AL-0185	BARTON SHOALS ENERGY	BARTON SHOALS ENERGY, LLC	AL	7/12/2002	FOUR (4) COMBINED CYCLE COMBUSTION TURBINE UNITS	173	MW	NOX	DRY LOW NOX + SCR	2.5	PPM @ 15% O2	BACT-PSD
TX-0437	HARTBURG POWER, LP	HARTBURG POWER, LP	TX	7/5/2002	TURBINE, COMBINED CYCLE & DUCT BURNER	277	mw	NOX	SCR FOR BOTH TURBINE AND DUCT BURNER, TURBINES USE STEAM	5	PPMVD @ 15% O2	BACT-PSD
NM-0044	CLOVIS ENERGY FACILITY	DUKE ENERGY CURRY LLC	NM	6/27/2002	TURBINES, COMBINED CYCLE, NATURAL GAS (4)	1515	MMBTU/H	NOX	THIS FACILITY WILL ONLY COMBUST PIPELINE QUALITY NATURAL GAS.	3.5	PPMV @ 15% O2	BACT-PSD
MS-0055	EL PASO MERCHANT ENERGY C	EL PASO MERCHANT ENERGY CO.	MS	6/24/2002	TURBINE, COMBINED CYCLE, DUCT BURNER, NAT GAS, (2)	1737	MMBTU/H	NOX	LOW NOX BURNERS AND SELECTIVE CATALYTIC REDUCTION UNIT	3.5	PPMV @ 15% O2	BACT-PSD
OK-0070	GENOVA OK I POWER PROJECT	GENOVA OKLAHOMA LLC	OK	6/13/2002	MHI COMBUSTION TURBINE & DUCT BURNERS	1767	MMBTU/H	NOX	SELECTIVE CATALYTIC REDUCTION (SCR) WITH DRY LOW-NOX	3.5	PPM @ 15% O2	BACT-PSD
OK-0070	GENOVA OK I POWER PROJECT	GENOVA OKLAHOMA LLC	OK	6/13/2002	GE COMBUSTION TURBINE & DUCT BURNERS	1705	MMBTU/H	NOX	SELECTIVE CATALYTIC REDUCTION (SCR) WITH DRY LOW-NOX	3.5	PPMVD @ 15% O2	BACT-PSD
MT-0019	SILVER BOW GEN	CONTINENTAL ENERGY SERVICES, IN	MT	6/7/2002	TURBINE, COMBINED CYCLE 1	500	MW	NOX	SCR	3	PPM @ 15% O2	BACT-PSD
MT-0019	SILVER BOW GEN	CONTINENTAL ENERGY SERVICES, IN	MT	6/7/2002	TURBINE, COMBINED CYCLE 2	500	MW	NOX	SCR	3	PPM @ 15% O2	BACT-PSD
NC-0095	MIRANT GASTONIA POWER FACI	MIRANT GASTONIA LLC	NC	5/28/2002	TURBINES, COMBINED CYCLE, MHI/SW	175	MW	NOX	DRY LOW NOX AND SCR	2.5	PPMVD	BACT-PSD
NC-0095	MIRANT GASTONIA POWER FACI	MIRANT GASTONIA LLC	NC	5/28/2002	TURBINES, COMBINED CYCLE, GE	175	MW	NOX	DRY LOW NOX AND SCR	2.5	PPMVD	BACT-PSD
NC-0095	MIRANT GASTONIA POWER FACI	MIRANT GASTONIA LLC	NC	5/28/2002	TURBINES, COMBINED CYCLE, GE, DUCT BURNERS	175	MW	NOX	DRY LOW NOX AND SCR	2.5	PPMVD	BACT-PSD
NC-0095	MIRANT GASTONIA POWER FACI	MIRANT GASTONIA LLC	NC	5/28/2002	TURBINES, COMBINED CYCLE, MHI/SW, DUCT BURNERS	175	MW	NOX	DRY-LOW NOX AND SCR	2.5	PPMVD	BACT-PSD
OH-0264	NORTON ENERGY STORAGE, LL	NORTON ENERGY	OH	5/23/2002	COMBUSTION TURBINE (9), COMB CYCLE W/O DUCT BURNER	300	MW	NOX	SELECTIVE CATALYTIC REDUCTION (SCR) AND DRY LOW NOX (DLN)	3.5	PPM @ 15% O2	BACT-PSD
OH-0264	NORTON ENERGY STORAGE, LL	NORTON ENERGY	OH	5/23/2002	COMBUSTION TURBINES (9), COMB CYCLE W DUCT BURNER	300	MW	NOX	SELECTIVE CATALYTIC REDUCTION (SCR) AND DRY LOW	3.5	PPM @ 15% O2	BACT-PSD
AZ-0038	GILA BEND POWER GENERATING	GILA BEND POWER GENERATING STA	AZ	5/15/2002	TURBINE, COMBINED CYCLE, DUCT BURNER, NATURAL GAS	170	MW	NOX	SCR AND LOW NOX COMBUSTORS	2	PPM @ 15% O2	BACT-PSD
IA-0058	GREATER DES MOINES ENERGY	MIDAMERICAN ENERGY	IA	4/10/2002	COMBUSTION TURBINES - COMBINED CYCLE	350	MW	NOX	SELECTIVE CATALYTIC REDUCTION WITH DRY LOW NOX COMBUSTION	3	PPM @ 15% O2	BACT-PSD
PA-0226	LIMERICK POWER STATION	LIMERICK PARTNERS, LLC	PA	4/9/2002	TURBINE, COMBINED CYCLE	550	MW	NOX	LOW NOX BURNERS	2	PPM @15% O2	LAER
AR-0051	JACKSON FACILITY	DUKE ENERGY	AR	4/1/2002	TURBINES, COMBINED CYCLE, NATURAL GAS, (2)	170	MW	NOX	SELECTIVE CATALYTIC REDUCTION (SCR) AND DRY LOW- NOX	3.5	PPM @ 15% 02	BACT-PSD
NJ-0043	LIBERTY GENERATING STATION	LIBERTY GENERATING STATION	NJ	3/28/2002	COMBINED CYCLE TURBINE WITH DUCT BURNER	3202	MMBTU/H	NOX	SCR	2.5	PPMVD @ 15% O2	Other
PA-0188	FAIRLESS ENERGY LLC	FAIRLESS ENERGY LLC	PA	3/28/2002	TURBINE, COMBINED CYCLE	1190	MW	NOX	SCR, DRY LOW NOX COMBUSTION	2.5	PPMV @ 15% O2	LAER
NJ-0043	LIBERTY GENERATING STATION	LIBERTY GENERATING STATION	NJ	3/28/2002	COMBINED CYCLE TURBINE (3)	2964	MMBTU/H	NOX	SCR- AMMONIA FLOW RTE AT 11.46 GAL/H	2.5	PPMVD @ 15 % O2	Other
FL-0239	JEA/BRANDY BRANCH	JACKSONVILLE ELECTRIC AUTHORIT	FL	3/27/2002	TURBINES, COMBINED CYCLE, (2)	1911	MMBTU/H	NOX	DRY LOW NOX BURNERS FOR NATURAL GAS, SCR & WATER	3.5	PPMVD	BACT-PSD

OH-0268	LIMA ENERGY COMPANY	Global Energy, Inc.	OH	3/26/2002	COMBUSTION TURBINE (2), COMBINED CYCLE	170	MW	NOX	USE OF DILUTION PRIOR TO COMBUSTION AND DILUTION	25	PPM @ 15% O2	BACT-PSD
TX-0411	AMELIA ENERGY CENTER	CALPINE	TX	3/26/2002	TURBINE, COMBINED CYCLE, & DUCT BURNER (3)	180	MW	NOX	SELECTIVE CATALYTIC REDUCTION	3.5	PPM @ 15% O2	LAER
TX-0351	WEATHERFORD ELECTRIC GENE	SEI TEXAS LLC	TX	3/11/2002	(2) GE7121EA GAS TURBINES, S-3&4	1079	MMBTU/H	NOX	NONE INDICATED	9	PPM @ 15% O2	N/A
*LA-0157	PERRYVILLE POWER STATION	PERRYVILLE ENERGY PARTNERS, LL	LA	3/8/2002	(2) GAS TURBINE/HRSG UNITS, EPNS 1-1, 1-2	170	MW	NOX	GOOD OPERATING PRACTICES AND USE OF NATURAL GAS AS FUEL. LOW	62.7	LB/H*	BACT-PSD
*LA-0157	PERRYVILLE POWER STATION	PERRYVILLE ENERGY PARTNERS, LL	LA	3/8/2002	(2) GAS TURBINES, EPNS 1-1, 1-2			NOX	LOW NOX BURNERS, AND/OR SELECTIVE CATALYTIC REDUCTION,	4.5	PPM @ 15% O2	BACT-PSD
LA-0120	GEISMAR PLANT	SHELL CHEMICAL LP	LA	2/26/2002	(2) COGENERATION UNITS POINT # 720-99 AND 721-99	40	MW EACH	NOX	LOW NOX BURNERS AND A SELECTIVE CATALYTIC REDUCTION	5	PPM @ 15% O2	BACT-PSD
WA-0289	TRANSALTA CENTRALIA GENERA	TRANSALTA	WA	2/22/2002	(4) TURBINE/HRSG			NOX	WATER INJECTION AND SELECTIVE CATALYTIC REDUCTION	3	PPM @ 15% O2	BACT-PSD
TX-0388	SAND HILL ENERGY CENTER	AUSTIN ELECTRIC UTILITY	TX	2/12/2002	COMBINED CYCLE GAS TURBINE	164	MW	NOX		5	PPM @ 15% O2	BACT-PSD
OK-0056	HORSESHOE ENERGY PROJECT	MUSTANG POWER LLC	OK	2/12/2002	TURBINES AND DUCT BURNERS	310	MW TOTAL	NOX	SCR	12.5	PPM @ 15% O2	BACT-PSD
OK-0055	MUSTANG ENERGY PROJECT	MUSTANG POWER LLC	OK	2/12/2002	COMBUSTION TURBINES W/DUCT BURNERS	0		NOX	SCR	25	PPM @ 15% 02	BACT-PSD
TN-0144	HAYWOOD ENERGY CENTER, LL	CALPINE	TN	2/1/2002	TURBINE, COMBINED CYCLE, W/ DUCT FIRING	1990	MMBTU/H	NOX	DRY LOW NOX BURNERS, SCR	3.5	PPM @ 15% O2	BACT-PSD
TN-0144	HAYWOOD ENERGY CENTER, LL	CALPINE	TN	2/1/2002	TURBINE, COMBINED CYCLE, W/O DUCT FIRING	1990	MMBTU/H	NOX	DRY LOW NOX BURNERS, SCR	3.5	PPM @ 15% O2	BACT-PSD
LA-0164	ACADIA POWER STATION	ACADIA POWER PARTNERS	LA	1/31/2002	GAS TURBINE UNITS 1, 2, 3, 4	183	MW EACH	NOX	USE OF DRY LOW NOX BURNERS AND SELECTIVE CATALYTIC REDUCTION.	4.5	PPM @ 15% O2	BACT-PSD
TX-0350	ENNIS TRACTEBEL POWER	ENNIS-TRACTEBEL II LP	TX	1/31/2002	COMBUSTION TURBINE W/HRSG	350	MW	NOX	NONE INDICATED	9	PPM @ 15% O2	Other
PA-0223	FAYETTE	DUKE ENERGY	PA	1/30/2002	TURBINE, COMBINED CYCLE, (2)	280	MW	NOX	LO NOX BURNERS, SCR	2.5	PPMVD @ 15% O2	LAER
FL-0241	CPV CANA	COMPETIVE POWER VENTURES CAN	FL	1/17/2002	TURBINE, COMBINED CYCLE, NATURAL GAS	1680	MMBTU/H	NOX	DRY LOW NOX, SCR, WET INJECTION	2.5	PPMVD @ 15% O2	BACT-PSD
OR-0035	PORT WESTWARD PLANT	PORTLAND GENERAL ELECTRIC COM	OR	1/16/2002	(2) COMBUSTION TURBINES, WITH DUCT BURNER	325	MW, EACH	NOX	SELECTIVE CATALYTIC REDUCTION, DRY LOW NOX COMBUSTION, AND	2.5	PPM @ 15% O2	BACT-PSD
PA-0189	CONECTIV BETHLEHEM, INC.	CONECTIV BETHLEHEM, INC	PA	1/16/2002	TURBINE, COMBINED CYCLE, (6)	122	MW	NOX	LAER FOR COMBINED CYCLE IS SCR,DLN COMBUSTERS, CLEAN FUEL,	2.5	PPMVD @ 15% O2	LAER
GA-0102	WANSLEY COMBINED CYCLE EN	OGLETHORPE POWER CORPORATIO	GA	1/15/2002	TURBINE, COMBINED CYCLE, (2)	167	MW	NOX	DRY LOW NOX COMBUSTORS, SELECTIVE CATALYTIC REDUCTION	3	PPM @ 15% O2	BACT-PSD
VA-0256	TENASKA FLUVANNA	TENASKA VIRGINIA PARTNERS, L. P.	VA	1/11/2002	TURBINES, COMBINED CYCLE, (3), NATURAL GAS	61200	MMSCF/YR	NOX	SELECTIVE CATALYTIC REDUCTION, CONTINUOUS EMISSION MONITORS	3	PPMVD	BACT-PSD
NC-0086	FAYETTEVILLE GENERATION, LL	FAYETTEVILLE GENERATION, LLC	NC	1/10/2002	TURBINE, COMBINED CYCLE, NATURAL GAS, (2)	154	MW	NOX	DRY LOW NOX AND SCR	3.5	PPMVD @ 15% O2	BACT-PSD
NC-0094	GENPOWER EARLEYS, LLC	GENPOWER EARLEYS, LLC	NC	1/9/2002	TURBINES, COMBINED CYCLE, NATURAL GAS (2)	1715	MMBTU/H	NOX	DLN AND SCR	2.5	PPMVD	BACT-PSD
TX-0234	EDINBURG ENERGY LIMITED PA	EDINBURG ENERGY LIMITED PARTNE	TX	1/8/2002	(4) COMBINED CYCLE GAS TURBINE, ABB MODEL GT24	180	MW	NOX	NOX EMISSIONS SHALL NOT EXCEED 15 PPMVD WHEN CORRECTED TO	15	PPM @ 15% O2	BACT-PSD
OH-0257	JACKSON COUNTY POWER, LLC	JACKSON COUNTY POWER, LLC	OH	12/27/2001	COMBUSTION TURBINES, COMBINED CYCLE, (4)	305	MW	NOX	SELECTIVE CATALYTIC REDUCTION (SCR) WITH DRY LOW NOX (DLN)	3.5	PPM @ 15% O2	BACT-PSD
GA-0094	EFFINGHAM COUNTY POWER, LL	EFFINGHAM COUNTY POWER, LLC	GA	12/27/2001	TURBINE, COMBINED CYCLE, (2)	185	MW	NOX	LOW NOX BURNERS AND SCR	3	PPMVD @ 15% O2	BACT-PSD
*LA-0136	PLAQUEMINE COGENERATION F	VENTURES LEASE COMPANY, LLC	LA	12/26/2001	(4) GAS TURBINES/DUCT BURNERS	2876	MMBTU/H	NOX	DRY LOW NOX BURNERS, SELECTIVE CATALYTIC REDUCTION	5	PPMVD @ 15% O2	BACT-PSD
WV-0014	PANDA CULLODEN GENERATING	PANDA CULLODEN POWER, L.P.	WV	12/18/2001	COMBUSTION TURBINE, 300 MW	300	MW	NOX	DRY LOW-NOX BURNERS AND SELECTIVE CATALYTIC REDUCTION	3.5	PPM	BACT-PSD
MS-0058	CHOCTAW GAS GENERATION, LL	CHOCTAW GAS GENERATION, LLC	MS	12/13/2001	TURBINE, COMBINED CYCLE, (2)	2737	MMBTU/H	NOX	DRY LOW NOX BURNERS AND SCR	3.5	PPMVD @ 15% O2	BACT-PSD
AL-0180	DALE	DUKE ENERGY	AL	12/11/2001	2 GE 7FA GAS FIRED COMB. CYCLE W/568 MMBTU DUCT B	170	MW EACH	NOX	DLN AND SCR	3.5	PPM @ 15% O2	BACT-PSD
IN-0095	ALLEGHENY ENERGY SUPPLY C	ALLEGHENY ENERGY SUPPLY	IN	12/7/2001	2 CMBND CYCLE COMBUST. TURBINE WESTINGHOUSE 501F	2071	MMBTU/H (H	NOX	DRY LOW NOX COMBUSTOR AND SELECTIVE CATALYTIC REDUCTION	2.5	PPM@15% O2	BACT-PSD
MS-0051	BATESVILLE GENERATION FACIL	LSP	MS	11/13/2001	COMBINED CYCLE COMBUSTION TURBINE GENERATION (CTG)	2100	MMBTU/H	NOX	SCR	3.5	PPMV@15%O2(DRY,3	BACT-PSD
MS-0065	LONE OAK ENERGY CENTER, LL	LONE OAK ENERGY CENTER, LLC	MS	11/13/2001	AA-001 COMBUSTION TURBINE, COMBINED CYCLE	1837	MMBTU/H	NOX	DRY LOW NOX BURNERS, SELECTIVE CATALYTIC REDUCTION (SCR)	3.5	PPMVD	BACT-PSD
MS-0065	LONE OAK ENERGY CENTER, LL	LONE OAK ENERGY CENTER, LLC	MS	11/13/2001	AA-003 COMBUSTION TURBINE, COMBINED CYCLE	1837	MMBTU/H	NOX	DRY LOW NOX BURNERS, SELECTIVE CATALYTIC REDUCTION (SCR)	3.5	PPMVD	BACT-PSD
MS-0065	LONE OAK ENERGY CENTER, LL	LONE OAK ENERGY CENTER, LLC	MS	11/13/2001	AA-002 COMBUSTION TURBINE, COMBINED CYCLE	1837	MMBTU/H	NOX	DRY LOW NOX BURNERS, SELECTIVE CATALYTIC REDUCTION (SCR)	3.5	PPMVD	BACT-PSD
AR-0047	HOT SPRINGS POWER PROJECT	HOT SPRINGS POWER PROJECT	AR	11/9/2001	COMBUSTION TURBINE, HRSG, DUCT BURNER	700	MW	NOX	DRY LOW NOX BURNERS W/ SELECTIVE CATALYTIC REDUCTION.	3.5	PPMVD @ 15% 02	BACT-PSD
TX-0233	CHANNELVIEW COGENERATION	RELIANT ENERGY	TX	10/29/2001	TURBINE, COMBINED CYCLE, AND DUCT BURNER #1-#4	180	MW	NOX	DRY LOW NOX BURNERS	10	PPM @ 15% O2	LAER

GA-0093	AUGUSTA ENERGY CENTER	AUGUSTA ENERGY CENTER	GA	10/28/2001	TURBINE, COMBINED CYCLE, (3)	750	MW	NOX	SCR	3	PPM @ 15% O2	BACT-PSD
*NJ-0036	AES RED OAK LLC	AES RED OAK LLC	NJ	10/24/2001	THREE 501 F TURBINES WITH HRSG	1967	MMBTU/H AT	NOX	SCR- MODIFIED FROM 42.1 GAL NH3/H TO 72.11 GAL NH3/H AND FROM 20%	15.3	PPM @ 15% O2	BACT-PSD
*WA-0292	SATSOP COMBUSTION TURBINE	GRAYS HARBOR ENERGY LLC	WA	10/23/2001	(2) NAT GAS COMBINED CYCLE COMBUSTION TURBINES	325	MW	NOX	GE ADVANCED DRY-LOW NOX COMBUSTORS PLUS SCR	2.5	PPM @ 15% O2	BACT-PSD
AL-0181	AUTAUGA	DUKE ENERGY	AL	10/23/2001	2 GE COM. CYCLE UNITS W/HRSG & 550 MMBTU/HR DUCT B	2407	MMBTU/H (W	NOX	SCR	3.5	PPM @ 15% O2	BACT-PSD
PA-0192	LOWER MOUNT BETHEL ENERGY	LOWER MOUNT BETHEL ENERGY, LL(	PA	10/20/2001	TURBINE, COMBINED CYCLE, (2)	370	MW	NOX	SELECTIVE CATALYTIC REDUCTION, DRY LOW NOX LEAN BURN	3.5	PPMVD	LAER
ID-0010	MIDDLETON FACILITY	GARNET ENERGY LLC	ID	10/19/2001	(2) GAS TURBINES WITH DUCT BURNERS, NAT GAS	2097	MMBTU/H	NOX	DUCT BURNER, SELECTIVE CATALYTIC REDUCTION, CATALYTIC	2.5	PPM @ 15% O2	BACT-PSD
ID-0012	GARNET ENERGY, MIDDLETON F	GARNET ENERGY LLC	ID	10/19/2001	TURBINE, COMBINED CYCLE, NATURAL GAS, (2)	1707	MMBTU/H	NOX	LOW NOX BURNERS, SELECTIVE CATALYTIC REDUCTION	2.5	PPM @ 15% O2	BACT-PSD
ID-0010	MIDDLETON FACILITY	GARNET ENERGY LLC	ID	10/19/2001	(2) GAS TURBINES ANNUAL EMISSION LIMITS, BOTH FUEL			NOX	DUCT BURNER, SELECTIVE CATALYTIC REDUCTION, CATALYTIC	2.5	PPM @ 15% O2	BACT-PSD
OH-0265	DRESDEN ENERGY LLC	Dresden Energy	OH	10/16/2001	COMBUSTION TURBINE (2), COMB. CYCLE W DUCT BURN	171.7	MW	NOX	SELECTIVE CATALYTIC REDUCTION (SCR) AND DRY LOW NOX (DLN)	3.5	PPM @ 15% O2	BACT-PSD
OH-0265	DRESDEN ENERGY LLC	Dresden Energy	OH	10/16/2001	COMBUSTION TURBINE (2), COMB. CYCLE W/O DUCT BURN	171.7	MW	NOX	SELECTIVE CATALYTIC REDUCTION (SCR) AND DRY LOW NOX (DLN)	3.5	PPM @ 15% O2	BACT-PSD
AR-0057	TENASKA ARKANSAS PARTNERS	TENASKA ARKANSAS PARTNERS, LP	AR	10/9/2001	TURBINE, COMBINED CYCLE, NATURAL GAS	185	MW	NOX	SELECTIVE CATALYTIC REDUCTION (SCR).	3.5	PPMVD @ 15% 02	BACT-PSD
IN-0110	COGENTRIX LAWRENCE CO., LL(	COGENTRIX LAWRENCE CO., LLC	IN	10/5/2001	TURBINES, COMBINED CYCLE, & DUCT BURNERS, (3)	1944.1	MMBTU/H	NOX	DRY LOW NOX BURNERS, GOOD COMBUSTION PRACTICE, AND SCR	3	PPMVD @ 15% O2	BACT-PSD
IN-0110	COGENTRIX LAWRENCE CO., LL(	COGENTRIX LAWRENCE CO., LLC	IN	10/5/2001	TURBINES, COMBINED CYCLE, (3)	1944.1	MMBTU/H	NOX	DRY LOW NOX BURNERS, AND GOOD COMBUSTION: SCR	3	PPMVD @ 15% O2	BACT-PSD
AL-0179	TALLADEGA GENERATING STATI	TENASKA ALABAMA IV PARTNERS, LF	AL	10/3/2001	COMBINED CYCLE COMB. TURB. UNITS W/ DUCT FIRING (6	170	MW	NOX	DLN COMBUSTION & SCR	3.5	PPM @ 15% O2	BACT-PSD
MD-0033	KELSON RIDGE	FREE STATE ELECTRIC, LLC	MD	9/27/2001	COMBINED CYCLE COMBUSTION TURBINE W/ HRSG & DUCT	180	MW	NOX	EXCLUSIVE USE OF NATURAL GAS, ADVANCED DRY LOW-NOX BURNERS,	2.5	PPMVD @ 15% O2	LAER
FL-0233	OUC STANTON ENERGY CENTER	ORLANDO UTILITIES COMMISSION (O	FL	9/21/2001	TURBINE, COMBINED CYCLE, NATURAL GAS, (2)	2402	MMBTU/H	NOX	SCR	3.5	PPMVD	BACT-PSD
FL-0226	EL PASO MANATEE ENERGY CEN	EL PASO MERCHANT ENERGY CENTE	FL	9/11/2001	TURBINE, COMBINED CYCLE, NAT. GAS	1.79	MMCF/H	NOX	GE 2.6 DRY LOW NOX. SELECTIVE CATALYTIC REDUCTION (SCR)	2.5	PPMVD @ 15% O2	BACT-PSD
FL-0227	EL PASO BELLE GLADE ENERGY	EL PASO MERCHANT ENERGY CENTE	FL	9/7/2001	TURBINE, COMBINED CYCLE, NAT. GAS	1.79	MMCF/H	NOX	GE 2.6 DRY LOW NOX, AND SELECTIVE CATALYTIC REDUCTION	2.5	PPMVD @ 15% O2	BACT-PSD
WA-0288	LONGVIEW ENERGY DEVELOPME	LONGVIEW ENERGY DEVELOPMENT	WA	9/4/2001	COMBUSTION TURBINE, COMBINEDCYCLE (NG)	290	MW	NOX	SELECTIVE CATALYTIC REDUCTION (SCR).	2.5	PPMVD	Other
NJ-0058	LINDEN GENERATING STATION	PSEG FOSSILL LLC	NJ	8/24/2001	COMBUSTION GAS TURBINES(GE 7FA)(4 UNITS): COMBINED CYCLE	1651	MMBTU/H	NOX	SELECTIVE CATALYTIC REDUCTION(SCR) AND DRY LOW NOX	2	PPMVD@15%O2	BACT-PSD
TX-0344	DEER PARK ENERGY CENTER	DEER PARK ENERGY CENTER LP	TX	8/22/2001	(4) CTG1-4 & HRSG1-4, ST-1 THRU -4	180	MW, EA	NOX	DRY LOW NOX BURNERS & SELECTIVE CATALYTIC REDUCTION	2.5	PPM @ 15% O2	LAER
FL-0225	EL PASO BROWARD ENERGY CE	EL PASO MERCHANT ENERGY COMP/	FL	8/17/2001	TURBINE, COMBINED CYCLE, NAT. GAS	1.79	MMCF/H	NOX	GE 2.6 DRY LOW NOX SYSTEM. SELECTIVE CATALYTIC REDUCTION	2.5	PPMVD @ 15 % O2	BACT-PSD
OK-0044	SMITH POCOLA ENERGY PROJEC	SMITH COGENERATION OK INC	OK	8/16/2001	TURBINES, NATURAL GAS, (4)	171.5	MW	NOX	LOW NOX BURNERS	9	PPM @ 15% O2	BACT-PSD
OK-0044	SMITH POCOLA ENERGY PROJEC	SMITH COGENERATION OK INC	OK	8/16/2001	TURBINES, COMBINED CYCLE, NATURAL GAS, (4)	171.5	MW	NOX	LOW NOX BURNERS	15	PPM @ 15% O2	BACT-PSD
OK-0045	REDBUD POWER PLT	REDBUD ENERGY LP	OK	8/15/2001	TURBINE, COMBINED CYCLE, (4)	1698	MMBTU/H	NOX	DRY LOW NOX COMBUSTORS	15	PPM @ 15% O2	BACT-PSD
FL-0252	FORT PIERCE REPOWERING	FORT PIERCE REPOWERING PROJEC	FL	8/15/2001	TURBINE, COMBINED CYCLE, NATURAL GAS	180	MW	NOX	GOOD COMBUSTION AND SCR	3.5	PPMVD @ 15% O2	BACT-PSD
LA-0122	MANSFIELD MILL	INTERNATIONAL PAPER - MANSFIELD	LA	8/14/2001	GAS TURBINE/HRSG			NOX	DRY LOW NOX BURNER	21.7	PPM @ 15 % O2	BACT-PSD
OH-0263	FREMONT ENERGY CENTER, LL(	CALPINE CORPORATION	OH	8/9/2001	COMBUSTION TURBINES (2), COMB CYCLE W DUCT BURNER	180	MW	NOX	SELECTIVE CATALYTIC REDUCTION (SCR) AND DRY LOW NOX (DLN)	3.5	PPM @ 15% O2	BACT-PSD
OH-0263	FREMONT ENERGY CENTER, LL(	CALPINE CORPORATION	OH	8/9/2001	COMBUSTION TURBINES(2), COMB CYCLE W/O DUCT BURNER	180	MW	NOX	SELECTIVE CATALYTIC REDUCTION (SCR) AND DRY LOW NOX(DLN)	3.5	PPMVD	BACT-PSD
PA-0196	SWEC-FALLS TOWNSHIP	SWEC-FALLS TOWNSHIP	PA	8/7/2001	TURBINE, COMBINED CYCLE, NATURAL GAS	544	MW	NOX	DLN BURNERS, SCR	3	PPM @ 15% O2	LAER
FL-0240	CPV PIERCE	COMPETITIVE POWER VENTURES PIE	FL	8/7/2001	TURBINE, COMBINED CYCLE, NATURAL GAS	1680	MMBTU/H	NOX	DRY LOW NOX PLUS SCR WET INJECTION	2.5	PPMVD @ 15% O2	BACT-PSD
MI-0303	MIDLAND COGENERATION	MIDLAND COGENERATION VENTURE	MI	7/26/2001	GAS TURBINE, COMBINED CYCLE, 2 EACH	262	MW	NOX	DNLB AND SCR. SCONOX AND XONON UNPROVEN ON LARGE TURBINES.	3.5	PPMDV@15% O2	BACT-PSD
MI-0302	MIRANT WYANDOTTE LLC	MIRANT WYANDOTTE LLC	MI	7/25/2001	GAS TURBINES, COMBINED CYCLE, 2 EACH	2205	MMBTU/H	NOX	APPLICABLE MODE: WITHOUT STEAM INJECTION, AND OVER 148 GMW. 67.9	3	PPMDV @15% O2	BACT-PSD
MI-0302	MIRANT WYANDOTTE LLC	MIRANT WYANDOTTE LLC	MI	7/25/2001	GAS TURBINES, COMBINED CYCLE, 2 EACH	2205	MMBTU/H	NOX	NOX AS NO2. DRY LOW NOX STAGED COMBUSTION, SELECTIVE CATALYTIC	3.5	PPMVD@15% O2	BACT-PSD
PA-0228	SPRINGDALE TOWNSHIP STATIO	ALLEGHENY ENERGY SUPPLY CO., L.	PA	7/12/2001	TURBINE, COMBINED CYCLE	2094	MMBTU/H	NOX	DRY LOW-NOX BURNERS WITH SCR	2.5	PPM @ 15% O2	BACT-PSD
TX-0343	MONTGOMERY COUNTY POWER	MC ENERGY PARTNERS LP	TX	6/27/2001	(2) CTG-HRSG STACKS, STACK1 & 2	660	MW, TOTAL	NOX	SELECTIVE CATALYTIC REDUCTION SYSTEM UNIT	5	PPM @ 15% O2	BACT-PSD

NJ-0044	MANTUA CREEK GENERATING FA	MANTUA CREEK GENERATING FACILI	NJ	6/26/2001	COMBUSTION TURBINE WITH DUCT BURNER (3)	2181	MMBTU/H	NOX	SCR- 29% AQUEOUS AMMONIA, DRY LOW NOX	2.5	PPMVD @ 15% O2	Other
PA-0197	RELIANT ENERGY HUNTERSTOW	RELIANT ENERGY	PA	6/15/2001	COMBUSTION TURBINE, COMBINED CYCLE, (3)	900	MW	NOX	DRY LOW NOX LEAN BURNERS & SCR	3.5	PPM @ 15% O2	LAER
KY-0081	TRAPP	KENTUCKY PIONEER ENERGY, LLC	KY	6/7/2001	TURBINES, COMBINED CYCLE, NATURAL GAS, (2)	1765	MMBTU/H	NOX	STEAM INJECTION	25	PPM @ 15% O2	BACT-PSD
MI-0267	RENAISSANCE POWER LLC	RENAISSANCE POWER LLC	MI	6/7/2001	TURBINES, STATIONARY GAS, COMBINED CYCLE, 3 EACH	170	MW	NOX	DRY LOW NOX BURNERS AND SELECTIVE CATALYTIC REDUCTION.	3.5	PPMDV @15% O2	BACT-PSD
IN-0085	PSEG LAWRENCEBURG ENERGY	PSEG LAWRENCEBURG ENERGY FAC	IN	6/7/2001	TURBINE, NATURAL GAS, COMBINED CYCLE FOUR	476.6	MMBTU/H	NOX	SELECTIVE CATALYTIC REDUCTION. EMISSION ALTERNATE LIMIT ARE FOR	3	PPMVD @ 15% 02	BACT-PSD
IN-0087	VIGO	DUKE ENERGY	IN	6/6/2001	TURBINE, NATURAL GAS, COMBINED CYCLE (2)	170	MW	NOX	SELECTIVE CATALYTIC REDUCTION. LIMIT IS FOR EACH CT.	9	PPMDV @15% O2	BACT-PSD
FL-0216	HINES ENERGY COMPLEX, POWE	PROGRESS ENERGY FLORIDA	FL	6/4/2001	TURBINES, COMBINED CYCLE, NATURAL GAS, 2	1915	MMBTU/H	NOX	DRY LOW NOX COMBUSTORS & SELECTIVE CATALYTIC REDUCTION	3.5	PPMVD @ 15% O2	BACT-PSD
CA-0949	MOUNTAINVIEW POWER	MOUNTAINVIEW POWER	CA	5/22/2001	TURBINE, COMBINED CYCLE, NATURAL GAS, (4)	175.7	MW	NOX	SCR	2.5	PPPMVD	LAER

APPENDIX F

COSTS ASSOCIATED WITH EMISSION CONTROLS

EnviroKinetics
--- Keeping Pace With The World ---

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Anita Lindell
AirPermits.com
Tel: 206-634-3923, Fax: 509-355-2337
alindell@nswest.net

Re: EKI 11401
Date: August 13, 2001

Dear Anita

Since we provided you with a budget quote for four SCR systems via Steven Frasch at the Cinco Group, Steven asked me to provide a breakdown of the costs. Since we quoted "turn key" systems, below I've provided budgetary breakout costs for the catalyst alone, and the catalyst integrated into a complete system.

Unit	9 ppm NOx/CO comb. GE 7FA 77.8% Conv	GE 7FA 92% Conv	SW 501F 100% Load 92% Conv	SW 501F 60% Load 93.7% Conv
2 ppm CO Catalyst only	44% $480,000	$480,000	$848,000	$848,000
2 ppm SCR Catalyst only	56% $609,000	$1,218,000	$1,218,000	$1,218,000
Total Catalyst alone	$1,089,000	$1,698,000	$2,066,000	$2,066,000
Complete turn key System	$2,771,900	$2,873,700	$2,885,700	$3,202,700
	−1,089,000			
	1,682,900 aux. equipment			

If I can be of further help, please don't hesitate to ask.

Any questions, please call.

SCR: 1,682,900 + 609,000 = 2,291,900

Cocat: 1,682,900 + 480,000 = 2,162,900

Best regards,

Kent Crites

Kent Crites (In Tulsa)
Technical sales mgr.
Tel: 918-249-8052, Fax: 918-254-0326 (note new fax no.)
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EnviroKinetics
--- Keeping Pace With The World ---

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Menlo Park, CA 94025-7272
Tel: 805-985-6646, Fax: 805-985-2127
cell: 818-519-8063
SFrasch@Earthlink.net

RE: your 2CG26801 / our EKI 11401
Date: July 20, 2001

SCR and CO system Budget Quotes

Dear Stephen

I received the process data supplied to you by Ms. Lindell at Air Permits.com. Attached I've prepared a budgetary proposal for a "turnkey" system for the SCR and CO portions. Based on the exhaust temperature of 650 deg F, I have assumed that the turbines are combined cycle and the SCR units will be installed between the superheater and the high pressure evaporator coils of the HRSG's. If this assumption is wrong, please let me know. We can supply the stack and other supporting equipment as well once we know the final turbine configuration.

The scope of these budget quotations includes the following:

1. SCR and CO Catalyst, and catalyst support structures in fabricated horizontal ductwork with internal insulation and stainless steel lining. The duct is built as a "spoolpiece" that is inserted between the boiler sections. (see drawing attached). Ladders and platforms for catalyst loading are included.
2. Ammonia Injection Grids (AIG), manifolds, valves, and sampling ports are included.
3. We have included the SCR control systems and all instrumentation. The instrumentation is installed on a skid with the ammonia vaporizer, control valves, regulators, and pressure indicators A PLC controlled NEMA 4 panel with all ladder logic is installed on the skid, pre-wired and tested. Local instruments that are mounted on the ductwork are also included.
4. Our scope includes engineering design, P&ID diagrams, General arrangement drawings, foundation loading diagrams, foundation design as well as catalyst and ductwork supply.
5. A tank for aqueous ammonia storage (10 days operating) and an ammonia transfer pump is included for each system.

The following is assumed to be by others:

1. Turbine equipment.
2. Site prep work, foundations, Motor control centers, installation.
3. Exhaust stack to atmosphere.

SCR Design Parameters:

Please see attached data sheets and drawings for clarification of scope and process conditions. The data sheet for the GE-1 only is attached.

Commercial:

Base quote total price SCR and CO reactors, ammonia injection grids, instrument skid, local instruments, ammonia storage, initial SCR and CO catalyst charges, F.O.B. factory (plus 5 days installation and startup assistance).	
GE-1	$2,771,900
GE-2	$2,873,700
SW-100	$2,885,700
SW-60	$3,202,700
Delivery date for ductwork and structures:	16 weeks after drawing approval
Delivery date for catalyst:	20 - 22 weeks after drawing approval

Shipping Weights and estimated freight (based on GE-1):

WEIGHTS	
DUCT WT TOTAL	142,890
SCR CAT WT	194,480
CO CAT WT	48,620
SKID	5,000
TANK WT, LBS	7,700
TOTAL	398,690
FREIGHT ESTIMATE	$89,705

Options:

Optional CEMs for NOx (per unit)	$99,000

Required payment terms: 10% with order 20% on drawings 50% on receipt of steel 20% on notice of readiness to ship	**Delivery Condition:** [ ] F.O.B. Exit Port [ ] Delivery to Job Site [x] Ex Works [ ] C.I.F.
Drawings: 3-4 weeks ARO	Delivery: see above

Best Regards,

Kent Crites (In Tulsa)

Technical sales mgr.
Tel: 918-249-8052, Fax: (918)-254-0326 (note new fax no.)
e-mail: kentcrites@aol.com

EnviroKinetics

SCR DATA SHEET

RFQ NO.:	EKI 11401
DATE:	7/10/01
BY:	KENT
SHEET:	1 OF 2
EQUIP. NO.:	

1	END USER:			CLIENT REF:	AIRPERMITS.COM	
2	STREET:			CONTACT:	ANITA LINDELL	
3	CITY:			PHONE:	(206) 634-3923	
4	STATE:			FAX:	(509) 355-2337	
5	UNIT TYPE:	GE-1		REQ'D SHIP DATE:	20-24 WEEKS	
6	HEAT RATE:	8,425		JOB SITE LOCATION:		
7	CAPACITY (MW):	130.5		NO. REQUIRED:	ONE	
8	EXHAUST CONDITIONS			CASE 1	CASE 2	CASE 3
9	CASE DESCRIPTION:			DESIGN		
10	FUEL TYPE:			NATURAL GAS		
11	OPERATING HOURS (HRS/YR):			8,760		
12	MASS FLOW RATE (WET BASIS, LBS/HR):			3,700,000 @ 650 F		
13	QUENCH AIR, LBS/HR:					
14	GAS TEMP @ CATALYST FACE, F:			650		
15	TEMPERATURE DISTRIBUTION, F:			(+/-) 20 F		
16	VELOCITY DISTRIBUTION, %:			(+/-) 15 %		
17	NH3 DISTRIBUTION, %:			(+/-) 5 %		
18	EXHAUST COMPOSITION (VOL%, WET BASIS):					
19	O2			13.1%		
20	N2			76.2%		
21	CO2			3.6%		
22	H2O			7.2%		
23	Ar			1.0%		
24	INLET NOx PPMVD @ 15 % O2:			9		
25	INLET CO PPMVD @ 15 % O2:			9		
26	PARTICULATE (LBS/HR):					
27	INLET SOx PPMVD @ 15 % O2:					
28	INLET SO2 PPMVD @ 15 % O2:					
29	INLET SO3 PPMVD @ 15 % O2:					
30	INLET VOC PPMVD @ 15 % O2:					
31	UHC (LBS/HR AS CH4):					
32	OTHER:					
33	OUTLET GUARANTEES:					
34	NOx PPMVD @ 15 % O2:			2.0 / 77.8 %		
35	CO PPMVD @ 15 % O2:			2.0 / 77.8 %		
36	VOC PPMVD @ 15 % O2:					
37	NH3 SLIP PPMVD @ 15 % O2 OR LBS/HR:			10		
38	CO CATALYST PRESSURE DROP, IN. W.C.*:			1.5" W.C.		
39	NOx CATALYST PRESSURE DROP, IN. W.C.*:			4.0" W.C.		
40	COMMENTS:					
41	EXHAUST FLOW DIRECTION:		HORIZONTAL			
42	DUCT CROSS SECTION, SQ FT:		1,416			
43	INLET GAS PATH DIMENSIONS, FT:		WIDTH: 37.6	HEIGHT: 37.6		
44	OUTLET GAS PATH DIMENSIONS, FT:		WIDTH: 37.6	HEIGHT: 37.6		
45	LENGTH, FT:		38	AREA, SQ FT: 5,815		
46	EXPANSION ALLOWED IN:		WIDTH, HEIGHT, LENGTH			
47	AMMONIA SOURCE:		AQUEOUS 19 % SOLUTION			
48	ELECTRICAL CLASSIFICATION:		UNCLASSIFIED			
49	ELECTRICAL ENCLOSURES:		NEMA 4			
50	SURFACE PREP:	PIPE	SP6			
51		STRUCTURE	SP6			
52	PAINT:	PRIMER	THICK: 3 MIL	TYPE: ZINC		
53		FINISH	THICK: NONE	TYPE:		
54	PIPE WELDING SPECS:			ANSI B31.3		
55	SYSTEM LOCATION:			OUTDOORS		
56	CONTROL METHOD:			LOCAL CONTROL PANEL / PLC*		
57	* PLC PREFERENCE, PLEASE INDICATE TYPE:					
58	(STANDARD IS ALLEN BRADLEY SLC500)					
59						
60						
61						
62						
63						
64						

EnviroKinetics

SCR DATA SHEET		
	RFQ NO.:	EKI 11401
	DATE:	7/10/01
	BY:	KENT
	SHEET:	2 OF 2
	EQUIP. NO.:	

65	SCOPE OF SUPPLY:	
66	AMMONIA FLOW CONTROL UNIT (AFCU)	
67	AMMONIA VAPORIZATION METHOD	EXHAUST GAS ATOMIZATION
68	UTILITY AIR CONSUMPTION, SCFM:	280
69	AMMONIA INJECTION MANIFOLD ARRANGEMENT	HORIZONTAL
70	AMMONIA INJECTION GRID MATERIAL (AIG)	A-36 CS
71	AMMONIA INJECTION GRID FEED	FROM ONE SIDE
72	PUMP SKID (AQUEOUS SYSTEMS)	AMMONIA TRANSFER PUMP
73	VAPORIZER SKID (ANHYDROUS SYSTEMS)	NA
74	AMMONIA CONSUMPTION, LBS/HR AS NH3	37.6
75	19 % AQ. AMMONIA USAGE, GPM	0.40
76	AMMONIA TRUCK UNLOADING SKID (AQUEOUS OR ANHYDROUS)	NOT OFFERED
77	AMMONIA STORAGE	
78	STORAGE TANK	10 DAYS CAPACITY
79	TANK CAPACITY, GALS:	8,000 HT: 15.0 DIA: 9.0
80	STORAGE TANK MATERIAL	A-36 CS CODE: API CORR ALLOW: 1/8 IN.
81	TANK INSTRUMENTATION	LEVEL GAUGE, LEVEL TRANSMITTER, PSV
82	CATALYST	
83	CATALYST (IF CERTAIN TYPE REQUIRED, PLEASE SPECIFY)	HONEYCOMB
84	CATALYST LIFE GUARANTEE	SCR: 3 YRS @ 8760 HPY CO: 3 YRS @ 8760 HPY
85	CATALYST SUPPORT STRUCTURE	INTERNAL CSS AND SEALS
86	MATERIAL	A-36 CS
87	SCR CATALYST VOLUME (EST), CU FT:	2,832
88	DUCTWORK	
89	SCR REACTOR INSULATION	CERAMIC FIBER, INTERNAL
90	SCR REQ'D COLD FACE TEMPERATURE	175 - 225
91	SCR FLOOR LINER:	10 GA. 304 SS
92	SCR ROOF AND SIDES LINER:	12 GA. 304 SS
93	CASING MATERIAL:	3/16" A-36
94	CATALYST HOIST AND MONORAIL:	MANUAL
95	INLET TRANSITION DUCTING	TO MEET INLET GAS PATH ONLY
96	OUTLET TRANSITION DUCTING	TO MEET OUTLET GAS PATH ONLY
97	MANWAYS	UPSTREAM AND DOWNSTREAM OF CATALYST BEDS
98	MANWAYS	36 X 36
99	STACK	
100	STACK DIAMETER, FT:	
101	STACK HEIGHT, FT:	
102	STACK EXIT VELOCITY:	
103	STACK SILENCER FOR:	
104	COOLING FAN:	
105	SITE CONDITIONS	
106	ASCE WIND SPEED:	70
107	UBC SEISMIC ZONE:	4
108	DAS:	OFFERED AS OPTION
109	CFD MODELING:	OFFERED AS OPTION
110	CEMS:	OFFERED AS OPTION
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EmeraChem

Proposal to:

BP AMOCO

Proposal #BP-AMOCO-GTHT-7FA-010726R2

Gas Turbine Installation

of

The SCONOx™ Catalytic Absorption System

September 6, 2001

CONFIDENTIALITY NOTE: This proposal and accompanying documents contain information from EmeraChem, which is confidential or privileged. The information is intended to be for the use of the individual or entity named on this document. If you are not the intended recipient, be aware that any disclosure, copying, distribution or use of the contents of this information is prohibited.

Price and Payment Schedule

Pricing Basis

The project is based upon the "Scope of Supply" as defined within this proposal for the SCONOx system, equipment, and services.

Price

Pricing is provided for two options: complete system purchase and mechanical system / catalyst purchase or catalyst lease.

6.2.1. *Complete SCONOx™ System Purchase (including catalyst)*

Base Design Proposal – Complete SCONOx system purchase (including catalyst). The work and equipment delivery scope encompasses the engineering, design, procurement, fabrication, catalyst, start-up, testing and turnover of three SCONOx™ NOx Emission Control Systems.

COMPLETE SYSTEM PURCHASE (U.S. Dollars)	
Base Design	Option 1
$ 30,444,193	$ 32,193,249

1.1.2. *Purchase and Catalyst Lease Options*

This section provides breakout pricing for the mechanical system purchase and the catalyst purchase (or an estimated catalyst lease). The benefit of these options is that the Buyer may choose to procure the mechanical systems from another vendor, and procure the proprietary catalyst directly from EmeraChem without additional mark-ups.

Mechanical System Purchase Option (in conjunction with the catalyst lease or separate catalyst purchase):

The mechanical system purchase scope includes the engineering, design, procurement, fabrication, start-up, testing and turnover of three SCONOx™ mechanical systems (total net).

MECHANICAL SYSTEM PURCHASE (U.S. Dollars)	
Base Design	Option 1
$ 17,539,003	$ 17,653,415

6.2.3 *SCONOx™ Catalyst Purchase Option:*

The SCONOx™ catalyst purchase price for three SCONOx systems (total net)

CATALYST PURCHASE (U.S. Dollars)	
Base Design	Option 1
$ 12,905,190	$ 14,539,834

6.2.4 *Estimated SCONOx™ Catalyst Lease:*

As a lease example, the Buyer purchases the mechanical system separately. The SCONOx™ catalyst is leased for a ten (10) year period (other lease periods are available). The monthly price includes the initial catalyst charge and all required catalyst replacements during the term for three units.

ESTIMATED CATALYST LEASE (U.S. Dollars)†	
Base Design	Option 1
$ 237,105 per month	$ 250,566 per month

† Estimated interest rate is 7% for this example. Actual interest rate is dependent upon Buyer's credit rating and monetary market conditions at time of order. Lease funding would be provided by a third party.

6.2.5 *Pricing Notes*

6.2.5.1. Delivery is FOB Mfg. This proposal incorporates the attached terms and conditions.

6.2.5.2 The prices in this proposal are valid for a period of 30 days from the date of this proposal. After 30 days, prices are subject to change without notice.

6.2.5.3 These prices are based on the current industrial value of Platinum (Pt) as of the date of this proposal. If the price of platinum changes by the time of purchase, the catalyst price will be adjusted to compensate for the change in platinum price. The platinum price is the "Industrial Price" as stated in the Wall Street Journal on the day the purchase order is provided.

6.3 ***Catalyst Maintenance Services***

A comprehensive catalyst maintenance program designed to provide complete catalyst service for operation and maintenance on the SCONOx™ system, in conjunction with the provision for technical support, field service and operator training can be provided. An important benefit of this program is that the catalyst will be maintained to a condition, which optimizes its performance, reliability, and on-line availability thus maximizing the catalyst life. A maintenance proposal can be provided, if desired.

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anniklinn@hotmail.com

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From : KentCrites@aol.com
To : anniklinn@hotmail.com
CC : sfrasch@earthlink.net
Subject : Fwd: VOC removal by oxidation catalyst
Date : Tue, 23 Oct 2001 11:52:29 EDT

Reply Reply All Forward Delete Put in Folder...

Printer Friendly Version

Anita
It depends on the VOC that is present. Methane, ethane, and propane are the hardest compounds to convert. On the other hand, methane is not considered to be a VOC, but it is the primary component of natural gas and it is the most likely hydrocarbon to be found in turbine exhaust gases. So, the CO catalyst would convert 70% of the VOC if it were made up of alcohols or other light solvents, but it probably will only convert 30% of methane, ethane and propane.

Kent Crites
EnviroKinetics, Inc.
Tel: 918-249-8052, Fax: 918-254-0326
EnviroKinetics: engineered solutions for environmental control

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From : "Anita Lindell" <anniklinn@hotmail.com>
To : sfrasch@earthlink.net
CC : kent@envirokinetics.com
Subject : VOC removal by oxidation catalyst
Date : Mon, 22 Oct 2001 14:22:12 -0700

Stephen and Kent,

I just wanted to see what type of VOC removal that can be expected by the CO oxidation catalyst? I have seen numbers from around 30% to as high as 70%. I would like to add this as a benefit to the CO oxidation catalyst in my air permitting analysis. Thanks in advance.

Anita Lindell
AirPermits.com
206-634-3923

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APPENDIX G

DISPERSION MODELING PROTOCOLS

October 29, 2001
Project 01105.02

Mr. Alan Fiksdal, Manager
State of Washington, Energy Facility Site Evaluation Council
P.O. Box 43172
Olympia, WA 98504-3172

Re: *BP Cherry Point Refinery - 750 Megawatt Cogeneration Facility PSD Application - Class I Areas Air Dispersion Modeling Protocol*

Dear: Mr. Fiksdal:

BP Cherry Point Refinery (BP) proposes to construct and operate a natural-gas-fired cogeneration electric power generating facility at its refinery near Blaine, Washington. The project is anticipated to be subject to the requirements of the Prevention of Significant Deterioration (PSD) permitting process. BP, through Golder Associates, has retained the services of AirPermits.com to prepare the required air permit applications and to perform air quality dispersion modeling to demonstrate that the project will not cause or contribute to a violation of any Class I PSD Increment or Air Quality Related Value (AQRV).

Federal Class I Areas are places of special national or regional value from a natural, scenic, recreational, or historic perspective. These areas were established as part of the PSD regulations included in the 1977 Clean Air Act Amendments. Federal Class I Areas are afforded the highest degree of protection among the types of areas classified under the PSD regulations.

AirPermits.com has prepared this dispersion modeling protocol prior to completing the Class I air quality analysis for the PSD permit application. Class I modeling entails two separate analyses: Class I PSD Increments and Air Quality Related Values (AQRVs). This protocol outlines the methodologies that will be used to complete the Class I air quality analysis and includes the proposed dispersion model, selected meteorological data, proposed receptor grids, and terrain information. This protocol is submitted for your review and approval. Class II area modeling is discussed in a separate modeling protocol.

Class I areas within 200 kilometers of the BP refinery will be included in this study. Within this 200 kilometer radius are the North Cascades National Park, the Olympic National Park, the Glacier Peak Wilderness Area, the Pasayten Wilderness Area, and the Alpine Lakes Wilderness Area. AQRVs will also be calculated for the Mt. Baker Wilderness Area at the request of the U.S. Forest Service (USFS) even though it is not a Class I area.

PROJECT DESCRIPTION

The proposed power plant will be capable of generating approximately 750 megawatts (MW) of electric power. The project will include the installation and operation of up to three General Electric 7FA combustion turbines (CTs) and three heat recovery steam generators (HRSG) with supplemental firing capability (duct burners). The primary fuel for the CTs and duct burners will be natural gas although the duct burners may fire natural gas or refinery fuel gas or a mixture of both. No other fuels are being considered at this time. Each of the three CT/HRSG combinations will have an individual associated stack.

MODEL SELECTION

AirPermits.com proposes to conduct the dispersion modeling in Class I areas using the CalPuff model version 5.4 provided by Earth Tech Inc. CalPuff is a multi-layer, multi-species, non-steady-state puff dispersion model that can simulate the effects of time and space-varying meteorological conditions on pollutant transport, transformation, and removal.

Modeling will be performed in accordance with the guidelines set forth in the *Interagency Workgroup on Air Quality Modeling (IWAQM) Phase 2 Summary Report and Recommendations for Modeling Long Range Transport Impacts* and the *Federal Land Manager's Air Quality Related Values Workgroup (FLAG) Phase I Report*. Guideline options will be used such as gaussian distribution, partial-puff-height adjustment, stack tip downwash, Pasquill-Gifford dispersion coefficients and partial plume penetration of elevated inversion.

CLASS I AREA PSD INCREMENT ANALYSIS

A PSD permit application is required to demonstrate through air dispersion modeling that the emissions increase from the proposed new facility will not cause or contribute significantly to any violations of allowable increments within the identified Class I areas. A significant contribution to a Class I increment is defined as a modeled concentration in excess of the significant impact levels (SILs) for Class I increments, shown in Table 1.

Typically, for receptor locations that are less than 50 kilometers (km) from a source, steady-state Gaussian dispersion models such as the ISCST3 dispersion model are used to determine the pollutant impacts. However, most steady-state Gaussian plume models are not considered accurate for predicting ambient impacts at receptors that are greater than 50 km in distance from the source. For receptors that are located greater than 50 km in distance from the source, the CalPuff modeling system is recommended to determine if adverse impacts will occur at the Class I areas.

CLASS I AREA AQRV ANALYSES

It is the responsibility of the Federal Land Manager (FLM) to identify AQRVs in each of the Class I Areas that may be affected by air pollution. AQRV indicators typically identified by FLMs include visibility degradation and acidic deposition. The following sections discuss the AQRVs that will be addressed at Class I areas for the proposed project and address the specific methodology to be used in performing the necessary analyses.

VISIBILITY

Visibility can be affected by plume impairment (heterogeneous) or regional haze (homogeneous). Plume impairment results when there is a contrast or color difference between the plume and a viewed background (the sky or a terrain feature). Plume impairment is generally only of concern when the Class I Area is near the proposed source, such that minimal dispersion of the plume occurs. The FLM considers "near" being a distance of 50 km or less. Since the distance to the nearest Class I area is more than 50 km from the proposed plant, a regional haze analysis will be prepared for each Class I area identified. Background extinction coefficients to be used in the postprocessor CalPost will be obtained from the FLAG Phase I Report. These are 0.6 Mm^{-1} for hygroscopic components and 4.5 Mm^{-1} for non-hygroscopic components for all Class I areas in the study area. A significance level of 5 percent (%) visibility change has been set to evaluate the requirement for cumulative modeling with other nearby sources.

DEPOSITION

Soils and aquatic resources in Class I areas are potentially influenced by nitrogen and sulfur deposition. Nitrogen and sulfur deposition occur through both wet and dry processes. Significance levels of 6 grams per hectare per year (kg/ha/yr) and 10 g/ha/yr for sulfur and nitrogen deposition, respectively, will be used.

METEOROLOGICAL DATA

One year of MM5 data from March of 1998 to February of 1999 and the CalMet preprocessor will be used in conjunction with data from the BP on-site meteorological station, National Weather Service (NWS) surface meteorological stations, upper air meteorological stations, and precipitation stations to develop the meteorological field. The CalMet meteorological preprocessor combines information from multiple surface and upper air meteorological stations as well as topography and land use data to compile a three-dimensional meteorological field. Based on the IWAQM Phase 2 recommendations, the meteorological domain, which is equal to the CalPuff modeling domain, will be determined by extending 80 km beyond the outer receptors and sources

considered in the analysis. This will result in a grid that is approximately 475 km by 400 km. A 12 km by 12 km resolution will be used for the domain.

The CalMet wind fields will be spot checked for agreement between predicted wind profiles and the surrounding terrain. If it is determined that the wind profiles do not agree with the nearby terrain profiles, the resolution of the meteorological domain may be reduced to improve CalMet's accuracy.

MODEL METHODOLOGY

SOURCE INFORMATION

The CalPuff dispersion model allows for emissions units to be represented as point, area, or volume sources. The same point sources (turbines) proposed in the Class II modeling protocol will be considered in the CalPuff modeling analyses. The "worst-case" stack parameters, load condition, and ambient temperature from the Class II modeling will be used in the Class I modeling.

The building downwash information determined in the original PSD modeling will also be used with all CalPuff modeling analyses.

RECEPTOR INFORMATION

Lambert Conformal Coordinates (LCC) will be used as the grid system throughout the CalPuff modeling. A 2 km spaced discrete receptor grid will be used to determine concentrations with the Class I and other specified areas. Additional specific sensitive discrete receptors within the areas will be included in the modeling analysis if necessary.

CHEMICAL REACTIONS

The primary pollutants to impact haze are ammonium sulfate and ammonium nitrate. These compounds are formed through atmospheric reactions involving NO_2 and SO_2, which are products of combustion. NO_2 absorbs light (causing a brown color) and can also impact visibility, although to a lesser degree than ammonium sulfate and ammonium nitrate. In addition, PM, which is also emitted from the turbines and duct burners, can contribute to haze. CalPuff uses the MESOPUFF-II chemical transformation algorithms, where the concentrations of the five previously mentioned pollutants plus nitric acid are tracked.

There are two user-selected input parameters that affect the MESOPUFF-II chemical transformation: ammonia and ozone concentrations. The IWAQM Phase 2 report recommends using ammonia concentration values of 0.5 ppb for forests, 1.0 ppb for arid

lands, and 10 ppb for grasslands. Ammonia background concentrations in Canada have been measured at 17 ppb. Since the land use in the study domain is mixed, 17 ppb will be used as a conservative value to assure that the conversion of NO_X to ammonium sulfate is not ammonia limited. An annual ozone concentration of 28 ppb has been measured in Canada and will be used in this study as a conservative value.

ADDITIONAL MODEL SETTINGS

All analyses will be performed using the model restart option, such that puffs from the prior time period that are still active are maintained in the current time period.

SUMMARY AND APPROVAL OF MODELING PROTOCOL

Using Ecology, USFS, and NPS approved data, procedures, and the CalPuff model, AirPermits.com will prepare a modeling assessment demonstrating that emissions from the proposed facility will not cause or contribute to a violation of the NAAQS, PSD increments, or AQRVs. It is very likely that the maximum ground-level impacts from the proposed facility will be below the SILs and other significance levels. Should that be the case, cumulative modeling, modeling to incorporate the impact of other nearby existing sources, will not be performed in support of the PSD application.

AirPermits.com is supplying this written protocol for approval of the modeling methodologies to be used for this PSD permit action. If you have any questions about the material presented in this letter, require additional information, or would like to talk about any of the proposed methods, please do not hesitate to call me at (425) 788-0120 or Brian Phillips at (206) 367-2638.

Sincerely,

Walter J. Russell
President

cc: Clint Bowman, Washington State Department of Ecology
Mike Torpey, BP Cherry Point Refinery
Jim Thornton, Golder Associates
Brian Phillips, AirPermits.com

Table 1

Significant Impact Levels

Pollutant	Averaging Time				
	Annual	24-hour	8-hour	3-hour	1-hour
SO_2	0.1 $\mu g/m^3$	0.275 $\mu g/m^3$	---	1.23 $\mu g/m^3$	---
PM_{10}	0.27 $\mu g/m^3$	1.35 $\mu g/m^3$	---	---	---
NO_2	0.1 $\mu g/m^3$	---	---	---	---

October 29, 2001
Project 01105.02

Mr. Alan Fiksdal, Manager
State of Washington, Energy Facility Site Evaluation Council
P.O. Box 43172
Olympia, WA 98504-3172

Re: *BP Cherry Point Refinery - 750 Megawatt Cogeneration Facility PSD Application - Class II Areas Air Dispersion Modeling Protocol*

Dear: Mr. Fiksdal:

BP Cherry Point Refinery (BP) proposes to construct and operate a natural-gas-fired cogeneration electric power generating facility at its refinery near Blaine, Washington. The project is anticipated to be subject to the requirements of the Prevention of Significant Deterioration (PSD) permitting process. BP, through Golder Associates, has retained the services of AirPermits.com to prepare the required air permit applications and to perform air quality dispersion modeling to demonstrate that the project will not cause or contribute to a violation of any National Ambient Air Quality Standards (NAAQS) or PSD Increments. AirPermits.com has also been commissioned to perform any required state air toxics emissions and impacts evaluations.

AirPermits.com has prepared this dispersion modeling protocol for the Class II air quality analysis required for the PSD permit application. This protocol outlines the methodologies to be used in undertaking the Class II areas air quality analyses and includes the choice of dispersion model, procedures for treating building downwash, selected meteorological data, proposed receptor grids, and terrain information. This protocol is submitted for your review and approval. A separate modeling protocol will be submitted for the PSD Class I areas.

Modeling will be used to determine the impacts of the proposed power plant and to compare them with the significant impact levels (SILs), the National Ambient Air Quality Standards (NAAQS) and the PSD increments for criteria pollutants and the Acceptable Source Impact Levels (ASILs) for toxic pollutants.

PROJECT DESCRIPTION

The proposed power plant will be capable of generating approximately 750 megawatts (MW) of electric power. At this time, the project will include the installation and operation of up to three General Electric 7FA combustion turbines (CTs) and three heat recovery steam generators (HRSG) with supplemental firing capability (duct burners). The CTs will be fired primarily with natural gas. The duct burners will fire natural gas or refinery fuel gas or a mixture of both. Each of the three CT/HRSG combinations will have an individual associated stack.

MODEL SELECTION AND METHODOLOGY

SELECTION OF MODEL

AirPermits.com proposes to conduct the dispersion modeling analyses using the latest version (00101) of the Industrial Source Complex (ISCST3) model to estimate maximum ground-level concentrations. The ISCST3 dispersion model is a refined, steady-state, multiple source, Gaussian dispersion model and is the preferred model to use for industrial sources in this type of air quality analysis. AirPermits.com will use the BEE-Line Software, BEEST (version 8.17b) proprietary version of the ISCST3 model.

Building downwash will be included using the USEPA-sanctioned Building Profile Input Program (BPIP), version 95086. BPIP is designed to incorporate the concepts and procedures expressed in the Good Engineering Practice (GEP) Technical Support document, the Building Downwash Guidance document, and other related documents. BPIP is incorporated in the BEEST software.

Modeling will be performed in accordance with regulatory guidelines set forth in USEPA's *Guideline On Air Quality Models*. Regulatory default options will be used such as final plume rise, stack tip downwash and buoyancy dispersed diffusion and default values will be used for wind profile exponents, temperature gradients, and wind dispersion coefficients.

METEOROLOGICAL DATA

Actual hourly meteorological data representative of the project site are available from the BP Cherry Point Refinery on-site meteorological measurements program. The BP meteorological measurements program is operated to collect PSD-grade meteorological data. Quarterly data reports and quarterly audit reports are available. The hourly meteorological data for the 1995, 1996, 1998, 1999, and 2000 calendar years have been processed into a format suitable for use in the ISCST3 and CalPuff dispersion models using the USEPA-approved MPRM meteorological preprocessor. The 1995, 1996, 1998, and 1999 data have previously been used in a recent PSD application for BP. Data for calendar year 1997 are not used due to an abundance of missing on-site data and the difficulty of locating other needed off-site data.

Upper air data for Quillayute, Washington, will be used, as it is the closest station to the site with upper air data. Data not available on-site, such as relative humidity, and missing data will be obtained from other nearby sites such as Bellingham, Vancouver Airport, or Seattle.

RECEPTOR GRIDS

Ground-level concentrations will be calculated over four Cartesian receptor grids and at receptors placed along the BP Cherry Point refinery property line. Ground-level

pollutant concentrations will not be calculated within the BP property fenceline. The property line receptors will be spaced at an interval of 50 meters. For PSD purposes, the four Cartesian grids will cover a region extending from all edges of the proposed facility boundary to approximately 12 kilometers (km) from the facility boundary.

The fine grids will contain 50-meter-spaced receptors extending to approximately 1 km and 100-meter-spaced receptors extending to approximately 2 km from the center stack of the proposed facility. The medium grids will contain 250-meter-spaced receptors extending to approximately 4 km and with 500-meter-spaced receptors extending approximately to 8 km. A coarse grid will contain 1,000-meter-spaced receptors that extend approximately to 12 km. Based on our experience, a receptor array of this type is typically sufficient for identifying the "worst-case" ground-level pollutant concentrations and rarely requires additional, more refined receptor spacing and additional model runs.

If the significance level modeling analysis predicts concentrations above or approaching the SILs at the 12 km distance, for PSD purposes, the coarse grid will be extended to capture the full area of impact. Based on past experience with similar facilities, the ground-level impacts generally do not typically exceed the SILs and the maximum ground-level impacts occur well within the 12 km distance.

In addition, receptors will be placed along the Canada-US border with a spacing of 1 km and elsewhere in the greater Vancouver area in Canada with a grid spacing of 2 km in order to determine the maximum pollutant concentrations in Canada. This receptor grid will extend out to a maximum distance of 50 kilometers from the proposed facility site. The ISCST3 dispersion model is approved for use only up to a distance of 50 kilometers from the source.

TREATMENT OF TERRAIN

Terrain elevations used in the ISCST3 modeling analyses will be extrapolated from Digital Elevation Model (DEM) data obtained from the U.S. Geological Survey (USGS). The DEM data consist of arrays of regularly spaced elevations and correspond to the 1:24,000 scale topographic quadrangle map series. The array elevations are at 30-meter intervals and the elevation at each ISCST3 receptor will be extrapolated using the BEEST software to determine elevations at the defined 50-meter, 100-meter, 250-meter, 500-meter, 1,000-meter, and 2,000-meter receptor intervals. All data obtained from the DEM files will be checked for completeness and spot-checked for accuracy against elevations on corresponding USGS 1:24,000 scale topographical quadrangle maps or other appropriate maps. Missing or erroneous data from the DEM files will be replaced by direct extrapolation from the USGS data.

LAND USE ANALYSIS

The land use in the area will be classified as rural for this analysis and rural dispersion coefficients will be specified in ISCST3.

REPRESENTATION OF EMISSION SOURCES

COORDINATE SYSTEM

In all modeling analyses, the location of emission sources, structures, and receptors will be represented in the Universal Transverse Mercator (UTM) coordinate system).

SOURCE PARAMETERS

The ISCST3 dispersion model allows for emissions units to be represented as point, area, or volume sources. For point sources with unobstructed vertical releases, it is appropriate to use actual stack parameters (i.e., height, diameter, exhaust gas temperature, and gas exit flow) in the modeling analyses. Each source to be included in the modeling analysis will be represented as a point source having an unobstructed vertical discharge using actual stack parameters (i.e., emissions in pounds per hour, flow rate in actual cubic feet per minute, stack exhaust gas temperature in degrees Fahrenheit) provided by the BP engineering consultant. The three stacks may be modeled as one collocated stack with the stack parameters the same as each individual stack but with the emissions tripled.

Facility buildings and other structures, with their associated vertical and horizontal dimensions, which could contribute to aerodynamic downwash of the plume, will be incorporated into the model. The dimensions of these buildings and other structures will be simulated in the modeling using the same coordinate system as the receptor grids.

MODELING SCENARIOS

FUEL TYPE, LOAD MODELING AND AMBIENT TEMPERATURE ANALYSIS

The air quality impacts of the CTs are dependent upon fuel type, operating load conditions and ambient temperature. Maximum impacts are not always associated with a given fuel type or an operating load of 100% on a pollutant-by-pollutant basis. Therefore, for each pollutant and averaging period, three different load scenarios will be modeled for each fuel type to be considered. These three operating load scenarios will likely consider CT loads at 100%, 75%, and 50%. During normal operations, BP will not operate at less than 50% load and any operations at less than 50% will generally be associated with startup or shutdown conditions.

Since combustion turbines exhibit some variation in emission rate and exhaust flow depending on the ambient temperature, the turbine vendors have been asked to provide emissions and flow information for ambient temperatures of 5°F, 50°F, and 85°F for each fuel type to be considered. These ambient temperature scenarios will be modeled to represent operations on a cold day, an average day, and a hot day, respectively. These temperature levels were determined using the 2-meter reference temperature data from the on-site meteorological measurements program. It is appropriate to model the 5°F

turbine operating parameters only during the colder seasons of the year. Conversely, it is not appropriate to model the 85°F conditions during the colder winter months. However, for this application, each temperature scenario will be modeled for the entire year to find the potential maximum ambient impacts for short term averaging times. For the pollutants with annual average ambient air quality standards, the turbine operating parameters at the annual average temperature of 51°F will be used.

The greatest air quality impacts resulting from the three operating load scenarios and the three ambient temperature scenarios and for each potential fuel type will be used to compare against the significant impact levels (SILs) shown in Table 1. Should the modeling results show that an SIL for a given pollutant is exceeded, cumulative modeling will be performed. Should this be the case, a separate modeling protocol will be developed and submitted for review and approval prior to conducting any cumulative source modeling.

AMBIENT RATIO METHOD FOR NO_X

The Ambient Ratio Method (ARM) may be used to further refine the significance modeling analysis, NAAQS modeling analysis, or PSD increment modeling analysis for nitrogen dioxide (NO_2). The ARM has evolved from previous representations (e.g., Ozone Limiting Method) of the oxidation of nitrogen oxide by ambient ozone and other photochemical oxidants. The ARM is contained in Section 6.2.3, *Models for Nitrogen Dioxide (Annual Average)*, of 40 CFR Part 51, Appendix W. If warranted, the default ratio of 75% NO_2/NO_X will be used for the proposed facility's significance, NAAQS, and PSD increment modeling analyses.

ADDITIONAL IMPACTS ANALYSES

Additional impact analyses will be conducted to evaluate the impact of potential toxic air pollutants (TAPs) using the guidance provided in WAC 173-460. Only toxic air pollutants with emission rates in excess of the small quantity emission rates listed in WAC 173—460-080(2)(e) will be modeled with the exception of those TAPs which have Acceptable Source Impact Levels (ASILs) less than 0.001 micrograms per cubic meter ($\mu g/m^3$), which are required to be modeled regardless of emission rate. Modeled impacts will be compared to the respective ASILs. The small quantity emissions levels and ASILs of some TAPs generally associated with these types of facilities are shown in Table 3. The emissions of ammonia from the SCR system will also be modeled as required by WAC 173-460.

PSD regulations require that three additional impact analyses be performed as parts of the PSD permit application. These are a growth analysis, a soil and vegetation analysis, and a visibility analysis. The PSD application will address these issues; however, no additional modeling analyses are anticipated for the growth and soil/vegetation analyses. Visibility modeling analyses will be required for the Class I areas and will be addressed

using the CalPuff model. A separate protocol for Class I area impact analyses will address the visibility analysis issues.

The impacts that the proposed cogeneration facility will have on pollutant concentrations in Canada will be evaluated by using the results of the ISCST3 modeling analyses. The results will be compared against the Canadian or British Columbia Air Quality Objectives shown in Table 2. Also, if required, the impacts in Canada will be further evaluated with consideration of the potential emission reductions that the project proponent expects to provide. If required after consultation with the Canadian air quality authorities and the presentation of the preliminary ISCST3 model results for each regulated pollutant, the 98th, 75th, and 50th percentiles will be determined and reported along with the seasonal and cumulative PM_{10} impacts as discussed in the Particulate Matter Science Assessment Document. Based on the wind direction frequency distribution, the fraction of emissions from the facility that cross into Canada on an annual basis will be estimated.

It has been requested that startup and shutdown emissions be considered in the modeling analysis. Startup and shutdown data has not been acquired from the turbine manufacturer and it is not known exactly what the content and form of this data will be. Modeling dynamic situations such as startup and shutdown is not easily performed with a steady-state model such as ISCST3. A modeling protocol addendum will be submitted when this data has been obtained and a realistic method has been determined to model these dynamic cases.

SUMMARY AND APPROVAL OF MODELING PROTOCOL

Using Ecology-approved data, procedures, and the ISCST3 dispersion model, AirPermits.com will prepare a modeling assessment demonstrating that emissions from the proposed facility will not cause or contribute to a violation of the NAAQS, PSD increment, or toxic pollutant standards. It is very likely that the maximum ground-level impacts from the proposed facility will be below the SILs. Should that be the case, cumulative modeling, modeling to incorporate the impact of other nearby existing sources, will not be performed in support of the PSD application.

AirPermits.com is supplying this written protocol for approval of the modeling methodologies to be used for this PSD permit action. If you have any questions about the material presented in this letter, require additional information, or would like to talk about any of the proposed methods, please do not hesitate to call me at (425) 788-0120 or Brian Phillips at (206) 367-2638.

Sincerely,

Walter J. Russell
President

cc: Clint Bowman, Washington State Department of Ecology
Greg Corcoran, BP Cherry Point Refinery
Mike Torpey, BP Cherry Point Refinery
Doug Morell, Golder Associates
Brian Phillips, AirPermits.com

Table 1

Significant Impact Levels

Pollutant	Averaging Time				
	Annual	24-hour	8-hour	3-hour	1-hour
SO_2	1.0 $\mu g/m^3$	5.0 $\mu g/m^3$	---	25 $\mu g/m^3$	---
PM_{10}	1.0 $\mu g/m^3$	5.0 $\mu g/m^3$	---	---	---
NO_2	1.0 $\mu g/m^3$	---	---	---	---
CO	---	---	500 $\mu g/m^3$	---	2,000 $\mu g/m^3$

NOTE: Source: WAC 173-400

Table 2

Canadian Air Quality Objectives

Pollutant	Averaging Time				
	Annual	24-hour	8-hour	3-hour	1-hour
SO_2	25 $\mu g/m^3$	150 $\mu g/m^3$	---	375 $\mu g/m^3$	450 $\mu g/m^3$
PM_{10}	30 $\mu g/m^3$	50 $\mu g/m^3$	---	---	---
NO_2	60 $\mu g/m^3$	200 $\mu g/m^3$	---	---	400 $\mu g/m^3$
CO	---	---	5,500 $\mu g/m^3$	---	14,300 $\mu g/m^3$

Table 3
Toxics Data

Toxic Compound	Small Quantity Emission Rate (lb/yr)	Small Quantity Emission Rate (lb/hr)	ASIL ($\mu g/m^3$)	Class A or B Toxic Compound		EPA Classified HAP (Yes/No)
VOC						
Acetaldehyde	50		0.45	A	annual	**Yes**
Acrolein	175	0.02	0.02	B	24-hr	**Yes**
Ammonia	17,500	2.0	100	B	24-hr	No
Benzene	20		0.12	A	annual	**Yes**
1,3-Butadiene	0.5		0.0036	A	annual	**Yes**
Butane (isomers)	43,748	5.0	6,300	B	24-hr	No
Cyclohexane	43,748	5.0	3,400	B	24-hr	No
Cyclopentane	43,748	5.6	5,700	B	24-hr	No
Ethylbenzene	43,748	5.0	1,000	B	24-hr	**Yes**
Formaldehyde	20		0.077	A	annual	**Yes**
Heptane (isomers)	43,748	5.0	5,500	B	24-hr	No
N-Hexane	22,750	2.6	200	B	24-hr	**Yes**
Hexane (isomers)	43,748	5.0	5,900	B	24-hr	**Yes**
Methylcyclohexane	43,748	5.0	5,400	B	24-hr	No
Naphthalene	22,750	2.6	170	B	24-hr	**Yes**
Nonane	43,748	5.0	3,500	B	24-hr	No
Octane (isomers)	43,748	5.0	4,700	B	24-hr	No
PAH	a		0.000480	A	annual	**Yes**
Pentane (isomers)	43,748	5.0	6,000	B	24-hr	No
Toluene	43,748	5.0	400	B	24-hr	**Yes**
1,2,3-Trimethylbenzene	43,748	5.0	420	B	24-hr	No
Xylene	43,748	5.0	1,500	B	24-hr	**Yes**
PM						
Arsenic	a		0.00023	A	annual	**Yes**
Barium	175	0.02	1.7	B	24-hr	No
Beryllium	a		0.00042	A	annual	**Yes**
Cadmium	a		0.00056	A	annual	**Yes**
Chromium	175	0.02	1.7	B	24-hr	**Yes**
Cobalt	175	0.02	0.33	B	24-hr	**Yes**
Copper	175	0.0	0.3	B	24-hr	No
Lead	50		0.5	A	24-hr[b]	**Yes**
Manganese	175	0.02	0.4	B	24-hr	**Yes**
Mercury	175	0.02	0.33	B	24-hr	**Yes**
Molybdenum	5,250	0.6	33	B	24-hr	No
Nickel	0.5		0.0021	A	annual	**Yes**
Selenium	175	0.02	0.67	B	24-hr	No
Sulfuric Acid	175	0.02	3.3	B	24-hr	No
Tin	175	0.02	6.7	B	24-hr	No
Vanadium	175	0.02	0.17	B	24-hr	No
Zinc	175	0.02	7	B	24-hr	No

Notes:
a. Must be modeled regardless of emission rate [WAC 173-460-080(2)(e)].
b. 24-hour averaging time – special ASIL [WAC 173-460, Table 3]

APPENDIX H

MODELED EMISSIONS AND RESULTS

Model Results - GE 7FA Turbines - 2x1 Base Case

Model	File	Pol	Average	Group	Rank	Conc.	East(X)	North(Y)	Elevation	Time	Met File
					SIL =	1.0 µg/m^3					
ISC3PBEE	2x1ann95_95_P10.USF	P10	ANNUAL	1CB/ALL	1ST	0.54716	520359.81	5415305	34.14	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann95_95_P10.USF	P10	ANNUAL	1BB/ALL	1ST	0.54548	520359.81	5415305	34.14	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann95_95_P10.USF	P10	ANNUAL	7B/ALL	1ST	0.54506	520359.81	5415305	34.14	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann95_95_P10.USF	P10	ANNUAL	1AB/ALL	1ST	0.54485	520359.81	5415305	34.14	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann98_98_P10.USF	P10	ANNUAL	1CB/ALL	1ST	0.54249	520359.81	5415305	34.14	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann98_98_P10.USF	P10	ANNUAL	1BB/ALL	1ST	0.54142	520359.81	5415305	34.14	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann98_98_P10.USF	P10	ANNUAL	7B/ALL	1ST	0.54122	520359.81	5415305	34.14	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann98_98_P10.USF	P10	ANNUAL	1AB/ALL	1ST	0.54108	520359.81	5415305	34.14	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann95_95_P10.USF	P10	ANNUAL	COOLING	1ST	0.53885	520359.81	5415305	34.14	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann98_98_P10.USF	P10	ANNUAL	COOLING	1ST	0.53296	520359.81	5415305	34.14	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann96_96_P10.USF	P10	ANNUAL	1CB/ALL	1ST	0.5295	520359.81	5415305	34.14	1 YRS	Arco96.isc
ISC3PBEE	2x1ann96_96_P10.USF	P10	ANNUAL	1BB/ALL	1ST	0.52707	520359.81	5415305	34.14	1 YRS	Arco96.isc
ISC3PBEE	2x1ann96_96_P10.USF	P10	ANNUAL	7B/ALL	1ST	0.52636	520359.81	5415305	34.14	1 YRS	Arco96.isc
ISC3PBEE	2x1ann96_96_P10.USF	P10	ANNUAL	1AB/ALL	1ST	0.52581	520359.81	5415305	34.14	1 YRS	Arco96.isc
ISC3PBEE	2x1ann96_96_P10.USF	P10	ANNUAL	COOLING	1ST	0.51754	520359.81	5415305	34.14	1 YRS	Arco96.isc
ISC3PBEE	2x1ann99_99_P10.USF	P10	ANNUAL	1CB/ALL	1ST	0.51393	520359.81	5415305	34.14	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann99_99_P10.USF	P10	ANNUAL	1BB/ALL	1ST	0.51197	520359.81	5415305	34.14	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann99_99_P10.USF	P10	ANNUAL	7B/ALL	1ST	0.51154	520359.81	5415305	34.14	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann99_99_P10.USF	P10	ANNUAL	1AB/ALL	1ST	0.51119	520359.81	5415305	34.14	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann99_99_P10.USF	P10	ANNUAL	COOLING	1ST	0.50089	520359.81	5415305	34.14	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann00_00_P10.USF	P10	ANNUAL	1CB/ALL	1ST	0.48167	520359.81	5415305	34.14	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann00_00_P10.USF	P10	ANNUAL	1BB/ALL	1ST	0.4813	520359.81	5415305	34.14	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann00_00_P10.USF	P10	ANNUAL	7B/ALL	1ST	0.48125	520359.81	5415305	34.14	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann00_00_P10.USF	P10	ANNUAL	1AB/ALL	1ST	0.48121	520359.81	5415305	34.14	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann00_00_P10.USF	P10	ANNUAL	COOLING	1ST	0.47523	520359.81	5415305	34.14	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann98_98_P10.USF	P10	ANNUAL	7B	1ST	0.17448	522500	5427200	110.95	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann99_99_P10.USF	P10	ANNUAL	7B	1ST	0.17271	523300	5426100	116.13	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann96_96_P10.USF	P10	ANNUAL	7B	1ST	0.16608	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann95_95_P10.USF	P10	ANNUAL	7B	1ST	0.16591	522500	5427200	110.95	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann98_98_P10.USF	P10	ANNUAL	1CB	1ST	0.14265	520700	5417100	35.05	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann99_99_P10.USF	P10	ANNUAL	1CB	1ST	0.14168	523300	5426100	116.13	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann95_95_P10.USF	P10	ANNUAL	1CB	1ST	0.12785	523300	5426100	116.13	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_P10.USF	P10	ANNUAL	1CB	1ST	0.12727	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann00_00_P10.USF	P10	ANNUAL	7B	1ST	0.12364	523300	5426100	116.13	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann99_99_P10.USF	P10	ANNUAL	1BB	1ST	0.11714	523300	5426100	116.13	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann98_98_P10.USF	P10	ANNUAL	1BB	1ST	0.11653	522500	5427200	110.95	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann96_96_P10.USF	P10	ANNUAL	1BB	1ST	0.11023	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann95_95_P10.USF	P10	ANNUAL	1BB	1ST	0.10997	522500	5427200	110.95	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann98_98_P10.USF	P10	ANNUAL	1AB	1ST	0.09864	522500	5427200	110.95	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann00_00_P10.USF	P10	ANNUAL	1CB	1ST	0.09807	523300	5426100	116.13	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann99_99_P10.USF	P10	ANNUAL	1AB	1ST	0.09479	523500	5427200	138.99	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann96_96_P10.USF	P10	ANNUAL	1AB	1ST	0.09268	522500	5427200	110.95	1 YRS	Arco96.isc

ISC3PBEE	2x1ann95_95_P10.USF	P10	ANNUAL	1AB	1ST	0.0926	522500	5427200	110.95	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann00_00_P10.USF	P10	ANNUAL	1BB	1ST	0.08189	523300	5426100	116.13	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann00_00_P10.USF	P10	ANNUAL	1AB	1ST	0.06682	523500	5427200	138.99	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann98_98_P10.USF	P10	ANNUAL	GEN	1ST	0.0186	520492.5	5415310	35.97	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann99_99_P10.USF	P10	ANNUAL	GEN	1ST	0.01584	520448.19	5415308	35.36	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann95_95_P10.USF	P10	ANNUAL	GEN	1ST	0.01543	520492.5	5415310	35.97	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_P10.USF	P10	ANNUAL	GEN	1ST	0.01462	520448.19	5415308	35.36	1 YRS	Arco96.isc
ISC3PBEE	2x1ann00_00_P10.USF	P10	ANNUAL	GEN	1ST	0.01339	520492.5	5415310	35.97	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann95_95_P10.USF	P10	ANNUAL	FPUMP	1ST	0.01099	520448.19	5414902	35.66	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann00_00_P10.USF	P10	ANNUAL	FPUMP	1ST	0.01069	520448.19	5414902	35.66	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann99_99_P10.USF	P10	ANNUAL	FPUMP	1ST	0.01068	520448.19	5414902	35.66	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann96_96_P10.USF	P10	ANNUAL	FPUMP	1ST	0.00962	520448.19	5414902	35.66	1 YRS	Arco96.isc
ISC3PBEE	2x1ann98_98_P10.USF	P10	ANNUAL	FPUMP	1ST	0.00892	520448.19	5414902	35.66	1 YRS	ARCO98.ISC

Model Results - GE 7FA Turbines - 2x1 Alternate Steam Turbine Building Case

Model	File	Pol	Average	Group	Rank	Conc.	East(X)	North(Y)	Elevation	Time	Met File
					SIL =	1.0 μg/m^3					
ISC3PBEE	2x1ann (Alt)_95_P10.USF	P10	ANNUAL	1CB/ALL	1ST	0.53639	520359.81	5415305	34.14	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann (Alt)_95_P10.USF	P10	ANNUAL	1BB/ALL	1ST	0.5362	520359.81	5415305	34.14	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann (Alt)_95_P10.USF	P10	ANNUAL	7B/ALL	1ST	0.53616	520359.81	5415305	34.14	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann (Alt)_95_P10.USF	P10	ANNUAL	1AB/ALL	1ST	0.53615	520359.81	5415305	34.14	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann (Alt)_98_P10.USF	P10	ANNUAL	1CB/ALL	1ST	0.53534	520359.81	5415305	34.14	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann (Alt)_98_P10.USF	P10	ANNUAL	1BB/ALL	1ST	0.53522	520359.81	5415305	34.14	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann (Alt)_98_P10.USF	P10	ANNUAL	7B/ALL	1ST	0.5352	520359.81	5415305	34.14	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann (Alt)_98_P10.USF	P10	ANNUAL	1AB/ALL	1ST	0.53519	520359.81	5415305	34.14	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann (Alt)_95_P10.USF	P10	ANNUAL	COOLING	1ST	0.53034	520359.81	5415305	34.14	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann (Alt)_98_P10.USF	P10	ANNUAL	COOLING	1ST	0.52764	520359.81	5415305	34.14	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann (Alt)_96_P10.USF	P10	ANNUAL	1CB/ALL	1ST	0.51938	520359.81	5415305	34.14	1 YRS	Arco96.isc
ISC3PBEE	2x1ann (Alt)_96_P10.USF	P10	ANNUAL	1BB/ALL	1ST	0.51899	520359.81	5415305	34.14	1 YRS	Arco96.isc
ISC3PBEE	2x1ann (Alt)_96_P10.USF	P10	ANNUAL	7B/ALL	1ST	0.51887	520359.81	5415305	34.14	1 YRS	Arco96.isc
ISC3PBEE	2x1ann (Alt)_96_P10.USF	P10	ANNUAL	1AB/ALL	1ST	0.51884	520359.81	5415305	34.14	1 YRS	Arco96.isc
ISC3PBEE	2x1ann (Alt)_99_P10.USF	P10	ANNUAL	1CB/ALL	1ST	0.51465	520359.81	5415305	34.14	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann (Alt)_99_P10.USF	P10	ANNUAL	1BB/ALL	1ST	0.51438	520359.81	5415305	34.14	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann (Alt)_99_P10.USF	P10	ANNUAL	7B/ALL	1ST	0.51431	520359.81	5415305	34.14	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann (Alt)_99_P10.USF	P10	ANNUAL	1AB/ALL	1ST	0.51428	520359.81	5415305	34.14	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann (Alt)_96_P10.USF	P10	ANNUAL	COOLING	1ST	0.51151	520359.81	5415305	34.14	1 YRS	Arco96.isc
ISC3PBEE	2x1ann (Alt)_99_P10.USF	P10	ANNUAL	COOLING	1ST	0.50469	520359.81	5415305	34.14	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann (Alt)_00_P10.USF	P10	ANNUAL	1CB/ALL	1ST	0.48405	520359.81	5415305	34.14	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann (Alt)_00_P10.USF	P10	ANNUAL	1BB/ALL	1ST	0.48399	520359.81	5415305	34.14	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann (Alt)_00_P10.USF	P10	ANNUAL	7B/ALL	1ST	0.48399	520359.81	5415305	34.14	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann (Alt)_00_P10.USF	P10	ANNUAL	1AB/ALL	1ST	0.48398	520359.81	5415305	34.14	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann (Alt)_00_P10.USF	P10	ANNUAL	COOLING	1ST	0.47823	520359.81	5415305	34.14	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann (Alt)_98_P10.USF	P10	ANNUAL	7B	1ST	0.17531	522500	5427200	110.95	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann (Alt)_99_P10.USF	P10	ANNUAL	7B	1ST	0.17371	523300	5426100	116.13	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann (Alt)_96_P10.USF	P10	ANNUAL	7B	1ST	0.1671	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann (Alt)_95_P10.USF	P10	ANNUAL	7B	1ST	0.1667	522500	5427200	110.95	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann (Alt)_99_P10.USF	P10	ANNUAL	1CB	1ST	0.14236	523300	5426100	116.13	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann (Alt)_98_P10.USF	P10	ANNUAL	1CB	1ST	0.14234	520700	5417100	35.05	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann (Alt)_95_P10.USF	P10	ANNUAL	1CB	1ST	0.1284	523300	5426100	116.13	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann (Alt)_96_P10.USF	P10	ANNUAL	1CB	1ST	0.12789	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann (Alt)_00_P10.USF	P10	ANNUAL	7B	1ST	0.12424	523300	5426100	116.13	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann (Alt)_99_P10.USF	P10	ANNUAL	1BB	1ST	0.1177	523300	5426100	116.13	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann (Alt)_98_P10.USF	P10	ANNUAL	1BB	1ST	0.11706	522500	5427200	110.95	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann (Alt)_96_P10.USF	P10	ANNUAL	1BB	1ST	0.11082	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann (Alt)_95_P10.USF	P10	ANNUAL	1BB	1ST	0.11047	522500	5427200	110.95	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann (Alt)_98_P10.USF	P10	ANNUAL	1AB	1ST	0.09912	522500	5427200	110.95	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann (Alt)_00_P10.USF	P10	ANNUAL	1CB	1ST	0.09849	523300	5426100	116.13	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann (Alt)_99_P10.USF	P10	ANNUAL	1AB	1ST	0.09521	523500	5427200	138.99	1 YRS	ARCO99.ISC

ISC3PBEE	2x1ann (Alt)_96_P10.USF	P10	ANNUAL	1AB	1ST	0.09328	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann (Alt)_95_P10.USF	P10	ANNUAL	1AB	1ST	0.09302	522500	5427200	110.95	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann (Alt)_00_P10.USF	P10	ANNUAL	1BB	1ST	0.08227	523300	5426100	116.13	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann (Alt)_00_P10.USF	P10	ANNUAL	1AB	1ST	0.06715	523500	5427200	138.99	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann (Alt)_98_P10.USF	P10	ANNUAL	GEN	1ST	0.01366	520492.5	5415310	35.97	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann (Alt)_95_P10.USF	P10	ANNUAL	GEN	1ST	0.01131	520581	5415313	39.01	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann (Alt)_96_P10.USF	P10	ANNUAL	GEN	1ST	0.01082	520448.19	5415308	35.36	1 YRS	Arco96.isc
ISC3PBEE	2x1ann (Alt)_99_P10.USF	P10	ANNUAL	GEN	1ST	0.01082	520448.19	5415308	35.36	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann (Alt)_95_P10.USF	P10	ANNUAL	FPUMP	1ST	0.01045	520448.19	5414902	35.66	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann (Alt)_99_P10.USF	P10	ANNUAL	FPUMP	1ST	0.00996	520448.19	5414902	35.66	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann (Alt)_00_P10.USF	P10	ANNUAL	FPUMP	1ST	0.00969	520448.19	5414902	35.66	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann (Alt)_96_P10.USF	P10	ANNUAL	FPUMP	1ST	0.0091	520448.19	5414902	35.66	1 YRS	Arco96.isc
ISC3PBEE	2x1ann (Alt)_00_P10.USF	P10	ANNUAL	GEN	1ST	0.00898	520492.5	5415310	35.97	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann (Alt)_98_P10.USF	P10	ANNUAL	FPUMP	1ST	0.0085	520448.19	5414902	35.66	1 YRS	ARCO98.ISC

Model Results - GE 7FA Turbines - 2x1 Base Case

Model	File	Pol	Average	Group	Rank	Conc.	East(X)	North(Y)	Elevation	Time	Met File
					SIL =	5.0 μg/m^3					
ISC3PBEE	2x1_24_PM.USF	PM	24-HR	1CC/ALL	1ST	3.86143	520100	5415400	28.96	99110924	ARC95_00.isc
ISC3PBEE	2x1_24_PM.USF	PM	24-HR	1AA/ALL	1ST	3.78723	520315.5	5415303	32.92	91824	ARC95_00.isc
ISC3PBEE	2x1_24_PM.USF	PM	24-HR	1AB/ALL	1ST	3.78723	520315.5	5415303	32.92	91824	ARC95_00.isc
ISC3PBEE	2x1_24_PM.USF	PM	24-HR	1AC/ALL	1ST	3.78723	520315.5	5415303	32.92	91824	ARC95_00.isc
ISC3PBEE	2x1_24_PM.USF	PM	24-HR	1BA/ALL	1ST	3.78723	520315.5	5415303	32.92	91824	ARC95_00.isc
ISC3PBEE	2x1_24_PM.USF	PM	24-HR	1BB/ALL	1ST	3.78723	520315.5	5415303	32.92	91824	ARC95_00.isc
ISC3PBEE	2x1_24_PM.USF	PM	24-HR	1BC/ALL	1ST	3.78723	520315.5	5415303	32.92	91824	ARC95_00.isc
ISC3PBEE	2x1_24_PM.USF	PM	24-HR	1CA/ALL	1ST	3.78723	520315.5	5415303	32.92	91824	ARC95_00.isc
ISC3PBEE	2x1_24_PM.USF	PM	24-HR	1CB/ALL	1ST	3.78723	520315.5	5415303	32.92	91824	ARC95_00.isc
ISC3PBEE	2x1_24_PM.USF	PM	24-HR	7A/ALL	1ST	3.78723	520315.5	5415303	32.92	91824	ARC95_00.isc
ISC3PBEE	2x1_24_PM.USF	PM	24-HR	7B/ALL	1ST	3.78723	520315.5	5415303	32.92	91824	ARC95_00.isc
ISC3PBEE	2x1_24_PM.USF	PM	24-HR	7C/ALL	1ST	3.78723	520315.5	5415303	32.92	91824	ARC95_00.isc
ISC3PBEE	2x1_24_PM.USF	PM	24-HR	COOLING	1ST	3.78414	520315.5	5415303	32.92	91824	ARC95_00.isc
ISC3PBEE	2x1_24_PM.USF	PM	24-HR	1CC	1ST	2.9252	520150	5415450	29.87	99032924	ARC95_00.isc
ISC3PBEE	2x1_24_PM.USF	PM	24-HR	1CB	1ST	2.74648	520150	5415450	29.87	99032924	ARC95_00.isc
ISC3PBEE	2x1_24_PM.USF	PM	24-HR	1CA	1ST	2.60796	520150	5415450	29.87	99032924	ARC95_00.isc
ISC3PBEE	2x1_24_PM.USF	PM	24-HR	7C	1ST	2.28493	518800	5417600	13.41	99110924	ARC95_00.isc
ISC3PBEE	2x1_24_PM.USF	PM	24-HR	7B	1ST	2.19913	518800	5417600	13.41	99110924	ARC95_00.isc
ISC3PBEE	2x1_24_PM.USF	PM	24-HR	1BC	1ST	1.92712	520150	5415450	29.87	99032924	ARC95_00.isc
ISC3PBEE	2x1_24_PM.USF	PM	24-HR	7A	1ST	1.91097	520950	5414550	42.06	95092124	ARC95_00.isc
ISC3PBEE	2x1_24_PM.USF	PM	24-HR	1BB	1ST	1.75121	520150	5415450	29.87	99032924	ARC95_00.isc
ISC3PBEE	2x1_24_PM.USF	PM	24-HR	1BA	1ST	1.61129	520250	5415450	31.09	99012924	ARC95_00.isc
ISC3PBEE	2x1_24_PM.USF	PM	24-HR	1AC	1ST	1.31381	520250	5415450	31.09	99012924	ARC95_00.isc
ISC3PBEE	2x1_24_PM.USF	PM	24-HR	1AB	1ST	1.12125	521000	5414500	42.06	95092124	ARC95_00.isc
ISC3PBEE	2x1_24_PM.USF	PM	24-HR	1AA	1ST	1.07893	521000	5414500	42.06	95092124	ARC95_00.isc
ISC3PBEE	2x1_24_PM.USF	PM	24-HR	GEN	1ST	0.3745	520227	5414902	34.14	98121824	ARC95_00.isc
ISC3PBEE	2x1_24_PM.USF	PM	24-HR	FPUMP	1ST	0.28909	520448.19	5414902	35.66	98082824	ARC95_00.isc

Model Results - GE 7FA Turbines - 2x1 Alternate Steam Turbine Building Case

Model	File	Pol	Average	Group	Rank	Conc.	East(X)	North(Y)	Elevation	Time	Met File
					SIL =	5.0 mg/m^3					
ISC3PBEE	2x1_24 (Alt)_95_PM.USF	PM	24-HR	1CC/ALL	1ST	3.98891	520150	5415400	29.87	99110924	ARC95_00.isc
ISC3PBEE	2x1_24 (Alt)_95_PM.USF	PM	24-HR	1CB/ALL	1ST	3.80301	520100	5415450	28.96	99110924	ARC95_00.isc
ISC3PBEE	2x1_24 (Alt)_95_PM.USF	PM	24-HR	1AA/ALL	1ST	3.78968	520315.5	5415303	32.92	91824	ARC95_00.isc
ISC3PBEE	2x1_24 (Alt)_95_PM.USF	PM	24-HR	1AB/ALL	1ST	3.78968	520315.5	5415303	32.92	91824	ARC95_00.isc
ISC3PBEE	2x1_24 (Alt)_95_PM.USF	PM	24-HR	1AC/ALL	1ST	3.78968	520315.5	5415303	32.92	91824	ARC95_00.isc
ISC3PBEE	2x1_24 (Alt)_95_PM.USF	PM	24-HR	1BA/ALL	1ST	3.78968	520315.5	5415303	32.92	91824	ARC95_00.isc
ISC3PBEE	2x1_24 (Alt)_95_PM.USF	PM	24-HR	1BB/ALL	1ST	3.78968	520315.5	5415303	32.92	91824	ARC95_00.isc
ISC3PBEE	2x1_24 (Alt)_95_PM.USF	PM	24-HR	1BC/ALL	1ST	3.78968	520315.5	5415303	32.92	91824	ARC95_00.isc
ISC3PBEE	2x1_24 (Alt)_95_PM.USF	PM	24-HR	1CA/ALL	1ST	3.78968	520315.5	5415303	32.92	91824	ARC95_00.isc
ISC3PBEE	2x1_24 (Alt)_95_PM.USF	PM	24-HR	7A/ALL	1ST	3.78968	520315.5	5415303	32.92	91824	ARC95_00.isc
ISC3PBEE	2x1_24 (Alt)_95_PM.USF	PM	24-HR	7B/ALL	1ST	3.78968	520315.5	5415303	32.92	91824	ARC95_00.isc
ISC3PBEE	2x1_24 (Alt)_95_PM.USF	PM	24-HR	7C/ALL	1ST	3.78968	520315.5	5415303	32.92	91824	ARC95_00.isc
ISC3PBEE	2x1_24 (Alt)_95_PM.USF	PM	24-HR	COOLING	1ST	3.78414	520315.5	5415303	32.92	91824	ARC95_00.isc
ISC3PBEE	2x1_24 (Alt)_95_PM.USF	PM	24-HR	1CC	1ST	3.10958	520150	5415500	29.26	99032924	ARC95_00.isc
ISC3PBEE	2x1_24 (Alt)_95_PM.USF	PM	24-HR	1CB	1ST	2.91991	520150	5415500	29.26	99032924	ARC95_00.isc
ISC3PBEE	2x1_24 (Alt)_95_PM.USF	PM	24-HR	1CA	1ST	2.77157	520150	5415500	29.26	99032924	ARC95_00.isc
ISC3PBEE	2x1_24 (Alt)_95_PM.USF	PM	24-HR	7C	1ST	2.39212	520150	5415500	29.26	99032924	ARC95_00.isc
ISC3PBEE	2x1_24 (Alt)_95_PM.USF	PM	24-HR	7B	1ST	2.2141	518800	5417600	13.41	99110924	ARC95_00.isc
ISC3PBEE	2x1_24 (Alt)_95_PM.USF	PM	24-HR	1BC	1ST	2.04234	520150	5415500	29.26	99032924	ARC95_00.isc
ISC3PBEE	2x1_24 (Alt)_95_PM.USF	PM	24-HR	7A	1ST	1.9473	520950	5414550	42.06	95092124	ARC95_00.isc
ISC3PBEE	2x1_24 (Alt)_95_PM.USF	PM	24-HR	1BB	1ST	1.85455	520150	5415500	29.26	99032924	ARC95_00.isc
ISC3PBEE	2x1_24 (Alt)_95_PM.USF	PM	24-HR	1BA	1ST	1.66588	520150	5415500	29.26	99032924	ARC95_00.isc
ISC3PBEE	2x1_24 (Alt)_95_PM.USF	PM	24-HR	1AC	1ST	1.26678	520150	5415500	29.26	99032924	ARC95_00.isc
ISC3PBEE	2x1_24 (Alt)_95_PM.USF	PM	24-HR	1AB	1ST	1.1373	520950	5414550	42.06	95092124	ARC95_00.isc
ISC3PBEE	2x1_24 (Alt)_95_PM.USF	PM	24-HR	1AA	1ST	1.08881	521000	5414550	42.06	95092124	ARC95_00.isc
ISC3PBEE	2x1_24 (Alt)_95_PM.USF	PM	24-HR	GEN	1ST	0.38519	520600	5414950	38.1	98121724	ARC95_00.isc
ISC3PBEE	2x1_24 (Alt)_95_PM.USF	PM	24-HR	FPUMP	1ST	0.28909	520448.19	5414902	35.66	98082824	ARC95_00.isc

Model Results - Siemens STG6-500F Turbines - 2x1 Base Case

Model	File	Pol	Average	Group	Rank	Conc.	East(X)	North(Y)	Elevation	Time	Met File
					SIL =	5.0 mg/m^3					
ISC3PBEE	2x1_24(SW)_95_PM.USF	PM	24-HR	1AA/ALL	1ST	3.78723	520315.5	5415303	32.92	91824	ARC95_00.isc
ISC3PBEE	2x1_24(SW)_95_PM.USF	PM	24-HR	1AB/ALL	1ST	3.78723	520315.5	5415303	32.92	91824	ARC95_00.isc
ISC3PBEE	2x1_24(SW)_95_PM.USF	PM	24-HR	1AC/ALL	1ST	3.78723	520315.5	5415303	32.92	91824	ARC95_00.isc
ISC3PBEE	2x1_24(SW)_95_PM.USF	PM	24-HR	1BA/ALL	1ST	3.78723	520315.5	5415303	32.92	91824	ARC95_00.isc
ISC3PBEE	2x1_24(SW)_95_PM.USF	PM	24-HR	1BB/ALL	1ST	3.78723	520315.5	5415303	32.92	91824	ARC95_00.isc
ISC3PBEE	2x1_24(SW)_95_PM.USF	PM	24-HR	1BC/ALL	1ST	3.78723	520315.5	5415303	32.92	91824	ARC95_00.isc
ISC3PBEE	2x1_24(SW)_95_PM.USF	PM	24-HR	1CA/ALL	1ST	3.78723	520315.5	5415303	32.92	91824	ARC95_00.isc
ISC3PBEE	2x1_24(SW)_95_PM.USF	PM	24-HR	1CB/ALL	1ST	3.78723	520315.5	5415303	32.92	91824	ARC95_00.isc
ISC3PBEE	2x1_24(SW)_95_PM.USF	PM	24-HR	1CC/ALL	1ST	3.78723	520315.5	5415303	32.92	91824	ARC95_00.isc
ISC3PBEE	2x1_24(SW)_95_PM.USF	PM	24-HR	7A/ALL	1ST	3.78723	520315.5	5415303	32.92	91824	ARC95_00.isc
ISC3PBEE	2x1_24(SW)_95_PM.USF	PM	24-HR	7B/ALL	1ST	3.78723	520315.5	5415303	32.92	91824	ARC95_00.isc
ISC3PBEE	2x1_24(SW)_95_PM.USF	PM	24-HR	7C/ALL	1ST	3.78723	520315.5	5415303	32.92	91824	ARC95_00.isc
ISC3PBEE	2x1_24(SW)_95_PM.USF	PM	24-HR	COOLING	1ST	3.78414	520315.5	5415303	32.92	91824	ARC95_00.isc
ISC3PBEE	2x1_24(SW)_95_PM.USF	PM	24-HR	7B	1ST	1.24673	521000	5414500	42.06	95092124	ARC95_00.isc
ISC3PBEE	2x1_24(SW)_95_PM.USF	PM	24-HR	7C	1ST	1.23747	521000	5414500	42.06	95092124	ARC95_00.isc
ISC3PBEE	2x1_24(SW)_95_PM.USF	PM	24-HR	7A	1ST	1.20581	521000	5414500	42.06	95092124	ARC95_00.isc
ISC3PBEE	2x1_24(SW)_95_PM.USF	PM	24-HR	1CC	1ST	0.85775	520250	5415450	31.09	99012924	ARC95_00.isc
ISC3PBEE	2x1_24(SW)_95_PM.USF	PM	24-HR	1CB	1ST	0.75904	520250	5415450	31.09	99012924	ARC95_00.isc
ISC3PBEE	2x1_24(SW)_95_PM.USF	PM	24-HR	1BC	1ST	0.71434	520250	5415450	31.09	99012924	ARC95_00.isc
ISC3PBEE	2x1_24(SW)_95_PM.USF	PM	24-HR	1BB	1ST	0.61225	520250	5415450	31.09	99012924	ARC95_00.isc
ISC3PBEE	2x1_24(SW)_95_PM.USF	PM	24-HR	1CA	1ST	0.59608	520250	5415450	31.09	99012924	ARC95_00.isc
ISC3PBEE	2x1_24(SW)_95_PM.USF	PM	24-HR	1AB	1ST	0.5939	521000	5414500	42.06	95092124	ARC95_00.isc
ISC3PBEE	2x1_24(SW)_95_PM.USF	PM	24-HR	1AA	1ST	0.57835	521000	5414500	42.06	95092124	ARC95_00.isc
ISC3PBEE	2x1_24(SW)_95_PM.USF	PM	24-HR	1BA	1ST	0.56734	521000	5414500	42.06	95092124	ARC95_00.isc
ISC3PBEE	2x1_24(SW)_95_PM.USF	PM	24-HR	1AC	1ST	0.55671	521000	5414500	42.06	95092124	ARC95_00.isc
ISC3PBEE	2x1_24(SW)_95_PM.USF	PM	24-HR	GEN	1ST	0.3745	520227	5414902	34.14	98121824	ARC95_00.isc
ISC3PBEE	2x1_24(SW)_95_PM.USF	PM	24-HR	FPUMP	1ST	0.28909	520448.19	5414902	35.66	98082824	ARC95_00.isc

Model Results - GE 7FA Turbines - 2x1 Base Case

Model	File	Pol	Average	Group	Rank	Conc.	East(X)	North(Y)	Elevation	Time	Met File
					SIL =	1.0 μg/m^3					
ISC3PBEE	2x1ann98_98_NOX.USF	NOX	ANNUAL	1CB/ALL	1ST	0.79715	520448.19	5415308	35.36	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann98_98_NOX.USF	NOX	ANNUAL	1BB/ALL	1ST	0.79607	520448.19	5415308	35.36	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann98_98_NOX.USF	NOX	ANNUAL	7B/ALL	1ST	0.79575	520448.19	5415308	35.36	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann98_98_NOX.USF	NOX	ANNUAL	1AB/ALL	1ST	0.79548	520448.19	5415308	35.36	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann98_98_NOX.USF	NOX	ANNUAL	GEN	1ST	0.73078	520492.5	5415310	35.97	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann99_99_NOX.USF	NOX	ANNUAL	1CB/ALL	1ST	0.68525	520448.19	5415308	35.36	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann99_99_NOX.USF	NOX	ANNUAL	1BB/ALL	1ST	0.68449	520448.19	5415308	35.36	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann99_99_NOX.USF	NOX	ANNUAL	7B/ALL	1ST	0.6843	520448.19	5415308	35.36	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann99_99_NOX.USF	NOX	ANNUAL	1AB/ALL	1ST	0.6841	520448.19	5415308	35.36	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann95_95_NOX.USF	NOX	ANNUAL	1CB/ALL	1ST	0.6673	520492.5	5415310	35.97	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann95_95_NOX.USF	NOX	ANNUAL	1BB/ALL	1ST	0.66606	520492.5	5415310	35.97	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann95_95_NOX.USF	NOX	ANNUAL	1BA/ALL	1ST	0.6659	520492.5	5415310	35.97	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann95_95_NOX.USF	NOX	ANNUAL	7B/ALL	1ST	0.6659	520492.5	5415310	35.97	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann95_95_NOX.USF	NOX	ANNUAL	1AB/ALL	1ST	0.66521	520492.5	5415310	35.97	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_NOX.USF	NOX	ANNUAL	1CB/ALL	1ST	0.62688	520448.19	5415308	35.36	1 YRS	Arco96.isc
ISC3PBEE	2x1ann96_96_NOX.USF	NOX	ANNUAL	1BB/ALL	1ST	0.62595	520448.19	5415308	35.36	1 YRS	Arco96.isc
ISC3PBEE	2x1ann96_96_NOX.USF	NOX	ANNUAL	7B/ALL	1ST	0.62562	520448.19	5415308	35.36	1 YRS	Arco96.isc
ISC3PBEE	2x1ann96_96_NOX.USF	NOX	ANNUAL	1AB/ALL	1ST	0.62538	520448.19	5415308	35.36	1 YRS	Arco96.isc
ISC3PBEE	2x1ann99_99_NOX.USF	NOX	ANNUAL	GEN	1ST	0.62218	520448.19	5415308	35.36	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann95_95_NOX.USF	NOX	ANNUAL	GEN	1ST	0.60613	520492.5	5415310	35.97	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann00_00_NOX.USF	NOX	ANNUAL	1CB/ALL	1ST	0.58148	520492.5	5415310	35.97	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann00_00_NOX.USF	NOX	ANNUAL	1BB/ALL	1ST	0.58128	520492.5	5415310	35.97	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann00_00_NOX.USF	NOX	ANNUAL	7B/ALL	1ST	0.58128	520492.5	5415310	35.97	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann00_00_NOX.USF	NOX	ANNUAL	1AB/ALL	1ST	0.58118	520492.5	5415310	35.97	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann96_96_NOX.USF	NOX	ANNUAL	GEN	1ST	0.57454	520448.19	5415308	35.36	1 YRS	Arco96.isc
ISC3PBEE	2x1ann00_00_NOX.USF	NOX	ANNUAL	GEN	1ST	0.52603	520492.5	5415310	35.97	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann95_95_NOX.USF	NOX	ANNUAL	FPUMP	1ST	0.3628	520448.19	5414902	35.66	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann00_00_NOX.USF	NOX	ANNUAL	FPUMP	1ST	0.35291	520448.19	5414902	35.66	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann99_99_NOX.USF	NOX	ANNUAL	FPUMP	1ST	0.35233	520448.19	5414902	35.66	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann96_96_NOX.USF	NOX	ANNUAL	FPUMP	1ST	0.3173	520448.19	5414902	35.66	1 YRS	Arco96.isc
ISC3PBEE	2x1ann98_98_NOX.USF	NOX	ANNUAL	FPUMP	1ST	0.29442	520448.19	5414902	35.66	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann98_98_NOX.USF	NOX	ANNUAL	7B	1ST	0.1355	522500	5427200	110.95	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann99_99_NOX.USF	NOX	ANNUAL	7B	1ST	0.13413	523300	5426100	116.13	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann96_96_NOX.USF	NOX	ANNUAL	7B	1ST	0.12898	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann95_95_NOX.USF	NOX	ANNUAL	7B	1ST	0.12885	522500	5427200	110.95	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann00_00_NOX.USF	NOX	ANNUAL	7B	1ST	0.09603	523300	5426100	116.13	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann98_98_NOX.USF	NOX	ANNUAL	1AB	1ST	0.08644	522500	5427200	110.95	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann99_99_NOX.USF	NOX	ANNUAL	1BB	1ST	0.08385	523300	5426100	116.13	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann98_98_NOX.USF	NOX	ANNUAL	1BB	1ST	0.08342	522500	5427200	110.95	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann99_99_NOX.USF	NOX	ANNUAL	1AB	1ST	0.08307	523500	5427200	138.99	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann98_98_NOX.USF	NOX	ANNUAL	1CB	1ST	0.08242	520700	5417100	35.05	1 YRS	ARCO98.ISC

ISC3PBEE	2x1ann99_99_NOX.USF	NOX	ANNUAL	1CB	1ST	0.08186	523300	5426100	116.13	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann96_96_NOX.USF	NOX	ANNUAL	1AB	1ST	0.08122	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann95_95_NOX.USF	NOX	ANNUAL	1AB	1ST	0.08115	522500	5427200	110.95	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_NOX.USF	NOX	ANNUAL	1BB	1ST	0.07891	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann95_95_NOX.USF	NOX	ANNUAL	1BB	1ST	0.07872	522500	5427200	110.95	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann95_95_NOX.USF	NOX	ANNUAL	1CB	1ST	0.07387	523300	5426100	116.13	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_NOX.USF	NOX	ANNUAL	1CB	1ST	0.07353	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann00_00_NOX.USF	NOX	ANNUAL	1BB	1ST	0.05862	523300	5426100	116.13	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann00_00_NOX.USF	NOX	ANNUAL	1AB	1ST	0.05856	523500	5427200	138.99	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann00_00_NOX.USF	NOX	ANNUAL	1CB	1ST	0.05666	523300	5426100	116.13	1 YRS	ARCO2000.ISC

Model Results - GE 7FA Turbines - 2x1 Alternate Steam Turbine Building Case

Model	File	Pol	Average	Group	Rank	Conc.	East(X)	North(Y)	Elevation	Time	Met File
						SIL = 1.0 μg/m^3					
ISC3PBEE	2x1ann (Alt)_98_NOX.USF	NOX	ANNUAL	1CB/ALL	1ST	0.63	520492.5	5415310	35.97	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann (Alt)_98_NOX.USF	NOX	ANNUAL	1BB/ALL	1ST	0.62971	520492.5	5415310	35.97	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann (Alt)_98_NOX.USF	NOX	ANNUAL	7B/ALL	1ST	0.62969	520492.5	5415310	35.97	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann (Alt)_98_NOX.USF	NOX	ANNUAL	1AB/ALL	1ST	0.62961	520492.5	5415310	35.97	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann (Alt)_95_NOX.USF	NOX	ANNUAL	1CB/ALL	1ST	0.56492	520581	5415313	39.01	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann (Alt)_95_NOX.USF	NOX	ANNUAL	7B/ALL	1ST	0.56452	520581	5415313	39.01	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann (Alt)_95_NOX.USF	NOX	ANNUAL	1BB/ALL	1ST	0.5645	520581	5415313	39.01	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann (Alt)_95_NOX.USF	NOX	ANNUAL	1AB/ALL	1ST	0.56431	520581	5415313	39.01	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann (Alt)_98_NOX.USF	NOX	ANNUAL	GEN	1ST	0.5368	520492.5	5415310	35.97	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann (Alt)_99_NOX.USF	NOX	ANNUAL	1CB/ALL	1ST	0.52962	520448.19	5415308	35.36	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann (Alt)_99_NOX.USF	NOX	ANNUAL	1BB/ALL	1ST	0.52941	520448.19	5415308	35.36	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann (Alt)_99_NOX.USF	NOX	ANNUAL	7B/ALL	1ST	0.52937	520448.19	5415308	35.36	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann (Alt)_99_NOX.USF	NOX	ANNUAL	1AB/ALL	1ST	0.52934	520448.19	5415308	35.36	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann (Alt)_96_NOX.USF	NOX	ANNUAL	1CB/ALL	1ST	0.51137	520448.19	5415308	35.36	1 YRS	Arco96.isc
ISC3PBEE	2x1ann (Alt)_96_NOX.USF	NOX	ANNUAL	1BB/ALL	1ST	0.51111	520448.19	5415308	35.36	1 YRS	Arco96.isc
ISC3PBEE	2x1ann (Alt)_96_NOX.USF	NOX	ANNUAL	7B/ALL	1ST	0.51104	520448.19	5415308	35.36	1 YRS	Arco96.isc
ISC3PBEE	2x1ann (Alt)_96_NOX.USF	NOX	ANNUAL	1AB/ALL	1ST	0.51101	520448.19	5415308	35.36	1 YRS	Arco96.isc
ISC3PBEE	2x1ann (Alt)_00_NOX.USF	NOX	ANNUAL	1CB/ALL	1ST	0.44557	520581	5415313	39.01	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann (Alt)_00_NOX.USF	NOX	ANNUAL	1BB/ALL	1ST	0.44538	520581	5415313	39.01	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann (Alt)_00_NOX.USF	NOX	ANNUAL	7B/ALL	1ST	0.44535	520581	5415313	39.01	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann (Alt)_00_NOX.USF	NOX	ANNUAL	1AB/ALL	1ST	0.44527	520581	5415313	39.01	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann (Alt)_95_NOX.USF	NOX	ANNUAL	GEN	1ST	0.44446	520581	5415313	39.01	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann (Alt)_99_NOX.USF	NOX	ANNUAL	GEN	1ST	0.42523	520448.19	5415308	35.36	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann (Alt)_96_NOX.USF	NOX	ANNUAL	GEN	1ST	0.42493	520448.19	5415308	35.36	1 YRS	Arco96.isc
ISC3PBEE	2x1ann (Alt)_00_NOX.USF	NOX	ANNUAL	GEN	1ST	0.3529	520492.5	5415310	35.97	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann (Alt)_95_NOX.USF	NOX	ANNUAL	FPUMP	1ST	0.34481	520448.19	5414902	35.66	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann (Alt)_99_NOX.USF	NOX	ANNUAL	FPUMP	1ST	0.32866	520448.19	5414902	35.66	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann (Alt)_00_NOX.USF	NOX	ANNUAL	FPUMP	1ST	0.31985	520448.19	5414902	35.66	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann (Alt)_96_NOX.USF	NOX	ANNUAL	FPUMP	1ST	0.30017	520448.19	5414902	35.66	1 YRS	Arco96.isc
ISC3PBEE	2x1ann (Alt)_98_NOX.USF	NOX	ANNUAL	FPUMP	1ST	0.28047	520448.19	5414902	35.66	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann (Alt)_98_NOX.USF	NOX	ANNUAL	7B	1ST	0.13615	522500	5427200	110.95	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann (Alt)_99_NOX.USF	NOX	ANNUAL	7B	1ST	0.13491	523300	5426100	116.13	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann (Alt)_96_NOX.USF	NOX	ANNUAL	7B	1ST	0.12978	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann (Alt)_95_NOX.USF	NOX	ANNUAL	7B	1ST	0.12946	522500	5427200	110.95	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann (Alt)_00_NOX.USF	NOX	ANNUAL	7B	1ST	0.09649	523300	5426100	116.13	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann (Alt)_98_NOX.USF	NOX	ANNUAL	1AB	1ST	0.08687	522500	5427200	110.95	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann (Alt)_99_NOX.USF	NOX	ANNUAL	1BB	1ST	0.08425	523300	5426100	116.13	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann (Alt)_98_NOX.USF	NOX	ANNUAL	1BB	1ST	0.0838	522500	5427200	110.95	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann (Alt)_99_NOX.USF	NOX	ANNUAL	1AB	1ST	0.08344	523500	5427200	138.99	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann (Alt)_99_NOX.USF	NOX	ANNUAL	1CB	1ST	0.08225	523300	5426100	116.13	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann (Alt)_98_NOX.USF	NOX	ANNUAL	1CB	1ST	0.08224	520700	5417100	35.05	1 YRS	ARCO98.ISC

ISC3PBEE	2x1ann (Alt)_96_NOX.USF	NOX	ANNUAL	1AB	1ST	0.08175	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann (Alt)_95_NOX.USF	NOX	ANNUAL	1AB	1ST	0.08152	522500	5427200	110.95	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann (Alt)_96_NOX.USF	NOX	ANNUAL	1BB	1ST	0.07933	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann (Alt)_95_NOX.USF	NOX	ANNUAL	1BB	1ST	0.07908	522500	5427200	110.95	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann (Alt)_95_NOX.USF	NOX	ANNUAL	1CB	1ST	0.07418	523300	5426100	116.13	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann (Alt)_96_NOX.USF	NOX	ANNUAL	1CB	1ST	0.07389	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann (Alt)_00_NOX.USF	NOX	ANNUAL	1BB	1ST	0.05889	523300	5426100	116.13	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann (Alt)_00_NOX.USF	NOX	ANNUAL	1AB	1ST	0.05885	523500	5427200	138.99	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann (Alt)_00_NOX.USF	NOX	ANNUAL	1CB	1ST	0.05691	523300	5426100	116.13	1 YRS	ARCO2000.ISC

Model Results - Siemens STG6-500F Turbines - 2x1 Base Case

Model	File	Pol	Average	Group	Rank	Conc.	East(X)	North(Y)	Elevation	Time	Met File
					SIL =	1.0 μg/m^3					
ISC3PBEE	2x1ann (SW)_98_NOX.USF	NOX	ANNUAL	1CB/ALL	1ST	0.76821	520448.19	5415308	35.36	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann (SW)_98_NOX.USF	NOX	ANNUAL	1BB/ALL	1ST	0.76798	520448.19	5415308	35.36	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann (SW)_98_NOX.USF	NOX	ANNUAL	7B/ALL	1ST	0.76786	520448.19	5415308	35.36	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann (SW)_98_NOX.USF	NOX	ANNUAL	1AB/ALL	1ST	0.76781	520448.19	5415308	35.36	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann (SW)_98_NOX.USF	NOX	ANNUAL	GEN	1ST	0.69533	520448.19	5415308	35.36	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann (SW)_99_NOX.USF	NOX	ANNUAL	1CB/ALL	1ST	0.65427	520448.19	5415308	35.36	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann (SW)_99_NOX.USF	NOX	ANNUAL	1BB/ALL	1ST	0.65413	520448.19	5415308	35.36	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann (SW)_99_NOX.USF	NOX	ANNUAL	7B/ALL	1ST	0.65407	520448.19	5415308	35.36	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann (SW)_99_NOX.USF	NOX	ANNUAL	1AB/ALL	1ST	0.654	520448.19	5415308	35.36	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann (SW)_95_NOX.USF	NOX	ANNUAL	1CB/ALL	1ST	0.61322	520492.5	5415310	35.97	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann (SW)_95_NOX.USF	NOX	ANNUAL	1BB/ALL	1ST	0.61291	520492.5	5415310	35.97	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann (SW)_95_NOX.USF	NOX	ANNUAL	7B/ALL	1ST	0.61284	520492.5	5415310	35.97	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann (SW)_95_NOX.USF	NOX	ANNUAL	1AB/ALL	1ST	0.61245	520492.5	5415310	35.97	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann (SW)_96_NOX.USF	NOX	ANNUAL	1CB/ALL	1ST	0.60914	520448.19	5415308	35.36	1 YRS	Arco96.isc
ISC3PBEE	2x1ann (SW)_96_NOX.USF	NOX	ANNUAL	1BB/ALL	1ST	0.60893	520448.19	5415308	35.36	1 YRS	Arco96.isc
ISC3PBEE	2x1ann (SW)_96_NOX.USF	NOX	ANNUAL	7B/ALL	1ST	0.60883	520448.19	5415308	35.36	1 YRS	Arco96.isc
ISC3PBEE	2x1ann (SW)_96_NOX.USF	NOX	ANNUAL	1AB/ALL	1ST	0.60874	520448.19	5415308	35.36	1 YRS	Arco96.isc
ISC3PBEE	2x1ann (SW)_99_NOX.USF	NOX	ANNUAL	GEN	1ST	0.59219	520448.19	5415308	35.36	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann (SW)_96_NOX.USF	NOX	ANNUAL	GEN	1ST	0.55806	520448.19	5415308	35.36	1 YRS	Arco96.isc
ISC3PBEE	2x1ann (SW)_95_NOX.USF	NOX	ANNUAL	GEN	1ST	0.55381	520492.5	5415310	35.97	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann (SW)_00_NOX.USF	NOX	ANNUAL	1CB/ALL	1ST	0.53551	520492.5	5415310	35.97	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann (SW)_00_NOX.USF	NOX	ANNUAL	1BB/ALL	1ST	0.53547	520492.5	5415310	35.97	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann (SW)_00_NOX.USF	NOX	ANNUAL	7B/ALL	1ST	0.53546	520492.5	5415310	35.97	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann (SW)_00_NOX.USF	NOX	ANNUAL	1AB/ALL	1ST	0.53543	520492.5	5415310	35.97	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann (SW)_00_NOX.USF	NOX	ANNUAL	GEN	1ST	0.48031	520492.5	5415310	35.97	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann (SW)_95_NOX.USF	NOX	ANNUAL	FPUMP	1ST	0.34473	520448.19	5414902	35.66	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann (SW)_99_NOX.USF	NOX	ANNUAL	FPUMP	1ST	0.32865	520448.19	5414902	35.66	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann (SW)_00_NOX.USF	NOX	ANNUAL	FPUMP	1ST	0.31982	520448.19	5414902	35.66	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann (SW)_96_NOX.USF	NOX	ANNUAL	FPUMP	1ST	0.3	520448.19	5414902	35.66	1 YRS	Arco96.isc
ISC3PBEE	2x1ann (SW)_98_NOX.USF	NOX	ANNUAL	FPUMP	1ST	0.28037	520448.19	5414902	35.66	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann (SW)_98_NOX.USF	NOX	ANNUAL	7B	1ST	0.12534	522500	5427200	110.95	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann (SW)_99_NOX.USF	NOX	ANNUAL	7B	1ST	0.11975	523500	5427200	138.99	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann (SW)_96_NOX.USF	NOX	ANNUAL	7B	1ST	0.11728	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann (SW)_95_NOX.USF	NOX	ANNUAL	7B	1ST	0.11711	522500	5427200	110.95	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann (SW)_98_NOX.USF	NOX	ANNUAL	1AB	1ST	0.08799	522500	5427200	110.95	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann (SW)_00_NOX.USF	NOX	ANNUAL	7B	1ST	0.08528	523500	5427200	138.99	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann (SW)_99_NOX.USF	NOX	ANNUAL	1AB	1ST	0.08309	523500	5427200	138.99	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann (SW)_96_NOX.USF	NOX	ANNUAL	1AB	1ST	0.08164	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann (SW)_95_NOX.USF	NOX	ANNUAL	1AB	1ST	0.08125	522500	5427200	110.95	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann (SW)_98_NOX.USF	NOX	ANNUAL	1BB	1ST	0.08052	522500	5427200	110.95	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann (SW)_99_NOX.USF	NOX	ANNUAL	1BB	1ST	0.07766	523300	5426100	116.13	1 YRS	ARCO99.ISC

ISC3PBEE	2x1ann (SW)_96_NOX.USF	NOX	ANNUAL	1BB	1ST	0.07606	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann (SW)_95_NOX.USF	NOX	ANNUAL	1BB	1ST	0.07578	522500	5427200	110.95	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann (SW)_98_NOX.USF	NOX	ANNUAL	1CB	1ST	0.07462	522500	5427200	110.95	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann (SW)_99_NOX.USF	NOX	ANNUAL	1CB	1ST	0.07353	523300	5426100	116.13	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann (SW)_96_NOX.USF	NOX	ANNUAL	1CB	1ST	0.0708	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann (SW)_95_NOX.USF	NOX	ANNUAL	1CB	1ST	0.07057	522500	5427200	110.95	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann (SW)_00_NOX.USF	NOX	ANNUAL	1AB	1ST	0.05914	523500	5427200	138.99	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann (SW)_00_NOX.USF	NOX	ANNUAL	1BB	1ST	0.05482	523500	5427200	138.99	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann (SW)_00_NOX.USF	NOX	ANNUAL	1CB	1ST	0.05238	523300	5426100	116.13	1 YRS	ARCO2000.ISC

Model Results - GE 7FA Turbines - 2x1 Base Case

Model	File	Pol	Average	Group	Rank	Conc.	East(X)	North(Y)	Elevation	Time	Met File
					SIL =	1.0 μg/m^3					
ISC3PBEE	2x1ann98_98_S02.USF	S02	ANNUAL	7B/ALL	1ST	0.06368	522500	5427200	110.95	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann98_98_S02.USF	S02	ANNUAL	7B	1ST	0.06356	522500	5427200	110.95	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann99_99_S02.USF	S02	ANNUAL	7B/ALL	1ST	0.06304	523300	5426100	116.13	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann99_99_S02.USF	S02	ANNUAL	7B	1ST	0.06291	523300	5426100	116.13	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann96_96_S02.USF	S02	ANNUAL	7B/ALL	1ST	0.0606	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann95_95_S02.USF	S02	ANNUAL	7B/ALL	1ST	0.06055	522500	5427200	110.95	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_S02.USF	S02	ANNUAL	7B	1ST	0.0605	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann95_95_S02.USF	S02	ANNUAL	7B	1ST	0.06043	522500	5427200	110.95	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann00_00_S02.USF	S02	ANNUAL	7B/ALL	1ST	0.04526	523300	5426100	116.13	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann00_00_S02.USF	S02	ANNUAL	7B	1ST	0.04504	523300	5426100	116.13	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann98_98_S02.USF	S02	ANNUAL	1CB/ALL	1ST	0.04132	520700	5417000	36.88	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann98_98_S02.USF	S02	ANNUAL	1AB/ALL	1ST	0.04096	522500	5427200	110.95	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann98_98_S02.USF	S02	ANNUAL	1AB	1ST	0.04083	522500	5427200	110.95	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann99_99_S02.USF	S02	ANNUAL	1BB/ALL	1ST	0.04046	523300	5426100	116.13	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann99_99_S02.USF	S02	ANNUAL	1BB	1ST	0.04033	523300	5426100	116.13	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann98_98_S02.USF	S02	ANNUAL	1BB/ALL	1ST	0.04025	522500	5427200	110.95	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann98_98_S02.USF	S02	ANNUAL	1BB	1ST	0.04012	522500	5427200	110.95	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann98_98_S02.USF	S02	ANNUAL	1CB	1ST	0.03963	520700	5417100	35.05	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann99_99_S02.USF	S02	ANNUAL	1CB/ALL	1ST	0.03949	523300	5426100	116.13	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann99_99_S02.USF	S02	ANNUAL	1AB/ALL	1ST	0.03936	523500	5427200	138.99	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann99_99_S02.USF	S02	ANNUAL	1CB	1ST	0.03936	523300	5426100	116.13	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann99_99_S02.USF	S02	ANNUAL	1AB	1ST	0.03924	523500	5427200	138.99	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann96_96_S02.USF	S02	ANNUAL	1AB/ALL	1ST	0.03848	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann95_95_S02.USF	S02	ANNUAL	1AB/ALL	1ST	0.03846	522500	5427200	110.95	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_S02.USF	S02	ANNUAL	1AB	1ST	0.03837	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann95_95_S02.USF	S02	ANNUAL	1AB	1ST	0.03834	522500	5427200	110.95	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_S02.USF	S02	ANNUAL	1BB/ALL	1ST	0.03806	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann95_95_S02.USF	S02	ANNUAL	1BB/ALL	1ST	0.03798	522500	5427200	110.95	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_S02.USF	S02	ANNUAL	1BB	1ST	0.03795	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann95_95_S02.USF	S02	ANNUAL	1BB	1ST	0.03786	522500	5427200	110.95	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann95_95_S02.USF	S02	ANNUAL	1CB/ALL	1ST	0.03566	523300	5426100	116.13	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann95_95_S02.USF	S02	ANNUAL	1CB	1ST	0.03551	523300	5426100	116.13	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_S02.USF	S02	ANNUAL	1CB/ALL	1ST	0.03546	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann96_96_S02.USF	S02	ANNUAL	1CB	1ST	0.03535	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann00_00_S02.USF	S02	ANNUAL	1BB/ALL	1ST	0.02841	523300	5426100	116.13	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann00_00_S02.USF	S02	ANNUAL	1BB	1ST	0.02819	523300	5426100	116.13	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann00_00_S02.USF	S02	ANNUAL	1AB/ALL	1ST	0.02786	523500	5427200	138.99	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann00_00_S02.USF	S02	ANNUAL	1AB	1ST	0.02766	523500	5427200	138.99	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann00_00_S02.USF	S02	ANNUAL	1CB/ALL	1ST	0.02746	523300	5426100	116.13	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann00_00_S02.USF	S02	ANNUAL	1CB	1ST	0.02724	523300	5426100	116.13	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann98_98_S02.USF	S02	ANNUAL	GEN	1ST	0.02126	520492.5	5415310	35.97	1 YRS	ARCO98.ISC

ISC3PBEE	2x1ann99_99_S02.USF	S02	ANNUAL	GEN	1ST	0.0181	520448.19	5415308	35.36	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann95_95_S02.USF	S02	ANNUAL	GEN	1ST	0.01763	520492.5	5415310	35.97	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_S02.USF	S02	ANNUAL	GEN	1ST	0.01671	520448.19	5415308	35.36	1 YRS	Arco96.isc
ISC3PBEE	2x1ann00_00_S02.USF	S02	ANNUAL	GEN	1ST	0.0153	520492.5	5415310	35.97	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann95_95_S02.USF	S02	ANNUAL	FPUMP	1ST	0.01099	520448.19	5414902	35.66	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann00_00_S02.USF	S02	ANNUAL	FPUMP	1ST	0.01069	520448.19	5414902	35.66	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann99_99_S02.USF	S02	ANNUAL	FPUMP	1ST	0.01068	520448.19	5414902	35.66	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann96_96_S02.USF	S02	ANNUAL	FPUMP	1ST	0.00962	520448.19	5414902	35.66	1 YRS	Arco96.isc
ISC3PBEE	2x1ann98_98_S02.USF	S02	ANNUAL	FPUMP	1ST	0.00892	520448.19	5414902	35.66	1 YRS	ARCO98.ISC

Model Results - GE 7FA Turbines - 2x1 Base Case

Model	File	Pol	Average	Group	Rank	Conc.	East(X)	North(Y)	Elevation	Time	Met File
					SIL =	5.0 μg/m^3					
ISC3PBEE	2x1_24_SO2.USF	SO2	24-HR	7C/ALL	1ST	0.82456	520150	5415450	29.87	99032924	ARC95_00.isc
ISC3PBEE	2x1_24_SO2.USF	SO2	24-HR	7B/ALL	1ST	0.81213	518800	5417600	13.41	99110924	ARC95_00.isc
ISC3PBEE	2x1_24_SO2.USF	SO2	24-HR	1CC/ALL	1ST	0.81187	520150	5415450	29.87	99032924	ARC95_00.isc
ISC3PBEE	2x1_24_SO2.USF	SO2	24-HR	1CA/ALL	1ST	0.81173	520150	5415450	29.87	99032924	ARC95_00.isc
ISC3PBEE	2x1_24_SO2.USF	SO2	24-HR	1CB/ALL	1ST	0.81098	520150	5415450	29.87	99032924	ARC95_00.isc
ISC3PBEE	2x1_24_SO2.USF	SO2	24-HR	7B	1ST	0.80106	518800	5417600	13.41	99110924	ARC95_00.isc
ISC3PBEE	2x1_24_SO2.USF	SO2	24-HR	7C	1ST	0.78791	518800	5417600	13.41	99110924	ARC95_00.isc
ISC3PBEE	2x1_24_SO2.USF	SO2	24-HR	7A/ALL	1ST	0.77007	520950	5414550	42.06	95092124	ARC95_00.isc
ISC3PBEE	2x1_24_SO2.USF	SO2	24-HR	1CC	1ST	0.7638	520150	5415450	29.87	99032924	ARC95_00.isc
ISC3PBEE	2x1_24_SO2.USF	SO2	24-HR	1CA	1ST	0.76366	520150	5415450	29.87	99032924	ARC95_00.isc
ISC3PBEE	2x1_24_SO2.USF	SO2	24-HR	1CB	1ST	0.76291	520150	5415450	29.87	99032924	ARC95_00.isc
ISC3PBEE	2x1_24_SO2.USF	SO2	24-HR	7A	1ST	0.73298	520950	5414550	42.06	95092124	ARC95_00.isc
ISC3PBEE	2x1_24_SO2.USF	SO2	24-HR	1AA/ALL	1ST	0.6737	520271.19	5414902	34.14	95102924	ARC95_00.isc
ISC3PBEE	2x1_24_SO2.USF	SO2	24-HR	1AB/ALL	1ST	0.6737	520271.19	5414902	34.14	95102924	ARC95_00.isc
ISC3PBEE	2x1_24_SO2.USF	SO2	24-HR	1AC/ALL	1ST	0.6737	520271.19	5414902	34.14	95102924	ARC95_00.isc
ISC3PBEE	2x1_24_SO2.USF	SO2	24-HR	1BA/ALL	1ST	0.6737	520271.19	5414902	34.14	95102924	ARC95_00.isc
ISC3PBEE	2x1_24_SO2.USF	SO2	24-HR	1BB/ALL	1ST	0.6737	520271.19	5414902	34.14	95102924	ARC95_00.isc
ISC3PBEE	2x1_24_SO2.USF	SO2	24-HR	1BC/ALL	1ST	0.6737	520271.19	5414902	34.14	95102924	ARC95_00.isc
ISC3PBEE	2x1_24_SO2.USF	SO2	24-HR	1BC	1ST	0.61414	520150	5415450	29.87	99032924	ARC95_00.isc
ISC3PBEE	2x1_24_SO2.USF	SO2	24-HR	1BB	1ST	0.60287	520150	5415450	29.87	99032924	ARC95_00.isc
ISC3PBEE	2x1_24_SO2.USF	SO2	24-HR	1BA	1ST	0.58672	520250	5415450	31.09	99012924	ARC95_00.isc
ISC3PBEE	2x1_24_SO2.USF	SO2	24-HR	1AC	1ST	0.50422	520250	5415450	31.09	99012924	ARC95_00.isc
ISC3PBEE	2x1_24_SO2.USF	SO2	24-HR	1AA	1ST	0.47888	521000	5414500	42.06	95092124	ARC95_00.isc
ISC3PBEE	2x1_24_SO2.USF	SO2	24-HR	1AB	1ST	0.46417	521000	5414500	42.06	95092124	ARC95_00.isc
ISC3PBEE	2x1_24_SO2.USF	SO2	24-HR	GEN	1ST	0.428	520227	5414902	34.14	98121824	ARC95_00.isc
ISC3PBEE	2x1_24_SO2.USF	SO2	24-HR	FPUMP	1ST	0.28909	520448.19	5414902	35.66	98082824	ARC95_00.isc

Model Results - GE 7FA Turbines - 2x1 Base Case

Model	File	Pol	Average	Group	Rank	Conc.	East(X)	North(Y)	Elevation	Time	Met File
					SIL =	25.0 µg/m^3					
ISC3PBEE	2x1_3_SO2.USF	SO2	3-HR	1AA/ALL	1ST	5.00878	520271.19	5414902	34.14	95030115	ARC95_00.isc
ISC3PBEE	2x1_3_SO2.USF	SO2	3-HR	1AB/ALL	1ST	5.00878	520271.19	5414902	34.14	95030115	ARC95_00.isc
ISC3PBEE	2x1_3_SO2.USF	SO2	3-HR	1AC/ALL	1ST	5.00878	520271.19	5414902	34.14	95030115	ARC95_00.isc
ISC3PBEE	2x1_3_SO2.USF	SO2	3-HR	1BA/ALL	1ST	5.00878	520271.19	5414902	34.14	95030115	ARC95_00.isc
ISC3PBEE	2x1_3_SO2.USF	SO2	3-HR	1BB/ALL	1ST	5.00878	520271.19	5414902	34.14	95030115	ARC95_00.isc
ISC3PBEE	2x1_3_SO2.USF	SO2	3-HR	1BC/ALL	1ST	5.00878	520271.19	5414902	34.14	95030115	ARC95_00.isc
ISC3PBEE	2x1_3_SO2.USF	SO2	3-HR	1CA/ALL	1ST	5.00878	520271.19	5414902	34.14	95030115	ARC95_00.isc
ISC3PBEE	2x1_3_SO2.USF	SO2	3-HR	1CB/ALL	1ST	5.00878	520271.19	5414902	34.14	95030115	ARC95_00.isc
ISC3PBEE	2x1_3_SO2.USF	SO2	3-HR	1CC/ALL	1ST	5.00878	520271.19	5414902	34.14	95030115	ARC95_00.isc
ISC3PBEE	2x1_3_SO2.USF	SO2	3-HR	7A/ALL	1ST	5.00878	520271.19	5414902	34.14	95030115	ARC95_00.isc
ISC3PBEE	2x1_3_SO2.USF	SO2	3-HR	7B/ALL	1ST	5.00878	520271.19	5414902	34.14	95030115	ARC95_00.isc
ISC3PBEE	2x1_3_SO2.USF	SO2	3-HR	7C/ALL	1ST	5.00878	520271.19	5414902	34.14	95030115	ARC95_00.isc
ISC3PBEE	2x1_3_SO2.USF	SO2	3-HR	7C	1ST	4.08717	516300	5423100	79.86	96081424	ARC95_00.isc
ISC3PBEE	2x1_3_SO2.USF	SO2	3-HR	7B	1ST	4.0214	516300	5423100	79.86	96081424	ARC95_00.isc
ISC3PBEE	2x1_3_SO2.USF	SO2	3-HR	7A	1ST	3.94979	516300	5423100	79.86	96081424	ARC95_00.isc
ISC3PBEE	2x1_3_SO2.USF	SO2	3-HR	GEN	1ST	3.49829	520227	5414902	34.14	22615	ARC95_00.isc
ISC3PBEE	2x1_3_SO2.USF	SO2	3-HR	1CA	1ST	2.69052	520150	5415450	29.87	99030309	ARC95_00.isc
ISC3PBEE	2x1_3_SO2.USF	SO2	3-HR	FPUMP	1ST	2.68154	520227	5414902	34.14	121415	ARC95_00.isc
ISC3PBEE	2x1_3_SO2.USF	SO2	3-HR	1CB	1ST	2.64559	520150	5415450	29.87	99030309	ARC95_00.isc
ISC3PBEE	2x1_3_SO2.USF	SO2	3-HR	1CC	1ST	2.57691	520150	5415450	29.87	99030309	ARC95_00.isc
ISC3PBEE	2x1_3_SO2.USF	SO2	3-HR	1BA	1ST	2.56275	516300	5423100	79.86	96081424	ARC95_00.isc
ISC3PBEE	2x1_3_SO2.USF	SO2	3-HR	1BB	1ST	2.52587	516300	5423100	79.86	96081424	ARC95_00.isc
ISC3PBEE	2x1_3_SO2.USF	SO2	3-HR	1BC	1ST	2.45024	520150	5415450	29.87	99030309	ARC95_00.isc
ISC3PBEE	2x1_3_SO2.USF	SO2	3-HR	1AC	1ST	2.38649	516300	5423100	79.86	96081424	ARC95_00.isc
ISC3PBEE	2x1_3_SO2.USF	SO2	3-HR	1AB	1ST	2.37982	516300	5423100	79.86	96081424	ARC95_00.isc
ISC3PBEE	2x1_3_SO2.USF	SO2	3-HR	1AA	1ST	2.36373	516300	5423100	79.86	96081424	ARC95_00.isc

Model Results - GE 7FA Turbines - 2x1 Base Case

Model	File	Pol	Average	Group	Rank	Conc.	East(X)	North(Y)	Elevation	Time	Met File
					SIL =	None					
ISC3PBEE	2x1_1_95_SO2.USF	SO2	1-HR	1AA/ALL	1ST	10.2812	520315.5	5414902	34.14	12412	ARC95_00.isc
ISC3PBEE	2x1_1_95_SO2.USF	SO2	1-HR	1AB/ALL	1ST	10.2812	520315.5	5414902	34.14	12412	ARC95_00.isc
ISC3PBEE	2x1_1_95_SO2.USF	SO2	1-HR	1AC/ALL	1ST	10.2812	520315.5	5414902	34.14	12412	ARC95_00.isc
ISC3PBEE	2x1_1_95_SO2.USF	SO2	1-HR	1BA/ALL	1ST	10.2812	520315.5	5414902	34.14	12412	ARC95_00.isc
ISC3PBEE	2x1_1_95_SO2.USF	SO2	1-HR	1BB/ALL	1ST	10.2812	520315.5	5414902	34.14	12412	ARC95_00.isc
ISC3PBEE	2x1_1_95_SO2.USF	SO2	1-HR	1BC/ALL	1ST	10.2812	520315.5	5414902	34.14	12412	ARC95_00.isc
ISC3PBEE	2x1_1_95_SO2.USF	SO2	1-HR	1CA/ALL	1ST	10.2812	520315.5	5414902	34.14	12412	ARC95_00.isc
ISC3PBEE	2x1_1_95_SO2.USF	SO2	1-HR	1CB/ALL	1ST	10.2812	520315.5	5414902	34.14	12412	ARC95_00.isc
ISC3PBEE	2x1_1_95_SO2.USF	SO2	1-HR	1CC/ALL	1ST	10.2812	520315.5	5414902	34.14	12412	ARC95_00.isc
ISC3PBEE	2x1_1_95_SO2.USF	SO2	1-HR	7A/ALL	1ST	10.2812	520315.5	5414902	34.14	12412	ARC95_00.isc
ISC3PBEE	2x1_1_95_SO2.USF	SO2	1-HR	7B/ALL	1ST	10.2812	520315.5	5414902	34.14	12412	ARC95_00.isc
ISC3PBEE	2x1_1_95_SO2.USF	SO2	1-HR	7C/ALL	1ST	10.2812	520315.5	5414902	34.14	12412	ARC95_00.isc
ISC3PBEE	2x1_1_95_SO2.USF	SO2	1-HR	GEN	1ST	9.43144	520315.5	5414902	34.14	12412	ARC95_00.isc
ISC3PBEE	2x1_1_95_SO2.USF	SO2	1-HR	7A	1ST	6.50361	520600	5415750	31.39	98080410	ARC95_00.isc
ISC3PBEE	2x1_1_95_SO2.USF	SO2	1-HR	7C	1ST	6.47935	520950	5415050	37.19	98090712	ARC95_00.isc
ISC3PBEE	2x1_1_95_SO2.USF	SO2	1-HR	7B	1ST	6.44988	520300	5415700	28.04	98071010	ARC95_00.isc
ISC3PBEE	2x1_1_95_SO2.USF	SO2	1-HR	FPUMP	1ST	5.81664	520250	5414850	34.14	11912	ARC95_00.isc
ISC3PBEE	2x1_1_95_SO2.USF	SO2	1-HR	1AA	1ST	4.49147	521000	5414650	42.06	98083112	ARC95_00.isc
ISC3PBEE	2x1_1_95_SO2.USF	SO2	1-HR	1AB	1ST	4.20706	520950	5415600	32.92	98090315	ARC95_00.isc
ISC3PBEE	2x1_1_95_SO2.USF	SO2	1-HR	1CA	1ST	4.19782	524300	5412100	81.69	95102001	ARC95_00.isc
ISC3PBEE	2x1_1_95_SO2.USF	SO2	1-HR	1BB	1ST	4.08124	520950	5415050	37.19	98090712	ARC95_00.isc
ISC3PBEE	2x1_1_95_SO2.USF	SO2	1-HR	1CB	1ST	4.08115	524300	5412100	81.69	95102001	ARC95_00.isc
ISC3PBEE	2x1_1_95_SO2.USF	SO2	1-HR	1BA	1ST	4.08114	520300	5415700	28.04	98071010	ARC95_00.isc
ISC3PBEE	2x1_1_95_SO2.USF	SO2	1-HR	1CC	1ST	3.95888	524300	5412100	81.69	95102001	ARC95_00.isc
ISC3PBEE	2x1_1_95_SO2.USF	SO2	1-HR	1AC	1ST	3.88142	520950	5415600	32.92	98090315	ARC95_00.isc
ISC3PBEE	2x1_1_95_SO2.USF	SO2	1-HR	1BC	1ST	3.86738	520300	5415750	25.6	98071010	ARC95_00.isc

Model Results - GE 7FA Turbines - 2x1 Base Case

Model	File	Pol	Average	Group	Rank	Conc.	East(X)	North(Y)	Elevation	Time	Met File
					SIL =	500 μg/m^3					
ISC3PBEE	2x1_8_CO.USF	CO	8-HR	1AA/ALL	1ST	10.92182	520271.19	5414902	34.14	98121816	ARC95_00.isc
ISC3PBEE	2x1_8_CO.USF	CO	8-HR	1AB/ALL	1ST	10.92182	520271.19	5414902	34.14	98121816	ARC95_00.isc
ISC3PBEE	2x1_8_CO.USF	CO	8-HR	1AC/ALL	1ST	10.92182	520271.19	5414902	34.14	98121816	ARC95_00.isc
ISC3PBEE	2x1_8_CO.USF	CO	8-HR	1BA/ALL	1ST	10.92182	520271.19	5414902	34.14	98121816	ARC95_00.isc
ISC3PBEE	2x1_8_CO.USF	CO	8-HR	1BB/ALL	1ST	10.92182	520271.19	5414902	34.14	98121816	ARC95_00.isc
ISC3PBEE	2x1_8_CO.USF	CO	8-HR	1BC/ALL	1ST	10.92182	520271.19	5414902	34.14	98121816	ARC95_00.isc
ISC3PBEE	2x1_8_CO.USF	CO	8-HR	1CA/ALL	1ST	10.92182	520271.19	5414902	34.14	98121816	ARC95_00.isc
ISC3PBEE	2x1_8_CO.USF	CO	8-HR	1CB/ALL	1ST	10.92182	520271.19	5414902	34.14	98121816	ARC95_00.isc
ISC3PBEE	2x1_8_CO.USF	CO	8-HR	1CC/ALL	1ST	10.92182	520271.19	5414902	34.14	98121816	ARC95_00.isc
ISC3PBEE	2x1_8_CO.USF	CO	8-HR	7A/ALL	1ST	10.92182	520271.19	5414902	34.14	98121816	ARC95_00.isc
ISC3PBEE	2x1_8_CO.USF	CO	8-HR	7B/ALL	1ST	10.92182	520271.19	5414902	34.14	98121816	ARC95_00.isc
ISC3PBEE	2x1_8_CO.USF	CO	8-HR	7C/ALL	1ST	10.92182	520271.19	5414902	34.14	98121816	ARC95_00.isc
ISC3PBEE	2x1_8_CO.USF	CO	8-HR	GEN	1ST	10.54703	520227	5414902	34.14	98121816	ARC95_00.isc
ISC3PBEE	2x1_8_CO.USF	CO	8-HR	7C	1ST	2.35406	520250	5415450	31.09	99012908	ARC95_00.isc
ISC3PBEE	2x1_8_CO.USF	CO	8-HR	7B	1ST	2.13996	520250	5415450	31.09	99012908	ARC95_00.isc
ISC3PBEE	2x1_8_CO.USF	CO	8-HR	1CA	1ST	2.06056	520250	5415450	31.09	99012908	ARC95_00.isc
ISC3PBEE	2x1_8_CO.USF	CO	8-HR	1CB	1ST	2.03364	520250	5415450	31.09	99012908	ARC95_00.isc
ISC3PBEE	2x1_8_CO.USF	CO	8-HR	1CC	1ST	1.96448	520250	5415450	31.09	99012908	ARC95_00.isc
ISC3PBEE	2x1_8_CO.USF	CO	8-HR	7A	1ST	1.9198	520250	5415450	31.09	99012908	ARC95_00.isc
ISC3PBEE	2x1_8_CO.USF	CO	8-HR	1BB	1ST	1.79256	520250	5415450	31.09	99012908	ARC95_00.isc
ISC3PBEE	2x1_8_CO.USF	CO	8-HR	1BC	1ST	1.78878	520250	5415450	31.09	99012908	ARC95_00.isc
ISC3PBEE	2x1_8_CO.USF	CO	8-HR	1BA	1ST	1.74345	520250	5415450	31.09	99012908	ARC95_00.isc
ISC3PBEE	2x1_8_CO.USF	CO	8-HR	FPUMP	1ST	1.71273	520227	5414902	34.14	96032416	ARC95_00.isc
ISC3PBEE	2x1_8_CO.USF	CO	8-HR	1AC	1ST	1.5181	520250	5415450	31.09	99012908	ARC95_00.isc
ISC3PBEE	2x1_8_CO.USF	CO	8-HR	1AB	1ST	1.4115	520250	5415450	31.09	99012908	ARC95_00.isc
ISC3PBEE	2x1_8_CO.USF	CO	8-HR	1AA	1ST	1.27837	520250	5415450	31.09	99012908	ARC95_00.isc

Model Results - GE 7FA Turbines - 2x1 Base Case

Model	File	Pol	Average	Group	Rank	Conc.	East(X)	North(Y)	Elevation	Time	Met File
					SIL =	2,000 μg/m^3					
ISC3PBEE	2x1_1_95_CO.USF	CO	1-HR	1AA/ALL	1ST	83.04567	520315.5	5414902	34.14	12412	ARC95_00.isc
ISC3PBEE	2x1_1_95_CO.USF	CO	1-HR	1AB/ALL	1ST	83.04567	520315.5	5414902	34.14	12412	ARC95_00.isc
ISC3PBEE	2x1_1_95_CO.USF	CO	1-HR	1AC/ALL	1ST	83.04567	520315.5	5414902	34.14	12412	ARC95_00.isc
ISC3PBEE	2x1_1_95_CO.USF	CO	1-HR	1BA/ALL	1ST	83.04567	520315.5	5414902	34.14	12412	ARC95_00.isc
ISC3PBEE	2x1_1_95_CO.USF	CO	1-HR	1BB/ALL	1ST	83.04567	520315.5	5414902	34.14	12412	ARC95_00.isc
ISC3PBEE	2x1_1_95_CO.USF	CO	1-HR	1BC/ALL	1ST	83.04567	520315.5	5414902	34.14	12412	ARC95_00.isc
ISC3PBEE	2x1_1_95_CO.USF	CO	1-HR	1CA/ALL	1ST	83.04567	520315.5	5414902	34.14	12412	ARC95_00.isc
ISC3PBEE	2x1_1_95_CO.USF	CO	1-HR	1CB/ALL	1ST	83.04567	520315.5	5414902	34.14	12412	ARC95_00.isc
ISC3PBEE	2x1_1_95_CO.USF	CO	1-HR	1CC/ALL	1ST	83.04567	520315.5	5414902	34.14	12412	ARC95_00.isc
ISC3PBEE	2x1_1_95_CO.USF	CO	1-HR	7A/ALL	1ST	83.04567	520315.5	5414902	34.14	12412	ARC95_00.isc
ISC3PBEE	2x1_1_95_CO.USF	CO	1-HR	7B/ALL	1ST	83.04567	520315.5	5414902	34.14	12412	ARC95_00.isc
ISC3PBEE	2x1_1_95_CO.USF	CO	1-HR	7C/ALL	1ST	83.04567	520315.5	5414902	34.14	12412	ARC95_00.isc
ISC3PBEE	2x1_1_95_CO.USF	CO	1-HR	GEN	1ST	81.34614	520315.5	5414902	34.14	12412	ARC95_00.isc
ISC3PBEE	2x1_1_95_CO.USF	CO	1-HR	FPUMP	1ST	11.63327	520250	5414850	34.14	11912	ARC95_00.isc
ISC3PBEE	2x1_1_95_CO.USF	CO	1-HR	7A	1ST	6.73588	520600	5415750	31.39	98080410	ARC95_00.isc
ISC3PBEE	2x1_1_95_CO.USF	CO	1-HR	7B	1ST	6.69327	520300	5415700	28.04	98071010	ARC95_00.isc
ISC3PBEE	2x1_1_95_CO.USF	CO	1-HR	7C	1ST	6.67373	520950	5415050	37.19	98090712	ARC95_00.isc
ISC3PBEE	2x1_1_95_CO.USF	CO	1-HR	1AA	1ST	4.5997	521000	5414650	42.06	98083112	ARC95_00.isc
ISC3PBEE	2x1_1_95_CO.USF	CO	1-HR	1AB	1ST	4.37097	520950	5415600	32.92	98090315	ARC95_00.isc
ISC3PBEE	2x1_1_95_CO.USF	CO	1-HR	1CA	1ST	4.27702	524300	5412100	81.69	95102001	ARC95_00.isc
ISC3PBEE	2x1_1_95_CO.USF	CO	1-HR	1CB	1ST	4.16278	524300	5412100	81.69	95102001	ARC95_00.isc
ISC3PBEE	2x1_1_95_CO.USF	CO	1-HR	1BB	1ST	4.14602	520950	5415050	37.19	98090712	ARC95_00.isc
ISC3PBEE	2x1_1_95_CO.USF	CO	1-HR	1BA	1ST	4.14205	520300	5415700	28.04	98071010	ARC95_00.isc
ISC3PBEE	2x1_1_95_CO.USF	CO	1-HR	1AC	1ST	3.99075	520950	5415600	32.92	98090315	ARC95_00.isc
ISC3PBEE	2x1_1_95_CO.USF	CO	1-HR	1CC	1ST	3.95888	524300	5412100	81.69	95102001	ARC95_00.isc
ISC3PBEE	2x1_1_95_CO.USF	CO	1-HR	1BC	1ST	3.93406	520300	5415750	25.6	98071010	ARC95_00.isc

Model Results - GE 7FA Turbines - 2x1 Base Case

Model	File	Pol	Average	Group	Rank	Conc.	East(X)	North(Y)	Elevation	Time	Met File
					ASIL =	0.45 µg/m^3					
ISC3PBEE	2x1ann98_98_ACETALD.USF	ACETALD	ANNUAL	1CB/ALL	1ST	0.00018	520700	5417000	36.88	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann00_00_ACETALD.USF	ACETALD	ANNUAL	1AB/ALL	1ST	0.00017	520448.19	5414902	35.66	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann95_95_ACETALD.USF	ACETALD	ANNUAL	1AB/ALL	1ST	0.00017	520448.19	5414902	35.66	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann99_99_ACETALD.USF	ACETALD	ANNUAL	1AB/ALL	1ST	0.00017	520448.19	5414902	35.66	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann00_00_ACETALD.USF	ACETALD	ANNUAL	1BB/ALL	1ST	0.00017	520448.19	5414902	35.66	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann95_95_ACETALD.USF	ACETALD	ANNUAL	1BB/ALL	1ST	0.00017	520448.19	5414902	35.66	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann99_99_ACETALD.USF	ACETALD	ANNUAL	1BB/ALL	1ST	0.00017	520448.19	5414902	35.66	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann98_98_ACETALD.USF	ACETALD	ANNUAL	1CB	1ST	0.00017	520700	5417100	35.05	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann99_99_ACETALD.USF	ACETALD	ANNUAL	1CB	1ST	0.00017	523300	5426100	116.13	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann00_00_ACETALD.USF	ACETALD	ANNUAL	1CB/ALL	1ST	0.00017	520448.19	5414902	35.66	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann95_95_ACETALD.USF	ACETALD	ANNUAL	1CB/ALL	1ST	0.00017	520448.19	5414902	35.66	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann99_99_ACETALD.USF	ACETALD	ANNUAL	1CB/ALL	1ST	0.00017	523300	5426100	116.13	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann00_00_ACETALD.USF	ACETALD	ANNUAL	7B/ALL	1ST	0.00017	520448.19	5414902	35.66	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann95_95_ACETALD.USF	ACETALD	ANNUAL	7B/ALL	1ST	0.00017	520448.19	5414902	35.66	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann99_99_ACETALD.USF	ACETALD	ANNUAL	7B/ALL	1ST	0.00017	520448.19	5414902	35.66	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann00_00_ACETALD.USF	ACETALD	ANNUAL	FPUMP	1ST	0.00017	520448.19	5414902	35.66	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann95_95_ACETALD.USF	ACETALD	ANNUAL	FPUMP	1ST	0.00017	520448.19	5414902	35.66	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann99_99_ACETALD.USF	ACETALD	ANNUAL	FPUMP	1ST	0.00017	520448.19	5414902	35.66	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann95_95_ACETALD.USF	ACETALD	ANNUAL	1CB	1ST	0.00016	523300	5426100	116.13	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_ACETALD.USF	ACETALD	ANNUAL	1CB/ALL	1ST	0.00016	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann96_96_ACETALD.USF	ACETALD	ANNUAL	1AB/ALL	1ST	0.00015	520448.19	5414902	35.66	1 YRS	Arco96.isc
ISC3PBEE	2x1ann96_96_ACETALD.USF	ACETALD	ANNUAL	1BB/ALL	1ST	0.00015	520448.19	5414902	35.66	1 YRS	Arco96.isc
ISC3PBEE	2x1ann96_96_ACETALD.USF	ACETALD	ANNUAL	1CB	1ST	0.00015	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann96_96_ACETALD.USF	ACETALD	ANNUAL	7B/ALL	1ST	0.00015	520448.19	5414902	35.66	1 YRS	Arco96.isc
ISC3PBEE	2x1ann96_96_ACETALD.USF	ACETALD	ANNUAL	FPUMP	1ST	0.00015	520448.19	5414902	35.66	1 YRS	Arco96.isc
ISC3PBEE	2x1ann98_98_ACETALD.USF	ACETALD	ANNUAL	1AB/ALL	1ST	0.00014	520448.19	5414902	35.66	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann98_98_ACETALD.USF	ACETALD	ANNUAL	1BB	1ST	0.00014	522500	5427200	110.95	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann99_99_ACETALD.USF	ACETALD	ANNUAL	1BB	1ST	0.00014	523300	5426100	116.13	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann98_98_ACETALD.USF	ACETALD	ANNUAL	1BB/ALL	1ST	0.00014	522500	5427200	110.95	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann98_98_ACETALD.USF	ACETALD	ANNUAL	7B/ALL	1ST	0.00014	520448.19	5414902	35.66	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann98_98_ACETALD.USF	ACETALD	ANNUAL	FPUMP	1ST	0.00014	520448.19	5414902	35.66	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann95_95_ACETALD.USF	ACETALD	ANNUAL	1BB	1ST	0.00013	522500	5427200	110.95	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_ACETALD.USF	ACETALD	ANNUAL	1BB	1ST	0.00013	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann98_98_ACETALD.USF	ACETALD	ANNUAL	7B	1ST	0.00013	522500	5427200	110.95	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann99_99_ACETALD.USF	ACETALD	ANNUAL	7B	1ST	0.00013	523300	5426100	116.13	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann98_98_ACETALD.USF	ACETALD	ANNUAL	1AB	1ST	0.00012	522500	5427200	110.95	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann00_00_ACETALD.USF	ACETALD	ANNUAL	1CB	1ST	0.00012	523300	5426100	116.13	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann95_95_ACETALD.USF	ACETALD	ANNUAL	7B	1ST	0.00012	522500	5427200	110.95	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_ACETALD.USF	ACETALD	ANNUAL	7B	1ST	0.00012	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann95_95_ACETALD.USF	ACETALD	ANNUAL	1AB	1ST	0.00011	522500	5427200	110.95	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_ACETALD.USF	ACETALD	ANNUAL	1AB	1ST	0.00011	522500	5427200	110.95	1 YRS	Arco96.isc

ISC3PBEE	2x1ann99_99_ACETALD.USF	ACETALD	ANNUAL	1AB	1ST	0.00011	523500	5427200	138.99	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann00_00_ACETALD.USF	ACETALD	ANNUAL	1BB	1ST	0.0001	523300	5426100	116.13	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann00_00_ACETALD.USF	ACETALD	ANNUAL	7B	1ST	0.00009	523300	5426100	116.13	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann00_00_ACETALD.USF	ACETALD	ANNUAL	1AB	1ST	0.00008	523500	5427200	138.99	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann00_00_ACETALD.USF	ACETALD	ANNUAL	GEN	1ST	0.00001	520492.5	5415310	35.97	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann95_95_ACETALD.USF	ACETALD	ANNUAL	GEN	1ST	0.00001	520492.5	5415310	35.97	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_ACETALD.USF	ACETALD	ANNUAL	GEN	1ST	0.00001	520448.19	5415308	35.36	1 YRS	Arco96.isc
ISC3PBEE	2x1ann98_98_ACETALD.USF	ACETALD	ANNUAL	GEN	1ST	0.00001	520492.5	5415310	35.97	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann99_99_ACETALD.USF	ACETALD	ANNUAL	GEN	1ST	0.00001	520448.19	5415308	35.36	1 YRS	ARCO99.ISC

Model Results - GE 7FA Turbines - 2x1 Base Case

Model	File	Pol	Average	Group	Rank	Conc.	East(X)	North(Y)	Elevation	Time	Met File
					ASIL =	0.02 µg/m^3					
ISC3PBEE	2x1_24_ACROLEIN.USF	ACROLEIN	24-HR	1CC/ALL	1ST	0.00205	520150	5415450	29.87	99032924	ARC95_00.isc
ISC3PBEE	2x1_24_ACROLEIN.USF	ACROLEIN	24-HR	1CC	1ST	0.00202	520150	5415450	29.87	99032924	ARC95_00.isc
ISC3PBEE	2x1_24_ACROLEIN.USF	ACROLEIN	24-HR	1CB/ALL	1ST	0.00193	520150	5415450	29.87	99032924	ARC95_00.isc
ISC3PBEE	2x1_24_ACROLEIN.USF	ACROLEIN	24-HR	1CB	1ST	0.0019	520150	5415450	29.87	99032924	ARC95_00.isc
ISC3PBEE	2x1_24_ACROLEIN.USF	ACROLEIN	24-HR	1CA/ALL	1ST	0.00182	520150	5415450	29.87	99032924	ARC95_00.isc
ISC3PBEE	2x1_24_ACROLEIN.USF	ACROLEIN	24-HR	1CA	1ST	0.00179	520150	5415450	29.87	99032924	ARC95_00.isc
ISC3PBEE	2x1_24_ACROLEIN.USF	ACROLEIN	24-HR	1BC/ALL	1ST	0.00135	520150	5415450	29.87	99032924	ARC95_00.isc
ISC3PBEE	2x1_24_ACROLEIN.USF	ACROLEIN	24-HR	1BC	1ST	0.00132	520150	5415450	29.87	99032924	ARC95_00.isc
ISC3PBEE	2x1_24_ACROLEIN.USF	ACROLEIN	24-HR	1BB/ALL	1ST	0.00122	520150	5415450	29.87	99032924	ARC95_00.isc
ISC3PBEE	2x1_24_ACROLEIN.USF	ACROLEIN	24-HR	1BB	1ST	0.00119	520150	5415450	29.87	99032924	ARC95_00.isc
ISC3PBEE	2x1_24_ACROLEIN.USF	ACROLEIN	24-HR	1BA	1ST	0.00109	520250	5415450	31.09	99012924	ARC95_00.isc
ISC3PBEE	2x1_24_ACROLEIN.USF	ACROLEIN	24-HR	1BA/ALL	1ST	0.00109	520150	5415450	29.87	99032924	ARC95_00.isc
ISC3PBEE	2x1_24_ACROLEIN.USF	ACROLEIN	24-HR	7C/ALL	1ST	0.001	520150	5415450	29.87	99032924	ARC95_00.isc
ISC3PBEE	2x1_24_ACROLEIN.USF	ACROLEIN	24-HR	7C	1ST	0.00098	518800	5417600	13.41	99110924	ARC95_00.isc
ISC3PBEE	2x1_24_ACROLEIN.USF	ACROLEIN	24-HR	7B	1ST	0.00094	518800	5417600	13.41	99110924	ARC95_00.isc
ISC3PBEE	2x1_24_ACROLEIN.USF	ACROLEIN	24-HR	7B/ALL	1ST	0.00094	518800	5417600	13.41	99110924	ARC95_00.isc
ISC3PBEE	2x1_24_ACROLEIN.USF	ACROLEIN	24-HR	1AC	1ST	0.00088	520250	5415450	31.09	99012924	ARC95_00.isc
ISC3PBEE	2x1_24_ACROLEIN.USF	ACROLEIN	24-HR	1AC/ALL	1ST	0.00088	520250	5415450	31.09	99012924	ARC95_00.isc
ISC3PBEE	2x1_24_ACROLEIN.USF	ACROLEIN	24-HR	7A/ALL	1ST	0.00083	520950	5414550	42.06	95092124	ARC95_00.isc
ISC3PBEE	2x1_24_ACROLEIN.USF	ACROLEIN	24-HR	7A	1ST	0.00081	520950	5414550	42.06	95092124	ARC95_00.isc
ISC3PBEE	2x1_24_ACROLEIN.USF	ACROLEIN	24-HR	1AB/ALL	1ST	0.00076	521000	5414500	42.06	95092124	ARC95_00.isc
ISC3PBEE	2x1_24_ACROLEIN.USF	ACROLEIN	24-HR	1AB	1ST	0.00075	521000	5414500	42.06	95092124	ARC95_00.isc
ISC3PBEE	2x1_24_ACROLEIN.USF	ACROLEIN	24-HR	1AA/ALL	1ST	0.00073	521000	5414500	42.06	95092124	ARC95_00.isc
ISC3PBEE	2x1_24_ACROLEIN.USF	ACROLEIN	24-HR	1AA	1ST	0.00072	521000	5414500	42.06	95092124	ARC95_00.isc
ISC3PBEE	2x1_24_ACROLEIN.USF	ACROLEIN	24-HR	FPUMP	1ST	0.00054	520448.19	5414902	35.66	98082824	ARC95_00.isc
ISC3PBEE	2x1_24_ACROLEIN.USF	ACROLEIN	24-HR	GEN	1ST	0.00006	520227	5414902	34.14	98121824	ARC95_00.isc

Model Results - GE 7FA Turbines - 2x1 Base Case

Model	File	Pol	Average	Group	Rank	Conc.	East(X)	North(Y)	Elevation	Time	Met File
					ASIL =	100 µg/m^3					
ISC3PBEE	2x1_24_AMMONIA.USF	AMMONIA	24-HR	1CC	1ST	2.1939	520150	5415450	29.87	99032924	ARC95_00.isc
ISC3PBEE	2x1_24_AMMONIA.USF	AMMONIA	24-HR	1CC/ALL	1ST	2.1939	520150	5415450	29.87	99032924	ARC95_00.isc
ISC3PBEE	2x1_24_AMMONIA.USF	AMMONIA	24-HR	1CB	1ST	2.05986	520150	5415450	29.87	99032924	ARC95_00.isc
ISC3PBEE	2x1_24_AMMONIA.USF	AMMONIA	24-HR	1CB/ALL	1ST	2.05986	520150	5415450	29.87	99032924	ARC95_00.isc
ISC3PBEE	2x1_24_AMMONIA.USF	AMMONIA	24-HR	1CA	1ST	1.94516	520150	5415450	29.87	99032924	ARC95_00.isc
ISC3PBEE	2x1_24_AMMONIA.USF	AMMONIA	24-HR	1CA/ALL	1ST	1.94516	520150	5415450	29.87	99032924	ARC95_00.isc
ISC3PBEE	2x1_24_AMMONIA.USF	AMMONIA	24-HR	1BC	1ST	1.42946	520150	5415450	29.87	99032924	ARC95_00.isc
ISC3PBEE	2x1_24_AMMONIA.USF	AMMONIA	24-HR	1BC/ALL	1ST	1.42946	520150	5415450	29.87	99032924	ARC95_00.isc
ISC3PBEE	2x1_24_AMMONIA.USF	AMMONIA	24-HR	1BB	1ST	1.29187	520150	5415450	29.87	99032924	ARC95_00.isc
ISC3PBEE	2x1_24_AMMONIA.USF	AMMONIA	24-HR	1BB/ALL	1ST	1.29187	520150	5415450	29.87	99032924	ARC95_00.isc
ISC3PBEE	2x1_24_AMMONIA.USF	AMMONIA	24-HR	1BA	1ST	1.1822	520250	5415450	31.09	99012924	ARC95_00.isc
ISC3PBEE	2x1_24_AMMONIA.USF	AMMONIA	24-HR	1BA/ALL	1ST	1.1822	520250	5415450	31.09	99012924	ARC95_00.isc
ISC3PBEE	2x1_24_AMMONIA.USF	AMMONIA	24-HR	7C	1ST	1.06368	518800	5417600	13.41	99110924	ARC95_00.isc
ISC3PBEE	2x1_24_AMMONIA.USF	AMMONIA	24-HR	7C/ALL	1ST	1.06368	518800	5417600	13.41	99110924	ARC95_00.isc
ISC3PBEE	2x1_24_AMMONIA.USF	AMMONIA	24-HR	7B	1ST	1.02022	518800	5417600	13.41	99110924	ARC95_00.isc
ISC3PBEE	2x1_24_AMMONIA.USF	AMMONIA	24-HR	7B/ALL	1ST	1.02022	518800	5417600	13.41	99110924	ARC95_00.isc
ISC3PBEE	2x1_24_AMMONIA.USF	AMMONIA	24-HR	1AC	1ST	0.95873	520250	5415450	31.09	99012924	ARC95_00.isc
ISC3PBEE	2x1_24_AMMONIA.USF	AMMONIA	24-HR	1AC/ALL	1ST	0.95873	520250	5415450	31.09	99012924	ARC95_00.isc
ISC3PBEE	2x1_24_AMMONIA.USF	AMMONIA	24-HR	7A	1ST	0.8835	520950	5414550	42.06	95092124	ARC95_00.isc
ISC3PBEE	2x1_24_AMMONIA.USF	AMMONIA	24-HR	7A/ALL	1ST	0.8835	520950	5414550	42.06	95092124	ARC95_00.isc
ISC3PBEE	2x1_24_AMMONIA.USF	AMMONIA	24-HR	1AB	1ST	0.81381	521000	5414500	42.06	95092124	ARC95_00.isc
ISC3PBEE	2x1_24_AMMONIA.USF	AMMONIA	24-HR	1AB/ALL	1ST	0.81381	521000	5414500	42.06	95092124	ARC95_00.isc
ISC3PBEE	2x1_24_AMMONIA.USF	AMMONIA	24-HR	1AA	1ST	0.77891	521000	5414500	42.06	95092124	ARC95_00.isc
ISC3PBEE	2x1_24_AMMONIA.USF	AMMONIA	24-HR	1AA/ALL	1ST	0.77891	521000	5414500	42.06	95092124	ARC95_00.isc

Model Results - GE 7FA Turbines - 2x1 Base Case

Model	File	Pol	Average	Group	Rank	Conc.	East(X)	North(Y)	Elevation	Time	Met File
					ASIL =	0.00023 μg/m^3					
ISC3PBEE	2x1ann98_98_ARSENIC.USF	ARSENIC	ANNUAL	1AB/ALL	1ST	0.0001	520448.19	5415308	35.36	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann98_98_ARSENIC.USF	ARSENIC	ANNUAL	1BB/ALL	1ST	0.0001	520448.19	5415308	35.36	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann98_98_ARSENIC.USF	ARSENIC	ANNUAL	1CB/ALL	1ST	0.0001	520448.19	5415308	35.36	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann98_98_ARSENIC.USF	ARSENIC	ANNUAL	7B/ALL	1ST	0.0001	520448.19	5415308	35.36	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann98_98_ARSENIC.USF	ARSENIC	ANNUAL	GEN	1ST	0.0001	520492.5	5415310	35.97	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann95_95_ARSENIC.USF	ARSENIC	ANNUAL	1AB/ALL	1ST	0.00009	520492.5	5415310	35.97	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann99_99_ARSENIC.USF	ARSENIC	ANNUAL	1AB/ALL	1ST	0.00009	520448.19	5415308	35.36	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann95_95_ARSENIC.USF	ARSENIC	ANNUAL	1BB/ALL	1ST	0.00009	520492.5	5415310	35.97	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann99_99_ARSENIC.USF	ARSENIC	ANNUAL	1BB/ALL	1ST	0.00009	520448.19	5415308	35.36	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann95_95_ARSENIC.USF	ARSENIC	ANNUAL	1CB/ALL	1ST	0.00009	520492.5	5415310	35.97	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann99_99_ARSENIC.USF	ARSENIC	ANNUAL	1CB/ALL	1ST	0.00009	520448.19	5415308	35.36	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann95_95_ARSENIC.USF	ARSENIC	ANNUAL	7B/ALL	1ST	0.00009	520492.5	5415310	35.97	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann99_99_ARSENIC.USF	ARSENIC	ANNUAL	7B/ALL	1ST	0.00009	520448.19	5415308	35.36	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann00_00_ARSENIC.USF	ARSENIC	ANNUAL	1AB/ALL	1ST	0.00008	520492.5	5415310	35.97	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann96_96_ARSENIC.USF	ARSENIC	ANNUAL	1AB/ALL	1ST	0.00008	520448.19	5415308	35.36	1 YRS	Arco96.isc
ISC3PBEE	2x1ann00_00_ARSENIC.USF	ARSENIC	ANNUAL	1BB/ALL	1ST	0.00008	520492.5	5415310	35.97	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann96_96_ARSENIC.USF	ARSENIC	ANNUAL	1BB/ALL	1ST	0.00008	520448.19	5415308	35.36	1 YRS	Arco96.isc
ISC3PBEE	2x1ann00_00_ARSENIC.USF	ARSENIC	ANNUAL	1CB/ALL	1ST	0.00008	520492.5	5415310	35.97	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann96_96_ARSENIC.USF	ARSENIC	ANNUAL	1CB/ALL	1ST	0.00008	520448.19	5415308	35.36	1 YRS	Arco96.isc
ISC3PBEE	2x1ann00_00_ARSENIC.USF	ARSENIC	ANNUAL	7B/ALL	1ST	0.00008	520492.5	5415310	35.97	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann96_96_ARSENIC.USF	ARSENIC	ANNUAL	7B/ALL	1ST	0.00008	520448.19	5415308	35.36	1 YRS	Arco96.isc
ISC3PBEE	2x1ann95_95_ARSENIC.USF	ARSENIC	ANNUAL	GEN	1ST	0.00008	520492.5	5415310	35.97	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_ARSENIC.USF	ARSENIC	ANNUAL	GEN	1ST	0.00008	520448.19	5415308	35.36	1 YRS	Arco96.isc
ISC3PBEE	2x1ann99_99_ARSENIC.USF	ARSENIC	ANNUAL	GEN	1ST	0.00008	520448.19	5415308	35.36	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann00_00_ARSENIC.USF	ARSENIC	ANNUAL	GEN	1ST	0.00007	520492.5	5415310	35.97	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann00_00_ARSENIC.USF	ARSENIC	ANNUAL	FPUMP	1ST	0.00003	520448.19	5414902	35.66	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann95_95_ARSENIC.USF	ARSENIC	ANNUAL	FPUMP	1ST	0.00003	520448.19	5414902	35.66	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_ARSENIC.USF	ARSENIC	ANNUAL	FPUMP	1ST	0.00003	520448.19	5414902	35.66	1 YRS	Arco96.isc
ISC3PBEE	2x1ann99_99_ARSENIC.USF	ARSENIC	ANNUAL	FPUMP	1ST	0.00003	520448.19	5414902	35.66	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann98_98_ARSENIC.USF	ARSENIC	ANNUAL	FPUMP	1ST	0.00002	520448.19	5414902	35.66	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann00_00_ARSENIC.USF	ARSENIC	ANNUAL	1AB	1ST	0	523500	5427200	138.99	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann95_95_ARSENIC.USF	ARSENIC	ANNUAL	1AB	1ST	0	522500	5427200	110.95	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_ARSENIC.USF	ARSENIC	ANNUAL	1AB	1ST	0	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann98_98_ARSENIC.USF	ARSENIC	ANNUAL	1AB	1ST	0	522500	5427200	110.95	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann99_99_ARSENIC.USF	ARSENIC	ANNUAL	1AB	1ST	0	523500	5427200	138.99	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann00_00_ARSENIC.USF	ARSENIC	ANNUAL	1BB	1ST	0	523300	5426100	116.13	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann95_95_ARSENIC.USF	ARSENIC	ANNUAL	1BB	1ST	0	522500	5427200	110.95	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_ARSENIC.USF	ARSENIC	ANNUAL	1BB	1ST	0	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann98_98_ARSENIC.USF	ARSENIC	ANNUAL	1BB	1ST	0	522500	5427200	110.95	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann99_99_ARSENIC.USF	ARSENIC	ANNUAL	1BB	1ST	0	523300	5426100	116.13	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann00_00_ARSENIC.USF	ARSENIC	ANNUAL	1CB	1ST	0	523300	5426100	116.13	1 YRS	ARCO2000.ISC

ISC3PBEE	2x1ann95_95_ARSENIC.USF	ARSENIC	ANNUAL	1CB	1ST	0	523300	5426100	116.13	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_ARSENIC.USF	ARSENIC	ANNUAL	1CB	1ST	0	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann98_98_ARSENIC.USF	ARSENIC	ANNUAL	1CB	1ST	0	520700	5417100	35.05	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann99_99_ARSENIC.USF	ARSENIC	ANNUAL	1CB	1ST	0	523300	5426100	116.13	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann00_00_ARSENIC.USF	ARSENIC	ANNUAL	7B	1ST	0	523300	5426100	116.13	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann95_95_ARSENIC.USF	ARSENIC	ANNUAL	7B	1ST	0	522500	5427200	110.95	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_ARSENIC.USF	ARSENIC	ANNUAL	7B	1ST	0	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann98_98_ARSENIC.USF	ARSENIC	ANNUAL	7B	1ST	0	522500	5427200	110.95	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann99_99_ARSENIC.USF	ARSENIC	ANNUAL	7B	1ST	0	523300	5426100	116.13	1 YRS	ARCO99.ISC

Model Results - GE 7FA Turbines - 2x1 Base Case

Model	File	Pol	Average	Group	Rank	Conc.	East(X)	North(Y)	Elevation	Time	Met File
						ASIL = 0.0036 μg/m^3					
ISC3PBEE	2x1ann00_00_13BUTAD.USF	13BUTAD	ANNUAL	1AB/ALL	1ST	0.00001	520448.19	5414902	35.66	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann95_95_13BUTAD.USF	13BUTAD	ANNUAL	1AB/ALL	1ST	0.00001	520448.19	5414902	35.66	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_13BUTAD.USF	13BUTAD	ANNUAL	1AB/ALL	1ST	0.00001	520448.19	5414902	35.66	1 YRS	Arco96.isc
ISC3PBEE	2x1ann98_98_13BUTAD.USF	13BUTAD	ANNUAL	1AB/ALL	1ST	0.00001	520448.19	5414902	35.66	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann99_99_13BUTAD.USF	13BUTAD	ANNUAL	1AB/ALL	1ST	0.00001	520448.19	5414902	35.66	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann95_95_13BUTAD.USF	13BUTAD	ANNUAL	1BB	1ST	0.00001	522500	5427200	110.95	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_13BUTAD.USF	13BUTAD	ANNUAL	1BB	1ST	0.00001	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann98_98_13BUTAD.USF	13BUTAD	ANNUAL	1BB	1ST	0.00001	522500	5427200	110.95	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann99_99_13BUTAD.USF	13BUTAD	ANNUAL	1BB	1ST	0.00001	523300	5426100	116.13	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann00_00_13BUTAD.USF	13BUTAD	ANNUAL	1BB/ALL	1ST	0.00001	520448.19	5414902	35.66	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann95_95_13BUTAD.USF	13BUTAD	ANNUAL	1BB/ALL	1ST	0.00001	520448.19	5414902	35.66	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_13BUTAD.USF	13BUTAD	ANNUAL	1BB/ALL	1ST	0.00001	520448.19	5414902	35.66	1 YRS	Arco96.isc
ISC3PBEE	2x1ann98_98_13BUTAD.USF	13BUTAD	ANNUAL	1BB/ALL	1ST	0.00001	520448.19	5414902	35.66	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann99_99_13BUTAD.USF	13BUTAD	ANNUAL	1BB/ALL	1ST	0.00001	520448.19	5414902	35.66	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann95_95_13BUTAD.USF	13BUTAD	ANNUAL	1CB	1ST	0.00001	523300	5426100	116.13	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_13BUTAD.USF	13BUTAD	ANNUAL	1CB	1ST	0.00001	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann98_98_13BUTAD.USF	13BUTAD	ANNUAL	1CB	1ST	0.00001	520700	5417100	35.05	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann99_99_13BUTAD.USF	13BUTAD	ANNUAL	1CB	1ST	0.00001	523300	5426100	116.13	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann00_00_13BUTAD.USF	13BUTAD	ANNUAL	1CB/ALL	1ST	0.00001	520448.19	5414902	35.66	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann95_95_13BUTAD.USF	13BUTAD	ANNUAL	1CB/ALL	1ST	0.00001	520448.19	5414902	35.66	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_13BUTAD.USF	13BUTAD	ANNUAL	1CB/ALL	1ST	0.00001	520448.19	5414902	35.66	1 YRS	Arco96.isc
ISC3PBEE	2x1ann98_98_13BUTAD.USF	13BUTAD	ANNUAL	1CB/ALL	1ST	0.00001	520448.19	5414902	35.66	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann99_99_13BUTAD.USF	13BUTAD	ANNUAL	1CB/ALL	1ST	0.00001	520448.19	5414902	35.66	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann98_98_13BUTAD.USF	13BUTAD	ANNUAL	7B	1ST	0.00001	522500	5427200	110.95	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann00_00_13BUTAD.USF	13BUTAD	ANNUAL	7B/ALL	1ST	0.00001	520448.19	5414902	35.66	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann95_95_13BUTAD.USF	13BUTAD	ANNUAL	7B/ALL	1ST	0.00001	520448.19	5414902	35.66	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_13BUTAD.USF	13BUTAD	ANNUAL	7B/ALL	1ST	0.00001	520448.19	5414902	35.66	1 YRS	Arco96.isc
ISC3PBEE	2x1ann98_98_13BUTAD.USF	13BUTAD	ANNUAL	7B/ALL	1ST	0.00001	520448.19	5414902	35.66	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann99_99_13BUTAD.USF	13BUTAD	ANNUAL	7B/ALL	1ST	0.00001	520448.19	5414902	35.66	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann00_00_13BUTAD.USF	13BUTAD	ANNUAL	FPUMP	1ST	0.00001	520448.19	5414902	35.66	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann95_95_13BUTAD.USF	13BUTAD	ANNUAL	FPUMP	1ST	0.00001	520448.19	5414902	35.66	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_13BUTAD.USF	13BUTAD	ANNUAL	FPUMP	1ST	0.00001	520448.19	5414902	35.66	1 YRS	Arco96.isc
ISC3PBEE	2x1ann98_98_13BUTAD.USF	13BUTAD	ANNUAL	FPUMP	1ST	0.00001	520448.19	5414902	35.66	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann99_99_13BUTAD.USF	13BUTAD	ANNUAL	FPUMP	1ST	0.00001	520448.19	5414902	35.66	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann00_00_13BUTAD.USF	13BUTAD	ANNUAL	1AB	1ST	0	523500	5427200	138.99	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann95_95_13BUTAD.USF	13BUTAD	ANNUAL	1AB	1ST	0	522500	5427200	110.95	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_13BUTAD.USF	13BUTAD	ANNUAL	1AB	1ST	0	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann98_98_13BUTAD.USF	13BUTAD	ANNUAL	1AB	1ST	0	522500	5427200	110.95	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann99_99_13BUTAD.USF	13BUTAD	ANNUAL	1AB	1ST	0	523500	5427200	138.99	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann00_00_13BUTAD.USF	13BUTAD	ANNUAL	1BB	1ST	0	523300	5426100	116.13	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann00_00_13BUTAD.USF	13BUTAD	ANNUAL	1CB	1ST	0	523300	5426100	116.13	1 YRS	ARCO2000.ISC

ISC3PBEE	2x1ann00_00_13BUTAD.USF	13BUTAD	ANNUAL	7B	1ST	0	523300	5426100	116.13	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann95_95_13BUTAD.USF	13BUTAD	ANNUAL	7B	1ST	0	522500	5427200	110.95	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_13BUTAD.USF	13BUTAD	ANNUAL	7B	1ST	0	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann99_99_13BUTAD.USF	13BUTAD	ANNUAL	7B	1ST	0	523300	5426100	116.13	1 YRS	ARCO99.ISC

Model Results - GE 7FA Turbines - 2x1 Base Case

Model	File	Pol	Average	Group	Rank	Conc.	East(X)	North(Y)	Elevation	Time	Met File
					ASIL =	0.12 µg/m^3					
ISC3PBEE	2x1ann98_98_BENZENE.USF	BENZENE	ANNUAL	1AB/ALL	1ST	0.00036	520448.19	5415308	35.36	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann98_98_BENZENE.USF	BENZENE	ANNUAL	1BB/ALL	1ST	0.00036	520448.19	5415308	35.36	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann98_98_BENZENE.USF	BENZENE	ANNUAL	1CB/ALL	1ST	0.00036	520448.19	5415308	35.36	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann98_98_BENZENE.USF	BENZENE	ANNUAL	7B/ALL	1ST	0.00036	520448.19	5415308	35.36	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann98_98_BENZENE.USF	BENZENE	ANNUAL	GEN	1ST	0.00032	520492.5	5415310	35.97	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann99_99_BENZENE.USF	BENZENE	ANNUAL	1AB/ALL	1ST	0.00031	520448.19	5415308	35.36	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann99_99_BENZENE.USF	BENZENE	ANNUAL	1BB/ALL	1ST	0.00031	520448.19	5415308	35.36	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann99_99_BENZENE.USF	BENZENE	ANNUAL	1CB/ALL	1ST	0.00031	520448.19	5415308	35.36	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann99_99_BENZENE.USF	BENZENE	ANNUAL	7B/ALL	1ST	0.00031	520448.19	5415308	35.36	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann95_95_BENZENE.USF	BENZENE	ANNUAL	1AB/ALL	1ST	0.0003	520492.5	5415310	35.97	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann95_95_BENZENE.USF	BENZENE	ANNUAL	1BB/ALL	1ST	0.0003	520492.5	5415310	35.97	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann95_95_BENZENE.USF	BENZENE	ANNUAL	1CB/ALL	1ST	0.0003	520492.5	5415310	35.97	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann95_95_BENZENE.USF	BENZENE	ANNUAL	7B/ALL	1ST	0.0003	520492.5	5415310	35.97	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_BENZENE.USF	BENZENE	ANNUAL	1AB/ALL	1ST	0.00028	520448.19	5415308	35.36	1 YRS	Arco96.isc
ISC3PBEE	2x1ann96_96_BENZENE.USF	BENZENE	ANNUAL	1BB/ALL	1ST	0.00028	520448.19	5415308	35.36	1 YRS	Arco96.isc
ISC3PBEE	2x1ann96_96_BENZENE.USF	BENZENE	ANNUAL	1CB/ALL	1ST	0.00028	520448.19	5415308	35.36	1 YRS	Arco96.isc
ISC3PBEE	2x1ann96_96_BENZENE.USF	BENZENE	ANNUAL	7B/ALL	1ST	0.00028	520448.19	5415308	35.36	1 YRS	Arco96.isc
ISC3PBEE	2x1ann99_99_BENZENE.USF	BENZENE	ANNUAL	GEN	1ST	0.00027	520448.19	5415308	35.36	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann00_00_BENZENE.USF	BENZENE	ANNUAL	1AB/ALL	1ST	0.00026	520492.5	5415310	35.97	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann00_00_BENZENE.USF	BENZENE	ANNUAL	1BB/ALL	1ST	0.00026	520492.5	5415310	35.97	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann00_00_BENZENE.USF	BENZENE	ANNUAL	1CB/ALL	1ST	0.00026	520492.5	5415310	35.97	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann00_00_BENZENE.USF	BENZENE	ANNUAL	7B/ALL	1ST	0.00026	520492.5	5415310	35.97	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann95_95_BENZENE.USF	BENZENE	ANNUAL	GEN	1ST	0.00026	520492.5	5415310	35.97	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_BENZENE.USF	BENZENE	ANNUAL	GEN	1ST	0.00025	520448.19	5415308	35.36	1 YRS	Arco96.isc
ISC3PBEE	2x1ann00_00_BENZENE.USF	BENZENE	ANNUAL	GEN	1ST	0.00023	520492.5	5415310	35.97	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann95_95_BENZENE.USF	BENZENE	ANNUAL	FPUMP	1ST	0.00021	520448.19	5414902	35.66	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann00_00_BENZENE.USF	BENZENE	ANNUAL	FPUMP	1ST	0.0002	520448.19	5414902	35.66	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann99_99_BENZENE.USF	BENZENE	ANNUAL	FPUMP	1ST	0.0002	520448.19	5414902	35.66	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann98_98_BENZENE.USF	BENZENE	ANNUAL	1CB	1ST	0.00019	520700	5417100	35.05	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann99_99_BENZENE.USF	BENZENE	ANNUAL	1CB	1ST	0.00019	523300	5426100	116.13	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann96_96_BENZENE.USF	BENZENE	ANNUAL	FPUMP	1ST	0.00018	520448.19	5414902	35.66	1 YRS	Arco96.isc
ISC3PBEE	2x1ann95_95_BENZENE.USF	BENZENE	ANNUAL	1CB	1ST	0.00017	523300	5426100	116.13	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_BENZENE.USF	BENZENE	ANNUAL	1CB	1ST	0.00017	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann98_98_BENZENE.USF	BENZENE	ANNUAL	FPUMP	1ST	0.00017	520448.19	5414902	35.66	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann98_98_BENZENE.USF	BENZENE	ANNUAL	1BB	1ST	0.00016	522500	5427200	110.95	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann99_99_BENZENE.USF	BENZENE	ANNUAL	1BB	1ST	0.00016	523300	5426100	116.13	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann95_95_BENZENE.USF	BENZENE	ANNUAL	1BB	1ST	0.00015	522500	5427200	110.95	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_BENZENE.USF	BENZENE	ANNUAL	1BB	1ST	0.00015	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann98_98_BENZENE.USF	BENZENE	ANNUAL	7B	1ST	0.00015	522500	5427200	110.95	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann95_95_BENZENE.USF	BENZENE	ANNUAL	7B	1ST	0.00014	522500	5427200	110.95	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_BENZENE.USF	BENZENE	ANNUAL	7B	1ST	0.00014	522500	5427200	110.95	1 YRS	Arco96.isc

ISC3PBEE	2x1ann99_99_BENZENE.USF	BENZENE	ANNUAL	7B	1ST	0.00014	523300	5426100	116.13	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann98_98_BENZENE.USF	BENZENE	ANNUAL	1AB	1ST	0.00013	522500	5427200	110.95	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann00_00_BENZENE.USF	BENZENE	ANNUAL	1CB	1ST	0.00013	523300	5426100	116.13	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann95_95_BENZENE.USF	BENZENE	ANNUAL	1AB	1ST	0.00012	522500	5427200	110.95	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_BENZENE.USF	BENZENE	ANNUAL	1AB	1ST	0.00012	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann99_99_BENZENE.USF	BENZENE	ANNUAL	1AB	1ST	0.00012	523500	5427200	138.99	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann00_00_BENZENE.USF	BENZENE	ANNUAL	1BB	1ST	0.00011	523300	5426100	116.13	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann00_00_BENZENE.USF	BENZENE	ANNUAL	7B	1ST	0.0001	523300	5426100	116.13	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann00_00_BENZENE.USF	BENZENE	ANNUAL	1AB	1ST	0.00009	523500	5427200	138.99	1 YRS	ARCO2000.ISC

Model Results - GE 7FA Turbines - 2x1 Base Case

Model	File	Pol	Average	Group	Rank	Conc.	East(X)	North(Y)	Elevation	Time	Met File
						ASIL = 0.00042 μg/m^3					
ISC3PBEE	2x1ann00_00_BERYLL.USF	BERYLL	ANNUAL	1AB	1ST	0	523500	5427200	138.99	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann95_95_BERYLL.USF	BERYLL	ANNUAL	1AB	1ST	0	522500	5427200	110.95	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_BERYLL.USF	BERYLL	ANNUAL	1AB	1ST	0	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann98_98_BERYLL.USF	BERYLL	ANNUAL	1AB	1ST	0	522500	5427200	110.95	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann99_99_BERYLL.USF	BERYLL	ANNUAL	1AB	1ST	0	523500	5427200	138.99	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann00_00_BERYLL.USF	BERYLL	ANNUAL	1AB/ALL	1ST	0	523500	5427200	138.99	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann95_95_BERYLL.USF	BERYLL	ANNUAL	1AB/ALL	1ST	0	522500	5427200	110.95	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_BERYLL.USF	BERYLL	ANNUAL	1AB/ALL	1ST	0	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann98_98_BERYLL.USF	BERYLL	ANNUAL	1AB/ALL	1ST	0	522500	5427200	110.95	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann99_99_BERYLL.USF	BERYLL	ANNUAL	1AB/ALL	1ST	0	523500	5427200	138.99	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann00_00_BERYLL.USF	BERYLL	ANNUAL	1BB	1ST	0	523300	5426100	116.13	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann95_95_BERYLL.USF	BERYLL	ANNUAL	1BB	1ST	0	522500	5427200	110.95	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_BERYLL.USF	BERYLL	ANNUAL	1BB	1ST	0	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann98_98_BERYLL.USF	BERYLL	ANNUAL	1BB	1ST	0	522500	5427200	110.95	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann99_99_BERYLL.USF	BERYLL	ANNUAL	1BB	1ST	0	523300	5426100	116.13	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann00_00_BERYLL.USF	BERYLL	ANNUAL	1BB/ALL	1ST	0	523300	5426100	116.13	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann95_95_BERYLL.USF	BERYLL	ANNUAL	1BB/ALL	1ST	0	522500	5427200	110.95	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_BERYLL.USF	BERYLL	ANNUAL	1BB/ALL	1ST	0	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann98_98_BERYLL.USF	BERYLL	ANNUAL	1BB/ALL	1ST	0	522500	5427200	110.95	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann99_99_BERYLL.USF	BERYLL	ANNUAL	1BB/ALL	1ST	0	523300	5426100	116.13	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann00_00_BERYLL.USF	BERYLL	ANNUAL	1CB	1ST	0	523300	5426100	116.13	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann95_95_BERYLL.USF	BERYLL	ANNUAL	1CB	1ST	0	523300	5426100	116.13	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_BERYLL.USF	BERYLL	ANNUAL	1CB	1ST	0	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann98_98_BERYLL.USF	BERYLL	ANNUAL	1CB	1ST	0	520700	5417100	35.05	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann99_99_BERYLL.USF	BERYLL	ANNUAL	1CB	1ST	0	523300	5426100	116.13	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann00_00_BERYLL.USF	BERYLL	ANNUAL	1CB/ALL	1ST	0	523300	5426100	116.13	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann95_95_BERYLL.USF	BERYLL	ANNUAL	1CB/ALL	1ST	0	523300	5426100	116.13	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_BERYLL.USF	BERYLL	ANNUAL	1CB/ALL	1ST	0	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann98_98_BERYLL.USF	BERYLL	ANNUAL	1CB/ALL	1ST	0	520700	5417100	35.05	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann99_99_BERYLL.USF	BERYLL	ANNUAL	1CB/ALL	1ST	0	523300	5426100	116.13	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann00_00_BERYLL.USF	BERYLL	ANNUAL	7B	1ST	0	523300	5426100	116.13	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann95_95_BERYLL.USF	BERYLL	ANNUAL	7B	1ST	0	522500	5427200	110.95	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_BERYLL.USF	BERYLL	ANNUAL	7B	1ST	0	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann98_98_BERYLL.USF	BERYLL	ANNUAL	7B	1ST	0	522500	5427200	110.95	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann99_99_BERYLL.USF	BERYLL	ANNUAL	7B	1ST	0	523300	5426100	116.13	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann00_00_BERYLL.USF	BERYLL	ANNUAL	7B/ALL	1ST	0	523300	5426100	116.13	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann95_95_BERYLL.USF	BERYLL	ANNUAL	7B/ALL	1ST	0	522500	5427200	110.95	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_BERYLL.USF	BERYLL	ANNUAL	7B/ALL	1ST	0	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann98_98_BERYLL.USF	BERYLL	ANNUAL	7B/ALL	1ST	0	522500	5427200	110.95	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann99_99_BERYLL.USF	BERYLL	ANNUAL	7B/ALL	1ST	0	523300	5426100	116.13	1 YRS	ARCO99.ISC

Model Results - GE 7FA Turbines - 2x1 Base Case

Model	File	Pol	Average	Group	Rank	Conc.	East(X)	North(Y)	Elevation	Time	Met File
					ASIL =	0.00056 μg/m^3					
ISC3PBEE	2x1ann00_00_CADMIUM.USF	CADMIUM	ANNUAL	1AB/ALL	1ST	0.00001	520492.5	5415310	35.97	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann95_95_CADMIUM.USF	CADMIUM	ANNUAL	1AB/ALL	1ST	0.00001	520492.5	5415310	35.97	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_CADMIUM.USF	CADMIUM	ANNUAL	1AB/ALL	1ST	0.00001	520448.19	5415308	35.36	1 YRS	Arco96.isc
ISC3PBEE	2x1ann98_98_CADMIUM.USF	CADMIUM	ANNUAL	1AB/ALL	1ST	0.00001	520448.19	5415308	35.36	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann99_99_CADMIUM.USF	CADMIUM	ANNUAL	1AB/ALL	1ST	0.00001	520448.19	5415308	35.36	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann00_00_CADMIUM.USF	CADMIUM	ANNUAL	1BB/ALL	1ST	0.00001	520492.5	5415310	35.97	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann95_95_CADMIUM.USF	CADMIUM	ANNUAL	1BB/ALL	1ST	0.00001	520492.5	5415310	35.97	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_CADMIUM.USF	CADMIUM	ANNUAL	1BB/ALL	1ST	0.00001	520448.19	5415308	35.36	1 YRS	Arco96.isc
ISC3PBEE	2x1ann98_98_CADMIUM.USF	CADMIUM	ANNUAL	1BB/ALL	1ST	0.00001	520492.5	5415310	35.97	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann99_99_CADMIUM.USF	CADMIUM	ANNUAL	1BB/ALL	1ST	0.00001	520448.19	5415308	35.36	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann00_00_CADMIUM.USF	CADMIUM	ANNUAL	1CB/ALL	1ST	0.00001	520492.5	5415310	35.97	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann95_95_CADMIUM.USF	CADMIUM	ANNUAL	1CB/ALL	1ST	0.00001	520492.5	5415310	35.97	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_CADMIUM.USF	CADMIUM	ANNUAL	1CB/ALL	1ST	0.00001	520448.19	5415308	35.36	1 YRS	Arco96.isc
ISC3PBEE	2x1ann98_98_CADMIUM.USF	CADMIUM	ANNUAL	1CB/ALL	1ST	0.00001	520492.5	5415310	35.97	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann99_99_CADMIUM.USF	CADMIUM	ANNUAL	1CB/ALL	1ST	0.00001	520448.19	5415308	35.36	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann00_00_CADMIUM.USF	CADMIUM	ANNUAL	7B/ALL	1ST	0.00001	520492.5	5415310	35.97	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann95_95_CADMIUM.USF	CADMIUM	ANNUAL	7B/ALL	1ST	0.00001	520492.5	5415310	35.97	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_CADMIUM.USF	CADMIUM	ANNUAL	7B/ALL	1ST	0.00001	520448.19	5415308	35.36	1 YRS	Arco96.isc
ISC3PBEE	2x1ann98_98_CADMIUM.USF	CADMIUM	ANNUAL	7B/ALL	1ST	0.00001	520448.19	5415308	35.36	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann99_99_CADMIUM.USF	CADMIUM	ANNUAL	7B/ALL	1ST	0.00001	520448.19	5415308	35.36	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann00_00_CADMIUM.USF	CADMIUM	ANNUAL	GEN	1ST	0.00001	520492.5	5415310	35.97	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann95_95_CADMIUM.USF	CADMIUM	ANNUAL	GEN	1ST	0.00001	520492.5	5415310	35.97	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_CADMIUM.USF	CADMIUM	ANNUAL	GEN	1ST	0.00001	520448.19	5415308	35.36	1 YRS	Arco96.isc
ISC3PBEE	2x1ann98_98_CADMIUM.USF	CADMIUM	ANNUAL	GEN	1ST	0.00001	520492.5	5415310	35.97	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann99_99_CADMIUM.USF	CADMIUM	ANNUAL	GEN	1ST	0.00001	520448.19	5415308	35.36	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann00_00_CADMIUM.USF	CADMIUM	ANNUAL	1AB	1ST	0	523500	5427200	138.99	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann95_95_CADMIUM.USF	CADMIUM	ANNUAL	1AB	1ST	0	522500	5427200	110.95	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_CADMIUM.USF	CADMIUM	ANNUAL	1AB	1ST	0	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann98_98_CADMIUM.USF	CADMIUM	ANNUAL	1AB	1ST	0	522500	5427200	110.95	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann99_99_CADMIUM.USF	CADMIUM	ANNUAL	1AB	1ST	0	523500	5427200	138.99	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann00_00_CADMIUM.USF	CADMIUM	ANNUAL	1BB	1ST	0	523300	5426100	116.13	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann95_95_CADMIUM.USF	CADMIUM	ANNUAL	1BB	1ST	0	522500	5427200	110.95	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_CADMIUM.USF	CADMIUM	ANNUAL	1BB	1ST	0	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann98_98_CADMIUM.USF	CADMIUM	ANNUAL	1BB	1ST	0	522500	5427200	110.95	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann99_99_CADMIUM.USF	CADMIUM	ANNUAL	1BB	1ST	0	523300	5426100	116.13	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann00_00_CADMIUM.USF	CADMIUM	ANNUAL	1CB	1ST	0	523300	5426100	116.13	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann95_95_CADMIUM.USF	CADMIUM	ANNUAL	1CB	1ST	0	523300	5426100	116.13	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_CADMIUM.USF	CADMIUM	ANNUAL	1CB	1ST	0	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann98_98_CADMIUM.USF	CADMIUM	ANNUAL	1CB	1ST	0	520700	5417100	35.05	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann99_99_CADMIUM.USF	CADMIUM	ANNUAL	1CB	1ST	0	523300	5426100	116.13	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann00_00_CADMIUM.USF	CADMIUM	ANNUAL	7B	1ST	0	523300	5426100	116.13	1 YRS	ARCO2000.ISC

ISC3PBEE	2x1ann95_95_CADMIUM.USF	CADMIUM	ANNUAL	7B	1ST	0	522500	5427200	110.95	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_CADMIUM.USF	CADMIUM	ANNUAL	7B	1ST	0	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann98_98_CADMIUM.USF	CADMIUM	ANNUAL	7B	1ST	0	522500	5427200	110.95	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann99_99_CADMIUM.USF	CADMIUM	ANNUAL	7B	1ST	0	523300	5426100	116.13	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann00_00_CADMIUM.USF	CADMIUM	ANNUAL	FPUMP	1ST	0	520448.19	5414902	35.66	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann95_95_CADMIUM.USF	CADMIUM	ANNUAL	FPUMP	1ST	0	520448.19	5414902	35.66	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_CADMIUM.USF	CADMIUM	ANNUAL	FPUMP	1ST	0	520448.19	5414902	35.66	1 YRS	Arco96.isc
ISC3PBEE	2x1ann98_98_CADMIUM.USF	CADMIUM	ANNUAL	FPUMP	1ST	0	520448.19	5414902	35.66	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann99_99_CADMIUM.USF	CADMIUM	ANNUAL	FPUMP	1ST	0	520448.19	5414902	35.66	1 YRS	ARCO99.ISC

Model Results - GE 7FA Turbines - 2x1 Base Case

Model	File	Pol	Average	Group	Rank	Conc.	East(X)	North(Y)	Elevation	Time	Met File
					ASIL =	1.7 µg/m^3					
ISC3PBEE	2x1_24_CHROMIUM.USF	CHROMIUM	24-HR	1AA/ALL	1ST	0.00262	520271.19	5414902	34.14	95102924	ARC95_00.isc
ISC3PBEE	2x1_24_CHROMIUM.USF	CHROMIUM	24-HR	1AB/ALL	1ST	0.00262	520271.19	5414902	34.14	95102924	ARC95_00.isc
ISC3PBEE	2x1_24_CHROMIUM.USF	CHROMIUM	24-HR	1AC/ALL	1ST	0.00262	520271.19	5414902	34.14	95102924	ARC95_00.isc
ISC3PBEE	2x1_24_CHROMIUM.USF	CHROMIUM	24-HR	1BA/ALL	1ST	0.00262	520271.19	5414902	34.14	95102924	ARC95_00.isc
ISC3PBEE	2x1_24_CHROMIUM.USF	CHROMIUM	24-HR	1BB/ALL	1ST	0.00262	520271.19	5414902	34.14	95102924	ARC95_00.isc
ISC3PBEE	2x1_24_CHROMIUM.USF	CHROMIUM	24-HR	1BC/ALL	1ST	0.00262	520271.19	5414902	34.14	95102924	ARC95_00.isc
ISC3PBEE	2x1_24_CHROMIUM.USF	CHROMIUM	24-HR	1CA/ALL	1ST	0.00262	520271.19	5414902	34.14	95102924	ARC95_00.isc
ISC3PBEE	2x1_24_CHROMIUM.USF	CHROMIUM	24-HR	1CB/ALL	1ST	0.00262	520271.19	5414902	34.14	95102924	ARC95_00.isc
ISC3PBEE	2x1_24_CHROMIUM.USF	CHROMIUM	24-HR	1CC/ALL	1ST	0.00262	520271.19	5414902	34.14	95102924	ARC95_00.isc
ISC3PBEE	2x1_24_CHROMIUM.USF	CHROMIUM	24-HR	7A/ALL	1ST	0.00262	520271.19	5414902	34.14	95102924	ARC95_00.isc
ISC3PBEE	2x1_24_CHROMIUM.USF	CHROMIUM	24-HR	7B/ALL	1ST	0.00262	520271.19	5414902	34.14	95102924	ARC95_00.isc
ISC3PBEE	2x1_24_CHROMIUM.USF	CHROMIUM	24-HR	7C/ALL	1ST	0.00262	520271.19	5414902	34.14	95102924	ARC95_00.isc
ISC3PBEE	2x1_24_CHROMIUM.USF	CHROMIUM	24-HR	GEN	1ST	0.00198	520227	5414902	34.14	98121824	ARC95_00.isc
ISC3PBEE	2x1_24_CHROMIUM.USF	CHROMIUM	24-HR	1CC	1ST	0.00149	520150	5415450	29.87	99032924	ARC95_00.isc
ISC3PBEE	2x1_24_CHROMIUM.USF	CHROMIUM	24-HR	1CB	1ST	0.0014	520150	5415450	29.87	99032924	ARC95_00.isc
ISC3PBEE	2x1_24_CHROMIUM.USF	CHROMIUM	24-HR	1CA	1ST	0.00132	520150	5415450	29.87	99032924	ARC95_00.isc
ISC3PBEE	2x1_24_CHROMIUM.USF	CHROMIUM	24-HR	1BC	1ST	0.00097	520150	5415450	29.87	99032924	ARC95_00.isc
ISC3PBEE	2x1_24_CHROMIUM.USF	CHROMIUM	24-HR	1BB	1ST	0.00088	520150	5415450	29.87	99032924	ARC95_00.isc
ISC3PBEE	2x1_24_CHROMIUM.USF	CHROMIUM	24-HR	1BA	1ST	0.00081	520250	5415450	31.09	99012924	ARC95_00.isc
ISC3PBEE	2x1_24_CHROMIUM.USF	CHROMIUM	24-HR	FPUMP	1ST	0.00077	520448.19	5414902	35.66	98082824	ARC95_00.isc
ISC3PBEE	2x1_24_CHROMIUM.USF	CHROMIUM	24-HR	7C	1ST	0.00072	518800	5417600	13.41	99110924	ARC95_00.isc
ISC3PBEE	2x1_24_CHROMIUM.USF	CHROMIUM	24-HR	7B	1ST	0.00069	518800	5417600	13.41	99110924	ARC95_00.isc
ISC3PBEE	2x1_24_CHROMIUM.USF	CHROMIUM	24-HR	1AC	1ST	0.00065	520250	5415450	31.09	99012924	ARC95_00.isc
ISC3PBEE	2x1_24_CHROMIUM.USF	CHROMIUM	24-HR	7A	1ST	0.0006	520950	5414550	42.06	95092124	ARC95_00.isc
ISC3PBEE	2x1_24_CHROMIUM.USF	CHROMIUM	24-HR	1AB	1ST	0.00055	521000	5414500	42.06	95092124	ARC95_00.isc
ISC3PBEE	2x1_24_CHROMIUM.USF	CHROMIUM	24-HR	1AA	1ST	0.00053	521000	5414500	42.06	95092124	ARC95_00.isc

Model Results - GE 7FA Turbines - 2x1 Base Case

Model	File	Pol	Average	Group	Rank	Conc.	East(X)	North(Y)	Elevation	Time	Met File
						ASIL = 0.077 µg/m^3					
ISC3PBEE	2x1ann98_98_FORMALD.USF	FORMALD	ANNUAL	1CB/ALL	1ST	0.00499	520700	5417100	35.05	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann98_98_FORMALD.USF	FORMALD	ANNUAL	1CB	1ST	0.00498	520700	5417100	35.05	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann99_99_FORMALD.USF	FORMALD	ANNUAL	1CB	1ST	0.00495	523300	5426100	116.13	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann99_99_FORMALD.USF	FORMALD	ANNUAL	1CB/ALL	1ST	0.00495	523300	5426100	116.13	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann95_95_FORMALD.USF	FORMALD	ANNUAL	1CB	1ST	0.00447	523300	5426100	116.13	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann95_95_FORMALD.USF	FORMALD	ANNUAL	1CB/ALL	1ST	0.00447	523300	5426100	116.13	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_FORMALD.USF	FORMALD	ANNUAL	1CB	1ST	0.00445	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann96_96_FORMALD.USF	FORMALD	ANNUAL	1CB/ALL	1ST	0.00445	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann99_99_FORMALD.USF	FORMALD	ANNUAL	1BB	1ST	0.00403	523300	5426100	116.13	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann99_99_FORMALD.USF	FORMALD	ANNUAL	1BB/ALL	1ST	0.00403	523300	5426100	116.13	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann98_98_FORMALD.USF	FORMALD	ANNUAL	1BB	1ST	0.00401	522500	5427200	110.95	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann98_98_FORMALD.USF	FORMALD	ANNUAL	1BB/ALL	1ST	0.00401	522500	5427200	110.95	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann96_96_FORMALD.USF	FORMALD	ANNUAL	1BB	1ST	0.00379	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann96_96_FORMALD.USF	FORMALD	ANNUAL	1BB/ALL	1ST	0.00379	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann95_95_FORMALD.USF	FORMALD	ANNUAL	1BB	1ST	0.00378	522500	5427200	110.95	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann95_95_FORMALD.USF	FORMALD	ANNUAL	1BB/ALL	1ST	0.00378	522500	5427200	110.95	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann98_98_FORMALD.USF	FORMALD	ANNUAL	7B	1ST	0.00377	522500	5427200	110.95	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann98_98_FORMALD.USF	FORMALD	ANNUAL	7B/ALL	1ST	0.00377	522500	5427200	110.95	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann99_99_FORMALD.USF	FORMALD	ANNUAL	7B	1ST	0.00373	523300	5426100	116.13	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann99_99_FORMALD.USF	FORMALD	ANNUAL	7B/ALL	1ST	0.00373	523300	5426100	116.13	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann95_95_FORMALD.USF	FORMALD	ANNUAL	7B	1ST	0.00359	522500	5427200	110.95	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_FORMALD.USF	FORMALD	ANNUAL	7B	1ST	0.00359	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann95_95_FORMALD.USF	FORMALD	ANNUAL	7B/ALL	1ST	0.00359	522500	5427200	110.95	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_FORMALD.USF	FORMALD	ANNUAL	7B/ALL	1ST	0.00359	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann00_00_FORMALD.USF	FORMALD	ANNUAL	1CB	1ST	0.00343	523300	5426100	116.13	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann00_00_FORMALD.USF	FORMALD	ANNUAL	1CB/ALL	1ST	0.00343	523300	5426100	116.13	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann98_98_FORMALD.USF	FORMALD	ANNUAL	1AB	1ST	0.00334	522500	5427200	110.95	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann98_98_FORMALD.USF	FORMALD	ANNUAL	1AB/ALL	1ST	0.00334	522500	5427200	110.95	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann99_99_FORMALD.USF	FORMALD	ANNUAL	1AB	1ST	0.00321	523500	5427200	138.99	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann99_99_FORMALD.USF	FORMALD	ANNUAL	1AB/ALL	1ST	0.00321	523500	5427200	138.99	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann95_95_FORMALD.USF	FORMALD	ANNUAL	1AB	1ST	0.00313	522500	5427200	110.95	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_FORMALD.USF	FORMALD	ANNUAL	1AB	1ST	0.00313	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann95_95_FORMALD.USF	FORMALD	ANNUAL	1AB/ALL	1ST	0.00313	522500	5427200	110.95	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_FORMALD.USF	FORMALD	ANNUAL	1AB/ALL	1ST	0.00313	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann00_00_FORMALD.USF	FORMALD	ANNUAL	1BB/ALL	1ST	0.00282	523300	5426100	116.13	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann00_00_FORMALD.USF	FORMALD	ANNUAL	1BB	1ST	0.00281	523300	5426100	116.13	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann00_00_FORMALD.USF	FORMALD	ANNUAL	7B	1ST	0.00267	523300	5426100	116.13	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann00_00_FORMALD.USF	FORMALD	ANNUAL	7B/ALL	1ST	0.00267	523300	5426100	116.13	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann00_00_FORMALD.USF	FORMALD	ANNUAL	1AB	1ST	0.00226	523500	5427200	138.99	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann00_00_FORMALD.USF	FORMALD	ANNUAL	1AB/ALL	1ST	0.00226	523500	5427200	138.99	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann00_00_FORMALD.USF	FORMALD	ANNUAL	FPUMP	1ST	0.00026	520448.19	5414902	35.66	1 YRS	ARCO2000.ISC

ISC3PBEE	2x1ann95_95_FORMALD.USF	FORMALD	ANNUAL	FPUMP	1ST	0.00026	520448.19	5414902	35.66	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann99_99_FORMALD.USF	FORMALD	ANNUAL	FPUMP	1ST	0.00026	520448.19	5414902	35.66	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann96_96_FORMALD.USF	FORMALD	ANNUAL	FPUMP	1ST	0.00023	520448.19	5414902	35.66	1 YRS	Arco96.isc
ISC3PBEE	2x1ann98_98_FORMALD.USF	FORMALD	ANNUAL	FPUMP	1ST	0.00021	520448.19	5414902	35.66	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann95_95_FORMALD.USF	FORMALD	ANNUAL	GEN	1ST	0.00003	520492.5	5415310	35.97	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_FORMALD.USF	FORMALD	ANNUAL	GEN	1ST	0.00003	520448.19	5415308	35.36	1 YRS	Arco96.isc
ISC3PBEE	2x1ann98_98_FORMALD.USF	FORMALD	ANNUAL	GEN	1ST	0.00003	520492.5	5415310	35.97	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann99_99_FORMALD.USF	FORMALD	ANNUAL	GEN	1ST	0.00003	520448.19	5415308	35.36	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann00_00_FORMALD.USF	FORMALD	ANNUAL	GEN	1ST	0.00002	520492.5	5415310	35.97	1 YRS	ARCO2000.ISC

Model Results - GE 7FA Turbines - 2x1 Base Case

Model	File	Pol	Average	Group	Rank	Conc.	East(X)	North(Y)	Elevation	Time	Met File
					ASIL =	0.0021 μg/m^3					
ISC3PBEE	2x1ann98_98_NICKEL.USF	NICKEL	ANNUAL	1CB	1ST	0.00008	520700	5417100	35.05	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann99_99_NICKEL.USF	NICKEL	ANNUAL	1CB	1ST	0.00008	523300	5426100	116.13	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann98_98_NICKEL.USF	NICKEL	ANNUAL	1CB/ALL	1ST	0.00008	520700	5417100	35.05	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann99_99_NICKEL.USF	NICKEL	ANNUAL	1CB/ALL	1ST	0.00008	523300	5426100	116.13	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann95_95_NICKEL.USF	NICKEL	ANNUAL	1CB	1ST	0.00007	523300	5426100	116.13	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_NICKEL.USF	NICKEL	ANNUAL	1CB	1ST	0.00007	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann95_95_NICKEL.USF	NICKEL	ANNUAL	1CB/ALL	1ST	0.00007	523300	5426100	116.13	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_NICKEL.USF	NICKEL	ANNUAL	1CB/ALL	1ST	0.00007	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann95_95_NICKEL.USF	NICKEL	ANNUAL	1BB	1ST	0.00006	522500	5427200	110.95	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_NICKEL.USF	NICKEL	ANNUAL	1BB	1ST	0.00006	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann98_98_NICKEL.USF	NICKEL	ANNUAL	1BB	1ST	0.00006	522500	5427200	110.95	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann99_99_NICKEL.USF	NICKEL	ANNUAL	1BB	1ST	0.00006	523300	5426100	116.13	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann95_95_NICKEL.USF	NICKEL	ANNUAL	1BB/ALL	1ST	0.00006	522500	5427200	110.95	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_NICKEL.USF	NICKEL	ANNUAL	1BB/ALL	1ST	0.00006	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann98_98_NICKEL.USF	NICKEL	ANNUAL	1BB/ALL	1ST	0.00006	522500	5427200	110.95	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann99_99_NICKEL.USF	NICKEL	ANNUAL	1BB/ALL	1ST	0.00006	523300	5426100	116.13	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann98_98_NICKEL.USF	NICKEL	ANNUAL	7B	1ST	0.00006	522500	5427200	110.95	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann99_99_NICKEL.USF	NICKEL	ANNUAL	7B	1ST	0.00006	523300	5426100	116.13	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann98_98_NICKEL.USF	NICKEL	ANNUAL	7B/ALL	1ST	0.00006	522500	5427200	110.95	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann99_99_NICKEL.USF	NICKEL	ANNUAL	7B/ALL	1ST	0.00006	523300	5426100	116.13	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann95_95_NICKEL.USF	NICKEL	ANNUAL	1AB	1ST	0.00005	522500	5427200	110.95	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_NICKEL.USF	NICKEL	ANNUAL	1AB	1ST	0.00005	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann98_98_NICKEL.USF	NICKEL	ANNUAL	1AB	1ST	0.00005	522500	5427200	110.95	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann99_99_NICKEL.USF	NICKEL	ANNUAL	1AB	1ST	0.00005	523500	5427200	138.99	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann95_95_NICKEL.USF	NICKEL	ANNUAL	1AB/ALL	1ST	0.00005	522500	5427200	110.95	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_NICKEL.USF	NICKEL	ANNUAL	1AB/ALL	1ST	0.00005	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann98_98_NICKEL.USF	NICKEL	ANNUAL	1AB/ALL	1ST	0.00005	522500	5427200	110.95	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann99_99_NICKEL.USF	NICKEL	ANNUAL	1AB/ALL	1ST	0.00005	523500	5427200	138.99	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann00_00_NICKEL.USF	NICKEL	ANNUAL	1CB	1ST	0.00005	523300	5426100	116.13	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann00_00_NICKEL.USF	NICKEL	ANNUAL	1CB/ALL	1ST	0.00005	523300	5426100	116.13	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann95_95_NICKEL.USF	NICKEL	ANNUAL	7B	1ST	0.00005	522500	5427200	110.95	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_NICKEL.USF	NICKEL	ANNUAL	7B	1ST	0.00005	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann95_95_NICKEL.USF	NICKEL	ANNUAL	7B/ALL	1ST	0.00005	522500	5427200	110.95	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_NICKEL.USF	NICKEL	ANNUAL	7B/ALL	1ST	0.00005	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann00_00_NICKEL.USF	NICKEL	ANNUAL	1BB	1ST	0.00004	523300	5426100	116.13	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann00_00_NICKEL.USF	NICKEL	ANNUAL	1BB/ALL	1ST	0.00004	523300	5426100	116.13	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann00_00_NICKEL.USF	NICKEL	ANNUAL	7B	1ST	0.00004	523300	5426100	116.13	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann00_00_NICKEL.USF	NICKEL	ANNUAL	7B/ALL	1ST	0.00004	523300	5426100	116.13	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann00_00_NICKEL.USF	NICKEL	ANNUAL	1AB	1ST	0.00003	523500	5427200	138.99	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann00_00_NICKEL.USF	NICKEL	ANNUAL	1AB/ALL	1ST	0.00003	523500	5427200	138.99	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann00_00_NICKEL.USF	NICKEL	ANNUAL	GEN	1ST	0.00001	520492.5	5415310	35.97	1 YRS	ARCO2000.ISC

ISC3PBEE	2x1ann95_95_NICKEL.USF	NICKEL	ANNUAL	GEN	1ST	0.00001	520492.5	5415310	35.97	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_NICKEL.USF	NICKEL	ANNUAL	GEN	1ST	0.00001	520448.19	5415308	35.36	1 YRS	Arco96.isc
ISC3PBEE	2x1ann98_98_NICKEL.USF	NICKEL	ANNUAL	GEN	1ST	0.00001	520492.5	5415310	35.97	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann99_99_NICKEL.USF	NICKEL	ANNUAL	GEN	1ST	0.00001	520448.19	5415308	35.36	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann00_00_NICKEL.USF	NICKEL	ANNUAL	FPUMP	1ST	0	520448.19	5414902	35.66	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann95_95_NICKEL.USF	NICKEL	ANNUAL	FPUMP	1ST	0	520448.19	5414902	35.66	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_NICKEL.USF	NICKEL	ANNUAL	FPUMP	1ST	0	520448.19	5414902	35.66	1 YRS	Arco96.isc
ISC3PBEE	2x1ann98_98_NICKEL.USF	NICKEL	ANNUAL	FPUMP	1ST	0	520448.19	5414902	35.66	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann99_99_NICKEL.USF	NICKEL	ANNUAL	FPUMP	1ST	0	520448.19	5414902	35.66	1 YRS	ARCO99.ISC

Model Results - GE 7FA Turbines - 2x1 Base Case

Model	File	Pol	Average	Group	Rank	Conc.	East(X)	North(Y)	Elevation	Time	Met File
					ASIL =	0.00048 μg/m^3					
ISC3PBEE	2x1ann98_98_PAH.USF	PAH	ANNUAL	1AB/ALL	1ST	0.00009	520448.19	5415308	35.36	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann98_98_PAH.USF	PAH	ANNUAL	1BB/ALL	1ST	0.00009	520448.19	5415308	35.36	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann98_98_PAH.USF	PAH	ANNUAL	1CB/ALL	1ST	0.00009	520448.19	5415308	35.36	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann98_98_PAH.USF	PAH	ANNUAL	7B/ALL	1ST	0.00009	520448.19	5415308	35.36	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann98_98_PAH.USF	PAH	ANNUAL	GEN	1ST	0.00009	520492.5	5415310	35.97	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann95_95_PAH.USF	PAH	ANNUAL	1AB/ALL	1ST	0.00008	520492.5	5415310	35.97	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann99_99_PAH.USF	PAH	ANNUAL	1AB/ALL	1ST	0.00008	520448.19	5415308	35.36	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann95_95_PAH.USF	PAH	ANNUAL	1BB/ALL	1ST	0.00008	520492.5	5415310	35.97	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann99_99_PAH.USF	PAH	ANNUAL	1BB/ALL	1ST	0.00008	520448.19	5415308	35.36	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann95_95_PAH.USF	PAH	ANNUAL	1CB/ALL	1ST	0.00008	520492.5	5415310	35.97	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann99_99_PAH.USF	PAH	ANNUAL	1CB/ALL	1ST	0.00008	520448.19	5415308	35.36	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann95_95_PAH.USF	PAH	ANNUAL	7B/ALL	1ST	0.00008	520492.5	5415310	35.97	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann99_99_PAH.USF	PAH	ANNUAL	7B/ALL	1ST	0.00008	520448.19	5415308	35.36	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann00_00_PAH.USF	PAH	ANNUAL	1AB/ALL	1ST	0.00007	520492.5	5415310	35.97	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann96_96_PAH.USF	PAH	ANNUAL	1AB/ALL	1ST	0.00007	520448.19	5415308	35.36	1 YRS	Arco96.isc
ISC3PBEE	2x1ann00_00_PAH.USF	PAH	ANNUAL	1BB/ALL	1ST	0.00007	520492.5	5415310	35.97	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann96_96_PAH.USF	PAH	ANNUAL	1BB/ALL	1ST	0.00007	520448.19	5415308	35.36	1 YRS	Arco96.isc
ISC3PBEE	2x1ann00_00_PAH.USF	PAH	ANNUAL	1CB/ALL	1ST	0.00007	520492.5	5415310	35.97	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann96_96_PAH.USF	PAH	ANNUAL	1CB/ALL	1ST	0.00007	520448.19	5415308	35.36	1 YRS	Arco96.isc
ISC3PBEE	2x1ann00_00_PAH.USF	PAH	ANNUAL	7B/ALL	1ST	0.00007	520492.5	5415310	35.97	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann96_96_PAH.USF	PAH	ANNUAL	7B/ALL	1ST	0.00007	520448.19	5415308	35.36	1 YRS	Arco96.isc
ISC3PBEE	2x1ann95_95_PAH.USF	PAH	ANNUAL	GEN	1ST	0.00007	520492.5	5415310	35.97	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_PAH.USF	PAH	ANNUAL	GEN	1ST	0.00007	520448.19	5415308	35.36	1 YRS	Arco96.isc
ISC3PBEE	2x1ann99_99_PAH.USF	PAH	ANNUAL	GEN	1ST	0.00007	520448.19	5415308	35.36	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann00_00_PAH.USF	PAH	ANNUAL	GEN	1ST	0.00006	520492.5	5415310	35.97	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann00_00_PAH.USF	PAH	ANNUAL	FPUMP	1ST	0.00004	520448.19	5414902	35.66	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann95_95_PAH.USF	PAH	ANNUAL	FPUMP	1ST	0.00004	520448.19	5414902	35.66	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann99_99_PAH.USF	PAH	ANNUAL	FPUMP	1ST	0.00004	520448.19	5414902	35.66	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann95_95_PAH.USF	PAH	ANNUAL	1BB	1ST	0.00003	522500	5427200	110.95	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_PAH.USF	PAH	ANNUAL	1BB	1ST	0.00003	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann98_98_PAH.USF	PAH	ANNUAL	1BB	1ST	0.00003	522500	5427200	110.95	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann99_99_PAH.USF	PAH	ANNUAL	1BB	1ST	0.00003	523300	5426100	116.13	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann95_95_PAH.USF	PAH	ANNUAL	1CB	1ST	0.00003	523300	5426100	116.13	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_PAH.USF	PAH	ANNUAL	1CB	1ST	0.00003	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann98_98_PAH.USF	PAH	ANNUAL	1CB	1ST	0.00003	520700	5417100	35.05	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann99_99_PAH.USF	PAH	ANNUAL	1CB	1ST	0.00003	523300	5426100	116.13	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann98_98_PAH.USF	PAH	ANNUAL	7B	1ST	0.00003	522500	5427200	110.95	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann99_99_PAH.USF	PAH	ANNUAL	7B	1ST	0.00003	523300	5426100	116.13	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann96_96_PAH.USF	PAH	ANNUAL	FPUMP	1ST	0.00003	520448.19	5414902	35.66	1 YRS	Arco96.isc
ISC3PBEE	2x1ann98_98_PAH.USF	PAH	ANNUAL	FPUMP	1ST	0.00003	520448.19	5414902	35.66	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann00_00_PAH.USF	PAH	ANNUAL	1AB	1ST	0.00002	523500	5427200	138.99	1 YRS	ARCO2000.ISC

ISC3PBEE	2x1ann95_95_PAH.USF	PAH	ANNUAL	1AB	1ST	0.00002	522500	5427200	110.95	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_PAH.USF	PAH	ANNUAL	1AB	1ST	0.00002	522500	5427200	110.95	1 YRS	Arco96.isc
ISC3PBEE	2x1ann98_98_PAH.USF	PAH	ANNUAL	1AB	1ST	0.00002	522500	5427200	110.95	1 YRS	ARCO98.ISC
ISC3PBEE	2x1ann99_99_PAH.USF	PAH	ANNUAL	1AB	1ST	0.00002	523500	5427200	138.99	1 YRS	ARCO99.ISC
ISC3PBEE	2x1ann00_00_PAH.USF	PAH	ANNUAL	1BB	1ST	0.00002	523300	5426100	116.13	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann00_00_PAH.USF	PAH	ANNUAL	1CB	1ST	0.00002	523300	5426100	116.13	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann00_00_PAH.USF	PAH	ANNUAL	7B	1ST	0.00002	523300	5426100	116.13	1 YRS	ARCO2000.ISC
ISC3PBEE	2x1ann95_95_PAH.USF	PAH	ANNUAL	7B	1ST	0.00002	522500	5427200	110.95	1 YRS	ARCO95.ISC
ISC3PBEE	2x1ann96_96_PAH.USF	PAH	ANNUAL	7B	1ST	0.00002	522500	5427200	110.95	1 YRS	Arco96.isc

Model Results - GE 7FA Turbines - 2x1 Base Case

Model	File	Pol	Average	Group	Rank	Conc.	East(X)	North(Y)	Elevation	Time	Met File
					ASIL =	3.3 µg/m^3					
ISC3PBEE	2x1_24_H2SO4.USF	H2SO4	24-HR	1CC/ALL	1ST	0.57226	520150	5415450	29.87	99032924	ARC95_00.isc
ISC3PBEE	2x1_24_H2SO4.USF	H2SO4	24-HR	1CC	1ST	0.55741	520150	5415450	29.87	99032924	ARC95_00.isc
ISC3PBEE	2x1_24_H2SO4.USF	H2SO4	24-HR	1CB/ALL	1ST	0.53821	520150	5415450	29.87	99032924	ARC95_00.isc
ISC3PBEE	2x1_24_H2SO4.USF	H2SO4	24-HR	1CB	1ST	0.52336	520150	5415450	29.87	99032924	ARC95_00.isc
ISC3PBEE	2x1_24_H2SO4.USF	H2SO4	24-HR	1CA/ALL	1ST	0.50906	520150	5415450	29.87	99032924	ARC95_00.isc
ISC3PBEE	2x1_24_H2SO4.USF	H2SO4	24-HR	1CA	1ST	0.49422	520150	5415450	29.87	99032924	ARC95_00.isc
ISC3PBEE	2x1_24_H2SO4.USF	H2SO4	24-HR	1BC/ALL	1ST	0.37804	520150	5415450	29.87	99032924	ARC95_00.isc
ISC3PBEE	2x1_24_H2SO4.USF	H2SO4	24-HR	1BC	1ST	0.36319	520150	5415450	29.87	99032924	ARC95_00.isc
ISC3PBEE	2x1_24_H2SO4.USF	H2SO4	24-HR	1BB/ALL	1ST	0.34308	520150	5415450	29.87	99032924	ARC95_00.isc
ISC3PBEE	2x1_24_H2SO4.USF	H2SO4	24-HR	1BB	1ST	0.32823	520150	5415450	29.87	99032924	ARC95_00.isc
ISC3PBEE	2x1_24_H2SO4.USF	H2SO4	24-HR	1BA/ALL	1ST	0.30817	520150	5415450	29.87	99032924	ARC95_00.isc
ISC3PBEE	2x1_24_H2SO4.USF	H2SO4	24-HR	1BA	1ST	0.30037	520250	5415450	31.09	99012924	ARC95_00.isc
ISC3PBEE	2x1_24_H2SO4.USF	H2SO4	24-HR	7C/ALL	1ST	0.28118	520150	5415450	29.87	99032924	ARC95_00.isc
ISC3PBEE	2x1_24_H2SO4.USF	H2SO4	24-HR	7C	1ST	0.27025	518800	5417600	13.41	99110924	ARC95_00.isc
ISC3PBEE	2x1_24_H2SO4.USF	H2SO4	24-HR	7B/ALL	1ST	0.26261	518800	5417600	13.41	99110924	ARC95_00.isc
ISC3PBEE	2x1_24_H2SO4.USF	H2SO4	24-HR	7B	1ST	0.25921	518800	5417600	13.41	99110924	ARC95_00.isc
ISC3PBEE	2x1_24_H2SO4.USF	H2SO4	24-HR	1AC/ALL	1ST	0.24364	520250	5415450	31.09	99012924	ARC95_00.isc
ISC3PBEE	2x1_24_H2SO4.USF	H2SO4	24-HR	1AC	1ST	0.24359	520250	5415450	31.09	99012924	ARC95_00.isc
ISC3PBEE	2x1_24_H2SO4.USF	H2SO4	24-HR	7A/ALL	1ST	0.23586	520950	5414550	42.06	95092124	ARC95_00.isc
ISC3PBEE	2x1_24_H2SO4.USF	H2SO4	24-HR	7A	1ST	0.22447	520950	5414550	42.06	95092124	ARC95_00.isc
ISC3PBEE	2x1_24_H2SO4.USF	H2SO4	24-HR	1AB/ALL	1ST	0.21662	520950	5414550	42.06	95092124	ARC95_00.isc
ISC3PBEE	2x1_24_H2SO4.USF	H2SO4	24-HR	1AA/ALL	1ST	0.20935	520271.19	5414902	34.14	95102924	ARC95_00.isc
ISC3PBEE	2x1_24_H2SO4.USF	H2SO4	24-HR	1AB	1ST	0.20677	521000	5414500	42.06	95092124	ARC95_00.isc
ISC3PBEE	2x1_24_H2SO4.USF	H2SO4	24-HR	1AA	1ST	0.1979	521000	5414500	42.06	95092124	ARC95_00.isc
ISC3PBEE	2x1_24_H2SO4.USF	H2SO4	24-HR	GEN	1ST	0.13038	520227	5414902	34.14	98121824	ARC95_00.isc
ISC3PBEE	2x1_24_H2SO4.USF	H2SO4	24-HR	FPUMP	1ST	0.0928	520448.19	5414902	35.66	98082824	ARC95_00.isc

APPENDIX I

SAMPLE ISC-PRIME OUTPUT

APPENDIX I

SAMPLE ISC-PRIME OUTPUT

The ISC-Prime model produces very large output files. All of the output files for the modeling conducted for the Project are contained on a compact disc.

APPENDIX J

SAMPLE CALPUFF INPUT AND OUTPUT FILES

```
BP Refinery
Ferndale, WA
2nd Quarter 1998
---------------- Run title (3 lines) ----------------------------------------

                    CALMET MODEL CONTROL FILE
                    -------------------------

--------------------------------------------------------------------------------

INPUT GROUP: 0 -- Input and Output File Names


Subgroup (a)
------------
Default Name  Type          File Name
------------  ----          ---------
GEO.DAT       input     ! GEODAT=D:\CALPUFF\GEO.DAT        !
SURF.DAT      input     ! SRFDAT=D:\CALPUFF\SURF98Q2.DAT       !
CLOUD.DAT     input     * CLDDAT=                *
PRECIP.DAT    input     ! PRCDAT=D:\CALPUFF\PRECIP.DAT     !
MM4.DAT       input     ! MM4DAT=D:\MM5\ARCO\98Q2\98Q2.MM5      !
WT.DAT        input     ! WTDAT= D:\CALPUFF\WT.DAT      !

CALMET.LST    output    ! METLST=D:\CALPUFF\98Q2MET.LST      !
CALMET.DAT    output    ! METDAT=D:\CALPUFF\98Q2MET.DAT     !
PACOUT.DAT    output    * PACDAT=                *

All file names will be converted to lower case if LCFILES = T
Otherwise, if LCFILES = F, file names will be converted to UPPER CASE
         T = lower case      ! LCFILES = F !
         F = UPPER CASE

NUMBER OF UPPER AIR & OVERWATER STATIONS:

    Number of upper air stations (NUSTA)  No default     ! NUSTA =  20  !
    Number of overwater met stations
                                 (NOWSTA) No default     ! NOWSTA =  0  !

                        !END!
--------------------------------------------------------------------------------
Subgroup (b)
--------------------------------
Upper air files (one per station)
--------------------------------
Default Name  Type        File Name
------------  ----        ---------
UP1.DAT       input     1  ! UPDAT=D:\CALPUFF\UA2547.DAT!     !END!
UP2.DAT       input     2  ! UPDAT=D:\CALPUFF\UA2555.DAT!     !END!
UP3.DAT       input     3  ! UPDAT=D:\CALPUFF\UA2563.DAT!     !END!
UP4.DAT       input     4  ! UPDAT=D:\CALPUFF\UA2571.DAT!     !END!
UP5.DAT       input     5  ! UPDAT=D:\CALPUFF\UA3347.DAT!     !END!
UP6.DAT       input     6  ! UPDAT=D:\CALPUFF\UA3355.DAT!     !END!
UP7.DAT       input     7  ! UPDAT=D:\CALPUFF\UA3363.DAT!     !END!
UP8.DAT       input     8  ! UPDAT=D:\CALPUFF\UA3371.DAT!     !END!
UP9.DAT       input     9  ! UPDAT=D:\CALPUFF\UA4147.DAT!     !END!
UP10.DAT       input     10  ! UPDAT=D:\CALPUFF\UA4155.DAT!     !END!
```

```
UP11.DAT        input     11  ! UPDAT=D:\CALPUFF\UA4163.DAT!     !END!
UP12.DAT        input     12  ! UPDAT=D:\CALPUFF\UA4171.DAT!     !END!
UP13.DAT        input     13  ! UPDAT=D:\CALPUFF\UA4947.DAT!     !END!
UP14.DAT        input     14  ! UPDAT=D:\CALPUFF\UA4955.DAT!     !END!
UP15.DAT        input     15  ! UPDAT=D:\CALPUFF\UA4963.DAT!     !END!
UP16.DAT        input     16  ! UPDAT=D:\CALPUFF\UA4971.DAT!     !END!
UP17.DAT        input     17  ! UPDAT=D:\CALPUFF\UA5747.DAT!     !END!
UP18.DAT        input     18  ! UPDAT=D:\CALPUFF\UA5755.DAT!     !END!
UP19.DAT        input     19  ! UPDAT=D:\CALPUFF\UA5763.DAT!     !END!
UP20.DAT        input     20  ! UPDAT=D:\CALPUFF\UA5771.DAT!     !END!
-------------------------------------------------------------------------------
Subgroup (c)
----------------------------------------
Overwater station files (one per station)
----------------------------------------
Default Name  Type        File Name
------------  ----        ---------
-------------------------------------------------------------------------------
Subgroup (d)
----------------
Other file names
----------------

Default Name  Type        File Name
------------  ----        ---------
DIAG.DAT      input       * DIADAT=                    *
PROG.DAT      input       * PRGDAT=                    *

TEST.PRT      output      ! TSTPRT= D:\CALPUFF\INTER.PRT!
TEST.OUT      output      * TSTOUT=                    *
TEST.KIN      output      * TSTKIN=                    *
TEST.FRD      output      * TSTFRD=                    *
TEST.SLP      output      * TSTSLP=                    *

-------------------------------------------------------------------------------
NOTES: (1) File/path names can be up to 70 characters in length
       (2) Subgroups (a) and (d) must have ONE 'END' (surround by
           delimiters) at the end of the group
       (3) Subgroups (b) and (c) must have an 'END' (surround by
           delimiters) at the end of EACH LINE

                          !END!


-------------------------------------------------------------------------------

INPUT GROUP: 1 -- General run control parameters
--------------

     Starting date:   Year (IBYR) -- No default        ! IBYR=  1998  !
                     Month (IBMO) -- No default        ! IBMO=  4  !
                       Day (IBDY) -- No default        ! IBDY=  1  !
                      Hour (IBHR) -- No default        ! IBHR=  0  !

     Base time zone         (IBTZ) -- No default        ! IBTZ=  8  !
        PST = 08, MST = 07
        CST = 06, EST = 05
```

```
    Length of run (hours) (IRLG) -- No default        ! IRLG=  2184  !

    Run type              (IRTYPE) -- Default: 1      ! IRTYPE=  1  !

       0 = Computes wind fields only
       1 = Computes wind fields and micrometeorological variables
           (u*, w*, L, zi, etc.)
       (IRTYPE must be 1 to run CALPUFF or CALGRID)

    Compute special data fields required
    by CALGRID (i.e., 3-D fields of W wind
    components and temperature)
    in additional to regular            Default: T    ! LCALGRD = T !
    fields ? (LCALGRD)
    (LCALGRD must be T to run CALGRID)

     Flag to stop run after
     SETUP phase (ITEST)              Default: 2       ! ITEST=  2   !
     (Used to allow checking
     of the model inputs, files, etc.)
     ITEST = 1 - STOPS program after SETUP phase
     ITEST = 2 - Continues with execution of
                 COMPUTATIONAL phase after SETUP

!END!
-------------------------------------------------------------------------------

INPUT GROUP: 2 -- Grid control parameters
----------------

     HORIZONTAL GRID DEFINITION:

           No. X grid cells (NX)      No default     ! NX =   42  !
           No. Y grid cells (NY)      No default     ! NY =   34  !

     GRID SPACING (DGRIDKM)           No default     ! DGRIDKM = 12. !
                                      Units: km

     REFERENCE COORDINATES
     of SOUTHWEST corner of grid cell (1,1)

        X coordinate (XORIGKM)        No default     ! XORIGKM = 923.800 !
        Y coordinate (YORIGKM)        No default     ! YORIGKM = -108.000 !
                                      Units: km
        Latitude  (XLAT0)             No default     ! XLAT0 = 47.013 !
        Longitude (XLON0)             No default     ! XLON0 = 126.130 !

     UTM ZONE (IUTMZN)                Default: 0     ! IUTMZN =  10  !

     LAMBERT CONFORMAL PARAMETERS

     Rotate input winds from true north to
     map north using a Lambert conformal
     projection? (LLCONF)             Default: F     ! LLCONF = T !
```

```
    Latitude of 1st standard parallel   Default: 30.    ! XLAT1 = 30.000 !
    Latitude of 2nd standard parallel   Default: 60.    ! XLAT2 = 60.000 !
    (XLAT1 and XLAT2; + in NH, - in SH)

       Longitude (RLON0)                Default = 90.   ! RLON0 = 138.800 !
       (used only if LLCONF = T)
       (Positive = W. Hemisphere;
        Negative = E. Hemisphere)
       Origin Latitude (RLAT0)          Default = 40.   ! RLAT0 = 48.700 !
       (used only if IPROG > 2)
       (Positive = N. Hemisphere;
        Negative = S. Hemisphere)

    Vertical grid definition:

       No. of vertical layers (NZ)    No default     ! NZ =  10  !

       Cell face heights in arbitrary
       vertical grid (ZFACE(NZ+1))    No defaults
                                      Units: m
       ! ZFACE = 0.,20.,40.,80.,160.,300.,600.,1000.,1500.,2200.,3000. !

!END!

-------------------------------------------------------------------------------

INPUT GROUP: 3 -- Output Options
--------------


    DISK OUTPUT OPTION

       Save met. fields in an unformatted
       output file ?              (LSAVE)  Default: T      ! LSAVE = T !
       (F = Do not save, T = Save)

       Type of unformatted output file:
       (IFORMO)                            Default: 1     ! IFORMO =  1  !

            1 = CALPUFF/CALGRID type file (CALMET.DAT)
            2 = MESOPUFF-II type file     (PACOUT.DAT)


    LINE PRINTER OUTPUT OPTIONS:

       Print met. fields ?  (LPRINT)       Default: F      ! LPRINT = T !
       (F = Do not print, T = Print)
       (NOTE: parameters below control which
              met. variables are printed)

       Print interval
       (IPRINF) in hours                   Default: 1      ! IPRINF =  1  !
       (Meteorological fields are printed
        every  1  hours)
```

```
Specify which layers of U, V wind component
to print (IUVOUT(NZ)) -- NOTE: NZ values must be entered
(0=Do not print, 1=Print)
(used only if LPRINT=T)          Defaults: NZ*0
! IUVOUT =  0 ,  0 ,  0 ,  0 ,  0 ,  0 ,  0 ,  0 ,  0 ,  0  !
-----------------------


Specify which levels of the W wind component to print
(NOTE: W defined at TOP cell face --  10  values)
(IWOUT(NZ)) -- NOTE: NZ values must be entered
(0=Do not print, 1=Print)
(used only if LPRINT=T & LCALGRD=T)
-----------------------------------
                                    Defaults: NZ*0
 ! IWOUT =  0 ,  0 ,  0 ,  0 ,  0 ,  0 ,  0 ,  0 ,  0 ,  0  !


Specify which levels of the 3-D temperature field to print
(ITOUT(NZ)) -- NOTE: NZ values must be entered
(0=Do not print, 1=Print)
(used only if LPRINT=T & LCALGRD=T)
-----------------------------------
                                    Defaults: NZ*0
 ! ITOUT =  0 ,  0 ,  0 ,  0 ,  0 ,  0 ,  0 ,  0 ,  0 ,  0  !

Specify which meteorological fields
to print
(used only if LPRINT=T)             Defaults: 0 (all variables)
-----------------------


  Variable            Print ?
                   (0 = do not print,
                    1 = print)
  --------         ------------------

!  STABILITY  =          0            ! - PGT stability class
!  USTAR      =          0            ! - Friction velocity
!  MONIN      =          0            ! - Monin-Obukhov length
!  MIXHT      =          0            ! - Mixing height
!  WSTAR      =          0            ! - Convective velocity scale
!  PRECIP     =          0            ! - Precipitation rate
!  SENSHEAT   =          0            ! - Sensible heat flux
!  CONVZI     =          0            ! - Convective mixing ht.


 Testing and debug print options for micrometeorological module

    Print input meteorological data and
    internal variables (LDB)          Default: F       ! LDB = F !
    (F = Do not print, T = print)
    (NOTE: this option produces large amounts of output)

    First time step for which debug data
    are printed (NN1)                 Default: 1       ! NN1 =  1  !
```

```
      Last time step for which debug data
      are printed (NN2)                Default: 1        ! NN2 =  5  !


    Testing and debug print options for wind field module
    (all of the following print options control output to
     wind field module's output files: TEST.PRT, TEST.OUT,
     TEST.KIN, TEST.FRD, and TEST.SLP)

      Control variable for writing the test/debug
      wind fields to disk files (IOUTD)
      (0=Do not write, 1=write)        Default: 0        ! IOUTD =  0  !

      Number of levels, starting at the surface,
      to print (NZPRN2)                Default: 1        ! NZPRN2 =  10  !

      Print the INTERPOLATED wind components ?
      (IPR0) (0=no, 1=yes)             Default: 0        !  IPR0 =  1  !

      Print the TERRAIN ADJUSTED surface wind
      components ?
      (IPR1) (0=no, 1=yes)             Default: 0        !  IPR1 =  1  !

      Print the SMOOTHED wind components and
      the INITIAL DIVERGENCE fields ?
      (IPR2) (0=no, 1=yes)             Default: 0        !  IPR2 =  1  !

      Print the FINAL wind speed and direction
      fields ?
      (IPR3) (0=no, 1=yes)             Default: 0        !  IPR3 =  1  !

      Print the FINAL DIVERGENCE fields ?
      (IPR4) (0=no, 1=yes)             Default: 0        !  IPR4 =  1  !

      Print the winds after KINEMATIC effects
      are added ?
      (IPR5) (0=no, 1=yes)             Default: 0        !  IPR5 =  1  !

      Print the winds after the FROUDE NUMBER
      adjustment is made ?
      (IPR6) (0=no, 1=yes)             Default: 0        !  IPR6 =  1  !

      Print the winds after SLOPE FLOWS
      are added ?
      (IPR7) (0=no, 1=yes)             Default: 0        !  IPR7 =  1  !

      Print the FINAL wind field components ?
      (IPR8) (0=no, 1=yes)             Default: 0        !  IPR8 =  1  !

!END!

-------------------------------------------------------------------------------

INPUT GROUP: 4 -- Meteorological data options
--------------
```

```
   NUMBER OF SURFACE & PRECIP. METEOROLOGICAL STATIONS

      Number of surface stations    (NSSTA)  No default      ! NSSTA =  17  !
      Number of precipitation stations
                                    (NPSTA)  No default      ! NPSTA =  63  !

   CLOUD DATA OPTIONS
      Griddid cloud fields:
                                   (ICLOUD)  Default: 0      ! ICLOUD =  0  !
      ICLOUD = 0 - Gridded clouds not used
      ICLOUD = 1 - Gridded CLOUD.DAT generated as OUTPUT
      ICLOUD = 2 - Gridded CLOUD.DAT read as INPUT

   FILE FORMATS

      Surface meteorological data file format
                                   (IFORMS)  Default: 2      ! IFORMS =  2  !
      (1 = unformatted (e.g., SMERGE output))
      (2 = formatted   (free-formatted user input))

      Precipitation data file format
                                   (IFORMP)  Default: 2      ! IFORMP =  2  !
      (1 = unformatted (e.g., PMERGE output))
      (2 = formatted   (free-formatted user input))

      Cloud data file format
                                   (IFORMC)  Default: 2      ! IFORMC =  2  !
      (1 = unformatted - CALMET unformatted output)
      (2 = formatted   - free-formatted CALMET output or user input)

!END!

-------------------------------------------------------------------------------

INPUT GROUP: 5 -- Wind Field Options and Parameters
--------------


    WIND FIELD MODEL OPTIONS
       Model selection variable (IWFCOD)     Default: 1      ! IWFCOD =  1  !
          0 = Objective analysis only
          1 = Diagnostic wind module

       Compute Froude number adjustment
       effects ? (IFRADJ)                    Default: 1      ! IFRADJ =  1  !
       (0 = NO, 1 = YES)

       Compute kinematic effects ? (IKINE)   Default: 0      ! IKINE  =  0  !
       (0 = NO, 1 = YES)

       Use O'Brien procedure for adjustment
       of the vertical velocity ? (IOBR)     Default: 0      ! IOBR =  0  !
       (0 = NO, 1 = YES)

       Compute slope flow effects ? (ISLOPE) Default: 1      ! ISLOPE  =  1  !
```

```
(0 = NO, 1 = YES)

Extrapolate surface wind observations
to upper layers ? (IEXTRP)            Default: -4      ! IEXTRP = -1  !
(1 = no extrapolation is done,
 2 = power law extrapolation used,
 3 = user input multiplicative factors
     for layers 2 - NZ used (see FEXTRP array)
 4 = similarity theory used
 -1, -2, -3, -4 = same as above except layer 1 data
     at upper air stations are ignored

Extrapolate surface winds even
if calm? (ICALM)                      Default: 0       ! ICALM  =  0  !
(0 = NO, 1 = YES)

Layer-dependent biases modifying the weights of
surface and upper air stations (BIAS(NZ))
  -1<=BIAS<=1
Negative BIAS reduces the weight of upper air stations
  (e.g. BIAS=-0.1 reduces the weight of upper air stations
by 10%; BIAS= -1, reduces their weight by 100 %)
Positive BIAS reduces the weight of surface stations
  (e.g. BIAS= 0.2 reduces the weight of surface stations
by 20%; BIAS=1 reduces their weight by 100%)
Zero BIAS leaves weights unchanged (1/R**2 interpolation)
Default: NZ*0
                          ! BIAS =  0 ,  0 ,  0 ,  0 ,  0 ,  0 ,  0 ,  0 ,
0 ,  0  !

Minimum distance from nearest upper air station
to surface station for which extrapolation
of surface winds at surface station will be allowed
(RMIN2: Set to -1 for IEXTRP = 4 or other situations
 where all surface stations should be extrapolated)
                                       Default: 4.     ! RMIN2 = 4.0 !

Use gridded prognostic wind field model
output fields as input to the diagnostic
wind field model (IPROG)              Default: 0       ! IPROG =  15  !
(0 = No, [IWFCOD = 0 or 1]
 1 = Yes, use CSUMM prog. winds as Step 1 field, [IWFCOD = 0]
 2 = Yes, use CSUMM prog. winds as initial guess field [IWFCOD = 1]
 3 = Yes, use winds from MM4.DAT file as Step 1 field [IWFCOD = 0]
 4 = Yes, use winds from MM4.DAT file as initial guess field [IWFCOD = 1]
 5 = Yes, use winds from MM4.DAT file as observations [IWFCOD = 1]
 13 = Yes, use winds from MM5.DAT file as Step 1 field [IWFCOD = 0]
 14 = Yes, use winds from MM5.DAT file as initial guess field [IWFCOD =
1]
 15 = Yes, use winds from MM5.DAT file as observations [IWFCOD = 1]

RADIUS OF INFLUENCE PARAMETERS

Use varying radius of influence       Default: F       ! LVARY =  T!
(if no stations are found within RMAX1,RMAX2,
 or RMAX3, then the closest station will be used)
```

Maximum radius of influence over land in the surface layer (RMAX1)	No default Units: km	! RMAX1 = 0.5 !
Maximum radius of influence over land aloft (RMAX2)	No default Units: km	! RMAX2 = 0.5 !
Maximum radius of influence over water (RMAX3)	No default Units: km	! RMAX3 = 0.5 !

OTHER WIND FIELD INPUT PARAMETERS

Minimum radius of influence used in the wind field interpolation (RMIN)	Default: 0.1 Units: km	! RMIN = 0.1 !
Radius of influence of terrain features (TERRAD)	No default Units: km	! TERRAD = 50. !
Relative weighting of the first guess field and observations in the SURFACE layer (R1) (R1 is the distance from an observational station at which the observation and first guess field are equally weighted)	No default Units: km	! R1 = 1. !
Relative weighting of the first guess field and observations in the layers ALOFT (R2) (R2 is applied in the upper layers in the same manner as R1 is used in the surface layer).	No default Units: km	! R2 = 1. !
Relative weighting parameter of the prognostic wind field data (RPROG) (Used only if IPROG = 1)	No default Units: km	! RPROG = 0. !

Maximum acceptable divergence in the divergence minimization procedure (DIVLIM)	Default: 5.E-6	! DIVLIM= 5.0E-06 !
Maximum number of iterations in the divergence min. procedure (NITER)	Default: 50	! NITER = 50 !
Number of passes in the smoothing procedure (NSMTH(NZ)) NOTE: NZ values must be entered	Default: 2,(mxnz-1)*4	! NSMTH = 2 , 4 , 4 , 4 , 4 , 4 , 4 , 4 , 4 , 4 !
Maximum number of stations used in each layer for the interpolation of data to a grid point (NINTR2(NZ)) NOTE: NZ values must be entered	Default: 99.	! NINTR2 =

```
5 , 5 , 5 , 5 , 5 , 5 , 5 , 5 , 5 , 5 !

    Critical Froude number (CRITFN)        Default: 1.0     ! CRITFN = 1. !

    Empirical factor controlling the
    influence of kinematic effects
    (ALPHA)                                Default: 0.1     ! ALPHA = 0.1 !

    Multiplicative scaling factor for
    extrapolation of surface observations
    to upper layers (FEXTR2(NZ))           Default: NZ*0.0
    ! FEXTR2 = 0., 0., 0., 0., 0., 0., 0., 0., 0., 0. !
    (Used only if IEXTRP = 3 or -3)


BARRIER INFORMATION

    Number of barriers to interpolation
    of the wind fields (NBAR)              Default: 0       ! NBAR =  0  !

    THE FOLLOWING 4 VARIABLES ARE INCLUDED
    ONLY IF NBAR > 0
    NOTE: NBAR values must be entered      No defaults
          for each variable                Units: km

       X coordinate of BEGINNING
       of each barrier (XBBAR(NBAR))       ! XBBAR = 0. !
       Y coordinate of BEGINNING
       of each barrier (YBBAR(NBAR))       ! YBBAR = 0. !

       X coordinate of ENDING
       of each barrier (XEBAR(NBAR))       ! XEBAR = 0. !
       Y coordinate of ENDING
       of each barrier (YEBAR(NBAR))       ! YEBAR = 0. !


DIAGNOSTIC MODULE DATA INPUT OPTIONS

    Surface temperature (IDIOPT1)          Default: 0       ! IDIOPT1 =  0  !
       0 = Compute internally from
           hourly surface observations
       1 = Read preprocessed values from
           a data file (DIAG.DAT)

       Surface met. station to use for
       the surface temperature (ISURFT)    No default       ! ISURFT =  3  !
       (Must be a value from 1 to NSSTA)
       (Used only if IDIOPT1 = 0)
       --------------------------

    Domain-averaged temperature lapse
    rate (IDIOPT2)                         Default: 0       ! IDIOPT2 =  0  !
       0 = Compute internally from
           twice-daily upper air observations
       1 = Read hourly preprocessed values
           from a data file (DIAG.DAT)
```

```
  Upper air station to use for
  the domain-scale lapse rate (IUPT) No default     ! IUPT   =  10  !
  (Must be a value from 1 to NUSTA)
  (Used only if IDIOPT2 = 0)
  --------------------------

  Depth through which the domain-scale
  lapse rate is computed (ZUPT)      Default: 200.  ! ZUPT = 200. !
  (Used only if IDIOPT2 = 0)         Units: meters
  --------------------------

Domain-averaged wind components
(IDIOPT3)                            Default: 0     ! IDIOPT3 =  0  !
   0 = Compute internally from
       twice-daily upper air observations
   1 = Read hourly preprocessed values
       a data file (DIAG.DAT)

   Upper air station to use for
   the domain-scale winds (IUPWND)    Default: -1    ! IUPWND =  10  !
   (Must be a value from -1 to NUSTA)
   (Used only if IDIOPT3 = 0)
   --------------------------

   Bottom and top of layer through
   which the domain-scale winds
   are computed
   (ZUPWND(1), ZUPWND(2))        Defaults: 1., 1000. ! ZUPWND= 1., 1000.
!
   (Used only if IDIOPT3 = 0)    Units: meters
   --------------------------

Observed surface wind components
for wind field module (IDIOPT4)  Default: 0     ! IDIOPT4 =  0  !
   0 = Read WS, WD from a surface
       data file (SURF.DAT)
   1 = Read hourly preprocessed U, V from
       a data file (DIAG.DAT)

Observed upper air wind components
for wind field module (IDIOPT5)  Default: 0     ! IDIOPT5 =  0  !
   0 = Read WS, WD from an upper
       air data file (UP1.DAT, UP2.DAT, etc.)
   1 = Read hourly preprocessed U, V from
       a data file (DIAG.DAT)

LAKE BREEZE INFORMATION

   Use Lake Breeze Module  (LLBREZE)
                                     Default: F     ! LLBREZE = F !

    Number of lake breeze regions (NBOX)            ! NBOX =  0  !

  X Grid line 1 defining the region of interest
                                                    ! XG1 = 0. !

  X Grid line 2 defining the region of interest
                                                    ! XG2 = 0. !
```

```
Y Grid line 1 defining the region of interest
                                                    ! YG1 = 0. !
Y Grid line 2 defining the region of interest
                                                    ! YG2 = 0. !

 X Point defining the coastline (Straight line)
           (XBCST)  (KM)   Default: none    ! XBCST = 0. !

 Y Point defining the coastline (Straight line)
           (YBCST)  (KM)   Default: none    ! YBCST = 0. !

 X Point defining the coastline (Straight line)
           (XECST)  (KM)   Default: none    ! XECST = 0. !

 Y Point defining the coastline (Straight line)
           (YECST)  (KM)   Default: none    ! YECST = 0. !


Number of stations in the region     Default: none ! NLB = *1 !*
(Surface stations + upper air stations)

Station ID's  in the region   (METBXID(NLB))
(Surface stations first, then upper air stations)
  ! METBXID = *0 !*

!END!

-------------------------------------------------------------------------------

INPUT GROUP: 6 -- Mixing Height, Temperature and Precipitation Parameters
--------------

    EMPIRICAL MIXING HEIGHT CONSTANTS

       Neutral, mechanical equation
       (CONSTB)                          Default: 1.41    ! CONSTB = 1.41 !
       Convective mixing ht. equation
       (CONSTE)                          Default: 0.15    ! CONSTE = 0.15 !
       Stable mixing ht. equation
       (CONSTN)                          Default: 2400.   ! CONSTN = 2400.!
       Overwater mixing ht. equation
       (CONSTW)                          Default: 0.16    ! CONSTW = 0.16 !
       Absolute value of Coriolis
       parameter (FCORIOL)               Default: 1.E-4   ! FCORIOL = 1.0E-
04!
                                         Units: (1/s)

    SPATIAL AVERAGING OF MIXING HEIGHTS

       Conduct spatial averaging
       (IAVEZI)  (0=no, 1=yes)           Default: 1       ! IAVEZI =  1  !

       Max. search radius in averaging
       process (MNMDAV)                  Default: 1       ! MNMDAV =  50  !
                                         Units: Grid
                                                cells
```

Half-angle of upwind looking cone for averaging (HAFANG)	Default: 30. Units: deg.	! HAFANG = 30. !
Layer of winds used in upwind averaging (ILEVZI) (must be between 1 and NZ)	Default: 1	! ILEVZI = 1 !

OTHER MIXING HEIGHT VARIABLES

Minimum potential temperature lapse rate in the stable layer above the current convective mixing ht. (DPTMIN)	Default: 0.001 Units: deg. K/m	! DPTMIN = 0.001 !
Depth of layer above current conv. mixing height through which lapse rate is computed (DZZI)	Default: 200. Units: meters	! DZZI = 200. !
Minimum overland mixing height (ZIMIN)	Default: 50. Units: meters	! ZIMIN = 50. !
Maximum overland mixing height (ZIMAX)	Default: 3000. Units: meters	! ZIMAX = 3000. !
Minimum overwater mixing height (ZIMINW) -- (Not used if observed overwater mixing hts. are used)	Default: 50. Units: meters	! ZIMINW = 50. !
Maximum overwater mixing height (ZIMAXW) -- (Not used if observed overwater mixing hts. are used)	Default: 3000. Units: meters	! ZIMAXW = 3000. !

TEMPERATURE PARAMETERS

Interpolation type (1 = 1/R ; 2 = 1/R**2)	Default:1	! IRAD = 1 !
Radius of influence for temperature interpolation (TRADKM)	Default: 500. Units: km	! TRADKM = 100. !
Maximum Number of stations to include in temperature interpolation (NUMTS)	Default: 5	! NUMTS = 5 !
Conduct spatial averaging of temperatures (IAVET) (0=no, 1=yes) (will use mixing ht MNMDAV,HAFANG so make sure they are correct)	Default: 1	! IAVET = 1 !
Default temperature gradient below the mixing height over water (K/m) (TGDEFB)	Default: -.0098	! TGDEFB = -0.0098 !
Default temperature gradient above the mixing height over water (K/m) (TGDEFA)	Default: -.0045	! TGDEFA = -0.0045 !
Beginning (JWAT1) and ending (JWAT2) land use categories for temperature interpolation over water -- Make		! JWAT1 = 999 ! ! JWAT2 = 999 !

```
      bigger than largest land use to disable

   PRECIP INTERPOLATION PARAMETERS

      Method of interpolation (NFLAGP)       Default = 2     ! NFLAGP =  2  !
       (1=1/R,2=1/R**2,3=EXP/R**2)
      Radius of Influence (km) (SIGMAP)      Default = 100.0  ! SIGMAP = 48. !
       (0.0 => use half dist. btwn
        nearest stns w & w/out
        precip when NFLAGP = 3)
      Minimum Precip. Rate Cutoff (mm/hr)    Default = 0.01  ! CUTP = 0.01 !
       (values < CUTP = 0.0 mm/hr)
!END!
```

INPUT GROUP: 7 -- Surface meteorological station parameters

SURFACE STATION VARIABLES
(One record per station -- 17 records in all)

	Name[1]	ID[2]	X coord. (km)	Y coord. (km)	Time zone	Anem. Ht.(m)	
! SS1	='HQM'	1	1080.506	-85.521	8	10	!
! SS2	='OLM'	2	1157.474	-70.567	8	10	!
! SS3	='YKM'	3	1336.913	-75.631	8	10	!
! SS4	='TCM'	4	1183.717	-45.487	8	10	!
! SS5	='PWT'	5	1155.919	-15.002	8	10	!
! SS6	='SEA'	6	1189.995	-11.273	8	10	!
! SS7	='SMP'	7	1262.823	-14.265	8	10	!
! SS8	='BFI'	8	1188.237	-2.862	8	10	!
! SS9	='UIL'	9	1020.069	10.404	8	10	!
! SS10	='EAT'	10	1340.109	16.665	8	10	!
! SS11	='PAE'	11	1181.074	38.443	8	10	!
! SS12	='CLM'	12	1090.878	42.202	8	10	!
! SS13	='AWO'	13	1183.988	66.504	8	10	!
! SS14	='VIC'	14	1084.708	99.031	8	10	!
! SS15	='BLI'	15	1144.363	127.418	8	10	!
! SS16	='VAN'	16	1090.670	160.467	8	10	!
! SS17	='ABB'	17	1150.577	154.328	8	10	!

1
Four character string for station name
(MUST START IN COLUMN 9)

2
Five digit integer for station ID

!END!

INPUT GROUP: 8 -- Upper air meteorological station parameters

UPPER AIR STATION VARIABLES
(One record per station -- 20 records in all)

	Name[1]	ID[2]	X coord. (km)	Y coord. (km)	Time zone	
! US1	='2547'	2547	971.800	-60.000	8	!
! US2	='2555'	2555	971.800	36.000	8	!
! US3	='2563'	2563	971.800	132.000	8	!
! US4	='2571'	2571	971.800	228.000	8	!
! US5	='3347'	3347	1067.800	-60.000	8	!
! US6	='3355'	3355	1067.800	36.000	8	!
! US7	='3363'	3363	1067.800	132.000	8	!
! US8	='3371'	3371	1067.800	228.000	8	!
! US9	='4147'	4147	1163.800	-60.000	8	!
! US10	='4155'	4155	1163.800	36.000	8	!
! US11	='4163'	4163	1163.800	132.000	8	!
! US12	='4171'	4171	1163.800	228.000	8	!
! US13	='4947'	4947	1259.800	-60.000	8	!
! US14	='4955'	4955	1259.800	36.000	8	!
! US15	='4963'	4963	1259.800	132.000	8	!
! US16	='4971'	4971	1259.800	228.000	8	!
! US17	='5747'	5747	1355.800	-60.000	8	!
! US18	='5755'	5755	1355.800	36.000	8	!
! US19	='5763'	5763	1355.800	132.000	8	!
! US20	='5771'	5771	1355.800	228.000	8	!

[1] Four character string for station name
(MUST START IN COLUMN 9)

[2] Five digit integer for station ID

!END!

INPUT GROUP: 9 -- Precipitation station parameters

PRECIPITATION STATION VARIABLES
(One record per station -- 63 records in all)
(NOT INCLUDED IF NPSTA = 0)

	Name[1]	Station Code[2]	X coord. (km)	Y coord. (km)	
! PS1	='2547'	2547	971.800	-60.000	!

```
! PS2  ='2947'    2947   1019.800    -60.000      !
! PS3  ='3347'    3347   1067.800    -60.000      !
! PS4  ='3747'    3747   1115.800    -60.000      !
! PS5  ='4147'    4147   1163.800    -60.000      !
! PS6  ='4547'    4547   1211.800    -60.000      !
! PS7  ='4947'    4947   1259.800    -60.000      !
! PS8  ='5347'    5347   1307.800    -60.000      !
! PS9  ='5747'    5747   1355.800    -60.000      !
! PS10 ='2551'    2551    971.800    -12.000      !
! PS11 ='2951'    2951   1019.800    -12.000      !
! PS12 ='3351'    3351   1067.800    -12.000      !
! PS13 ='3751'    3751   1115.800    -12.000      !
! PS14 ='4151'    4151   1163.800    -12.000      !
! PS15 ='4551'    4551   1211.800    -12.000      !
! PS16 ='4951'    4951   1259.800    -12.000      !
! PS17 ='5351'    5351   1307.800    -12.000      !
! PS18 ='5751'    5751   1355.800    -12.000      !
! PS19 ='2555'    2555    971.800     36.000      !
! PS20 ='2955'    2955   1019.800     36.000      !
! PS21 ='3355'    3355   1067.800     36.000      !
! PS22 ='3755'    3755   1115.800     36.000      !
! PS23 ='4155'    4155   1163.800     36.000      !
! PS24 ='4555'    4555   1211.800     36.000      !
! PS25 ='4955'    4955   1259.800     36.000      !
! PS26 ='5355'    5355   1307.800     36.000      !
! PS27 ='5755'    5755   1355.800     36.000      !
! PS28 ='2559'    2559    971.800     84.000      !
! PS29 ='2959'    2959   1019.800     84.000      !
! PS30 ='3359'    3359   1067.800     84.000      !
! PS31 ='3759'    3759   1115.800     84.000      !
! PS32 ='4159'    4159   1163.800     84.000      !
! PS33 ='4559'    4559   1211.800     84.000      !
! PS34 ='4959'    4959   1259.800     84.000      !
! PS35 ='5359'    5359   1307.800     84.000      !
! PS36 ='5759'    5759   1355.800     84.000      !
! PS37 ='2563'    2563    971.800    132.000      !
! PS38 ='2963'    2963   1019.800    132.000      !
! PS39 ='3363'    3363   1067.800    132.000      !
! PS40 ='3763'    3763   1115.800    132.000      !
! PS41 ='4163'    4163   1163.800    132.000      !
! PS42 ='4563'    4563   1211.800    132.000      !
! PS43 ='4963'    4963   1259.800    132.000      !
! PS44 ='5363'    5363   1307.800    132.000      !
! PS45 ='5763'    5763   1355.800    132.000      !
! PS46 ='2567'    2567    971.800    180.000      !
! PS47 ='2967'    2967   1019.800    180.000      !
! PS48 ='3367'    3367   1067.800    180.000      !
! PS49 ='3767'    3767   1115.800    180.000      !
! PS50 ='4167'    4167   1163.800    180.000      !
! PS51 ='4567'    4567   1211.800    180.000      !
! PS52 ='4967'    4967   1259.800    180.000      !
! PS53 ='5367'    5367   1307.800    180.000      !
! PS54 ='5767'    5767   1355.800    180.000      !
! PS55 ='2571'    2571    971.800    228.000      !
! PS56 ='2971'    2971   1019.800    228.000      !
! PS57 ='3371'    3371   1067.800    228.000      !
! PS58 ='3771'    3771   1115.800    228.000      !
```

```
! PS59 ='4171'    4171   1163.800    228.000      !
! PS60 ='4571'    4571   1211.800    228.000      !
! PS61 ='4971'    4971   1259.800    228.000      !
! PS62 ='5371'    5371   1307.800    228.000      !
! PS63 ='5771'    5771   1355.800    228.000      !

-------------------
      1
        Four character string for station name
        (MUST START IN COLUMN 9)

      2
        Six digit station code composed of state
        code (first 2 digits) and station ID (last
        4 digits)

!END!
```

```
BP Cherry Point Cogeneration
Ferndale, WA
Case 6, Class I receptors
---------------- Run title (3 lines) ----------------------------------------

                    CALPUFF MODEL CONTROL FILE
                    --------------------------

------------------------------------------------------------------------------

INPUT GROUP: 0 -- Input and Output File Names

--------------
Default Name  Type          File Name
------------  ----          ---------
CALMET.DAT    input    * METDAT =              *
    or
ISCMET.DAT    input    * ISCDAT =              *
    or
PLMMET.DAT    input    * PLMDAT =              *
    or
PROFILE.DAT   input    * PRFDAT =              *
SURFACE.DAT   input    * SFCDAT =              *
RESTARTB.DAT  input    * RSTARTB=              *
------------------------------------------------------------------------------
CALPUFF.LST   output   ! PUFLST =D:\CALPUFF\6PUFF.LST   !
CONC.DAT      output   ! CONDAT =D:\CALPUFF\6CONC.DAT     !
DFLX.DAT      output   ! DFDAT  =D:\CALPUFF\6DRYDEP.DAT     !
WFLX.DAT      output   ! WFDAT  =D:\CALPUFF\6WETDEP.DAT     !

VISB.DAT      output   ! VISDAT =D:\CALPUFF\6VISB.DAT     !
RESTARTE.DAT  output   * RSTARTE=              *
------------------------------------------------------------------------------
Emission Files
--------------
PTEMARB.DAT   input    * PTDAT  =              *
VOLEMARB.DAT  input    * VOLDAT =              *
BAEMARB.DAT   input    * ARDAT  =              *
LNEMARB.DAT   input    * LNDAT  =              *
------------------------------------------------------------------------------
Other Files
-----------
OZONE.DAT     input    * OZDAT  =              *
VD.DAT        input    * VDDAT  =              *
CHEM.DAT      input    * CHEMDAT=              *
HILL.DAT      input    * HILDAT=               *
HILLRCT.DAT   input    * RCTDAT=               *
COASTLN.DAT   input    * CSTDAT=               *
FLUXBDY.DAT   input    * BDYDAT=               *
BCON.DAT      input    * BCNDAT=               *
DEBUG.DAT     output   * DEBUG =               *
MASSFLX.DAT   output   * FLXDAT=               *
MASSBAL.DAT   output   * BALDAT=               *
FOG.DAT       output   * FOGDAT=               *
------------------------------------------------------------------------------
All file names will be converted to lower case if LCFILES = T
Otherwise, if LCFILES = F, file names will be converted to UPPER CASE
```

```
        T = lower case       ! LCFILES = F !
        F = UPPER CASE
NOTE: (1) file/path names can be up to 70 characters in length


Provision for multiple input files
----------------------------------

     Number of CALMET.DAT files for run (NMETDAT)
                                        Default: 1        ! NMETDAT =   4   !

     Number of PTEMARB.DAT files for run (NPTDAT)
                                        Default: 0        ! NPTDAT =  0  !

     Number of BAEMARB.DAT files for run (NARDAT)
                                        Default: 0        ! NARDAT =  0  !

     Number of VOLEMARB.DAT files for run (NVOLDAT)
                                        Default: 0        ! NVOLDAT =  0  !

!END!

-------------
Subgroup (0a)
-------------

  The following CALMET.DAT filenames are processed in sequence if NMETDAT>1

Default Name  Type          File Name
------------  ----          ---------
 none         input    ! METDAT=D:\CALPUFF\98Q2MET.DAT     !  !END!
 none         input    ! METDAT=D:\CALPUFF\98Q3MET.DAT     !  !END!
 none         input    ! METDAT=D:\CALPUFF\98Q4MET.DAT     !  !END!
 none         input    ! METDAT=D:\CALPUFF\99Q1MET.DAT     !  !END!


--------------------------------------------------------------------------------

INPUT GROUP: 1 -- General run control parameters
--------------

    Option to run all periods found
    in the met. file     (METRUN)   Default: 0       ! METRUN =   0  !

        METRUN = 0 - Run period explicitly defined below
        METRUN = 1 - Run all periods in met. file

     Starting date:   Year (IBYR) -- No default       ! IBYR =  1998  !
     (used only if   Month (IBMO) -- No default       ! IBMO =  4  !
      METRUN = 0)      Day (IBDY) -- No default       ! IBDY =  1  !
                      Hour (IBHR) -- No default       ! IBHR =  0  !

     Length of run (hours) (IRLG) -- No default       ! IRLG =  7992  !

     Number of chemical species (NSPEC)
                                        Default: 5       ! NSPEC =  6   !
```

```
    Number of chemical species
    to be emitted  (NSE)            Default: 3       ! NSE =  4   !

    Flag to stop run after
    SETUP phase (ITEST)             Default: 2       ! ITEST =  2   !
    (Used to allow checking
    of the model inputs, files, etc.)
          ITEST = 1 - STOPS program after SETUP phase
          ITEST = 2 - Continues with execution of program
                      after SETUP

    Restart Configuration:

       Control flag (MRESTART)      Default: 0       ! MRESTART =  0   !

          0 = Do not read or write a restart file
          1 = Read a restart file at the beginning of
              the run
          2 = Write a restart file during run
          3 = Read a restart file at beginning of run
              and write a restart file during run

       Number of periods in Restart
       output cycle (NRESPD)        Default: 0       ! NRESPD =  0   !

          0 = File written only at last period
         >0 = File updated every NRESPD periods

    Meteorological Data Format (METFM)
                                    Default: 1       ! METFM =  1   !

          METFM = 1 - CALMET binary file (CALMET.MET)
          METFM = 2 - ISC ASCII file (ISCMET.MET)
          METFM = 3 - AUSPLUME ASCII file (PLMMET.MET)
          METFM = 4 - CTDM plus tower file (PROFILE.DAT) and
                      surface parameters file (SURFACE.DAT)

    PG sigma-y is adjusted by the factor (AVET/PGTIME)**0.2
    Averaging Time (minutes) (AVET)
                                    Default: 60.0    ! AVET = 60. !
    PG Averaging Time (minutes) (PGTIME)
                                    Default: 60.0    ! PGTIME = 60. !


!END!

-----------------------------------------------------------------------------

INPUT GROUP: 2 -- Technical options
--------------


     Vertical distribution used in the
     near field (MGAUSS)                Default: 1     ! MGAUSS =  1   !
        0 = uniform
        1 = Gaussian
```

```
Terrain adjustment method
(MCTADJ)                                  Default: 3      ! MCTADJ =  3   !
   0 = no adjustment
   1 = ISC-type of terrain adjustment
   2 = simple, CALPUFF-type of terrain
       adjustment
   3 = partial plume path adjustment

Subgrid-scale complex terrain
flag (MCTSG)                              Default: 0      ! MCTSG =  0   !
   0 = not modeled
   1 = modeled

Near-field puffs modeled as
elongated 0 (MSLUG)                       Default: 0      ! MSLUG =  0   !
   0 = no
   1 = yes (slug model used)

Transitional plume rise modeled ?
(MTRANS)                                  Default: 1      ! MTRANS =  1   !
   0 = no  (i.e., final rise only)
   1 = yes (i.e., transitional rise computed)

Stack tip downwash? (MTIP)                Default: 1      ! MTIP =  1  !
   0 = no  (i.e., no stack tip downwash)
   1 = yes (i.e., use stack tip downwash)

Vertical wind shear modeled above
stack top? (MSHEAR)                       Default: 0      ! MSHEAR =  0  !
   0 = no  (i.e., vertical wind shear not modeled)
   1 = yes (i.e., vertical wind shear modeled)

Puff splitting allowed? (MSPLIT)          Default: 0      ! MSPLIT =  0  !
   0 = no (i.e., puffs not split)
   1 = yes (i.e., puffs are split)

Chemical mechanism flag (MCHEM)           Default: 1      ! MCHEM =  1   !
   0 = chemical transformation not
       modeled
   1 = transformation rates computed
       internally (MESOPUFF II scheme)
   2 = user-specified transformation
       rates used
   3 = transformation rates computed
       internally (RIVAD/ARM3 scheme)
   4 = secondary organic aerosol formation
       computed (MESOPUFF II scheme for OH)

Wet removal modeled ? (MWET)              Default: 1      ! MWET =  1   !
   0 = no
   1 = yes

Dry deposition modeled ? (MDRY)           Default: 1      ! MDRY =  1   !
   0 = no
   1 = yes
   (dry deposition method specified
```

for each species in Input Group 3)

Method used to compute dispersion
coefficients (MDISP) Default: 3 ! MDISP = 3 !

1 = dispersion coefficients computed from measured values of turbulence, sigma v, sigma w
2 = dispersion coefficients from internally calculated sigma v, sigma w using micrometeorological variables (u*, w*, L, etc.)
3 = PG dispersion coefficients for RURAL areas (computed using the ISCST multi-segment approximation) and MP coefficients in urban areas
4 = same as 3 except PG coefficients computed using the MESOPUFF II eqns.
5 = CTDM sigmas used for stable and neutral conditions. For unstable conditions, sigmas are computed as in MDISP = 3, described above. MDISP = 5 assumes that measured values are read

Sigma-v/sigma-theta, sigma-w measurements used? (MTURBVW)
(Used only if MDISP = 1 or 5) Default: 3 ! MTURBVW = 3 !
1 = use sigma-v or sigma-theta measurements from PROFILE.DAT to compute sigma-y (valid for METFM = 1, 2, 3, 4)
2 = use sigma-w measurements from PROFILE.DAT to compute sigma-z (valid for METFM = 1, 2, 3, 4)
3 = use both sigma-(v/theta) and sigma-w from PROFILE.DAT to compute sigma-y and sigma-z (valid for METFM = 1, 2, 3, 4)
4 = use sigma-theta measurements from PLMMET.DAT to compute sigma-y (valid only if METFM = 3)

Back-up method used to compute dispersion
when measured turbulence data are
missing (MDISP2) Default: 3 ! MDISP2 = 3 !
(used only if MDISP = 1 or 5)
2 = dispersion coefficients from internally calculated sigma v, sigma w using micrometeorological variables (u*, w*, L, etc.)
3 = PG dispersion coefficients for RURAL areas (computed using the ISCST multi-segment approximation) and MP coefficients in urban areas
4 = same as 3 except PG coefficients computed using the MESOPUFF II eqns.

PG sigma-y,z adj. for roughness? Default: 0 ! MROUGH = 0 !
(MROUGH)
0 = no
1 = yes

Partial plume penetration of Default: 1 ! MPARTL = 1 !
elevated inversion?
(MPARTL)
0 = no

```
   1 = yes

Strength of temperature inversion     Default: 0     ! MTINV =  0  !
provided in PROFILE.DAT extended records?
(MTINV)
   0 = no (computed from measured/default gradients)
   1 = yes

PDF used for dispersion under convective conditions?
                                      Default: 0     ! MPDF =  0  !
(MPDF)
   0 = no
   1 = yes

Sub-Grid TIBL module used for shore line?
                                      Default: 0     ! MSGTIBL = 0  !
(MSGTIBL)
   0 = no
   1 = yes

Boundary conditions (concentration) modeled?
                                      Default: 0     ! MBCON = 0  !
(MBCON)
   0 = no
   1 = yes


Analyses of fogging and icing impacts due to emissions from
arrays of mechanically-forced cooling towers can be performed
using CALPUFF in conjunction with a cooling tower emissions
processor (CTEMISS) and its associated postprocessors.  Hourly
emissions of water vapor and temperature from each cooling tower
cell are computed for the current cell configuration and ambient
conditions by CTEMISS. CALPUFF models the dispersion of these
emissions and provides cloud information in a specialized format
for further analysis. Output to FOG.DAT is provided in either
'plume mode' or 'receptor mode' format.

Configure for FOG Model output?
                                      Default: 0     ! MFOG =  0  !
(MFOG)
   0 = no
   1 = yes  - report results in PLUME Mode format
   2 = yes  - report results in RECEPTOR Mode format


Test options specified to see if
they conform to regulatory
values? (MREG)                        Default: 1     ! MREG =  1   !

   0 = NO checks are made
   1 = Technical options must conform to USEPA values
                 METFM    1
                 AVET     60. (min)
                 MGAUSS   1
                 MCTADJ   3
                 MTRANS   1
```

```
                    MTIP      1
                    MCHEM     1 (if modeling SOx, NOx)
                    MWET      1
                    MDRY      1
                    MDISP     3
                    MROUGH    0
                    MPARTL    1
                    SYTDEP    550. (m)
                    MHFTSZ    0


!END!

-------------------------------------------------------------------------------

INPUT GROUP: 3a, 3b -- Species list
-------------------

------------
Subgroup (3a)
------------

  The following species are modeled:

! CSPEC =          SO2 !          !END!
! CSPEC =          SO4 !          !END!
! CSPEC =          NOX !          !END!
! CSPEC =         HNO3 !          !END!
! CSPEC =          NO3 !          !END!
! CSPEC =         PM10 !          !END!

                                                        Dry                 OUTPUT
GROUP
    SPECIES          MODELED          EMITTED       DEPOSITED
NUMBER
     NAME         (0=NO, 1=YES)    (0=NO, 1=YES)    (0=NO,
(0=NONE,
   (Limit: 12                                        1=COMPUTED-GAS        1=1st
CGRUP,
    Characters                                       2=COMPUTED-PARTICLE   2=2nd
CGRUP,
    in length)                                       3=USER-SPECIFIED)     3=
etc.)

!          SO2  =         1,               1,           1,                 0   !
!          SO4  =         1,               1,           2,                 0   !
!          NOX  =         1,               1,           1,                 0   !
!         HNO3  =         1,               0,           1,                 0   !
!          NO3  =         1,               0,           2,                 0   !
!         PM10  =         1,               1,           2,                 0   !

!END!

-------------
Subgroup (3b)
-------------
```

The following names are used for Species-Groups in which results for certain species are combined (added) prior to output. The CGRUP name will be used as the species name in output files. Use this feature to model specific particle-size distributions by treating each size-range as a separate species. Order must be consistent with 3(a) above.

INPUT GROUP: 4 -- Grid control parameters

METEOROLOGICAL grid:

```
          No. X grid cells (NX)      No default     ! NX =  42   !
          No. Y grid cells (NY)      No default     ! NY =  34   !
       No. vertical layers (NZ)      No default     ! NZ =  10   !

         Grid spacing (DGRIDKM)      No default     ! DGRIDKM = 12. !
                                     Units: km

              Cell face heights
                  (ZFACE(nz+1))      No defaults
                                     Units: m
  ! ZFACE = 0., 20., 40., 80., 160., 300., 600., 1000., 1500., 2200.,
            3000. !

          Reference Coordinates
        of SOUTHWEST corner of
             grid cell(1, 1):

          X coordinate (XORIGKM)     No default     ! XORIGKM = 923.8 !
          Y coordinate (YORIGKM)     No default     ! YORIGKM = -108. !
                                    Units: km

               UTM zone (IUTMZN)     No default     ! IUTMZN =  10   !

  Reference coordinates of CENTER
       of the domain (used in the
    calculation of solar elevation
                         angles)

          Latitude  (deg.) (XLAT)    No default     ! XLAT  = 48.376  !
         Longitude (deg.) (XLONG)    No default     ! XLONG = 122.188  !
           Time zone        (XTZ)    No default     ! XTZ   = 8.0  !
      (PST=8, MST=7, CST=6, EST=5)
```

Computational grid:

The computational grid is identical to or a subset of the MET. grid. The lower left (LL) corner of the computational grid is at grid point

(IBCOMP, JBCOMP) of the MET. grid. The upper right (UR) corner of the computational grid is at grid point (IECOMP, JECOMP) of the MET. grid. The grid spacing of the computational grid is the same as the MET. grid.

X index of LL corner (IBCOMP) (1 <= IBCOMP <= NX)	No default	! IBCOMP = 1 !
Y index of LL corner (JBCOMP) (1 <= JBCOMP <= NY)	No default	! JBCOMP = 1 !
X index of UR corner (IECOMP) (1 <= IECOMP <= NX)	No default	! IECOMP = 42 !
Y index of UR corner (JECOMP) (1 <= JECOMP <= NY)	No default	! JECOMP = 34 !

SAMPLING GRID (GRIDDED RECEPTORS):

The lower left (LL) corner of the sampling grid is at grid point (IBSAMP, JBSAMP) of the MET. grid. The upper right (UR) corner of the sampling grid is at grid point (IESAMP, JESAMP) of the MET. grid. The sampling grid must be identical to or a subset of the computational grid. It may be a nested grid inside the computational grid. The grid spacing of the sampling grid is DGRIDKM/MESHDN.

Logical flag indicating if gridded receptors are used (LSAMP) (T=yes, F=no)	Default: T	! LSAMP = F !
X index of LL corner (IBSAMP) (IBCOMP <= IBSAMP <= IECOMP)	No default	! IBSAMP = 1 !
Y index of LL corner (JBSAMP) (JBCOMP <= JBSAMP <= JECOMP)	No default	! JBSAMP = 1 !
X index of UR corner (IESAMP) (IBCOMP <= IESAMP <= IECOMP)	No default	! IESAMP = 1 !
Y index of UR corner (JESAMP) (JBCOMP <= JESAMP <= JECOMP)	No default	! JESAMP = 1 !
Nesting factor of the sampling grid (MESHDN) (MESHDN is an integer >= 1)	Default: 1	! MESHDN = 1 !

!END!

INPUT GROUP: 5 -- Output Options

```
--------------
                                                  *                                  *
   FILE                          DEFAULT VALUE                VALUE THIS RUN
   ----                          -------------                --------------

 Concentrations (ICON)                1                      !  ICON =  1   !
 Dry Fluxes (IDRY)                    1                      !  IDRY =  1   !
 Wet Fluxes (IWET)                    1                      !  IWET =  1   !
 Relative Humidity (IVIS)             1                      !  IVIS =  1   !
  (relative humidity file is
   required for visibility
   analysis)
 Use data compression option in output file?
 (LCOMPRS)                            Default: T             ! LCOMPRS = T !

 *
  0 = Do not create file, 1 = create file


  DIAGNOSTIC MASS FLUX OUTPUT OPTIONS:

     Mass flux across specified boundaries
     for selected species reported hourly?
     (IMFLX)                          Default: 0             ! IMFLX =  0  !
       0 = no
       1 = yes (FLUXBDY.DAT and MASSFLX.DAT filenames
                are specified in Input Group 0)

     Mass balance for each species
     reported hourly?
     (IMBAL)                          Default: 0             ! IMBAL =  0  !
       0 = no
       1 = yes (MASSBAL.DAT filename is
            specified in Input Group 0)


  LINE PRINTER OUTPUT OPTIONS:

     Print concentrations (ICPRT)     Default: 0             ! ICPRT =  1   !
     Print dry fluxes (IDPRT)         Default: 0             ! IDPRT =  1   !
     Print wet fluxes (IWPRT)         Default: 0             ! IWPRT =  1   !
     (0 = Do not print, 1 = Print)

     Concentration print interval
     (ICFRQ) in hours                 Default: 1             ! ICFRQ =  7992   !
     Dry flux print interval
     (IDFRQ) in hours                 Default: 1             ! IDFRQ =  7992   !
     Wet flux print interval
     (IWFRQ) in hours                 Default: 1             ! IWFRQ =  7992   !

     Units for Line Printer Output
     (IPRTU)                          Default: 1             ! IPRTU =  3   !
                    for              for
                Concentration     Deposition
         1 =       g/m**3           g/m**2/s
         2 =      mg/m**3          mg/m**2/s
         3 =      ug/m**3          ug/m**2/s
```

```
          4 =      ng/m**3        ng/m**2/s
          5 =     Odour Units

       Messages tracking progress of run
       written to the screen ?
       (IMESG)                          Default: 2         ! IMESG =  2   !
         0 = no
         1 = yes (advection step, puff ID)
         2 = yes (YYYYJJJHH, # old puffs, # emitted puffs)


     SPECIES (or GROUP for combined species) LIST FOR OUTPUT OPTIONS

                  ---- CONCENTRATIONS ----   ------ DRY FLUXES ------   ------
WET FLUXES ------   -- MASS FLUX --
   SPECIES
   /GROUP         PRINTED?  SAVED ON DISK?   PRINTED?  SAVED ON DISK?   PRINTED?
SAVED ON DISK?   SAVED ON DISK?
   -------        ------------------------   ------------------------   ---------
---------------   ---------------
!          SO2 =     1,           1,           1,           1,           1,
1,           0   !
!          NOX =     1,           1,           1,           1,           0,
0,           0   !
!         PM10 =     1,           1,           1,           1,           1,
1,           0   !
!          SO4 =     1,           1,           1,           1,           1,
1,           0   !
!         HNO3 =     1,           1,           1,           1,           1,
1,           0   !
!          NO3 =     1,           1,           1,           1,           1,
1,           0   !

     OPTIONS FOR PRINTING "DEBUG" QUANTITIES (much output)

       Logical for debug output
       (LDEBUG)                                Default: F     ! LDEBUG = F !

       First puff to track
       (IPFDEB)                                Default: 1     ! IPFDEB =  1  !

       Number of puffs to track
       (NPFDEB)                                Default: 1     ! NPFDEB =  1  !

       Met. period to start output
       (NN1)                                   Default: 1     ! NN1 =  1   !

       Met. period to end output
       (NN2)                                   Default: 10    ! NN2 =  10  !

!END!

-------------------------------------------------------------------------------


INPUT GROUP: 6a, 6b, & 6c -- Subgrid scale complex terrain inputs
```

```
-------------------------

---------------
Subgroup (6a)
---------------
       Number of terrain features (NHILL)       Default: 0     ! NHILL =  0   !

       Number of special complex terrain
       receptors  (NCTREC)                      Default: 0     ! NCTREC =  0   !

       Terrain and CTSG Receptor data for
       CTSG hills input in CTDM format ?
       (MHILL)                                  No Default     ! MHILL =  2   !
       1 = Hill and Receptor data created
           by CTDM processors & read from
           HILL.DAT and HILLRCT.DAT files
       2 = Hill data created by OPTHILL &
           input below in Subgroup (6b);
           Receptor data in Subgroup (6c)

       Factor to convert horizontal dimensions  Default: 1.0   ! XHILL2M = 1. !
       to meters (MHILL=1)

       Factor to convert vertical dimensions    Default: 1.0   ! ZHILL2M = 1. !
       to meters (MHILL=1)

       X-origin of CTDM system relative to      No Default     ! XCTDMKM =
0.0E00 !
       CALPUFF coordinate system, in Kilometers (MHILL=1)

       Y-origin of CTDM system relative to      No Default     ! YCTDMKM =
0.0E00 !
       CALPUFF coordinate system, in Kilometers (MHILL=1)

! END !

---------------
Subgroup (6b)
---------------

                      1 **
     HILL information


HILL            XC        YC       THETAH  ZGRID  RELIEF    EXPO 1    EXPO 2
SCALE 1    SCALE 2    AMAX1     AMAX2
 NO.           (km)      (km)      (deg.)   (m)     (m)       (m)       (m)
(m)         (m)        (m)       (m)
----           ----      ----      ------  -----  ------    ------    ------   --
-----    -------    -----     -----

---------------
Subgroup (6c)
---------------

    COMPLEX TERRAIN RECEPTOR INFORMATION
```

XRCT (km)	YRCT (km)	ZRCT (m)	XHH

1

Description of Complex Terrain Variables:

XC, YC = Coordinates of center of hill
THETAH = Orientation of major axis of hill (clockwise from North)
ZGRID = Height of the 0 of the grid above mean sea level
RELIEF = Height of the crest of the hill above the grid elevation
EXPO 1 = Hill-shape exponent for the major axis
EXPO 2 = Hill-shape exponent for the major axis
SCALE 1 = Horizontal length scale along the major axis
SCALE 2 = Horizontal length scale along the minor axis
AMAX = Maximum allowed axis length for the major axis
BMAX = Maximum allowed axis length for the major axis

XRCT, YRCT = Coordinates of the complex terrain receptors
ZRCT = Height of the ground (MSL) at the complex terrain Receptor
XHH = Hill number associated with each complex terrain receptor (NOTE: MUST BE ENTERED AS A REAL NUMBER)

**
NOTE: DATA for each hill and CTSG receptor are treated as a separate input subgroup and therefore must end with an input group terminator.

INPUT GROUP: 7 -- Chemical parameters for dry deposition of gases

SPECIES NAME	DIFFUSIVITY (cm**2/s)	ALPHA STAR	REACTIVITY	MESOPHYLL RESISTANCE (s/cm)	HENRY'S LAW COEFFICIENT (dimensionless)
! SO2 =	0.1509,	1000.,	8.,	0.,	0.04 !
! NOX =	0.1656,	1.,	8.,	5.,	3.5 !
! HNO3 =	0.1628,	1.,	18.,	0.,	0.00000008 !

!END!

INPUT GROUP: 8 -- Size parameters for dry deposition of particles

For SINGLE SPECIES, the mean and standard deviation are used to compute a deposition velocity for NINT (see group 9) size-ranges, and these are then averaged to obtain a mean deposition velocity.

For GROUPED SPECIES, the size distribution should be explicitly specified (by the 'species' in the group), and the standard deviation for each should be entered as 0. The model will then use the deposition velocity for the stated mean diameter.

	SPECIES NAME	GEOMETRIC MASS MEAN DIAMETER (microns)	GEOMETRIC STANDARD DEVIATION (microns)	
!	SO4 =	0.48,	2.	!
!	NO3 =	0.48,	2.	!
!	PM10 =	0.48,	2.	!

!END!

INPUT GROUP: 9 -- Miscellaneous dry deposition parameters

Reference cuticle resistance (s/cm)
(RCUTR) Default: 30 ! RCUTR = 30.0 !
Reference ground resistance (s/cm)
(RGR) Default: 10 ! RGR = 10.0 !
Reference pollutant reactivity
(REACTR) Default: 8 ! REACTR = 8.0 !

Number of particle-size intervals used to evaluate effective particle deposition velocity
(NINT) Default: 9 ! NINT = 9 !

Vegetation state in unirrigated areas
(IVEG) Default: 1 ! IVEG = 1 !
IVEG=1 for active and unstressed vegetation
IVEG=2 for active and stressed vegetation
IVEG=3 for inactive vegetation

!END!

INPUT GROUP: 10 -- Wet Deposition Parameters

Scavenging Coefficient -- Units: (sec)**(-1)

```
       Pollutant       Liquid Precip.        Frozen Precip.
       ---------       --------------        --------------
!          SO2 =          3.0E-05,              0.0E00 !
!          SO4 =          1.0E-04,             3.0E-05 !
!         HNO3 =          6.0E-05,              0.0E00 !
!          NO3 =          1.0E-04,             3.0E-05 !
!         PM10 =          1.0E-04,             3.0E-05 !

!END!

-------------------------------------------------------------------------------


INPUT GROUP: 11 -- Chemistry Parameters
---------------

     Ozone data input option (MOZ)      Default: 1            ! MOZ =  0   !
     (Used only if MCHEM = 1, 3, or 4)
        0 = use a constant background ozone value
        1 = read hourly ozone concentrations from
            the OZONE.DAT data file

     Background ozone concentration
     (BCKO3) in ppb                     Default: 80.          ! BCKO3 = 28.0 !
     (Used only if MCHEM = 1, 3, or 4 and
      MOZ = 0 or (MOZ = 1 and all hourly
      O3 data missing)

     Background ammonia concentration
     (BCKNH3) in ppb                    Default: 10.          ! BCKNH3 = 17.0 !

     Nighttime SO2 loss rate (RNITE1)
     in percent/hour                    Default: 0.2          ! RNITE1 = .2 !

     Nighttime NOx loss rate (RNITE2)
     in percent/hour                    Default: 2.0          ! RNITE2 = 2.0 !

     Nighttime HNO3 formation rate (RNITE3)
     in percent/hour                    Default: 2.0          ! RNITE3 = 2.0 !

  --- Data for SECONDARY ORGANIC AEROSOL (SOA) Option
     (used only if MCHEM = 4)

     The SOA module uses monthly values of:
          Fine particulate concentration in ug/m^3 (BCKPMF)
          Organic fraction of fine particulate     (OFRAC)
          VOC / NOX ratio (after reaction)         (VCNX)
     to characterize the air mass when computing
     the formation of SOA from VOC emissions.
     Typical values for several distinct air mass types are:

        Month    1    2    3    4    5    6    7    8    9   10   11   12
                Jan  Feb  Mar  Apr  May  Jun  Jul  Aug  Sep  Oct  Nov  Dec

     Clean Continental
```

```
      BCKPMF   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.
      OFRAC  .15  .15  .20  .20  .20  .20  .20  .20  .20  .20  .20  .15
      VCNX    50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.

   Clean Marine (surface)
      BCKPMF  .5   .5   .5   .5   .5   .5   .5   .5   .5   .5   .5   .5
      OFRAC  .25  .25  .30  .30  .30  .30  .30  .30  .30  .30  .30  .25
      VCNX    50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.

   Urban - low biogenic (controls present)
      BCKPMF  30.  30.  30.  30.  30.  30.  30.  30.  30.  30.  30.  30.
      OFRAC  .20  .20  .25  .25  .25  .25  .25  .25  .20  .20  .20  .20
      VCNX     4.   4.   4.   4.   4.   4.   4.   4.   4.   4.   4.   4.

   Urban - high biogenic (controls present)
      BCKPMF  60.  60.  60.  60.  60.  60.  60.  60.  60.  60.  60.  60.
      OFRAC  .25  .25  .30  .30  .30  .55  .55  .55  .35  .35  .35  .25
      VCNX    15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.

   Regional Plume
      BCKPMF  20.  20.  20.  20.  20.  20.  20.  20.  20.  20.  20.  20.
      OFRAC  .20  .20  .25  .35  .25  .40  .40  .40  .30  .30  .30  .20
      VCNX    15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.

   Urban - no controls present
      BCKPMF 100. 100. 100. 100. 100. 100. 100. 100. 100. 100. 100. 100.
      OFRAC  .30  .30  .35  .35  .35  .55  .55  .55  .35  .35  .35  .30
      VCNX     2.   2.   2.   2.   2.   2.   2.   2.   2.   2.   2.   2.

   Default: Clean Continental
   !  BCKPMF = 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00,
1.00, 1.00 !
   !  OFRAC  = 0.15, 0.15, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20,
0.20, 0.15 !
   !  VCNX   = 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00,
50.00, 50.00, 50.00 !


!END!


-------------------------------------------------------------------------------


INPUT GROUP: 12 -- Misc. Dispersion and Computational Parameters
---------------

   Horizontal size of puff (m) beyond which
   time-dependent dispersion equations (Heffter)
   are used to determine sigma-y and
   sigma-z (SYTDEP)                          Default: 550.    ! SYTDEP =
5.5E02 !

   Switch for using Heffter equation for sigma z
   as above (0 = Not use Heffter; 1 = use Heffter
   (MHFTSZ)                                  Default: 0       ! MHFTSZ =  0
!
```

```
     Stability class used to determine plume
     growth rates for puffs above the boundary
     layer (JSUP)                                Default: 5      ! JSUP =  5   !

     Vertical dispersion constant for stable
     conditions (k1 in Eqn. 2.7-3)  (CONK1)      Default: 0.01   ! CONK1 = .01 !

     Vertical dispersion constant for neutral/
     unstable conditions (k2 in Eqn. 2.7-4)
     (CONK2)                                     Default: 0.1    ! CONK2 = .1 !

     Factor for determining Transition-point from
     Schulman-Scire to Huber-Snyder Building Downwash
     scheme (SS used for Hs < Hb + TBD * HL)
     (TBD)                                       Default: 0.5    ! TBD = .5 !
        TBD < 0   ==> always use Huber-Snyder
        TBD = 1.5 ==> always use Schulman-Scire
        TBD = 0.5 ==> ISC Transition-point

     Range of land use categories for which
     urban dispersion is assumed
     (IURB1, IURB2)                              Default: 10     ! IURB1 =  10  !
                                                          19     ! IURB2 =  19  !

     Site characterization parameters for single-point Met data files ---------
     (needed for METFM = 2,3,4)

        Land use category for modeling domain
        (ILANDUIN)                               Default: 20     ! ILANDUIN =  20
!

        Roughness length (m) for modeling domain
        (Z0IN)                                   Default: 0.25   ! Z0IN = .25 !

        Leaf area index for modeling domain
        (XLAIIN)                                 Default: 3.0    ! XLAIIN = 3.0 !

        Elevation above sea level (m)
        (ELEVIN)                                 Default: 0.0    ! ELEVIN = 100.0
!

        Latitude (degrees) for met location
        (XLATIN)                                 Default: -999.  ! XLATIN = 48.85
!

        Longitude (degrees) for met location
        (XLONIN)                                 Default: -999.  ! XLONIN =
122.75 !

     Specialized information for interpreting single-point Met data files -----

        Anemometer height (m) (Used only if METFM = 2,3)
        (ANEMHT)                                 Default: 10.    ! ANEMHT = 10.0
!

        Form of lateral turbulance data in PROFILE.DAT file
```

```
        (Used only if METFM = 4 or MTURBVW = 1 or 3)
        (ISIGMAV)                                   Default: 1       ! ISIGMAV =  1
!
            0 = read sigma-theta
            1 = read sigma-v

        Choice of mixing heights (Used only if METFM = 4)
        (IMIXCTDM)                                  Default: 0       ! IMIXCTDM =  0
!
            0 = read PREDICTED mixing heights
            1 = read OBSERVED mixing heights

     Maximum length of a slug (met. grid units)
     (XMXLEN)                                       Default: 1.0     ! XMXLEN = 1.0 !

     Maximum travel distance of a puff/slug (in
     grid units) during one sampling step
     (XSAMLEN)                                      Default: 1.0     ! XSAMLEN = 1.0
!

     Maximum Number of slugs/puffs release from
     one source during one time step
     (MXNEW)                                        Default: 99      ! MXNEW =  99
!

     Maximum Number of sampling steps for
     one puff/slug during one time step
     (MXSAM)                                        Default: 99      ! MXSAM =  99
!

     Number of iterations used when computing
     the transport wind for a sampling step
     that includes gradual rise (for CALMET
     and PROFILE winds)
     (NCOUNT)                                       Default: 2       ! NCOUNT =  2
!

     Minimum sigma y for a new puff/slug (m)
     (SYMIN)                                        Default: 1.0     ! SYMIN = 1.0  !

     Minimum sigma z for a new puff/slug (m)
     (SZMIN)                                        Default: 1.0     ! SZMIN = 1.0  !

     Default minimum turbulence velocities
     sigma-v and sigma-w for each
     stability class (m/s)
     (SVMIN(6) and SWMIN(6))      Default SVMIN : .50,  .50,  .50,  .50,  .50,
.50
                                  Default SWMIN : .20,  .12,  .08,  .06,  .03,
.016

                                Stability Class :  A     B     C     D     E
F
                                                  ---   ---   ---   ---   ---   -
--
                                        ! SVMIN = 0.500, 0.500, 0.500, 0.500,
0.500, 0.500!
```

```
                                        ! SWMIN = 0.200, 0.120, 0.080, 0.060,
0.030, 0.016!

     Divergence criterion for dw/dz across puff
     used to initiate adjustment for horizontal
     convergence (1/s)
     Partial adjustment starts at CDIV(1), and
     full adjustment is reached at CDIV(2)
     (CDIV(2))                                  Default: 0.0,0.0  ! CDIV = .0,
.0 !

     Minimum wind speed (m/s) allowed for
     non-calm conditions. Also used as minimum
     speed returned when using power-law
     extrapolation toward surface
     (WSCALM)                                   Default: 0.5    ! WSCALM = 1.0 !

     Maximum mixing height (m)
     (XMAXZI)                                   Default: 3000.  ! XMAXZI =
3000.0 !

     Minimum mixing height (m)
     (XMINZI)                                   Default: 50.    ! XMINZI = 50.0
!

     Default wind speed classes --
     5 upper bounds (m/s) are entered;
     the 6th class has no upper limit
     (WSCAT(5))                       Default   :
                                      ISC RURAL : 1.54, 3.09, 5.14, 8.23, 10,8
(10.8+)

                                Wind Speed Class :  1     2     3     4     5
6
                                                   ---   ---   ---   ---   ---   -
--
                                        ! WSCAT = 1.54, 3.09, 5.14, 8.23, 10.80 !

     Default wind speed profile power-law
     exponents for stabilities 1-6
     (PLX0(6))                        Default   : ISC RURAL values
                                      ISC RURAL : .07, .07, .10, .15, .35, .55
                                      ISC URBAN : .15, .15, .20, .25, .30, .30

                                 Stability Class :  A     B     C     D     E
F
                                                   ---   ---   ---   ---   ---   -
--
                                        ! PLX0 = 0.07, 0.07, 0.10, 0.15, 0.35,
0.55 !

     Default potential temperature gradient
     for stable classes E, F (degK/m)
     (PTG0(2))                        Default: 0.020, 0.035
                                         ! PTG0 = 0.020,   0.035 !

     Default plume path coefficients for
```

```
     each stability class (used when option
     for partial plume height terrain adjustment
     is selected -- MCTADJ=3)
     (PPC(6))                    Stability Class :  A     B     C     D     E
F
                                    Default  PPC : .50,  .50,  .50,  .50,  .35,
.35
                                                   ---   ---   ---   ---   ---   -
--
                                         !  PPC = 0.50, 0.50, 0.50, 0.50, 0.35,
0.35 !

     Slug-to-puff transition criterion factor
     equal to sigma-y/length of slug
     (SL2PF)                                Default: 10.        ! SL2PF = 10.0 !

     Puff-splitting control variables ------------------------

       VERTICAL SPLIT
       --------------

       Number of puffs that result every time a puff
       is split - nsplit=2 means that 1 puff splits
       into 2
       (NSPLIT)                             Default:   3        ! NSPLIT =  3  !

       Time(s) of a day when split puffs are eligible to
       be split once again; this is typically set once
       per day, around sunset before nocturnal shear develops.
       24 values: 0 is midnight (00:00) and 23 is 11 PM (23:00)
       0=do not re-split    1=eligible for re-split
       (IRESPLIT(24))                       Default:  Hour 17 = 1
       !  IRESPLIT = 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,1,0,0,0,0,0,0 !

       Split is allowed only if last hour's mixing
       height (m) exceeds a minimum value
       (ZISPLIT)                            Default: 100.       ! ZISPLIT = 100.0
!

       Split is allowed only if ratio of last hour's
       mixing ht to the maximum mixing ht experienced
       by the puff is less than a maximum value (this
       postpones a split until a nocturnal layer develops)
       (ROLDMAX)                            Default: 0.25       ! ROLDMAX = 0.25
!

       HORIZONTAL SPLIT
       ----------------

       Number of puffs that result every time a puff
       is split - nsplith=5 means that 1 puff splits
       into 5
       (NSPLITH)                            Default:   5        ! NSPLITH =  5  !

       Minimum sigma-y (Grid Cells Units) of puff
       before it may be split
```

```
      (SYSPLITH)                          Default:  1.0       ! SYSPLITH = 1.0
!

      Minimum puff elongation rate (SYSPLITH/hr) due to
      wind shear, before it may be split
      (SHSPLITH)                          Default:  2.        ! SHSPLITH = 2.0
!

      Minimum concentration (g/m^3) of each
      species in puff before it may be split
      Enter array of NSPEC values; if a single value is
      entered, it will be used for ALL species
      (CNSPLITH)                          Default:  1.0E-07   ! CNSPLITH =
1.0E-07 !

    Integration control variables ------------------------

      Fractional convergence criterion for numerical SLUG
      sampling integration
      (EPSSLUG)                           Default:   1.0e-04  ! EPSSLUG = 1.0E-
04 !

      Fractional convergence criterion for numerical AREA
      source integration
      (EPSAREA)                           Default:   1.0e-06  ! EPSAREA = 1.0E-
06 !

      Trajectory step-length (m) used for numerical rise
      integration
      (DSRISE)                            Default:   1.0      ! DSRISE = 1.0 !

!END!

-------------------------------------------------------------------------------


INPUT GROUPS: 13a, 13b, 13c, 13d -- Point source parameters
--------------------------------

---------------
Subgroup (13a)
---------------

    Number of point sources with
    parameters provided below      (NPT1)  No default  !  NPT1 =  4  !

    Units used for point source
    emissions below                (IPTU)  Default: 1  !  IPTU =   3  !
          1 =        g/s
          2 =       kg/hr
          3 =       lb/hr
          4 =     tons/yr
          5 =     Odour Unit * m**3/s  (vol. flux of odour compound)
          6 =     Odour Unit * m**3/min
          7 =     metric tons/yr
```

```
     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (13d)        (NSPT1) Default: 0  !  NSPT1 =  0  !

     Number of point sources with
     variable emission parameters
     provided in external file      (NPT2)  No default  !  NPT2 =  0  !

     (If NPT2 > 0, these point
     source emissions are read from
     the file: PTEMARB.DAT)

!END!

---------------
Subgroup (13b)
---------------
                                          a
          POINT SOURCE: CONSTANT DATA
          ------------------------------
                                                                                  b
c
  Source      X UTM      Y UTM      Stack    Base      Stack     Exit  Exit     Bldg.
Emission
   No.     Coordinate Coordinate Height Elevation Diameter  Vel.  Temp.    Dwash
Rates
              (km)       (km)        (m)       (m)        (m)  (m/s) (deg. K)
  ------   ---------- ---------- ------  ------   -------- ----- -------- -----
--------
   1 ! SRCNAM = T2 !
   1 ! X = 1129.065,  134.135,   45.72, 35.05,      5.79,  20.3,  355.3,
1.0,1.26E01,  1.0E00, 5.61E01,
       0.0E00,  0.0E00, 5.62E01 !
   1 ! FMFAC  =      1.0 !   !END!
   2 ! SRCNAM = GEN !
   2 ! X = 1129.141,  134.218,     3.6,  35.1,        .2, 183.7,  754.8,
1.0,6.3E-02, 5.0E-03,  2.3E00,
       0.0E00,  0.0E00, 5.8E-02 !
   2 ! FMFAC  =      1.0 !   !END!
   3 ! SRCNAM = FPUMP !
   3 ! X = 1129.043,  134.203,    3.56, 35.05,       .15, 36.32,  722.0,
1.0,8.3E-03, 6.6E-04, 2.75E-01,
       0.0E00,  0.0E00, 4.2E-03 !
   3 ! FMFAC  =      1.0 !   !END!
   4 ! SRCNAM = COOL2 !
   4 ! X = 1129.003,  134.143,   22.86, 35.05,      9.15,   8.2, 305.37,  1.0,
0.0E00,  0.0E00,  0.0E00,
       0.0E00,  0.0E00,  1.6E00 !
   4 ! FMFAC  =      1.0 !   !END!

--------
```

[a] Data for each source are treated as a separate input subgroup and therefore must end with an input group terminator.

SRCNAM is a 12-character name for a source
(No default)

X is an array holding the source data listed by the column headings
(No default)

SIGYZI is an array holding the initial sigma-y and sigma-z (m)
(Default: 0.,0.)

FMFAC is a vertical momentum flux factor (0. or 1.0) used to represent the effect of rain-caps or other physical configurations that reduce momentum rise associated with the actual exit velocity.
(Default: 1.0 -- full momentum used)

b
0. = No building downwash modeled, 1. = downwash modeled
NOTE: must be entered as a REAL number (i.e., with decimal point)

c
An emission rate must be entered for every pollutant modeled. Enter emission rate of zero for secondary pollutants that are modeled, but not emitted. Units are specified by IPTU (e.g. 1 for g/s).

Subgroup (13c)

BUILDING DIMENSION DATA FOR SOURCES SUBJECT TO DOWNWASH

Source No. — Effective building width and height (in meters) every 10 degrees[a]

```
 1    ! SRCNAM  =   T2 !
 1    ! HEIGHT  =  29.0,   29.0,   29.0,   29.0,   29.0,   29.0,
                   29.0,   29.0,   18.3,   29.0,   29.0,   29.0,
                   29.0,   29.0,   29.0,   29.0,   29.0,   29.0,
                   29.0,   29.0,   29.0,   29.0,   29.0,   29.0,
                   29.0,   29.0,   29.0,   29.0,   29.0,   29.0,
                   29.0,   29.0,   29.0,   29.0,   29.0,   29.0!
 1    ! WIDTH   =  34.1,   34.1,   33.1,   31.1,   28.1,   24.3,
                   19.8,   14.6,   101.0,   14.6,   19.7,   24.3,
                   28.1,   31.1,   33.1,   34.1,   34.1,   33.0,
                   34.1,   34.1,   33.1,   31.1,   28.1,   24.3,
                   19.7,   14.6,   9.0,   14.6,   19.7,   24.3,
                   28.1,   31.1,   33.1,   34.1,   34.1,   33.0!
!END!
 2    ! SRCNAM  =   GEN !
 2    ! HEIGHT  =  3.3,   3.3,   29.0,   29.0,   29.0,   29.0,
                   29.0,   15.2,   15.2,   15.2,   15.2,   15.2,
                   15.2,   15.2,   15.2,   9.1,   9.1,   9.1,
                   3.3,   3.3,   3.3,   3.3,   9.1,   9.1,
                   9.1,   15.2,   9.1,   9.1,   9.1,   15.2,
                   15.2,   15.2,   15.2,   9.1,   9.1,   9.1!
 2    ! WIDTH   =  4.0,   4.9,   33.1,   31.1,   28.1,   24.3,
                   19.7,   61.8,   58.0,   61.8,   63.7,   63.7,
                   61.8,   58.0,   52.4,   67.8,   82.3,   61.0,
                   4.0,   4.9,   5.6,   6.2,   26.4,   24.9,
                   22.6,   61.8,   16.0,   19.6,   22.6,   63.7,
```

```
                    61.8,   58.0,   52.4,   67.8,   82.3,   61.0!
!END!
 3    ! SRCNAM  =   FPUMP !
 3    ! HEIGHT  =  12.2,   18.3,   18.3,   18.3,   18.3,   18.3,
                    18.3,   18.3,   18.3,   18.3,   15.2,   29.0,
                    29.0,   29.0,   29.0,   29.0,   29.0,   29.0,
                    12.2,   18.3,   18.3,   18.3,   18.3,   18.3,
                    18.3,   18.3,   18.3,   18.3,   15.2,   29.0,
                    29.0,   29.0,   29.0,   29.0,   29.0,   29.0!
 3    ! WIDTH   =  12.8,   66.5,   79.9,   91.0,   99.2,   104.4,
                    106.5,   105.4,   101.0,   105.4,   63.7,   24.3,
                    28.1,   31.1,   33.1,   34.1,   34.1,   33.0,
                    12.8,   66.5,   79.9,   91.0,   99.2,   104.5,
                    106.5,   105.4,   101.0,   105.4,   63.7,   24.3,
                    28.1,   31.1,   33.1,   34.1,   34.1,   33.0!
!END!
 4    ! SRCNAM  =   COOL2 !
 4    ! HEIGHT  =  18.3,   18.3,   18.3,   18.3,   18.3,   18.3,
                    18.3,   18.3,   18.3,   18.3,   18.3,   18.3,
                    18.3,   18.3,   18.3,   18.3,   18.3,   18.3,
                    18.3,   18.3,   18.3,   18.3,   18.3,   18.3,
                    29.0,   29.0,   18.3,   29.0,   29.0,   29.0,
                    29.0,   29.0,   18.3,   18.3,   18.3,   18.3!
 4    ! WIDTH   =  51.0,   66.5,   79.9,   91.0,   99.2,   104.5,
                    106.5,   105.4,   101.0,   105.4,   106.5,   104.5,
                    99.2,   91.0,   79.9,   66.5,   51.0,   34.0,
                    51.0,   66.5,   79.9,   91.0,   99.2,   104.5,
                    19.7,   14.6,   101.0,   14.6,   19.7,   24.3,
                    28.1,   31.1,   79.9,   66.5,   51.0,   34.0!
!END!
```

---

[a] Each pair of width and height values is treated as a separate input subgroup and therefore must end with an input group terminator.

Subgroup (13d)

POINT SOURCE: VARIABLE EMISSIONS DATA[a]

Use this subgroup to describe temporal variations in the emission rates given in 13b. Factors entered multiply the rates in 13b. Skip sources here that have constant emissions. For more elaborate variation in source parameters, use PTEMARB.DAT and NPT2 > 0.

IVARY determines the type of variation, and is source-specific:
(IVARY) Default: 0

- 0 = Constant
- 1 = Diurnal cycle (24 scaling factors: hours 1-24)
- 2 = Monthly cycle (12 scaling factors: months 1-12)
- 3 = Hour & Season (4 groups of 24 hourly scaling factors, where first group is DEC-JAN-FEB)
- 4 = Speed & Stab. (6 groups of 6 scaling factors, where

```
                                  first group is Stability Class A,
                                  and the speed classes have upper
                                  bounds (m/s) defined in Group 12
          5 =        Temperature  (12 scaling factors, where temperature
                                  classes have upper bounds (C) of:
                                  0, 5, 10, 15, 20, 25, 30, 35, 40,
                                  45, 50, 50+)
```

---

[a] Data for each species are treated as a separate input subgroup and therefore must end with an input group terminator.

INPUT GROUPS: 14a, 14b, 14c, 14d -- Area source parameters

Subgroup (14a)

```
     Number of polygon area sources with
     parameters specified below (NAR1)       No default  !  NAR1 =  0   !

     Units used for area source
     emissions below            (IARU)       Default: 1  !  IARU =   1  !
           1 =        g/m**2/s
           2 =       kg/m**2/hr
           3 =       lb/m**2/hr
           4 =     tons/m**2/yr
           5 =     Odour Unit * m/s  (vol. flux/m**2 of odour compound)
           6 =     Odour Unit * m/min
           7 =     metric tons/m**2/yr

     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (14d)        (NSAR1) Default: 0  !  NSAR1 =  0  !

     Number of buoyant polygon area sources
     with variable location and emission
     parameters (NAR2)                      No default  !  NAR2 =  0   !
     (If NAR2 > 0, ALL parameter data for
     these sources are read from the file: BAEMARB.DAT)

!END!
```

Subgroup (14b)

AREA SOURCE: CONSTANT DATA[a]

Source No.	Effect. Height (m)	Base Elevation (m)	Initial Sigma z (m)	Emission Rates[b]

---

[a] Data for each source are treated as a separate input subgroup and therefore must end with an input group terminator.

[b] An emission rate must be entered for every pollutant modeled. Enter emission rate of zero for secondary pollutants that are modeled, but not emitted. Units are specified by IARU (e.g. 1 for g/m**2/s).

Subgroup (14c)

Source No.	COORDINATES (UTM-km) FOR EACH VERTEX(4) OF EACH POLYGON Ordered list of X followed by list of Y, grouped by source[a]

---

[a] Data for each source are treated as a separate input subgroup and therefore must end with an input group terminator.

Subgroup (14d)

AREA SOURCE: VARIABLE EMISSIONS DATA[a]

Use this subgroup to describe temporal variations in the emission rates given in 14b. Factors entered multiply the rates in 14b. Skip sources here that have constant emissions. For more elaborate variation in source parameters, use BAEMARB.DAT and NAR2 > 0.

IVARY determines the type of variation, and is source-specific:
(IVARY) Default: 0

- 0 = Constant
- 1 = Diurnal cycle (24 scaling factors: hours 1-24)
- 2 = Monthly cycle (12 scaling factors: months 1-12)
- 3 = Hour & Season (4 groups of 24 hourly scaling factors, where first group is DEC-JAN-FEB)
- 4 = Speed & Stab. (6 groups of 6 scaling factors, where first group is Stability Class A, and the speed classes have upper

```
                                  bounds (m/s) defined in Group 12
          5 =       Temperature   (12 scaling factors, where temperature
                                  classes have upper bounds (C) of:
                                  0, 5, 10, 15, 20, 25, 30, 35, 40,
                                  45, 50, 50+)
```

---

[a] Data for each species are treated as a separate input subgroup and therefore must end with an input group terminator.

INPUT GROUPS: 15a, 15b, 15c -- Line source parameters

Subgroup (15a)

```
     Number of buoyant line sources
     with variable location and emission
     parameters (NLN2)                          No default  !  NLN2 =  0   !

     (If NLN2 > 0, ALL parameter data for
      these sources are read from the file: LNEMARB.DAT)

     Number of buoyant line sources (NLINES)    No default   ! NLINES =  0
!

     Units used for line source
     emissions below                (ILNU)      Default: 1  !  ILNU =   1  !
           1 =        g/s
           2 =       kg/hr
           3 =       lb/hr
           4 =     tons/yr
           5 =     Odour Unit * m**3/s  (vol. flux of odour compound)
           6 =     Odour Unit * m**3/min
           7 =     metric tons/yr

     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (15c)        (NSLN1) Default: 0  !  NSLN1 =  0  !

     Maximum number of segments used to model
     each line (MXNSEG)                         Default: 7   ! MXNSEG =  7
!

     The following variables are required only if NLINES > 0.  They are
     used in the buoyant line source plume rise calculations.

        Number of distances at which            Default: 6   ! NLRISE =  6
!
```

```
        transitional rise is computed

        Average building length (XL)                  No default   ! XL = .0 !
                                                      (in meters)

        Average building height (HBL)                 No default   ! HBL = .0 !
                                                      (in meters)

        Average building width (WBL)                  No default   ! WBL = .0 !
                                                      (in meters)

        Average line source width (WML)               No default   ! WML = .0 !
                                                      (in meters)

        Average separation between buildings (DXL)    No default   ! DXL = .0 !
                                                      (in meters)

        Average buoyancy parameter (FPRIMEL)          No default   ! FPRIMEL = .0
!
                                                      (in m**4/s**3)

!END!

---------------
Subgroup (15b)
---------------

          BUOYANT LINE SOURCE: CONSTANT DATA
          ----------------------------------

a
Source     Beg. X      Beg. Y      End. X    End. Y     Release    Base
Emission
 No.     Coordinate  Coordinate  Coordinate Coordinate  Height    Elevation
Rates
            (km)        (km)        (km)       (km)       (m)        (m)
------   ----------  ----------  ---------  ----------  -------   ---------    -
--------

--------

    a
     Data for each source are treated as a separate input subgroup
     and therefore must end with an input group terminator.

    b
     An emission rate must be entered for every pollutant modeled.
     Enter emission rate of zero for secondary pollutants that are
     modeled, but not emitted.  Units are specified by ILNTU
     (e.g. 1 for g/s).

---------------
Subgroup (15c)
---------------
                                                    a
          BUOYANT LINE SOURCE: VARIABLE EMISSIONS DATA
          --------------------------------------------
```

Use this subgroup to describe temporal variations in the emission rates given in 15b. Factors entered multiply the rates in 15b. Skip sources here that have constant emissions.

IVARY determines the type of variation, and is source-specific:
(IVARY) Default: 0

0 =	Constant	
1 =	Diurnal cycle	(24 scaling factors: hours 1-24)
2 =	Monthly cycle	(12 scaling factors: months 1-12)
3 =	Hour & Season	(4 groups of 24 hourly scaling factors, where first group is DEC-JAN-FEB)
4 =	Speed & Stab.	(6 groups of 6 scaling factors, where first group is Stability Class A, and the speed classes have upper bounds (m/s) defined in Group 12
5 =	Temperature	(12 scaling factors, where temperature classes have upper bounds (C) of: 0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 50+)

---

[a] Data for each species are treated as a separate input subgroup and therefore must end with an input group terminator.

INPUT GROUPS: 16a, 16b, 16c -- Volume source parameters

Subgroup (16a)

Number of volume sources with parameters provided in 16b,c (NVL1) No default ! NVL1 = 0 !

Units used for volume source emissions below in 16b (IVLU) Default: 1 ! IVLU = 1 !

1 =	g/s
2 =	kg/hr
3 =	lb/hr
4 =	tons/yr
5 =	Odour Unit * m**3/s (vol. flux of odour compound)
6 =	Odour Unit * m**3/min
7 =	metric tons/yr

Number of source-species combinations with variable emissions scaling factors provided below in (16c) (NSVL1) Default: 0 ! NSVL1 = 0 !

Number of volume sources with
variable location and emission
parameters (NVL2) No default ! NVL2 = 0 !

(If NVL2 > 0, ALL parameter data for
these sources are read from the VOLEMARB.DAT file(s))

!END!

Subgroup (16b)

VOLUME SOURCE: CONSTANT DATA[a]

X UTM Coordinate (km)	Y UTM Coordinate (km)	Effect. Height (m)	Base Elevation (m)	Initial Sigma y (m)	Initial Sigma z (m)	Emission Rates[b]

---

[a] Data for each source are treated as a separate input subgroup and therefore must end with an input group terminator.

[b] An emission rate must be entered for every pollutant modeled. Enter emission rate of zero for secondary pollutants that are modeled, but not emitted. Units are specified by IVLU (e.g. 1 for g/s).

Subgroup (16c)

VOLUME SOURCE: VARIABLE EMISSIONS DATA[a]

Use this subgroup to describe temporal variations in the emission rates given in 16b. Factors entered multiply the rates in 16b. Skip sources here that have constant emissions. For more elaborate variation in source parameters, use VOLEMARB.DAT and NVL2 > 0.

IVARY determines the type of variation, and is source-specific:
(IVARY) Default: 0

0 =	Constant	
1 =	Diurnal cycle	(24 scaling factors: hours 1-24)
2 =	Monthly cycle	(12 scaling factors: months 1-12)
3 =	Hour & Season	(4 groups of 24 hourly scaling factors, where first group is DEC-JAN-FEB)
4 =	Speed & Stab.	(6 groups of 6 scaling factors, where first group is Stability Class A, and the speed classes have upper bounds (m/s) defined in Group 12
5 =	Temperature	(12 scaling factors, where temperature

classes have upper bounds (C) of:
0, 5, 10, 15, 20, 25, 30, 35, 40,
45, 50, 50+)

---

[a] Data for each species are treated as a separate input subgroup and therefore must end with an input group terminator.

INPUT GROUPS: 17a & 17b -- Non-gridded (discrete) receptor information

Subgroup (17a)

Number of non-gridded receptors (NREC) No default ! NREC = 1834 !

!END!

Subgroup (17b)

NON-GRIDDED (DISCRETE) RECEPTOR DATA[a]

Receptor No.		X UTM Coordinate (km)	Y UTM Coordinate (km)	Ground Elevation (m)	Height Above Ground[b] (m)	
1	! X =	1090.063,	32.672,	1112.000,	0.000!	!END!
2	! X =	1094.8,	33.536,	936.000,	0.000!	!END!
3	! X =	1099.515,	34.504,	534.000,	0.000!	!END!
4	! X =	1109.871,	31.743,	703.000,	0.000!	!END!
5	! X =	1105.063,	30.697,	678.000,	0.000!	!END!
6	! X =	1100.433,	29.793,	913.000,	0.000!	!END!
7	! X =	1095.713,	28.825,	1616.000,	0.000!	!END!
8	! X =	1090.972,	27.959,	1580.000,	0.000!	!END!
9	! X =	1086.26,	26.948,	183.000,	0.000!	!END!
10	! X =	1081.528,	26.041,	854.000,	0.000!	!END!
11	! X =	1080.586,	30.695,	931.000,	0.000!	!END!
12	! X =	1085.255,	31.643,	539.000,	0.000!	!END!
13	! X =	1075.857,	29.793,	698.000,	0.000!	!END!
14	! X =	1076.854,	25.098,	1436.000,	0.000!	!END!
15	! X =	1077.811,	20.343,	1627.000,	0.000!	!END!
16	! X =	1082.489,	21.287,	1555.000,	0.000!	!END!
17	! X =	1087.265,	22.255,	910.000,	0.000!	!END!
18	! X =	1091.891,	23.197,	372.000,	0.000!	!END!
19	! X =	1096.636,	24.063,	678.000,	0.000!	!END!
20	! X =	1101.419,	24.993,	1530.000,	0.000!	!END!
21	! X =	1106.093,	25.956,	1739.000,	0.000!	!END!

22	! X =	1110.816,	26.935,	1295.000,	0.000!	!END!
23	! X =	1078.718,	15.579,	1025.000,	0.000!	!END!
24	! X =	1083.45,	16.533,	1388.000,	0.000!	!END!
25	! X =	1088.18,	17.492,	1504.000,	0.000!	!END!
26	! X =	1092.86,	18.446,	1097.000,	0.000!	!END!
27	! X =	1097.608,	19.312,	960.000,	0.000!	!END!
28	! X =	1102.337,	20.283,	1111.000,	0.000!	!END!
29	! X =	1107.024,	21.198,	1493.000,	0.000!	!END!
30	! X =	1111.751,	22.176,	953.000,	0.000!	!END!
31	! X =	1116.536,	23.118,	1667.000,	0.000!	!END!
32	! X =	1117.405,	18.45,	1288.000,	0.000!	!END!
33	! X =	1112.775,	17.487,	1406.000,	0.000!	!END!
34	! X =	1107.995,	16.497,	1203.000,	0.000!	!END!
35	! X =	1103.314,	15.532,	1790.000,	0.000!	!END!
36	! X =	1098.531,	14.551,	471.000,	0.000!	!END!
37	! X =	1093.889,	13.653,	1387.000,	0.000!	!END!
38	! X =	1089.086,	12.78,	1328.000,	0.000!	!END!
39	! X =	1084.391,	11.881,	1463.000,	0.000!	!END!
40	! X =	1079.615,	10.865,	1144.000,	0.000!	!END!
41	! X =	1080.572,	6.111,	1665.000,	0.000!	!END!
42	! X =	1085.262,	7.057,	1814.000,	0.000!	!END!
43	! X =	1090.069,	7.927,	1384.000,	0.000!	!END!
44	! X =	1094.748,	8.932,	954.000,	0.000!	!END!
45	! X =	1099.534,	9.909,	1151.000,	0.000!	!END!
46	! X =	1104.231,	10.822,	1475.000,	0.000!	!END!
47	! X =	1108.916,	11.789,	1622.000,	0.000!	!END!
48	! X =	1113.65,	12.768,	1405.000,	0.000!	!END!
49	! X =	1119.343,	8.895,	1478.000,	0.000!	!END!
50	! X =	1114.645,	7.97,	1336.000,	0.000!	!END!
51	! X =	1109.947,	7.049,	1138.000,	0.000!	!END!
52	! X =	1105.217,	6.022,	1065.000,	0.000!	!END!
53	! X =	1100.517,	5.109,	671.000,	0.000!	!END!
54	! X =	1095.727,	4.129,	1308.000,	0.000!	!END!
55	! X =	1090.984,	3.165,	1723.000,	0.000!	!END!
56	! X =	1086.313,	2.373,	1220.000,	0.000!	!END!
57	! X =	1081.579,	1.366,	1394.000,	0.000!	!END!
58	! X =	1082.486,	-3.398,	418.000,	0.000!	!END!
59	! X =	1087.225,	-2.39,	787.000,	0.000!	!END!
60	! X =	1091.94,	-1.538,	1055.000,	0.000!	!END!
61	! X =	1096.726,	-.512,	1145.000,	0.000!	!END!
62	! X =	1101.491,	.358,	1412.000,	0.000!	!END!
63	! X =	1106.125,	1.362,	1813.000,	0.000!	!END!
64	! X =	1110.837,	2.229,	2002.000,	0.000!	!END!
65	! X =	1115.59,	3.161,	857.000,	0.000!	!END!
66	! X =	1120.321,	4.198,	1509.000,	0.000!	!END!
67	! X =	1121.26,	-.56,	606.000,	0.000!	!END!
68	! X =	1116.555,	-1.486,	850.000,	0.000!	!END!
69	! X =	1111.868,	-2.509,	1762.000,	0.000!	!END!
70	! X =	1107.112,	-3.437,	1020.000,	0.000!	!END!
71	! X =	1102.354,	-4.362,	1347.000,	0.000!	!END!

```
1793 ! X = 1190.713166, 143.877609,    1758.000,        0.000!   !END!
1794 ! X = 1197.802226,145.3373526,    1377.000,        0.000!   !END!
1795 ! X = 1200.175233, 145.833703,    1602.000,        0.000!   !END!
1796 ! X = 1202.535096,146.3106541,    1262.000,        0.000!   !END!
1797 ! X = 1204.901398,146.7548399,     930.000,        0.000!   !END!
1798 ! X = 1197.499796,146.8990394,    1635.000,        0.000!   !END!
1799 ! X = 1199.871443,147.3951102,    1747.000,        0.000!   !END!
1800 ! X = 1202.206752,147.9019526,     900.000,        0.000!   !END!
1801 ! X = 1203.016654,143.9307254,    1186.000,        0.000!   !END!
1802 ! X = 1198.279035,142.9729264,    1346.000,        0.000!   !END!
1803 ! X = 1193.533184,142.0538674,    1385.000,        0.000!   !END!
1804 ! X = 1205.826888,142.0209325,    1057.000,        0.000!   !END!
1805 ! X = 1203.499091,141.5499432,    1565.000,        0.000!   !END!
1806 ! X = 1201.116954, 141.085794,    1177.000,        0.000!   !END!
1807 ! X = 1198.738969,140.6060044,    1761.000,        0.000!   !END!
1808 ! X = 1196.389917, 140.150023,    1803.000,        0.000!   !END!
1809 ! X = 1194.007938,139.6890798,    1948.000,        0.000!   !END!
1810 ! X = 1203.940732,139.1966627,     793.000,        0.000!   !END!
1811 ! X =  1199.22867,138.2620777,    1061.000,        0.000!   !END!
1812 ! X = 1194.485357,137.3084228,    2275.000,        0.000!   !END!
1813 ! X = 1191.648936,139.1989452,    1735.000,        0.000!   !END!
1814 ! X = 1189.286816, 138.726784,    1199.000,        0.000!   !END!
1815 ! X = 1188.043238,138.4952901,     900.000,        0.000!   !END!
1816 ! X = 1188.572265,136.1081354,    1305.000,        0.000!   !END!
1817 ! X = 1189.090705,133.7704475,    1861.000,        0.000!   !END!
1818 ! X = 1190.234877,133.9806218,    1754.000,        0.000!   !END!
1819 ! X = 1192.596089,134.4701549,    2850.000,        0.000!   !END!
1820 ! X = 1194.959805,134.9447781,    2860.000,        0.000!   !END!
1821 ! X = 1197.324252, 135.419507,    1826.000,        0.000!   !END!
1822 ! X = 1199.691456,135.8782804,    1075.000,        0.000!   !END!
1823 ! X = 1201.453714,136.2246007,    1025.000,        0.000!   !END!
1824 ! X = 1189.562622,131.4063472,    1427.000,        0.000!   !END!
1825 ! X = 1195.425053,132.5429114,    2083.000,        0.000!   !END!
1826 ! X = 1200.175146,133.4814599,     978.000,        0.000!   !END!
1827 ! X = 1188.809239,128.7963213,     759.000,        0.000!   !END!
1828 ! X = 1191.176255,129.2684289,    1084.000,        0.000!   !END!
1829 ! X = 1193.545782,  129.72563,    1527.000,        0.000!   !END!
1830 ! X = 1195.895793,130.1961722,    1477.000,        0.000!   !END!
1831 ! X = 1198.265194,130.6543364,     948.000,        0.000!   !END!
1832 ! X = 1200.631477, 131.130475,    1042.000,        0.000!   !END!
1833 ! X = 1189.287759,126.3985654,    1068.000,        0.000!   !END!
1834 ! X = 1196.373045,127.8156956,    1019.000,        0.000!   !END!
```

---

a
Data for each receptor are treated as a separate input subgroup and therefore must end with an input group terminator.

b
Receptor height above ground is optional. If no value is entered, the receptor is placed on the ground.

```
Run Title:
   BP Cherry Point Cogeneration
   Ferndale, WA
   Case 6, Class I receptors

-------------------------------------------------------------------------------

INPUT GROUP: 1 -- General run control parameters
--------------

     Option to run all periods found
     in the met. file(s)  (METRUN)        Default: 0   ! METRUN =   1  !

         METRUN = 0 - Run period explicitly defined below
         METRUN = 1 - Run all periods in CALPUFF data file(s)

     Starting date:    Year  (ISYR) --    No default   ! ISYR  =  1999   !
     (used only if     Month (ISMO) --    No default   ! ISMO  =  0    !
      METRUN = 0)      Day   (ISDY) --    No default   ! ISDY  =  0    !
                       Hour  (ISHR) --    No default   ! ISHR  =  0    !

     Number of hours to process (NHRS) -- No default   ! NHRS  =  0  !

     Process every hour of data?(NREP) -- Default: 1   ! NREP  =  1  !
      (1 = every hour processed,
       2 = every 2nd hour processed,
       5 = every 5th hour processed, etc.)

Species & Concentration/Deposition Information
----------------------------------------------

      Species to process (ASPEC)        -- No default   ! ASPEC = VISIB  !
      (ASPEC = VISIB for visibility processing)

      Layer/deposition code (ILAYER)    -- Default: 1   ! ILAYER =  1  !
        '1'  for CALPUFF concentrations,
        '-1' for dry deposition fluxes,
        '-2' for wet deposition fluxes,
        '-3' for wet+dry deposition fluxes.

      Scaling factors of the form:      -- Defaults:    ! A =  0.0    !
          X(new) = X(old) * A + B          A = 0.0      ! B =  0.0    !
        (NOT applied if A = B = 0.0)       B = 0.0

      Add Hourly Background Concentrations/Fluxes?
                                 (LBACK)  -- Default: F   ! LBACK =  F !

Receptor information
--------------------

  Gridded receptors processed?     (LG) -- Default: F   ! LG  = F  !
  Discrete receptors processed?    (LD) -- Default: F   ! LD  = T  !
  CTSG Complex terrain receptors processed?
                                  (LCT) -- Default: F   ! LCT = F  !

--Report results by DISCRETE receptor RING?
  (only used when LD = T)      (LDRING) -- Default: F   ! LDRING = F  !

--Select range of DISCRETE receptors (only used when LD = T):

  Select ALL DISCRETE receptors by setting NDRECP flag to -1;
                                 OR
  Select SPECIFIC DISCRETE receptors by entering a flag (0,1) for each
     0 = discrete receptor not processed
     1 = discrete receptor processed
  using repeated value notation to select blocks of receptors:
     23*1, 15*0, 12*1
  Flag for all receptors after the last one assigned is set to 0
  (NDRECP) -- Default: -1
 ! NDRECP = 665*1  !


--Select range of GRIDDED receptors (only used when LG = T):

       X index of LL corner (IBGRID) -- Default: -1      ! IBGRID = -1  !
           (-1 OR 1 <= IBGRID <= NX)

       Y index of LL corner (JBGRID) -- Default: -1      ! JBGRID = -1  !
           (-1 OR 1 <= JBGRID <= NY)

       X index of UR corner (IEGRID) -- Default: -1      ! IEGRID = -1  !
           (-1 OR 1 <= IEGRID <= NX)

       Y index of UR corner (JEGRID) -- Default: -1      ! JEGRID = -1  !
           (-1 OR 1 <= JEGRID <= NY)

  Note: Entire grid is processed if IBGRID=JBGRID=IEGRID=JEGRID=-1


--Specific gridded receptors can also be excluded from CALPOST
  processing by filling a processing grid array with 0s and 1s.  If the
  processing flag for receptor index (i,j) is 1 (ON), that receptor
  will be processed if it lies within the range delineated by IBGRID,
  JBGRID,IEGRID,JEGRID and if LG=T. If it is 0 (OFF), it will not be
  processed in the run.  By default, all array values are set to 1 (ON).

  Number of gridded receptor rows provided in Subgroup (1a) to
  identify specific gridded receptors to process
```

```
                        (NGONOFF) -- Default: 0       ! NGONOFF =  0  !

!END!

--------------
Subgroup (1a) -- Specific gridded receptors included/excluded
--------------

    Specific gridded receptors are excluded from CALPOST processing
    by filling a processing grid array with 0s and 1s.  A total of
    NGONOFF lines are read here.  Each line corresponds to one 'row'
    in the sampling grid, starting with the NORTHERNMOST row that
    contains receptors that you wish to exclude, and finishing with
    row 1 to the SOUTH (no intervening rows may be skipped).  Within
    a row, each receptor position is assigned either a 0 or 1,
    starting with the westernmost receptor.
       0 = gridded receptor not processed
       1 = gridded receptor processed

    Repeated value notation may be used to select blocks of receptors:
       23*1, 15*0, 12*1

    Because all values are initially set to 1, any receptors north of
    the first row entered, or east of the last value provided in a row,
    remain ON.

    (NGXRECP) -- Default: 1


--------------------------------------------------------------------------------

INPUT GROUP: 2 -- Visibility Parameters (ASPEC = VISIB)
--------------

    Maximum relative humidity (%) used in particle growth curve
                              (RHMAX) -- Default: 98   ! RHMAX  = 98.0 !

    Modeled species to be included in computing the light extinction
     Include SULFATE?          (LVSO4) -- Default: T   ! LVSO4  = T  !
     Include NITRATE?          (LVNO3) -- Default: T   ! LVNO3  = T  !
     Include ORGANIC CARBON?   (LVOC)  -- Default: T   ! LVOC   = F  !
     Include COARSE PARTICLES? (LVPMC) -- Default: T   ! LVPMC  = F  !
     Include FINE PARTICLES?   (LVPMF) -- Default: T   ! LVPMF  = T  !
     Include ELEMENTAL CARBON? (LVEC)  -- Default: T   ! LVEC   = F  !

    And, when ranking for TOP-N, TOP-50, and Exceedance tables,
     Include BACKGROUND?       (LVBK)  -- Default: T   ! LVBK   = T  !

    Species name used for particulates in MODEL.DAT file
                   COARSE    (SPECPMC) -- Default: PMC ! SPECPMC = EC !
                   FINE      (SPECPMF) -- Default: PMF ! SPECPMF = PM10 !

Extinction Efficiency (1/Mm per ug/m**3)
----------------------------------------
    MODELED particulate species:
              PM  COARSE      (EEPMC) -- Default: 0.6 ! EEPMC  = 0.6 !
              PM  FINE        (EEPMF) -- Default: 1.0 ! EEPMF  = 3.8 !
    BACKGROUND particulate species:
              PM  COARSE    (EEPMCBK) -- Default: 0.6 ! EEPMCBK = 0.6 !
    Other species:
             AMMONIUM SULFATE (EESO4) -- Default: 3.0 ! EESO4  = 3.0 !
             AMMONIUM NITRATE (EENO3) -- Default: 3.0 ! EENO3  = 3.0 !
             ORGANIC CARBON   (EEOC)  -- Default: 4.0 ! EEOC   = 4.0 !
             SOIL             (EESOIL)-- Default: 1.0 ! EESOIL = 1.0 !
             ELEMENTAL CARBON (EEEC)  -- Default: 10. ! EEEC   = 10.0 !

Background Extinction Computation
---------------------------------

    Method used for background light extinction
                              (MVISBK) -- Default: 6   ! MVISBK =  2  !

         1 =  Supply single light extinction and hygroscopic fraction
              - IWAQM (1993) RH adjustment applied to hygroscopic background
                and modeled sulfate and nitrate
         2 =  Compute extinction from speciated PM measurements (A)
              - Hourly RH adjustment applied to observed and modeled sulfate
                and nitrate
              - RH factor is capped at RHMAX
         3 =  Compute extinction from speciated PM measurements (B)
              - Hourly RH adjustment applied to observed and modeled sulfate
                and nitrate
              - Receptor-hour excluded if RH>RHMAX
              - Receptor-day excluded if fewer than 6 valid receptor-hours
         4 =  Read hourly transmissometer background extinction measurements
              - Hourly RH adjustment applied to modeled sulfate and nitrate
              - Hour excluded if measurement invalid (missing, interference,
                or large RH)
              - Receptor-hour excluded if RH>RHMAX
              - Receptor-day excluded if fewer than 6 valid receptor-hours
         5 =  Read hourly nephelometer background extinction measurements
              - Rayleigh extinction value (BEXTRAY) added to measurement
              - Hourly RH adjustment applied to modeled sulfate and nitrate
              - Hour excluded if measurement invalid (missing, interference,
                or large RH)
              - Receptor-hour excluded if RH>RHMAX
              - Receptor-day excluded if fewer than 6 valid receptor-hours
         6 =  Compute extinction from speciated PM measurements
              - FLAG RH adjustment factor applied to observed and
                modeled sulfate and nitrate

     Additional inputs used for MVISBK = 1:
     --------------------------------------
      Background light extinction (1/Mm)
```

```
                              (BEXTBK) -- No default   ! BEXTBK = 12.0 !
 Percentage of particles affected by relative humidity
                              (RHFRAC) -- No default   ! RHFRAC = 0.0 !

Additional inputs used for MVISBK = 6:
--------------------------------------
 Extinction coefficients for hygroscopic species (modeled and
 background) are computed using a monthly RH adjustment factor
 in place of an hourly RH factor (VISB.DAT file is NOT needed).
 Enter the 12 monthly factors here (RHFAC).  Month 1 is January.

 (RHFAC)  -- No default      ! RHFAC = 4.4, 4.4, 4.1, 4.1,
                                       4.1, 3.4, 3.4, 3.4,
                                       5.8, 5.8, 5.8, 4.4 !

Additional inputs used for MVISBK = 2,3,6:
------------------------------------------
 Background extinction coefficients are computed from monthly
 CONCENTRATIONS of ammonium sulfate (BKSO4), ammonium nitrate (BKNO3),
 coarse particulates (BKPMC), organic carbon (BKOC), soil (BKSOIL), and
 elemental carbon (BKEC).  Month 1 is January.
 (ug/m**3)

 (BKSO4)  -- No default      ! BKSO4 = 0.2, 0.2, 0.2, 0.2,
                                       0.2, 0.2, 0.2, 0.2,
                                       0.2, 0.2, 0.2, 0.2 !
 (BKNO3)  -- No default      ! BKNO3 = 0.0, 0.0, 0.0, 0.0,
                                       0.0, 0.0, 0.0, 0.0,
                                       0.0, 0.0, 0.0, 0.0 !
 (BKPMC)  -- No default      ! BKPMC = 0.0, 0.0, 0.0, 0.0,
                                       0.0, 0.0, 0.0, 0.0,
                                       0.0, 0.0, 0.0, 0.0 !
 (BKOC)   -- No default      ! BKOC  = 0.0, 0.0, 0.0, 0.0,
                                       0.0, 0.0, 0.0, 0.0,
                                       0.0, 0.0, 0.0, 0.0 !
 (BKSOIL) -- No default      ! BKSOIL= 4.5, 4.5, 4.5, 4.5,
                                       4.5, 4.5, 4.5, 4.5,
                                       4.5, 4.5, 4.5, 4.5 !
 (BKEC)   -- No default      ! BKEC  = 0.0, 0.0, 0.0, 0.0,
                                       0.0, 0.0, 0.0, 0.0,
                                       0.0, 0.0, 0.0, 0.0 !

Additional inputs used for MVISBK = 2,3,5,6:
--------------------------------------------
 Extinction due to Rayleigh scattering is added (1/Mm)
                              (BEXTRAY) -- Default: 10.0 ! BEXTRAY = 10.0 !

!END!
-------------------------------------------------------------------------------

INPUT GROUP: 3 -- Output options
--------------

Output Units
------------
   Units for All Output        (IPRTU) -- Default: 1   ! IPRTU =  1   !
                    for              for
               Concentration    Deposition
      1 =         g/m**3          g/m**2/s
      2 =        mg/m**3         mg/m**2/s
      3 =        ug/m**3         ug/m**2/s
      4 =        ng/m**3         ng/m**2/s
      5 =      Odour Units

   Visibility: extinction expressed in 1/Mega-meters (IPRTU is ignored)


Averaging time(s) reported
--------------------------

   1-hr averages            (L1HR) -- Default: T   !   L1HR = F  !

   3-hr averages            (L3HR) -- Default: T   !   L3HR = F  !

   24-hr averages          (L24HR) -- Default: T   !  L24HR = T  !

   Run-length averages     (LRUNL) -- Default: T   !  LRUNL = F  !

   User-specified averaging time in hours - results for
   an averaging time of NAVG hours are reported for
   NAVG greater than 0:
                            (NAVG) -- Default: 0   !   NAVG =  0  !


Types of tabulations reported
-----------------------------

   1) Visibility: daily visibility tabulations are always reported
                  for the selected receptors when ASPEC = VISIB.
                  In addition, any of the other tabulations listed
                  below may be chosen to characterize the light
                  extinction coefficients.
                  [List file or Plot/Analysis File]


   2) Top 50 table for each averaging time selected
      [List file only]
                            (LT50) -- Default: T   !   LT50 = T  !

   3) Top 'N' table for each averaging time selected
      [List file or Plot file]
                           (LTOPN) -- Default: F   !  LTOPN = T  !

        -- Number of 'Top-N' values at each receptor
           selected (NTOP must be <= 4)
```

```
                    (NTOP) -- Default: 4   ! NTOP =  3   !

   -- Specific ranks of 'Top-N' values reported
      (NTOP values must be entered)
            (ITOP(4) array) -- Default:     ! ITOP =  1 , 2 , 3   !
                                1,2,3,4


4) Threshold exceedance counts for each receptor and each averaging
   time selected
   [List file or Plot file]
                    (LEXCD) -- Default: F   !  LEXCD = T  !

   -- Identify the threshold for each averaging time by assigning a
      non-negative value (output units).

                              -- Default: -1.0
      Threshold for  1-hr averages   (THRESH1) !  THRESH1 = -1.0  !
      Threshold for  3-hr averages   (THRESH3) !  THRESH3 = -1.0  !
      Threshold for 24-hr averages  (THRESH24) ! THRESH24 = 1.0E00 !
      Threshold for NAVG-hr averages (THRESHN) !  THRESHN = -1.0  !


   -- Counts for the shortest averaging period selected can be
      tallied daily, and receptors that experience more than NCOUNT
      counts over any NDAY period will be reported.  This type of
      exceedance violation output is triggered only if NDAY > 0.

      Accumulation period(Days)
                     (NDAY) -- Default: 0   !    NDAY =  0  !
      Number of exceedances allowed
                   (NCOUNT) -- Default: 1   !  NCOUNT =  1  !


5) Selected day table(s)

   Echo Option -- Many records are written each averaging period
   selected and output is grouped by day
   [List file or Plot file]
                    (LECHO) -- Default: F   !  LECHO = F  !

   Timeseries Option -- Averages at all selected receptors for
   each selected averaging period are written to timeseries files.
   Each file contains one averaging period, and all receptors are
   written to a single record each averaging time.
   [TSttUUUU.DAT files]
                    (LTIME) -- Default: F   !  LTIME = F  !

   -- Days selected for output
                 (IECHO(366)) -- Default: 366*0
      ! IECHO  = 366*1  !
      (366 values must be entered)

Plot output options
-------------------

   Plot files can be created for the Top-N, Exceedance, and Echo
   tables selected above.  Two formats for these files are available,
   DATA and GRID.  In the DATA format, results at all receptors are
   listed along with the receptor location [x,y,val1,val2,...].
   In the GRID format, results at only gridded receptors are written,
   using a compact representation.  The gridded values are written in
   rows (x varies), starting with the most southern row of the grid.
   The GRID format is given the .GRD extension, and includes headers
   compatible with the SURFER(R) plotting software.

   A plotting and analysis file can also be created for the daily
   peak visibility summary output, in DATA format only.

   Generate Plot file output in addition to writing tables
   to List file?
                          (LPLT) -- Default: F   ! LPLT  = F !

   Use GRID format rather than DATA format,
   when available?
                          (LGRD) -- Default: F   ! LGRD  = F !


Additional Debug Output
-----------------------

   Output selected information to List file
    for debugging?
                        (LDEBUG) -- Default: F  ! LDEBUG  = F !

!END!

-------------------------------------------------
NOTICE: Starting year in control file sets the
        expected century for the simulation.  All
        YY years are converted to YYYY years in
        the range:         1949        2048
-------------------------------------------------


*****************************************************************************************************************
                                                CALPOST  Version 5.2          Level 991104b
*****************************************************************************************************************


  CALPOST Control File Input Summary -------------------------

    Replace run data with data in Puff file 1*Y:    1
```

```
                    Run starting date -- year: 1999
                                        month:    0
                                          day:    0
                                   Julian day:    0
       Time at beginning of run  -  hour(0-23):   0
                                 -      second:   0
                           Run length (hours):    0


Every hour of data processed -- NREP = 1


 Species & Concentration/Deposition Information
                                        Species: VISIB
                      Layer of processed data:     1
    (>0=conc, -1=dry flux, -2=wet flux, -3=wet & dry flux)
                  Multiplicative scaling factor: 0.0000E+00
                        Additive scaling factor: 0.0000E+00
                  Hourly background values used?: F


 Receptor information
                    Gridded receptors processed?: F
                   Discrete receptors processed?: T
      CTSG Complex terrain receptors processed?: F

 Discrete Receptors Processed

1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
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 Visibility Processing Selected

 Extinction Computation includes:
                              SULFATES
                              NITRATES
                              FINE PARTICLES
                              BACKGROUND
             Max. RH % for particle growth (%):  98.000

 Species name for modeled particulates
                                         fine: PM10

 Extinction Efficiency (1/Mm per ug/m**3)
                                ammonium sulfate:     3.00
                                ammonium nitrate:     3.00
                                  organic carbon:     4.00
                                            soil:     1.00
                               elemental carbon:    10.00
                              MODELED coarse PM:     0.60
                              MODELED   fine PM:     3.80
                              BACKGRND coarse PM:    0.60

 Background Extinction Calculation Method 2
         Rayleigh scattering extinction (1/Mm):    10.00
           Monthly background conc. (ug/m**3):

      (NH4)2SO4   (NH4)NO3     PM-C         OC       SOIL          EC
   1  .2000E+00  .0000E+00  .0000E+00  .0000E+00  .4500E+01  .0000E+00
   2  .2000E+00  .0000E+00  .0000E+00  .0000E+00  .4500E+01  .0000E+00
   3  .2000E+00  .0000E+00  .0000E+00  .0000E+00  .4500E+01  .0000E+00
   4  .2000E+00  .0000E+00  .0000E+00  .0000E+00  .4500E+01  .0000E+00
   5  .2000E+00  .0000E+00  .0000E+00  .0000E+00  .4500E+01  .0000E+00
   6  .2000E+00  .0000E+00  .0000E+00  .0000E+00  .4500E+01  .0000E+00
   7  .2000E+00  .0000E+00  .0000E+00  .0000E+00  .4500E+01  .0000E+00
   8  .2000E+00  .0000E+00  .0000E+00  .0000E+00  .4500E+01  .0000E+00
   9  .2000E+00  .0000E+00  .0000E+00  .0000E+00  .4500E+01  .0000E+00
  10  .2000E+00  .0000E+00  .0000E+00  .0000E+00  .4500E+01  .0000E+00
  11  .2000E+00  .0000E+00  .0000E+00  .0000E+00  .4500E+01  .0000E+00
  12  .2000E+00  .0000E+00  .0000E+00  .0000E+00  .4500E+01  .0000E+00


  Output options
                     Units requested for output:     (1/Mega-m)

  Averaging time(s) selected
      User-specified averaging time (NAVG hours):     0
                                 1-hr averages:     F
                                 3-hr averages:     F
                                24-hr averages:     T
                               NAVG-hr averages:     F
                          Length of run averages:     F

  Output components selected
                                        Top-50:     T
               Top-N values at each receptor:     T
            Exceedance counts at each receptor:     T
       Output selected information for debugging:     F
```

```
                Echo tables for selected days:      F
                Time-series for selected days:      F

 Top "n" table control
       Number of "top" values at each receptor:      3
       Specific ranks of "top" values reported:   1   2   3


 Plot file option
                          Plot files created:      F


 Threshold Exceedance control
      Exceedances of a specified value will be counted for --
                      24-hr averages exceeding: 1.0000E+00


IDENTIFICATION OF PROCESSED MODEL FILE ----------

CALPUFF     5.5         010730_1

BP Cherry Point Cogeneration
Ferndale, WA
Case 6, Class I receptors

Averaging time for values reported from model:
                1   HOUR

Number of averaging periods in file from model:
             7992

Chemical species names for each layer in model:
SO2            1
SO4            1
NOX            1
HNO3           1
NO3            1
PM10           1


-----------------------------------------------------------------------------------------------------------------------------
         INPUT FILES

 Default Name      Unit No.      File Name and Path
 ------------      --------      ------------------
  CALPOST.INP          5         D:\CALPUFF\6VISBPT.INP
    MODEL.DAT          4         D:\CALPUFF\6CONC.DAT
     VISB.DAT          9         D:\CALPUFF\6VISB.DAT

-----------------------------------------------------------------------------------------------------------------------------
         OUTPUT FILES

 Default Name      Unit No.      File Name and Path
 ------------      --------      ------------------
  CALPOST.LST          8         D:\CALPUFF\6VISBOLY.LST

*****************************************************************************************************************************
                                                CALPOST  Version 5.2          Level 991104b
*****************************************************************************************************************************


                          VISIB   B _SN_F

            TOP-50   24   HOUR AVERAGE   EXTINCTION   VALUES

                                 BEXT    BEXT
YEAR DAY TIME RECEPTOR TYPE B__SN__  BACKGND %CHNG  DELTA DV  RH-FAC   COORDINATES (km)

1998 300 2300 (  0, 109) D   25.335  25.335   0.000     0.000  18.059  1057.055   -23.392
1998 300 2300 (  0, 108) D   25.335  25.335   0.000     0.000  18.059  1061.265   -19.755
1998 300 2300 (  0, 107) D   25.335  25.335   0.000     0.000  18.059  1065.531   -16.726
1998 300 2300 (  0, 106) D   25.335  25.335   0.000     0.000  18.059  1070.271   -15.682
1998 300 2300 (  0, 105) D   25.335  25.335   0.000     0.000  18.059  1074.988   -14.794
1998 300 2300 (  0, 104) D   25.335  25.335   0.000     0.000  18.059  1079.644   -13.861
1998 300 2300 (  0, 126) D   25.335  25.335   0.000     0.000  18.059  1060.733     6.991
1998 300 2300 (  0, 125) D   25.335  25.335   0.000     0.000  18.059  1065.523     7.940
1998 300 2300 (  0, 122) D   25.335  25.335   0.000     0.000  18.059  1066.518     3.193
1998 300 2300 (  0, 117) D   25.335  25.335   0.000     0.000  18.059  1067.395    -1.473
1998 300 2300 (  0, 111) D   25.335  25.335   0.000     0.000  18.059  1048.176   -28.247
1998 300 2300 (  0, 110) D   25.335  25.335   0.000     0.000  18.059  1052.913   -27.427
1998 300 2300 (  0, 135) D   25.335  25.335   0.000     0.000  18.059  1050.370     9.891
1998 300 2300 (  0, 134) D   25.335  25.335   0.000     0.000  18.059  1055.057    10.814
1998 300 2300 (  0, 133) D   25.335  25.335   0.000     0.000  18.059  1059.883    11.818
1998 300 2300 (  0, 129) D   25.335  25.335   0.000     0.000  18.059  1046.522     4.145
1998 300 2300 (  0, 128) D   25.335  25.335   0.000     0.000  18.059  1051.363     5.092
1998 300 2300 (  0, 127) D   25.335  25.335   0.000     0.000  18.059  1056.025     6.165
1998 300 2300 (  0, 154) D   25.335  25.335   0.000     0.000  18.059  1005.906    35.542
1998 300 2300 (  0, 153) D   25.335  25.335   0.000     0.000  18.059  1005.024    40.209
1998 300 2300 (  0, 143) D   25.335  25.335   0.000     0.000  18.059  1044.623    13.606
1998 300 2300 (  0, 142) D   25.335  25.335   0.000     0.000  18.059  1049.515    13.678
1998 300 2300 (  0, 141) D   25.335  25.335   0.000     0.000  18.059  1054.244    15.180
1998 300 2300 (  0, 136) D   25.335  25.335   0.000     0.000  18.059  1045.633     8.965
1998 300 2300 (  0, 160) D   25.335  25.335   0.000     0.000  18.059  1010.918    11.750
1998 300 2300 (  0, 159) D   25.335  25.335   0.000     0.000  18.059  1009.650    16.554
1998 300 2300 (  0, 158) D   25.335  25.335   0.000     0.000  18.059  1008.817    21.229
1998 300 2300 (  0, 157) D   25.335  25.335   0.000     0.000  18.059  1007.766    25.968
1998 300 2300 (  0, 156) D   25.335  25.335   0.000     0.000  18.059  1003.996    30.119
1998 300 2300 (  0, 155) D   25.335  25.335   0.000     0.000  18.059  1006.865    30.734
1998 300 2300 (  0, 166) D   25.335  25.335   0.000     0.000  18.059  1035.295   -12.856
1998 300 2300 (  0, 165) D   25.335  25.335   0.000     0.000  18.059  1030.837    -8.840
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1998	300	2300	(0, 164)	D	25.335	25.335	0.000	0.000	18.059	1028.629	-4.364
1998	300	2300	(0, 163)	D	25.335	25.335	0.000	0.000	18.059	1022.989	-0.609
1998	300	2300	(0, 162)	D	25.335	25.335	0.000	0.000	18.059	1017.337	3.251
1998	300	2300	(0, 161)	D	25.335	25.335	0.000	0.000	18.059	1013.810	7.392
1998	300	2300	(0, 172)	D	25.335	25.335	0.000	0.000	18.059	1005.951	33.080
1998	300	2300	(0, 171)	D	25.335	25.335	0.000	0.000	18.059	1005.417	37.809
1998	300	2300	(0, 170)	D	25.335	25.335	0.000	0.000	18.059	1004.814	42.629
1998	300	2300	(0, 169)	D	25.335	25.335	0.000	0.000	18.059	1040.393	-26.609
1998	300	2300	(0, 168)	D	25.335	25.335	0.000	0.000	18.059	1038.569	-22.014
1998	300	2300	(0, 167)	D	25.335	25.335	0.000	0.000	18.059	1036.212	-17.618
1998	300	2300	(0, 180)	D	25.335	25.335	0.000	0.000	18.059	1014.386	5.128
1998	300	2300	(0, 179)	D	25.335	25.335	0.000	0.000	18.059	1011.702	9.472
1998	300	2300	(0, 178)	D	25.335	25.335	0.000	0.000	18.059	1010.143	14.172
1998	300	2300	(0, 177)	D	25.335	25.335	0.000	0.000	18.059	1009.142	18.920
1998	300	2300	(0, 176)	D	25.335	25.335	0.000	0.000	18.059	1008.309	23.595
1998	300	2300	(0, 175)	D	25.335	25.335	0.000	0.000	18.059	1007.318	28.293
1998	300	2300	(0, 174)	D	25.335	25.335	0.000	0.000	18.059	1004.968	27.927
1998	300	2300	(0, 173)	D	25.335	25.335	0.000	0.000	18.059	1004.020	32.684

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CALPOST Version 5.2 Level 991104b

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VISIB B _SN_F

3 RANKED 24 HOUR AVERAGE EXTINCTION VALUES AT EACH DISCRETE RECEPTOR (YEAR,DAY,ENDING TIME) (1/Mega-m)

RECEPTOR	COORDINATES (km)		1 RANK		2 RANK		3 RANK	
1	1090.063	32.672	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
2	1094.800	33.536	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
3	1099.515	34.504	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
4	1109.871	31.743	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
5	1105.063	30.697	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
6	1100.433	29.793	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
7	1095.713	28.825	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
8	1090.972	27.959	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
9	1086.260	26.948	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
10	1081.528	26.041	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
11	1080.586	30.695	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
12	1085.255	31.643	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
13	1075.857	29.793	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
14	1076.854	25.098	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
15	1077.811	20.343	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
16	1082.489	21.287	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
17	1087.265	22.255	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
18	1091.891	23.197	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
19	1096.636	24.063	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
20	1101.419	24.993	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
21	1106.093	25.956	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
22	1110.816	26.935	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
23	1078.718	15.579	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
24	1083.450	16.533	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
25	1088.180	17.492	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
26	1092.860	18.446	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
27	1097.608	19.312	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
28	1102.337	20.283	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
29	1107.024	21.198	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
30	1111.751	22.176	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
31	1116.536	23.118	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
32	1117.405	18.450	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
33	1112.775	17.487	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
34	1107.995	16.497	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
35	1103.314	15.532	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
36	1098.531	14.551	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
37	1093.889	13.653	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
38	1089.086	12.780	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
39	1084.391	11.881	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
40	1079.615	10.865	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
41	1080.572	6.111	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
42	1085.262	7.057	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
43	1090.069	7.927	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
44	1094.748	8.932	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
45	1099.534	9.909	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
46	1104.231	10.822	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
47	1108.916	11.789	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
48	1113.650	12.768	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
49	1119.343	8.895	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
50	1114.645	7.970	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
51	1109.947	7.049	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
52	1105.217	6.022	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
53	1100.517	5.109	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
54	1095.727	4.129	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
55	1090.984	3.165	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
56	1086.313	2.373	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
57	1081.579	1.366	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
58	1082.486	-3.398	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
59	1087.225	-2.390	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
60	1091.940	-1.538	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
61	1096.726	-0.512	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
62	1101.491	0.358	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
63	1106.125	1.362	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
64	1110.837	2.229	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
65	1115.590	3.161	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
66	1120.321	4.198	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
67	1121.260	-0.560	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
68	1116.555	-1.486	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
69	1111.868	-2.509	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
70	1107.112	-3.437	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
71	1102.354	-4.362	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
72	1097.645	-5.273	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
73	1092.946	-6.230	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
74	1088.245	-7.183	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
75	1083.384	-8.111	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
76	1084.391	-12.855	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)

77	1089.147	-11.896	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
78	1093.861	-10.992	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
79	1098.514	-10.044	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
80	1103.327	-9.112	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
81	1107.969	-8.107	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
82	1112.779	-7.168	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
83	1117.430	-6.205	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
84	1122.239	-5.258	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
85	1113.710	-11.926	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
86	1109.015	-12.947	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
87	1104.290	-13.814	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
88	1099.583	-14.776	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
89	1094.756	-15.654	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
90	1090.108	-16.649	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
91	1085.349	-17.609	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
92	1114.631	-16.635	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
93	1109.983	-17.647	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
94	1105.163	-18.583	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
95	1100.534	-19.426	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
96	1095.731	-20.455	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
97	1091.050	-21.301	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
98	1096.696	-25.207	2.4636E+01	(1998,363,2300)	2.4216E+01	(1999,006,2300)	2.4209E+01	(1998,345,2300)
99	1086.296	-22.313	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
100	1126.005	0.430	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
101	1124.139	9.843	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
102	1081.592	-23.311	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
103	1077.877	-28.999	2.4636E+01	(1998,363,2300)	2.4216E+01	(1999,006,2300)	2.4209E+01	(1998,345,2300)
104	1079.644	-13.861	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
105	1074.988	-14.794	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
106	1070.271	-15.682	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
107	1065.531	-16.726	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
108	1061.265	-19.755	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
109	1057.055	-23.392	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
110	1052.913	-27.427	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
111	1048.176	-28.247	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
112	1069.234	-10.994	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
113	1074.089	-10.029	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
114	1078.773	-8.987	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
115	1073.039	-5.292	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
116	1077.798	-4.392	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
117	1067.395	-1.473	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
118	1072.131	-0.478	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
119	1076.835	0.412	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
120	1075.832	5.158	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
121	1071.201	4.178	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
122	1066.518	3.193	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
123	1074.889	9.863	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
124	1070.202	8.925	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
125	1065.523	7.940	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
126	1060.733	6.991	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
127	1056.025	6.165	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
128	1051.363	5.092	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
129	1046.522	4.145	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
130	1073.986	14.627	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
131	1069.252	13.681	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
132	1064.538	12.637	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
133	1059.883	11.818	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
134	1055.057	10.814	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
135	1050.370	9.891	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
136	1045.633	8.965	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
137	1073.052	19.283	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
138	1068.332	18.286	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
139	1063.583	17.445	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
140	1058.911	16.466	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
141	1054.244	15.180	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
142	1049.515	13.678	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
143	1044.623	13.606	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
144	1072.089	24.089	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
145	1067.383	23.043	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
146	1063.336	22.333	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
147	1071.167	28.955	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
148	1066.465	27.909	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
149	1061.652	26.900	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
150	1060.757	31.667	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
151	1065.507	32.717	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
152	1070.212	33.586	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
153	1005.024	40.209	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
154	1005.906	35.542	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
155	1006.865	30.734	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
156	1003.996	30.119	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
157	1007.766	25.968	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
158	1008.817	21.229	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
159	1009.650	16.554	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
160	1010.918	11.750	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
161	1013.810	7.392	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
162	1017.337	3.251	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
163	1022.989	-0.609	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
164	1028.629	-4.364	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
165	1030.837	-8.840	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
166	1035.295	-12.856	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
167	1036.212	-17.618	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
168	1038.569	-22.014	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
169	1040.393	-26.609	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
170	1004.814	42.629	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
171	1005.417	37.809	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
172	1005.951	33.080	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
173	1004.020	32.684	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
174	1004.968	27.927	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
175	1007.318	28.293	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
176	1008.309	23.595	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
177	1009.142	18.920	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
178	1010.143	14.172	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
179	1011.702	9.472	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
180	1014.386	5.128	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
181	1016.754	5.448	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)

182	1020.116	1.383	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
183	1025.863	-2.406	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
184	1029.070	-6.702	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
185	1033.744	-10.784	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
186	1035.779	-15.135	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
187	1037.943	-19.618	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
188	1040.036	-24.269	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
189	1040.896	-28.418	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
190	1050.780	-28.839	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
191	1050.415	-27.141	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
192	1055.196	-26.001	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
193	1054.767	-24.522	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
194	1057.300	-24.728	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
195	1059.384	-22.784	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
196	1059.005	-20.467	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
197	1063.616	-19.556	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
198	1063.314	-17.380	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
199	1074.008	-32.253	2.4636E+01	(1998,363,2300)	2.4215E+01	(1999,006,2300)	2.4209E+01	(1998,345,2300)
200	1075.467	-29.487	2.4636E+01	(1998,363,2300)	2.4216E+01	(1999,006,2300)	2.4209E+01	(1998,345,2300)
201	1077.386	-26.684	2.4636E+01	(1998,363,2300)	2.4216E+01	(1999,006,2300)	2.4209E+01	(1998,345,2300)
202	1079.740	-26.187	2.4636E+01	(1998,363,2300)	2.4216E+01	(1999,006,2300)	2.4209E+01	(1998,345,2300)
203	1080.167	-28.443	2.4636E+01	(1998,363,2300)	2.4216E+01	(1999,006,2300)	2.4209E+01	(1998,345,2300)
204	1082.034	-25.648	2.4636E+01	(1998,363,2300)	2.4216E+01	(1999,006,2300)	2.4209E+01	(1998,345,2300)
205	1081.140	-20.935	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
206	1083.451	-20.497	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
207	1085.843	-19.938	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
208	1083.939	-22.793	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
209	1088.273	-19.578	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
210	1088.603	-21.853	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
211	1089.112	-24.249	2.4636E+01	(1998,363,2300)	2.4216E+01	(1999,006,2300)	2.4209E+01	(1998,345,2300)
212	1089.612	-26.597	2.4636E+01	(1998,363,2300)	2.4216E+01	(1999,006,2300)	2.4209E+01	(1998,345,2300)
213	1091.937	-25.945	2.4636E+01	(1998,363,2300)	2.4216E+01	(1999,006,2300)	2.4209E+01	(1998,345,2300)
214	1091.464	-23.748	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
215	1093.858	-23.186	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
216	1094.329	-25.642	2.4636E+01	(1998,363,2300)	2.4216E+01	(1999,006,2300)	2.4209E+01	(1998,345,2300)
217	1093.375	-20.940	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
218	1092.933	-18.634	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
219	1092.402	-16.137	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
220	1092.010	-13.823	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
221	1089.592	-14.233	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
222	1087.253	-14.784	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
223	1087.743	-17.081	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
224	1082.536	-15.682	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
225	1082.994	-18.090	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
226	1080.712	-18.678	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
227	1080.246	-16.221	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
228	1067.917	-16.157	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
229	1072.574	-15.229	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
230	1077.332	-14.280	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
231	1082.038	-13.335	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
232	1086.804	-12.428	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
233	1091.489	-11.375	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
234	1065.026	-14.309	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
235	1067.424	-13.807	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
236	1069.672	-13.334	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
237	1072.130	-12.872	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
238	1074.428	-12.386	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
239	1076.826	-11.882	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
240	1079.224	-11.376	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
241	1081.549	-11.038	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
242	1083.937	-10.480	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
243	1086.284	-9.981	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
244	1088.641	-9.531	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
245	1091.047	-9.070	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
246	1096.198	-22.892	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
247	1098.591	-22.328	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
248	1100.911	-21.933	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
249	1103.323	-21.467	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
250	1105.715	-20.900	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
251	1108.076	-20.442	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
252	1110.436	-19.982	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
253	1112.797	-19.522	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
254	1115.096	-19.020	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
255	1115.412	-20.363	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
256	1117.517	-18.599	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
257	1098.077	-19.933	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
258	1102.867	-19.112	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
259	1107.508	-18.056	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
260	1112.347	-17.218	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
261	1116.945	-16.214	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
262	1090.513	-19.046	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
263	1095.314	-18.022	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
264	1097.642	-17.678	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
265	1100.002	-17.223	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
266	1102.392	-16.657	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
267	1104.751	-16.200	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
268	1107.070	-15.802	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
269	1109.509	-15.223	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
270	1111.858	-14.714	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
271	1114.176	-14.312	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
272	1097.179	-15.272	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
273	1101.867	-14.211	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
274	1106.643	-13.337	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
275	1111.348	-12.368	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
276	1094.318	-13.380	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
277	1096.725	-12.917	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
278	1098.983	-12.481	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
279	1101.430	-11.956	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
280	1103.768	-11.399	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
281	1106.034	-11.012	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
282	1108.542	-10.524	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
283	1110.898	-10.065	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
284	1113.255	-9.604	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
285	1115.641	-9.033	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
286	1117.967	-8.680	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)

287	1120.403	-8.097	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
288	1121.947	-7.740	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
289	1115.925	-10.745	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
290	1096.212	-10.520	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
291	1100.915	-9.560	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
292	1105.649	-8.487	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
293	1110.369	-7.619	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
294	1115.039	-6.758	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
295	1119.789	-5.772	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
296	1123.989	-4.372	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
297	1093.393	-8.567	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
298	1095.899	-8.085	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
299	1098.054	-7.670	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
300	1100.460	-7.205	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
301	1102.896	-6.629	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
302	1105.110	-6.252	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
303	1107.515	-5.784	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
304	1109.920	-5.315	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
305	1112.355	-4.735	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
306	1114.658	-4.284	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
307	1117.012	-3.822	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
308	1119.336	-3.469	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
309	1121.770	-2.886	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
310	1124.073	-2.431	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
311	1125.767	-1.263	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
312	1123.648	-0.017	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
313	1118.912	-1.055	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
314	1114.206	-1.980	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
315	1109.500	-2.901	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
316	1104.693	-3.837	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
317	1099.894	-4.819	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
318	1095.226	-5.668	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
319	1090.495	-6.733	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
320	1087.730	-4.768	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
321	1090.034	-4.327	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
322	1092.397	-3.925	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
323	1094.781	-3.362	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
324	1097.135	-2.908	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
325	1099.448	-2.514	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
326	1101.892	-1.988	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
327	1104.235	-1.482	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
328	1106.588	-1.024	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
329	1108.940	-0.566	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
330	1111.302	-0.156	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
331	1113.685	0.415	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
332	1116.047	0.826	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
333	1118.339	1.329	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
334	1120.841	1.822	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
335	1123.152	2.226	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
336	1124.933	2.683	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
337	1089.582	-1.971	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
338	1094.328	-1.007	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
339	1099.083	-0.089	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
340	1103.727	0.863	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
341	1108.481	1.789	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
342	1113.274	2.779	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
343	1117.985	3.652	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
344	1122.627	4.620	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
345	1124.577	5.006	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
346	1086.728	-0.075	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
347	1089.131	0.385	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
348	1091.523	0.897	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
349	1093.815	1.389	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
350	1096.026	1.764	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
351	1098.568	2.306	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
352	1100.919	2.762	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
353	1103.320	3.228	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
354	1105.761	3.755	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
355	1108.012	4.194	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
356	1110.352	4.704	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
357	1112.653	5.154	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
358	1115.142	5.694	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
359	1117.542	6.166	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
360	1119.842	6.619	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
361	1122.151	7.024	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
362	1124.031	7.500	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
363	1088.669	2.792	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
364	1093.352	3.795	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
365	1098.043	4.753	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
366	1102.843	5.684	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
367	1107.652	6.568	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
368	1112.181	7.558	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
369	1116.979	8.500	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
370	1121.735	9.387	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
371	1123.578	12.145	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
372	1123.759	13.586	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
373	1121.201	11.831	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
374	1121.132	12.962	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
375	1118.973	11.287	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
376	1118.675	12.529	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
377	1116.545	10.704	2.1878E+01	(1999,045,2300)	2.1781E+01	(1998,345,2300)	2.1490E+01	(1998,329,2300)
378	1114.227	10.352	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
379	1111.830	9.882	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
380	1109.441	9.362	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
381	1107.043	8.893	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
382	1104.694	8.435	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
383	1102.335	8.029	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
384	1100.056	7.482	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
385	1097.656	7.018	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
386	1095.307	6.564	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
387	1092.967	6.060	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
388	1090.517	5.589	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
389	1088.158	5.189	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
390	1085.867	4.698	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
391	1087.725	7.444	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)

392	1092.413	8.398	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
393	1097.151	9.363	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
394	1101.828	10.374	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
395	1106.523	11.288	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
396	1111.418	12.246	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
397	1116.052	13.209	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
398	1117.834	16.005	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
399	1115.638	15.572	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
400	1113.262	15.001	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
401	1110.856	14.580	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
402	1108.520	14.071	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
403	1106.104	13.703	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
404	1103.807	13.256	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
405	1101.380	12.679	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
406	1099.023	12.274	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
407	1096.635	11.760	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
408	1094.258	11.196	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
409	1091.940	10.854	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
410	1089.662	10.311	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
411	1087.205	9.891	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
412	1084.966	9.411	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
413	1086.783	12.357	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
414	1091.467	13.310	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
415	1096.170	14.165	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
416	1100.903	15.135	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
417	1105.635	16.108	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
418	1110.335	16.975	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
419	1115.075	17.906	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
420	1119.289	21.236	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
421	1116.986	20.832	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
422	1114.642	20.370	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
423	1112.277	19.750	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
424	1109.933	19.290	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
425	1107.479	18.861	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
426	1105.135	18.403	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
427	1102.800	17.896	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
428	1100.455	17.440	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
429	1098.100	17.035	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
430	1095.774	16.480	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
431	1093.339	15.958	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
432	1091.043	15.516	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
433	1088.677	15.165	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
434	1086.292	14.654	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
435	1083.905	14.146	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
436	1085.799	16.951	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
437	1090.520	17.962	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
438	1095.249	18.926	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
439	1099.957	19.735	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
440	1104.726	20.767	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
441	1109.512	21.704	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
442	1114.138	22.665	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
443	1113.734	24.979	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
444	1111.342	24.509	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
445	1108.941	24.089	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
446	1106.658	23.590	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
447	1104.276	23.072	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
448	1101.923	22.666	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
449	1099.490	22.141	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
450	1097.147	21.686	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
451	1094.744	21.273	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
452	1092.410	20.770	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
453	1090.067	20.318	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
454	1087.672	19.857	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
455	1085.298	19.298	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
456	1082.944	18.899	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
457	1084.877	21.764	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
458	1089.563	22.664	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
459	1094.338	23.638	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
460	1099.063	24.606	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
461	1103.797	25.527	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
462	1108.340	26.364	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
463	1112.963	27.324	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
464	1112.439	29.719	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
465	1110.348	29.308	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
466	1108.058	28.858	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
467	1105.678	28.339	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
468	1103.277	27.923	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
469	1100.986	27.476	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
470	1098.496	26.992	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
471	1096.155	26.538	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
472	1093.833	25.984	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
473	1091.451	25.472	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
474	1089.050	25.061	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
475	1086.767	24.570	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
476	1084.356	24.211	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
477	1082.002	23.552	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
478	1083.864	26.508	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
479	1088.587	27.468	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
480	1093.337	28.281	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
481	1098.107	29.257	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
482	1102.907	30.348	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
483	1107.606	31.163	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
484	1103.982	33.229	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
485	1102.408	32.642	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
486	1100.009	32.227	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
487	1097.581	31.703	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
488	1095.242	31.249	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
489	1092.852	30.786	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
490	1090.482	30.224	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
491	1088.133	29.824	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
492	1085.793	29.374	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
493	1083.502	28.934	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
494	1081.122	28.426	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
495	1083.011	31.231	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
496	1087.789	32.148	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)

497	1092.357	33.083	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
498	1097.133	34.008	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
499	1100.753	35.721	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
500	1099.347	35.447	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
501	1097.614	35.176	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
502	1097.787	36.638	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
503	1096.650	38.900	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
504	1096.327	41.124	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
505	1094.568	34.584	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
506	1092.229	34.011	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
507	1089.931	33.226	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
508	1087.331	33.945	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
509	1085.141	32.601	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
510	1082.621	32.767	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
511	1080.307	32.268	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
512	1069.749	35.927	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
513	1072.086	36.423	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
514	1072.554	34.074	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
515	1074.769	34.495	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
516	1067.808	33.118	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
517	1063.090	32.176	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
518	1058.458	30.877	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
519	1056.820	29.582	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
520	1058.872	28.839	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
521	1061.353	29.356	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
522	1063.693	29.796	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
523	1065.982	30.227	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
524	1068.431	30.638	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
525	1070.761	31.131	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
526	1073.032	31.665	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
527	1075.408	32.167	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
528	1077.863	32.130	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
529	1064.086	27.428	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
530	1068.758	28.361	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
531	1073.569	29.377	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
532	1078.290	30.328	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
533	1062.886	24.761	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
534	1064.571	25.130	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
535	1066.913	25.571	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
536	1069.185	26.104	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
537	1071.545	26.447	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
538	1073.967	27.010	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
539	1076.368	27.415	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
540	1078.689	27.961	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
541	1065.043	22.621	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
542	1069.709	23.605	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
543	1074.484	24.562	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
544	1079.248	25.573	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
545	1063.162	19.722	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
546	1065.568	20.382	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
547	1067.821	20.755	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
548	1070.195	21.307	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
549	1072.498	21.691	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
550	1074.982	22.214	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
551	1077.306	22.760	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
552	1079.767	23.125	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
553	1056.447	15.868	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
554	1061.190	17.015	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
555	1065.912	18.005	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
556	1070.601	18.890	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
557	1075.379	19.848	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
558	1080.108	20.799	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
559	1080.567	18.392	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
560	1078.272	17.955	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
561	1075.936	17.459	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
562	1073.541	17.005	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
563	1071.156	16.501	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
564	1068.869	16.017	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
565	1066.474	15.566	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
566	1064.138	15.074	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
567	1061.692	14.615	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
568	1059.305	14.117	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
569	1056.968	13.629	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
570	1054.512	13.224	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
571	1052.215	12.797	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
572	1051.805	15.005	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
573	1049.837	12.252	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
574	1047.530	11.877	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
575	1047.137	13.725	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
576	1045.161	11.284	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
577	1042.320	13.252	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
578	1042.813	10.852	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
579	1043.387	8.570	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
580	1048.035	9.426	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
581	1052.721	10.347	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
582	1057.467	11.230	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
583	1062.134	12.257	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
584	1066.877	13.148	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
585	1071.592	14.194	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
586	1076.434	15.112	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
587	1043.731	6.141	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
588	1046.080	6.574	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
589	1048.570	7.086	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
590	1050.860	7.561	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
591	1053.159	7.987	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
592	1055.490	8.524	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
593	1057.938	8.980	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
594	1060.277	9.469	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
595	1062.625	9.909	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
596	1064.964	10.399	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
597	1067.362	10.849	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
598	1069.710	11.292	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
599	1072.206	11.763	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
600	1074.494	12.249	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
601	1076.822	12.795	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)

602	1079.220	13.251	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
603	1049.016	4.676	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
604	1053.637	5.688	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
605	1058.397	6.521	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
606	1063.127	7.509	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
607	1067.825	8.392	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
608	1072.552	9.387	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
609	1077.289	10.338	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
610	1058.846	4.113	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
611	1061.237	4.611	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
612	1063.637	5.060	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
613	1065.919	5.592	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
614	1068.318	6.043	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
615	1070.658	6.537	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
616	1073.098	7.049	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
617	1075.457	7.444	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
618	1077.797	7.940	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
619	1080.176	8.496	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
620	1065.361	3.047	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
621	1068.803	3.745	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
622	1073.544	4.692	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
623	1078.285	5.642	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
624	1081.116	16.054	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
625	1081.506	13.739	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
626	1082.026	11.291	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
627	1082.425	8.925	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
628	1082.944	6.478	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
629	1066.963	0.854	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
630	1069.256	1.338	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
631	1071.667	1.739	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
632	1074.071	2.454	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
633	1076.341	2.780	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
634	1078.802	3.194	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
635	1081.134	3.742	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
636	1083.584	4.209	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
637	1069.740	-0.961	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
638	1074.486	-0.013	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
639	1079.290	0.898	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
640	1083.893	1.774	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
641	1070.244	-3.360	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
642	1072.648	-2.907	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
643	1074.991	-2.411	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
644	1077.335	-1.916	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
645	1079.678	-1.419	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
646	1082.081	-0.962	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
647	1084.333	-0.533	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
648	1084.833	-2.879	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
649	1080.185	-3.817	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
650	1075.477	-4.709	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
651	1070.646	-5.776	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
652	1069.033	-8.781	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
653	1071.100	-8.184	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
654	1073.496	-7.681	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
655	1075.842	-7.186	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
656	1078.297	-6.721	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
657	1080.593	-6.234	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
658	1083.007	-5.826	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
659	1085.302	-5.337	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
660	1085.842	-7.623	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
661	1081.050	-8.640	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
662	1076.448	-9.565	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
663	1071.634	-10.473	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)
664	1067.498	-11.666	2.5335E+01	(1998,300,2300)	2.5195E+01	(1998,362,2300)	2.5195E+01	(1998,317,2300)
665	1074.296	36.865	2.5195E+01	(1999,010,2300)	2.5195E+01	(1998,318,2300)	2.5054E+01	(1998,306,2300)

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CALPOST Version 5.2 Level 991104b

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COUNTS OF 24 HOUR AVERAGE EXTINCTION EXCEEDENCES AT EACH DISCRETE RECEPTOR (1/Mega-m)

THRESHOLD VALUE = 1.0000E+00 VISIB B _SN_F

RECEPTOR	COORDINATES (km)		COUNT
1	1090.063	32.672	333
2	1094.800	33.536	333
3	1099.515	34.504	333
4	1109.871	31.743	333
5	1105.063	30.697	333
6	1100.433	29.793	333
7	1095.713	28.825	333
8	1090.972	27.959	333
9	1086.260	26.948	333
10	1081.528	26.041	333
11	1080.586	30.695	333
12	1085.255	31.643	333
13	1075.857	29.793	333
14	1076.854	25.098	333
15	1077.811	20.343	333
16	1082.489	21.287	333
17	1087.265	22.255	333
18	1091.891	23.197	333
19	1096.636	24.063	333
20	1101.419	24.993	333
21	1106.093	25.956	333
22	1110.816	26.935	333
23	1078.718	15.579	333
24	1083.450	16.533	333
25	1088.180	17.492	333
26	1092.860	18.446	333
27	1097.608	19.312	333
28	1102.337	20.283	333
29	1107.024	21.198	333

30	1111.751	22.176	333
31	1116.536	23.118	333
32	1117.405	18.450	333
33	1112.775	17.487	333
34	1107.995	16.497	333
35	1103.314	15.532	333
36	1098.531	14.551	333
37	1093.889	13.653	333
38	1089.086	12.780	333
39	1084.391	11.881	333
40	1079.615	10.865	333
41	1080.572	6.111	333
42	1085.262	7.057	333
43	1090.069	7.927	333
44	1094.748	8.932	333
45	1099.534	9.909	333
46	1104.231	10.822	333
47	1108.916	11.789	333
48	1113.650	12.768	333
49	1118.343	8.895	333
50	1114.645	7.970	333
51	1109.947	7.049	333
52	1105.217	6.022	333
53	1100.517	5.109	333
54	1095.727	4.129	333
55	1090.984	3.165	333
56	1086.313	2.373	333
57	1081.579	1.366	333
58	1082.486	-3.398	333
59	1087.225	-2.390	333
60	1091.940	-1.538	333
61	1096.726	-0.512	333
62	1101.491	0.358	333
63	1106.125	1.362	333
64	1110.837	2.229	333
65	1115.590	3.161	333
66	1120.321	4.198	333
67	1121.260	-0.560	333
68	1116.555	-1.486	333
69	1111.868	-2.509	333
70	1107.112	-3.437	333
71	1102.354	-4.362	333
72	1097.645	-5.273	333
73	1092.946	-6.230	333
74	1088.245	-7.183	333
75	1083.384	-8.111	333
76	1084.391	-12.855	333
77	1089.147	-11.896	333
78	1093.861	-10.992	333
79	1098.514	-10.044	333
80	1103.327	-9.112	333
81	1107.969	-8.107	333
82	1112.779	-7.168	333
83	1117.430	-6.205	333
84	1122.239	-5.258	333
85	1113.710	-11.926	333
86	1109.015	-12.947	333
87	1104.290	-13.814	333
88	1099.583	-14.776	333
89	1094.756	-15.654	333
90	1090.108	-16.649	333
91	1085.349	-17.609	333
92	1114.631	-16.635	333
93	1109.983	-17.647	333
94	1105.163	-18.583	333
95	1100.534	-19.426	333
96	1095.731	-20.455	333
97	1091.050	-21.301	333
98	1096.696	-25.207	333
99	1086.296	-22.313	333
100	1126.005	0.430	333
101	1124.139	9.843	333
102	1081.592	-23.311	333
103	1077.877	-28.999	333
104	1079.644	-13.861	333
105	1074.988	-14.794	333
106	1070.271	-15.682	333
107	1065.531	-16.726	333
108	1061.265	-19.755	333
109	1057.055	-23.392	333
110	1052.913	-27.427	333
111	1048.176	-28.247	333
112	1069.234	-10.994	333
113	1074.089	-10.029	333
114	1078.773	-8.987	333
115	1073.039	-5.292	333
116	1077.798	-4.392	333
117	1067.395	-1.473	333
118	1072.131	-0.478	333
119	1076.835	0.412	333
120	1075.832	5.158	333
121	1071.201	4.178	333
122	1066.518	3.193	333
123	1074.889	9.863	333
124	1070.202	8.925	333
125	1065.523	7.940	333
126	1060.733	6.991	333
127	1056.025	6.165	333
128	1051.363	5.092	333
129	1046.522	4.145	333
130	1073.986	14.627	333
131	1069.252	13.681	333
132	1064.538	12.637	333
133	1059.883	11.818	333
134	1055.057	10.814	333

135	1050.370	9.891	333
136	1045.633	8.965	333
137	1073.052	19.283	333
138	1068.332	18.286	333
139	1063.583	17.445	333
140	1058.911	16.466	333
141	1054.244	15.180	333
142	1049.515	13.678	333
143	1044.623	13.606	333
144	1072.089	24.089	333
145	1067.383	23.043	333
146	1063.336	22.333	333
147	1071.167	28.955	333
148	1066.465	27.909	333
149	1061.652	26.900	333
150	1060.757	31.667	333
151	1065.507	32.717	333
152	1070.212	33.586	333
153	1005.024	40.209	333
154	1005.906	35.542	333
155	1006.865	30.734	333
156	1003.996	30.119	333
157	1007.766	25.968	333
158	1008.817	21.229	333
159	1009.650	16.554	333
160	1010.918	11.750	333
161	1013.810	7.392	333
162	1017.337	3.251	333
163	1022.989	-0.609	333
164	1028.629	-4.364	333
165	1030.837	-8.840	333
166	1035.295	-12.856	333
167	1036.212	-17.618	333
168	1038.569	-22.014	333
169	1040.393	-26.609	333
170	1004.814	42.629	333
171	1005.417	37.809	333
172	1005.951	33.080	333
173	1004.020	32.684	333
174	1004.968	27.927	333
175	1007.318	28.293	333
176	1008.309	23.595	333
177	1009.142	18.920	333
178	1010.143	14.172	333
179	1011.702	9.472	333
180	1014.386	5.128	333
181	1016.754	5.448	333
182	1020.116	1.383	333
183	1025.863	-2.406	333
184	1029.070	-6.702	333
185	1033.744	-10.784	333
186	1035.779	-15.135	333
187	1037.943	-19.618	333
188	1040.036	-24.269	333
189	1040.896	-28.418	333
190	1050.780	-28.839	333
191	1050.415	-27.141	333
192	1055.196	-26.001	333
193	1054.767	-24.522	333
194	1057.300	-24.728	333
195	1059.384	-22.784	333
196	1059.005	-20.467	333
197	1063.616	-19.556	333
198	1063.314	-17.380	333
199	1074.008	-32.253	333
200	1075.467	-29.487	333
201	1077.386	-26.684	333
202	1079.740	-26.187	333
203	1080.167	-28.443	333
204	1082.034	-25.648	333
205	1081.140	-20.935	333
206	1083.451	-20.497	333
207	1085.843	-19.938	333
208	1083.939	-22.793	333
209	1088.273	-19.578	333
210	1088.603	-21.853	333
211	1089.112	-24.249	333
212	1089.612	-26.597	333
213	1091.937	-25.945	333
214	1091.464	-23.748	333
215	1093.858	-23.186	333
216	1094.329	-25.642	333
217	1093.375	-20.940	333
218	1092.933	-18.634	333
219	1092.402	-16.137	333
220	1092.010	-13.823	333
221	1089.592	-14.233	333
222	1087.253	-14.784	333
223	1087.743	-17.081	333
224	1082.536	-15.682	333
225	1082.994	-18.090	333
226	1080.712	-18.678	333
227	1080.246	-16.221	333
228	1067.917	-16.157	333
229	1072.574	-15.229	333
230	1077.332	-14.280	333
231	1082.038	-13.335	333
232	1086.804	-12.428	333
233	1091.489	-11.375	333
234	1065.026	-14.309	333
235	1067.424	-13.807	333
236	1069.672	-13.334	333
237	1072.130	-12.872	333
238	1074.428	-12.386	333
239	1076.826	-11.882	333

240	1079.224	-11.376	333
241	1081.549	-11.038	333
242	1083.937	-10.480	333
243	1086.284	-9.981	333
244	1088.641	-9.531	333
245	1091.047	-9.070	333
246	1096.198	-22.892	333
247	1098.591	-22.328	333
248	1100.911	-21.933	333
249	1103.323	-21.467	333
250	1105.715	-20.900	333
251	1108.076	-20.442	333
252	1110.436	-19.982	333
253	1112.797	-19.522	333
254	1115.096	-19.020	333
255	1115.412	-20.363	333
256	1117.517	-18.599	333
257	1098.077	-19.933	333
258	1102.867	-19.112	333
259	1107.508	-18.056	333
260	1112.347	-17.218	333
261	1116.945	-16.214	333
262	1090.513	-19.046	333
263	1095.314	-18.022	333
264	1097.642	-17.678	333
265	1100.002	-17.223	333
266	1102.392	-16.657	333
267	1104.751	-16.200	333
268	1107.070	-15.802	333
269	1109.509	-15.223	333
270	1111.858	-14.714	333
271	1114.176	-14.312	333
272	1097.179	-15.272	333
273	1101.867	-14.211	333
274	1106.643	-13.337	333
275	1111.348	-12.368	333
276	1094.318	-13.380	333
277	1096.725	-12.917	333
278	1098.983	-12.481	333
279	1101.430	-11.956	333
280	1103.768	-11.399	333
281	1106.034	-11.012	333
282	1108.542	-10.524	333
283	1110.898	-10.065	333
284	1113.255	-9.604	333
285	1115.641	-9.033	333
286	1117.967	-8.680	333
287	1120.403	-8.097	333
288	1121.947	-7.740	333
289	1115.925	-10.745	333
290	1096.212	-10.520	333
291	1100.915	-9.560	333
292	1105.649	-8.487	333
293	1110.369	-7.619	333
294	1115.039	-6.758	333
295	1119.789	-5.772	333
296	1123.989	-4.372	333
297	1093.393	-8.567	333
298	1095.899	-8.085	333
299	1098.054	-7.670	333
300	1100.460	-7.205	333
301	1102.896	-6.629	333
302	1105.110	-6.252	333
303	1107.515	-5.784	333
304	1109.920	-5.315	333
305	1112.355	-4.735	333
306	1114.658	-4.284	333
307	1117.012	-3.822	333
308	1119.336	-3.469	333
309	1121.770	-2.886	333
310	1124.073	-2.431	333
311	1125.767	-1.263	333
312	1123.648	-0.017	333
313	1118.912	-1.055	333
314	1114.206	-1.980	333
315	1109.500	-2.901	333
316	1104.693	-3.837	333
317	1099.894	-4.819	333
318	1095.226	-5.668	333
319	1090.495	-6.733	333
320	1087.730	-4.768	333
321	1090.034	-4.327	333
322	1092.397	-3.925	333
323	1094.781	-3.362	333
324	1097.135	-2.908	333
325	1099.448	-2.514	333
326	1101.892	-1.988	333
327	1104.235	-1.482	333
328	1106.588	-1.024	333
329	1108.940	-0.566	333
330	1111.302	-0.156	333
331	1113.685	0.415	333
332	1116.047	0.826	333
333	1118.339	1.329	333
334	1120.841	1.822	333
335	1123.152	2.226	333
336	1124.933	2.683	333
337	1089.582	-1.971	333
338	1094.328	-1.007	333
339	1099.083	-0.089	333
340	1103.727	0.863	333
341	1108.481	1.789	333
342	1113.274	2.779	333
343	1117.985	3.652	333
344	1122.627	4.620	333

345	1124.577	5.006	333
346	1086.728	-0.075	333
347	1089.131	0.385	333
348	1091.523	0.897	333
349	1093.815	1.389	333
350	1096.026	1.764	333
351	1098.568	2.306	333
352	1100.919	2.762	333
353	1103.320	3.228	333
354	1105.761	3.755	333
355	1108.012	4.194	333
356	1110.352	4.704	333
357	1112.653	5.154	333
358	1115.142	5.694	333
359	1117.542	6.166	333
360	1119.842	6.619	333
361	1122.151	7.024	333
362	1124.031	7.500	333
363	1088.669	2.792	333
364	1093.352	3.795	333
365	1098.043	4.753	333
366	1102.843	5.684	333
367	1107.652	6.568	333
368	1112.181	7.558	333
369	1116.979	8.500	333
370	1121.735	9.387	333
371	1123.578	12.145	333
372	1123.759	13.586	333
373	1121.201	11.831	333
374	1121.132	12.962	333
375	1118.973	11.287	333
376	1118.675	12.529	333
377	1116.545	10.704	333
378	1114.227	10.352	333
379	1111.830	9.882	333
380	1109.441	9.362	333
381	1107.043	8.893	333
382	1104.694	8.435	333
383	1102.335	8.029	333
384	1100.056	7.482	333
385	1097.656	7.018	333
386	1095.307	6.564	333
387	1092.967	6.060	333
388	1090.517	5.589	333
389	1088.158	5.189	333
390	1085.867	4.698	333
391	1087.725	7.444	333
392	1092.413	8.398	333
393	1097.151	9.363	333
394	1101.828	10.374	333
395	1106.523	11.288	333
396	1111.418	12.246	333
397	1116.052	13.209	333
398	1117.834	16.005	333
399	1115.638	15.572	333
400	1113.262	15.001	333
401	1110.856	14.580	333
402	1108.520	14.071	333
403	1106.104	13.703	333
404	1103.807	13.256	333
405	1101.380	12.679	333
406	1099.023	12.274	333
407	1096.635	11.760	333
408	1094.258	11.196	333
409	1091.940	10.854	333
410	1089.662	10.311	333
411	1087.205	9.891	333
412	1084.966	9.411	333
413	1086.783	12.357	333
414	1091.467	13.310	333
415	1096.170	14.165	333
416	1100.903	15.135	333
417	1105.635	16.108	333
418	1110.335	16.975	333
419	1115.075	17.906	333
420	1119.289	21.236	333
421	1116.986	20.832	333
422	1114.642	20.370	333
423	1112.277	19.750	333
424	1109.933	19.290	333
425	1107.479	18.861	333
426	1105.135	18.403	333
427	1102.800	17.896	333
428	1100.455	17.440	333
429	1098.100	17.035	333
430	1095.774	16.480	333
431	1093.339	15.958	333
432	1091.043	15.516	333
433	1088.677	15.165	333
434	1086.292	14.654	333
435	1083.905	14.146	333
436	1085.799	16.951	333
437	1090.520	17.962	333
438	1095.249	18.926	333
439	1099.957	19.735	333
440	1104.726	20.767	333
441	1109.512	21.704	333
442	1114.138	22.665	333
443	1113.734	24.979	333
444	1111.342	24.509	333
445	1108.941	24.089	333
446	1106.658	23.590	333
447	1104.276	23.072	333
448	1101.923	22.666	333
449	1099.490	22.141	333

450	1097.147	21.686	333
451	1094.744	21.273	333
452	1092.410	20.770	333
453	1090.067	20.318	333
454	1087.672	19.857	333
455	1085.298	19.298	333
456	1082.944	18.899	333
457	1084.877	21.764	333
458	1089.563	22.664	333
459	1094.338	23.638	333
460	1099.063	24.606	333
461	1103.797	25.527	333
462	1108.340	26.364	333
463	1112.963	27.324	333
464	1112.439	29.719	333
465	1110.348	29.308	333
466	1108.058	28.858	333
467	1105.678	28.339	333
468	1103.277	27.923	333
469	1100.986	27.476	333
470	1098.496	26.992	333
471	1096.155	26.538	333
472	1093.833	25.984	333
473	1091.451	25.472	333
474	1089.050	25.061	333
475	1086.767	24.570	333
476	1084.356	24.211	333
477	1082.002	23.552	333
478	1083.864	26.508	333
479	1088.587	27.468	333
480	1093.337	28.281	333
481	1098.107	29.257	333
482	1102.907	30.348	333
483	1107.606	31.163	333
484	1103.982	33.229	333
485	1102.408	32.642	333
486	1100.009	32.227	333
487	1097.581	31.703	333
488	1095.242	31.249	333
489	1092.852	30.786	333
490	1090.482	30.224	333
491	1088.133	29.824	333
492	1085.793	29.374	333
493	1083.502	28.934	333
494	1081.122	28.426	333
495	1083.011	31.231	333
496	1087.789	32.148	333
497	1092.357	33.083	333
498	1097.133	34.008	333
499	1100.753	35.721	333
500	1099.347	35.447	333
501	1097.614	35.176	333
502	1097.787	36.638	333
503	1096.650	38.900	333
504	1096.327	41.124	333
505	1094.568	34.584	333
506	1092.229	34.011	333
507	1089.931	33.226	333
508	1087.331	33.945	333
509	1085.141	32.601	333
510	1082.621	32.767	333
511	1080.307	32.268	333
512	1069.749	35.927	333
513	1072.086	36.423	333
514	1072.554	34.074	333
515	1074.769	34.495	333
516	1067.808	33.118	333
517	1063.090	32.176	333
518	1058.458	30.877	333
519	1056.820	29.582	333
520	1058.872	28.839	333
521	1061.353	29.356	333
522	1063.693	29.796	333
523	1065.982	30.227	333
524	1068.431	30.638	333
525	1070.761	31.131	333
526	1073.032	31.665	333
527	1075.408	32.167	333
528	1077.863	32.130	333
529	1064.086	27.428	333
530	1068.758	28.361	333
531	1073.569	29.377	333
532	1078.290	30.328	333
533	1062.886	24.761	333
534	1064.571	25.130	333
535	1066.913	25.571	333
536	1069.185	26.104	333
537	1071.545	26.447	333
538	1073.967	27.010	333
539	1076.368	27.415	333
540	1078.689	27.961	333
541	1065.043	22.621	333
542	1069.709	23.605	333
543	1074.484	24.562	333
544	1079.248	25.573	333
545	1063.162	19.722	333
546	1065.568	20.382	333
547	1067.821	20.755	333
548	1070.195	21.307	333
549	1072.498	21.691	333
550	1074.982	22.214	333
551	1077.306	22.760	333
552	1079.767	23.125	333
553	1056.447	15.868	333
554	1061.190	17.015	333

555	1065.912	18.005	333
556	1070.601	18.890	333
557	1075.379	19.848	333
558	1080.108	20.799	333
559	1080.567	18.392	333
560	1078.272	17.955	333
561	1075.936	17.459	333
562	1073.541	17.005	333
563	1071.156	16.501	333
564	1068.869	16.017	333
565	1066.474	15.566	333
566	1064.138	15.074	333
567	1061.692	14.615	333
568	1059.305	14.117	333
569	1056.968	13.629	333
570	1054.512	13.224	333
571	1052.215	12.797	333
572	1051.805	15.005	333
573	1049.837	12.252	333
574	1047.530	11.877	333
575	1047.137	13.725	333
576	1045.161	11.284	333
577	1042.320	13.252	333
578	1042.813	10.852	333
579	1043.387	8.570	333
580	1048.035	9.426	333
581	1052.721	10.347	333
582	1057.467	11.230	333
583	1062.134	12.257	333
584	1066.877	13.148	333
585	1071.592	14.194	333
586	1076.434	15.112	333
587	1043.731	6.141	333
588	1046.080	6.574	333
589	1048.570	7.086	333
590	1050.860	7.561	333
591	1053.159	7.987	333
592	1055.490	8.524	333
593	1057.938	8.980	333
594	1060.277	9.469	333
595	1062.625	9.909	333
596	1064.964	10.399	333
597	1067.362	10.849	333
598	1069.710	11.292	333
599	1072.206	11.763	333
600	1074.494	12.249	333
601	1076.822	12.795	333
602	1079.220	13.251	333
603	1049.016	4.676	333
604	1053.637	5.688	333
605	1058.397	6.521	333
606	1063.127	7.509	333
607	1067.825	8.392	333
608	1072.552	9.387	333
609	1077.289	10.338	333
610	1058.846	4.113	333
611	1061.237	4.611	333
612	1063.637	5.060	333
613	1065.919	5.592	333
614	1068.318	6.043	333
615	1070.658	6.537	333
616	1073.098	7.049	333
617	1075.457	7.444	333
618	1077.797	7.940	333
619	1080.176	8.496	333
620	1065.361	3.047	333
621	1068.803	3.745	333
622	1073.544	4.692	333
623	1078.285	5.642	333
624	1081.116	16.054	333
625	1081.506	13.739	333
626	1082.026	11.291	333
627	1082.425	8.925	333
628	1082.944	6.478	333
629	1066.963	0.854	333
630	1069.256	1.338	333
631	1071.667	1.739	333
632	1074.071	2.454	333
633	1076.341	2.780	333
634	1078.802	3.194	333
635	1081.134	3.742	333
636	1083.584	4.209	333
637	1069.740	-0.961	333
638	1074.486	-0.013	333
639	1079.290	0.898	333
640	1083.893	1.774	333
641	1070.244	-3.360	333
642	1072.648	-2.907	333
643	1074.991	-2.411	333
644	1077.335	-1.916	333
645	1079.678	-1.419	333
646	1082.081	-0.962	333
647	1084.333	-0.533	333
648	1084.833	-2.879	333
649	1080.185	-3.817	333
650	1075.477	-4.709	333
651	1070.646	-5.776	333
652	1069.033	-8.781	333
653	1071.100	-8.184	333
654	1073.496	-7.681	333
655	1075.842	-7.186	333
656	1078.297	-6.721	333
657	1080.593	-6.234	333
658	1083.007	-5.826	333
659	1085.302	-5.337	333

660	1085.842	-7.623	333
661	1081.050	-8.640	333
662	1076.448	-9.565	333
663	1071.634	-10.473	333
664	1067.498	-11.666	333
665	1074.296	36.865	333

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CALPOST Version 5.2 Level 991104b

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24HR VISIBILITY

VISIB B _SN_F

(1/Mega-m)

YEAR	DAY	HR	RECEPTOR	COORDINATES (km)		TYPE	BEXT(Model)	BEXT(BKG)	BEXT(Total)	%CHANGE	F(RH)	Modeled Extinction by Species bxSO4	bxNO3	bxOC	bxEC	bxPMC	bxPMF
1998	91	23	372	1123.759	13.586	D	0.063	16.021	16.084	0.39	2.535	0.005	0.029	0.000	0.000	0.000	0.028
1998	92	23	101	1124.139	9.843	D	0.137	17.084	17.221	0.80	4.306	0.018	0.085	0.000	0.000	0.000	0.034
1998	93	23	372	1123.759	13.586	D	0.136	16.105	16.241	0.85	2.675	0.015	0.079	0.000	0.000	0.000	0.042
1998	94	23	372	1123.759	13.586	D	0.006	15.985	15.991	0.04	2.474	0.001	0.003	0.000	0.000	0.000	0.002
1998	95	23	100	1126.005	0.430	D	0.015	17.545	17.561	0.09	5.076	0.002	0.010	0.000	0.000	0.000	0.003
1998	96	23	504	1096.327	41.124	D	0.000	16.116	16.116	0.00	2.693	0.000	0.000	0.000	0.000	0.000	0.000
1998	97	23	1	1090.063	32.672	D	0.000	15.600	15.600	0.00	1.833	0.000	0.000	0.000	0.000	0.000	0.000
1998	98	23	464	1112.439	29.719	D	0.044	16.030	16.074	0.27	2.550	0.004	0.027	0.000	0.000	0.000	0.013
1998	99	23	372	1123.759	13.586	D	0.214	16.136	16.350	1.33	2.726	0.015	0.112	0.000	0.000	0.000	0.087
1998	100	23	504	1096.327	41.124	D	0.275	17.048	17.323	1.62	4.246	0.035	0.155	0.000	0.000	0.000	0.085
1998	101	23	373	1121.201	11.831	D	0.264	17.430	17.694	1.52	4.883	0.046	0.176	0.000	0.000	0.000	0.042
1998	102	23	170	1004.814	42.629	D	0.002	19.908	19.910	0.01	9.013	0.000	0.001	0.000	0.000	0.000	0.000
1998	103	23	216	1094.329	-25.642	D	0.076	18.842	18.918	0.40	7.237	0.010	0.052	0.000	0.000	0.000	0.014
1998	104	23	101	1124.139	9.843	D	0.095	17.164	17.259	0.55	4.440	0.007	0.050	0.000	0.000	0.000	0.038
1998	105	23	311	1125.767	-1.263	D	0.003	16.311	16.314	0.02	3.019	0.000	0.002	0.000	0.000	0.000	0.001
1998	106	23	372	1123.759	13.586	D	0.022	15.721	15.743	0.14	2.036	0.002	0.008	0.000	0.000	0.000	0.012
1998	107	23	504	1096.327	41.124	D	0.021	15.921	15.942	0.13	2.368	0.003	0.009	0.000	0.000	0.000	0.009
1998	108	23	170	1004.814	42.629	D	0.000	19.329	19.329	0.00	8.048	0.000	0.000	0.000	0.000	0.000	0.000
1998	109	23	1	1090.063	32.672	D	0.000	15.959	15.959	0.00	2.431	0.000	0.000	0.000	0.000	0.000	0.000
1998	110	23	1	1090.063	32.672	D	0.000	16.539	16.539	0.00	3.398	0.000	0.000	0.000	0.000	0.000	0.000
1998	111	23	372	1123.759	13.586	D	0.003	15.773	15.777	0.02	2.122	0.000	0.001	0.000	0.000	0.000	0.002
1998	112	23	256	1117.517	-18.599	D	0.000	15.718	15.718	0.00	2.030	0.000	0.000	0.000	0.000	0.000	0.000
1998	113	23	311	1125.767	-1.263	D	0.001	18.752	18.753	0.00	7.087	0.000	0.000	0.000	0.000	0.000	0.000
1998	114	23	100	1126.005	0.430	D	0.022	16.145	16.167	0.14	2.741	0.002	0.010	0.000	0.000	0.000	0.010
1998	115	23	101	1124.139	9.843	D	0.087	16.485	16.572	0.53	3.308	0.010	0.046	0.000	0.000	0.000	0.031
1998	116	23	464	1112.439	29.719	D	0.099	16.596	16.694	0.59	3.493	0.015	0.050	0.000	0.000	0.000	0.033
1998	117	23	420	1119.289	21.236	D	0.095	16.263	16.358	0.58	2.939	0.015	0.043	0.000	0.000	0.000	0.036
1998	118	23	98	1096.696	-25.207	D	0.003	17.339	17.342	0.02	4.732	0.000	0.002	0.000	0.000	0.000	0.001
1998	119	23	372	1123.759	13.586	D	0.033	16.041	16.074	0.21	2.568	0.002	0.005	0.000	0.000	0.000	0.026
1998	120	23	202	1079.740	-26.187	D	0.292	19.834	20.126	1.47	8.891	0.050	0.190	0.000	0.000	0.000	0.052
1998	121	23	187	1037.943	-19.618	D	0.150	19.922	20.072	0.75	9.037	0.019	0.112	0.000	0.000	0.000	0.019
1998	122	23	170	1004.814	42.629	D	0.008	20.181	20.189	0.04	9.469	0.002	0.004	0.000	0.000	0.000	0.002
1998	123	23	101	1124.139	9.843	D	0.045	16.783	16.828	0.27	3.805	0.008	0.020	0.000	0.000	0.000	0.017
1998	124	23	311	1125.767	-1.263	D	0.028	16.945	16.972	0.16	4.074	0.006	0.013	0.000	0.000	0.000	0.008
1998	125	23	311	1125.767	-1.263	D	0.009	16.918	16.928	0.06	4.031	0.002	0.005	0.000	0.000	0.000	0.003
1998	126	23	311	1125.767	-1.263	D	0.005	16.677	16.682	0.03	3.628	0.001	0.003	0.000	0.000	0.000	0.001
1998	127	23	420	1119.289	21.236	D	0.001	15.841	15.843	0.01	2.236	0.000	0.000	0.000	0.000	0.000	0.001
1998	128	23	101	1124.139	9.843	D	0.116	16.475	16.591	0.70	3.292	0.016	0.063	0.000	0.000	0.000	0.036
1998	129	23	100	1126.005	0.430	D	0.284	17.992	18.276	1.58	5.819	0.049	0.180	0.000	0.000	0.000	0.055
1998	130	23	101	1124.139	9.843	D	0.131	17.172	17.303	0.76	4.453	0.027	0.073	0.000	0.000	0.000	0.032
1998	131	23	101	1124.139	9.843	D	0.135	16.855	16.990	0.80	3.924	0.025	0.073	0.000	0.000	0.000	0.037
1998	132	23	597	1067.362	10.849	D	0.100	18.131	18.231	0.55	6.052	0.022	0.064	0.000	0.000	0.000	0.014
1998	133	23	101	1124.139	9.843	D	0.006	16.574	16.580	0.04	3.457	0.001	0.003	0.000	0.000	0.000	0.002
1998	134	23	464	1112.439	29.719	D	0.001	16.528	16.529	0.00	3.380	0.000	0.000	0.000	0.000	0.000	0.000
1998	135	23	1	1090.063	32.672	D	0.000	17.773	17.773	0.00	5.455	0.000	0.000	0.000	0.000	0.000	0.000
1998	136	23	100	1126.005	0.430	D	0.023	16.002	16.025	0.14	2.503	0.002	0.008	0.000	0.000	0.000	0.014
1998	137	23	100	1126.005	0.430	D	0.037	16.957	16.994	0.22	4.095	0.004	0.024	0.000	0.000	0.000	0.010
1998	138	23	100	1126.005	0.430	D	0.038	17.250	17.288	0.22	4.584	0.003	0.025	0.000	0.000	0.000	0.010
1998	139	23	372	1123.759	13.586	D	0.019	16.096	16.115	0.12	2.659	0.001	0.010	0.000	0.000	0.000	0.007
1998	140	23	100	1126.005	0.430	D	0.018	15.563	15.581	0.12	1.771	0.001	0.008	0.000	0.000	0.000	0.008
1998	141	23	372	1123.759	13.586	D	0.007	15.732	15.739	0.04	2.054	0.001	0.002	0.000	0.000	0.000	0.004
1998	142	23	504	1096.327	41.124	D	0.028	16.226	16.254	0.17	2.877	0.004	0.011	0.000	0.000	0.000	0.013
1998	143	23	597	1067.362	10.849	D	0.007	20.894	20.902	0.04	10.657	0.002	0.004	0.000	0.000	0.000	0.001
1998	144	23	170	1004.814	42.629	D	0.001	19.884	19.885	0.01	8.973	0.000	0.001	0.000	0.000	0.000	0.000
1998	145	23	1	1090.063	32.672	D	0.000	16.527	16.527	0.00	3.379	0.000	0.000	0.000	0.000	0.000	0.000
1998	146	23	499	1100.753	35.721	D	0.024	16.211	16.235	0.15	2.852	0.003	0.012	0.000	0.000	0.000	0.009
1998	147	23	499	1100.753	35.721	D	0.071	17.732	17.803	0.40	5.387	0.013	0.041	0.000	0.000	0.000	0.017
1998	148	23	502	1097.787	36.638	D	0.007	18.189	18.196	0.04	6.148	0.001	0.003	0.000	0.000	0.000	0.003
1998	149	23	499	1100.753	35.721	D	0.078	16.631	16.709	0.47	3.552	0.010	0.044	0.000	0.000	0.000	0.024
1998	150	23	464	1112.439	29.719	D	0.012	16.253	16.264	0.07	2.922	0.002	0.004	0.000	0.000	0.000	0.005
1998	151	23	464	1112.439	29.719	D	0.025	15.864	15.890	0.16	2.274	0.004	0.009	0.000	0.000	0.000	0.012
1998	152	23	100	1126.005	0.430	D	0.004	16.371	16.375	0.03	3.118	0.001	0.002	0.000	0.000	0.000	0.002
1998	153	23	499	1100.753	35.721	D	0.135	16.351	16.486	0.82	3.086	0.010	0.051	0.000	0.000	0.000	0.074
1998	154	23	100	1126.005	0.430	D	0.002	16.983	16.985	0.01	4.139	0.000	0.001	0.000	0.000	0.000	0.001
1998	155	23	100	1126.005	0.430	D	0.003	16.709	16.712	0.02	3.682	0.000	0.002	0.000	0.000	0.000	0.001
1998	156	23	100	1126.005	0.430	D	0.001	16.131	16.132	0.00	2.719	0.000	0.000	0.000	0.000	0.000	0.000
1998	157	23	100	1126.005	0.430	D	0.001	18.202	18.203	0.01	6.171	0.000	0.001	0.000	0.000	0.000	0.000
1998	158	23	1	1090.063	32.672	D	0.000	16.633	16.633	0.00	3.555	0.000	0.000	0.000	0.000	0.000	0.000
1998	159	23	100	1126.005	0.430	D	0.002	16.874	16.876	0.01	3.957	0.000	0.001	0.000	0.000	0.000	0.001
1998	160	23	101	1124.139	9.843	D	0.010	16.906	16.916	0.06	4.010	0.002	0.005	0.000	0.000	0.000	0.003
1998	161	23	100	1126.005	0.430	D	0.001	18.127	18.127	0.01	6.044	0.000	0.001	0.000	0.000	0.000	0.000
1998	162	23	100	1126.005	0.430	D	0.004	16.773	16.777	0.03	3.788	0.000	0.002	0.000	0.000	0.000	0.002
1998	163	23	1	1090.063	32.672	D	0.000	16.004	16.004	0.00	2.507	0.000	0.000	0.000	0.000	0.000	0.000
1998	164	23	1	1090.063	32.672	D	0.000	15.946	15.946	0.00	2.409	0.000	0.000	0.000	0.000	0.000	0.000
1998	165	23	420	1119.289	21.236	D	0.000	16.299	16.300	0.00	2.999	0.000	0.000	0.000	0.000	0.000	0.000
1998	166	23	420	1119.289	21.236	D	0.005	16.067	16.071	0.03	2.611	0.001	0.002	0.000	0.000	0.000	0.002
1998	167	23	1	1090.063	32.672	D	0.000	15.796	15.796	0.00	2.160	0.000	0.000	0.000	0.000	0.000	0.000
1998	168	23	1	1090.063	32.672	D	0.000	16.089	16.089	0.00	2.648	0.000	0.000	0.000	0.000	0.000	0.000
1998	169	23	1	1090.063	32.672	D	0.000	15.957	15.957	0.00	2.428	0.000	0.000	0.000	0.000	0.000	0.000
1998	170	23	1	1090.063	32.672	D	0.000	15.901	15.901	0.00	2.335	0.000	0.000	0.000	0.000	0.000	0.000
1998	171	23	1	1090.063	32.672	D	0.000	15.897	15.897	0.00	2.328	0.000	0.000	0.000	0.000	0.000	0.000
1998	172	23	100	1126.005	0.430	D	0.000	16.134	16.135	0.00	2.724	0.000	0.000	0.000	0.000	0.000	0.000

1998 173 23	1	1090.063	32.672	D	0.000	16.423	16.423	0.00	3.204	0.000	0.000	0.000	0.000	0.000	0.000
1998 174 23	420	1119.289	21.236	D	0.005	16.424	16.429	0.03	3.207	0.001	0.002	0.000	0.000	0.000	0.003
1998 175 23	464	1112.439	29.719	D	0.001	17.031	17.032	0.00	4.219	0.000	0.000	0.000	0.000	0.000	0.000
1998 176 23	420	1119.289	21.236	D	0.009	16.363	16.372	0.06	3.104	0.001	0.004	0.000	0.000	0.000	0.004
1998 177 23	101	1124.139	9.843	D	0.014	16.231	16.246	0.09	2.885	0.002	0.008	0.000	0.000	0.000	0.004
1998 178 23	100	1126.005	0.430	D	0.001	15.918	15.919	0.00	2.364	0.000	0.000	0.000	0.000	0.000	0.000
1998 179 23	1	1090.063	32.672	D	0.000	15.730	15.730	0.00	2.049	0.000	0.000	0.000	0.000	0.000	0.000
1998 180 23	1	1090.063	32.672	D	0.000	15.936	15.936	0.00	2.394	0.000	0.000	0.000	0.000	0.000	0.000
1998 181 23	1	1090.063	32.672	D	0.000	17.995	17.995	0.00	5.825	0.000	0.000	0.000	0.000	0.000	0.000
1998 182 23	372	1123.759	13.586	D	0.000	17.336	17.336	0.00	4.726	0.000	0.000	0.000	0.000	0.000	0.000
1998 183 23	1	1090.063	32.672	D	0.000	17.513	17.513	0.00	5.021	0.000	0.000	0.000	0.000	0.000	0.000
1998 184 23	464	1112.439	29.719	D	0.001	21.612	21.613	0.00	11.853	0.000	0.000	0.000	0.000	0.000	0.000
1998 185 23	420	1119.289	21.236	D	0.000	18.855	18.855	0.00	7.258	0.000	0.000	0.000	0.000	0.000	0.000
1998 186 23	504	1096.327	41.124	D	0.001	17.388	17.389	0.01	4.813	0.000	0.001	0.000	0.000	0.000	0.000
1998 187 23	464	1112.439	29.719	D	0.039	18.145	18.184	0.22	6.075	0.008	0.024	0.000	0.000	0.000	0.007
1998 188 23	31	1116.536	23.118	D	0.000	17.865	17.865	0.00	5.609	0.000	0.000	0.000	0.000	0.000	0.000
1998 189 23	1	1090.063	32.672	D	0.000	17.732	17.732	0.00	5.387	0.000	0.000	0.000	0.000	0.000	0.000
1998 190 23	1	1090.063	32.672	D	0.000	15.873	15.873	0.00	2.288	0.000	0.000	0.000	0.000	0.000	0.000
1998 191 23	1	1090.063	32.672	D	0.000	16.162	16.162	0.00	2.769	0.000	0.000	0.000	0.000	0.000	0.000
1998 192 23	464	1112.439	29.719	D	0.030	17.604	17.634	0.17	5.174	0.007	0.014	0.000	0.000	0.000	0.009
1998 193 23	504	1096.327	41.124	D	0.009	17.243	17.252	0.05	4.571	0.002	0.004	0.000	0.000	0.000	0.003
1998 194 23	464	1112.439	29.719	D	0.006	16.054	16.060	0.04	2.590	0.001	0.003	0.000	0.000	0.000	0.003
1998 195 23	504	1096.327	41.124	D	0.026	17.547	17.573	0.15	5.079	0.004	0.016	0.000	0.000	0.000	0.005
1998 196 23	1	1090.063	32.672	D	0.000	17.683	17.683	0.00	5.304	0.000	0.000	0.000	0.000	0.000	0.000
1998 197 23	1	1090.063	32.672	D	0.000	16.757	16.757	0.00	3.762	0.000	0.000	0.000	0.000	0.000	0.000
1998 198 23	1	1090.063	32.672	D	0.000	16.591	16.591	0.00	3.486	0.000	0.000	0.000	0.000	0.000	0.000
1998 199 23	464	1112.439	29.719	D	0.003	17.648	17.651	0.02	5.247	0.000	0.001	0.000	0.000	0.000	0.001
1998 200 23	4	1109.871	31.743	D	0.046	16.344	16.391	0.28	3.074	0.009	0.018	0.000	0.000	0.000	0.020
1998 201 23	101	1124.139	9.843	D	0.132	16.289	16.421	0.81	2.982	0.024	0.070	0.000	0.000	0.000	0.038
1998 202 23	1	1090.063	32.672	D	0.000	15.563	15.563	0.00	1.771	0.000	0.000	0.000	0.000	0.000	0.000
1998 203 23	1	1090.063	32.672	D	0.000	15.681	15.681	0.00	1.968	0.000	0.000	0.000	0.000	0.000	0.000
1998 204 23	1	1090.063	32.672	D	0.000	16.600	16.600	0.00	3.499	0.000	0.000	0.000	0.000	0.000	0.000
1998 205 23	1	1090.063	32.672	D	0.000	16.277	16.277	0.00	2.962	0.000	0.000	0.000	0.000	0.000	0.000
1998 206 23	1	1090.063	32.672	D	0.000	17.294	17.294	0.00	4.657	0.000	0.000	0.000	0.000	0.000	0.000
1998 207 23	311	1125.767	-1.263	D	0.000	15.545	15.545	0.00	1.741	0.000	0.000	0.000	0.000	0.000	0.000
1998 208 23	372	1123.759	13.586	D	0.000	15.768	15.768	0.00	2.114	0.000	0.000	0.000	0.000	0.000	0.000
1998 209 23	1	1090.063	32.672	D	0.000	15.749	15.749	0.00	2.081	0.000	0.000	0.000	0.000	0.000	0.000
1998 210 23	1	1090.063	32.672	D	0.000	15.848	15.848	0.00	2.247	0.000	0.000	0.000	0.000	0.000	0.000
1998 211 23	1	1090.063	32.672	D	0.000	16.378	16.378	0.00	3.131	0.000	0.000	0.000	0.000	0.000	0.000
1998 212 23	464	1112.439	29.719	D	0.001	16.017	16.018	0.00	2.529	0.000	0.000	0.000	0.000	0.000	0.000
1998 213 23	372	1123.759	13.586	D	0.000	16.043	16.043	0.00	2.572	0.000	0.000	0.000	0.000	0.000	0.000
1998 214 23	100	1126.005	0.430	D	0.003	15.512	15.516	0.02	1.687	0.000	0.001	0.000	0.000	0.000	0.002
1998 215 23	100	1126.005	0.430	D	0.000	15.711	15.711	0.00	2.019	0.000	0.000	0.000	0.000	0.000	0.000
1998 216 23	1	1090.063	32.672	D	0.000	15.690	15.690	0.00	1.983	0.000	0.000	0.000	0.000	0.000	0.000
1998 217 23	1	1090.063	32.672	D	0.000	17.258	17.258	0.00	4.597	0.000	0.000	0.000	0.000	0.000	0.000
1998 218 23	1	1090.063	32.672	D	0.000	16.232	16.232	0.00	2.887	0.000	0.000	0.000	0.000	0.000	0.000
1998 219 23	1	1090.063	32.672	D	0.000	15.613	15.613	0.00	1.855	0.000	0.000	0.000	0.000	0.000	0.000
1998 220 23	1	1090.063	32.672	D	0.000	15.769	15.769	0.00	2.116	0.000	0.000	0.000	0.000	0.000	0.000
1998 221 23	100	1126.005	0.430	D	0.000	16.348	16.348	0.00	3.080	0.000	0.000	0.000	0.000	0.000	0.000
1998 222 23	100	1126.005	0.430	D	0.015	16.150	16.165	0.10	2.750	0.002	0.007	0.000	0.000	0.000	0.006
1998 223 23	100	1126.005	0.430	D	0.000	15.964	15.964	0.00	2.440	0.000	0.000	0.000	0.000	0.000	0.000
1998 224 23	1	1090.063	32.672	D	0.000	15.924	15.924	0.00	2.374	0.000	0.000	0.000	0.000	0.000	0.000
1998 225 23	1	1090.063	32.672	D	0.000	15.825	15.825	0.00	2.209	0.000	0.000	0.000	0.000	0.000	0.000
1998 226 23	1	1090.063	32.672	D	0.000	17.017	17.017	0.00	4.194	0.000	0.000	0.000	0.000	0.000	0.000
1998 227 23	1	1090.063	32.672	D	0.000	15.889	15.889	0.00	2.315	0.000	0.000	0.000	0.000	0.000	0.000
1998 228 23	1	1090.063	32.672	D	0.000	16.017	16.017	0.00	2.528	0.000	0.000	0.000	0.000	0.000	0.000
1998 229 23	372	1123.759	13.586	D	0.009	15.906	15.915	0.06	2.343	0.001	0.004	0.000	0.000	0.000	0.004
1998 230 23	372	1123.759	13.586	D	0.045	15.991	16.037	0.28	2.485	0.006	0.018	0.000	0.000	0.000	0.021
1998 231 23	101	1124.139	9.843	D	0.109	16.312	16.421	0.67	3.020	0.014	0.064	0.000	0.000	0.000	0.031
1998 232 23	101	1124.139	9.843	D	0.010	15.855	15.865	0.06	2.258	0.001	0.004	0.000	0.000	0.000	0.005
1998 233 23	464	1112.439	29.719	D	0.034	15.923	15.957	0.21	2.371	0.005	0.011	0.000	0.000	0.000	0.018
1998 234 23	101	1124.139	9.843	D	0.039	16.010	16.049	0.24	2.516	0.006	0.015	0.000	0.000	0.000	0.018
1998 235 23	372	1123.759	13.586	D	0.001	16.584	16.585	0.01	3.473	0.000	0.000	0.000	0.000	0.000	0.000
1998 236 23	372	1123.759	13.586	D	0.002	16.961	16.963	0.01	4.102	0.000	0.001	0.000	0.000	0.000	0.001
1998 237 23	1	1090.063	32.672	D	0.000	16.138	16.138	0.00	2.729	0.000	0.000	0.000	0.000	0.000	0.000
1998 238 23	100	1126.005	0.430	D	0.001	16.559	16.560	0.00	3.432	0.000	0.000	0.000	0.000	0.000	0.000
1998 239 23	100	1126.005	0.430	D	0.000	15.821	15.821	0.00	2.201	0.000	0.000	0.000	0.000	0.000	0.000
1998 240 23	256	1117.517	-18.599	D	0.000	15.688	15.688	0.00	1.980	0.000	0.000	0.000	0.000	0.000	0.000
1998 241 23	1	1090.063	32.672	D	0.000	16.922	16.922	0.00	4.036	0.000	0.000	0.000	0.000	0.000	0.000
1998 242 23	1	1090.063	32.672	D	0.000	16.949	16.949	0.00	4.081	0.000	0.000	0.000	0.000	0.000	0.000
1998 243 23	1	1090.063	32.672	D	0.000	16.292	16.292	0.00	2.987	0.000	0.000	0.000	0.000	0.000	0.000
1998 244 23	1	1090.063	32.672	D	0.000	16.445	16.445	0.00	3.242	0.000	0.000	0.000	0.000	0.000	0.000
1998 245 23	1	1090.063	32.672	D	0.000	16.049	16.049	0.00	2.581	0.000	0.000	0.000	0.000	0.000	0.000
1998 246 23	1	1090.063	32.672	D	0.000	16.294	16.294	0.00	2.991	0.000	0.000	0.000	0.000	0.000	0.000
1998 247 23	1	1090.063	32.672	D	0.000	15.885	15.885	0.00	2.308	0.000	0.000	0.000	0.000	0.000	0.000
1998 248 23	1	1090.063	32.672	D	0.000	16.082	16.082	0.00	2.637	0.000	0.000	0.000	0.000	0.000	0.000
1998 249 23	1	1090.063	32.672	D	0.000	16.103	16.103	0.00	2.671	0.000	0.000	0.000	0.000	0.000	0.000
1998 250 23	1	1090.063	32.672	D	0.000	15.864	15.864	0.00	2.273	0.000	0.000	0.000	0.000	0.000	0.000
1998 251 23	1	1090.063	32.672	D	0.000	15.724	15.724	0.00	2.040	0.000	0.000	0.000	0.000	0.000	0.000
1998 252 23	1	1090.063	32.672	D	0.000	15.636	15.636	0.00	1.893	0.000	0.000	0.000	0.000	0.000	0.000
1998 253 23	372	1123.759	13.586	D	0.016	16.235	16.251	0.10	2.892	0.001	0.007	0.000	0.000	0.000	0.008
1998 254 23	372	1123.759	13.586	D	0.003	16.146	16.149	0.02	2.744	0.000	0.002	0.000	0.000	0.000	0.001
1998 255 23	1	1090.063	32.672	D	0.000	16.210	16.210	0.00	2.850	0.000	0.000	0.000	0.000	0.000	0.000
1998 256 23	1	1090.063	32.672	D	0.000	16.637	16.637	0.00	3.562	0.000	0.000	0.000	0.000	0.000	0.000
1998 257 23	256	1117.517	-18.599	D	0.000	15.977	15.977	0.00	2.461	0.000	0.000	0.000	0.000	0.000	0.000
1998 258 23	100	1126.005	0.430	D	0.001	15.439	15.440	0.01	1.565	0.000	0.000	0.000	0.000	0.000	0.001
1998 259 23	101	1124.139	9.843	D	0.009	16.090	16.099	0.06	2.650	0.001	0.005	0.000	0.000	0.000	0.003
1998 260 23	1	1090.063	32.672	D	0.000	16.693	16.693	0.00	3.655	0.000	0.000	0.000	0.000	0.000	0.000
1998 261 23	420	1119.289	21.236	D	0.000	18.906	18.906	0.00	7.343	0.000	0.000	0.000	0.000	0.000	0.000
1998 262 23	1	1090.063	32.672	D	0.000	15.965	15.965	0.00	2.441	0.000	0.000	0.000	0.000	0.000	0.000
1998 263 23	372	1123.759	13.586	D	0.187	16.613	16.800	1.12	3.522	0.013	0.099	0.000	0.000	0.000	0.074
1998 264 23	311	1125.767	-1.263	D	0.005	16.840	16.845	0.03	3.900	0.000	0.003	0.000	0.000	0.000	0.001
1998 265 23	1	1090.063	32.672	D	0.000	16.594	16.594	0.00	3.490	0.000	0.000	0.000	0.000	0.000	0.000
1998 266 23	372	1123.759	13.586	D	0.014	16.425	16.440	0.09	3.209	0.001	0.007	0.000	0.000	0.000	0.006
1998 267 23	256	1117.517	-18.599	D	0.001	18.686	18.687	0.01	6.976	0.000	0.001	0.000	0.000	0.000	0.000
1998 268 23	1	1090.063	32.672	D	0.000	16.617	16.617	0.00	3.528	0.000	0.000	0.000	0.000	0.000	0.000
1998 269 23	1	1090.063	32.672	D	0.000	16.043	16.043	0.00	2.571	0.000	0.000	0.000	0.000	0.000	0.000
1998 270 23	100	1126.005	0.430	D	0.006	16.002	16.008	0.04	2.503	0.000	0.003	0.000	0.000	0.000	0.003
1998 271 23	1	1090.063	32.672	D	0.000	15.957	15.957	0.00	2.428	0.000	0.000	0.000	0.000	0.000	0.000
1998 272 23	1	1090.063	32.672	D	0.000	17.375	17.375	0.00	4.792	0.000	0.000	0.000	0.000	0.000	0.000
1998 273 23	1	1090.063	32.672	D	0.000	16.218	16.218	0.00	2.863	0.000	0.000	0.000	0.000	0.000	0.000
1998 274 23	311	1125.767	-1.263	D	0.000	16.487	16.487	0.00	3.312	0.000	0.000	0.000	0.000	0.000	0.000
1998 275 23	1	1090.063	32.672	D	0.000	16.667	16.667	0.00	3.611	0.000	0.000	0.000	0.000	0.000	0.000
1998 276 23	1	1090.063	32.672	D	0.000	17.006	17.006	0.00	4.177	0.000	0.000	0.000	0.000	0.000	0.000
1998 277 23	1	1090.063	32.672	D	0.000	16.387	16.387	0.00	3.145	0.000	0.000	0.000	0.000	0.000	0.000

1998	278	23	1	1090.063	32.672	D	0.000	16.457	16.457	0.00	3.262	0.000	0.000	0.000	0.000	0.000	0.000
1998	279	23	1	1090.063	32.672	D	0.000	17.281	17.281	0.00	4.635	0.000	0.000	0.000	0.000	0.000	0.000
1998	280	23	1	1090.063	32.672	D	0.000	16.891	16.891	0.00	3.985	0.000	0.000	0.000	0.000	0.000	0.000
1998	281	23	1	1090.063	32.672	D	0.000	17.396	17.396	0.00	4.827	0.000	0.000	0.000	0.000	0.000	0.000
1998	282	23	1	1090.063	32.672	D	0.000	19.062	19.062	0.00	7.604	0.000	0.000	0.000	0.000	0.000	0.000
1998	283	23	1	1090.063	32.672	D	0.000	19.488	19.488	0.00	8.314	0.000	0.000	0.000	0.000	0.000	0.000
1998	284	23	1	1090.063	32.672	D	0.000	18.386	18.386	0.00	6.476	0.000	0.000	0.000	0.000	0.000	0.000
1998	285	23	1	1090.063	32.672	D	0.000	17.730	17.730	0.00	5.383	0.000	0.000	0.000	0.000	0.000	0.000
1998	286	23	1	1090.063	32.672	D	0.000	19.838	19.838	0.00	8.897	0.000	0.000	0.000	0.000	0.000	0.000
1998	287	23	1	1090.063	32.672	D	0.000	16.800	16.800	0.00	3.834	0.000	0.000	0.000	0.000	0.000	0.000
1998	288	23	1	1090.063	32.672	D	0.000	16.450	16.450	0.00	3.249	0.000	0.000	0.000	0.000	0.000	0.000
1998	289	23	464	1112.439	29.719	D	0.017	19.422	19.440	0.09	8.204	0.002	0.011	0.000	0.000	0.000	0.005
1998	290	23	1	1090.063	32.672	D	0.000	19.315	19.315	0.00	8.026	0.000	0.000	0.000	0.000	0.000	0.000
1998	291	23	372	1123.759	13.586	D	0.001	17.806	17.807	0.00	5.511	0.000	0.000	0.000	0.000	0.000	0.000
1998	292	23	420	1119.289	21.236	D	0.165	17.759	17.924	0.93	5.432	0.012	0.064	0.000	0.000	0.000	0.088
1998	293	23	170	1004.814	42.629	D	0.039	17.999	18.038	0.22	5.832	0.004	0.029	0.000	0.000	0.000	0.006
1998	294	23	1	1090.063	32.672	D	0.000	21.726	21.726	0.00	12.044	0.000	0.000	0.000	0.000	0.000	0.000
1998	295	23	1	1090.063	32.672	D	0.000	20.596	20.596	0.00	10.159	0.000	0.000	0.000	0.000	0.000	0.000
1998	296	23	1	1090.063	32.672	D	0.000	24.913	24.913	0.00	17.355	0.000	0.000	0.000	0.000	0.000	0.000
1998	297	23	1	1090.063	32.672	D	0.000	22.389	22.389	0.00	13.148	0.000	0.000	0.000	0.000	0.000	0.000
1998	298	23	1	1090.063	32.672	D	0.000	22.458	22.458	0.00	13.263	0.000	0.000	0.000	0.000	0.000	0.000
1998	299	23	1	1090.063	32.672	D	0.000	22.257	22.257	0.00	12.928	0.000	0.000	0.000	0.000	0.000	0.000
1998	300	23	1	1090.063	32.672	D	0.000	20.524	20.524	0.00	10.039	0.000	0.000	0.000	0.000	0.000	0.000
1998	301	23	1	1090.063	32.672	D	0.000	17.448	17.448	0.00	4.913	0.000	0.000	0.000	0.000	0.000	0.000
1998	302	23	1	1090.063	32.672	D	0.000	19.195	19.195	0.00	7.824	0.000	0.000	0.000	0.000	0.000	0.000
1998	303	23	1	1090.063	32.672	D	0.000	22.259	22.259	0.00	12.932	0.000	0.000	0.000	0.000	0.000	0.000
1998	304	23	1	1090.063	32.672	D	0.000	22.694	22.694	0.00	13.656	0.000	0.000	0.000	0.000	0.000	0.000
1998	305	23	1	1090.063	32.672	D	0.000	24.016	24.016	0.00	15.860	0.000	0.000	0.000	0.000	0.000	0.000
1998	306	23	1	1090.063	32.672	D	0.000	25.054	25.054	0.00	17.590	0.000	0.000	0.000	0.000	0.000	0.000
1998	307	23	1	1090.063	32.672	D	0.000	22.951	22.951	0.00	14.085	0.000	0.000	0.000	0.000	0.000	0.000
1998	308	23	1	1090.063	32.672	D	0.000	24.772	24.772	0.00	17.121	0.000	0.000	0.000	0.000	0.000	0.000
1998	309	23	1	1090.063	32.672	D	0.000	20.949	20.949	0.00	10.748	0.000	0.000	0.000	0.000	0.000	0.000
1998	310	23	1	1090.063	32.672	D	0.000	21.647	21.647	0.00	11.912	0.000	0.000	0.000	0.000	0.000	0.000
1998	311	23	216	1094.329	-25.642	D	0.211	20.572	20.783	1.03	10.119	0.031	0.155	0.000	0.000	0.000	0.026
1998	312	23	189	1040.896	-28.418	D	0.011	20.658	20.669	0.05	10.263	0.001	0.009	0.000	0.000	0.000	0.001
1998	313	23	372	1123.759	13.586	D	0.009	19.343	19.352	0.05	8.071	0.001	0.006	0.000	0.000	0.000	0.002
1998	314	23	170	1004.814	42.629	D	0.000	19.616	19.616	0.00	8.527	0.000	0.000	0.000	0.000	0.000	0.000
1998	315	23	170	1004.814	42.629	D	0.005	22.366	22.372	0.02	13.111	0.001	0.004	0.000	0.000	0.000	0.001
1998	316	23	1	1090.063	32.672	D	0.000	22.525	22.525	0.00	13.375	0.000	0.000	0.000	0.000	0.000	0.000
1998	317	23	1	1090.063	32.672	D	0.000	22.523	22.523	0.00	13.372	0.000	0.000	0.000	0.000	0.000	0.000
1998	318	23	1	1090.063	32.672	D	0.000	25.195	25.195	0.00	17.824	0.000	0.000	0.000	0.000	0.000	0.000
1998	319	23	1	1090.063	32.672	D	0.000	22.681	22.681	0.00	13.635	0.000	0.000	0.000	0.000	0.000	0.000
1998	320	23	1	1090.063	32.672	D	0.000	20.488	20.488	0.00	9.980	0.000	0.000	0.000	0.000	0.000	0.000
1998	321	23	1	1090.063	32.672	D	0.000	18.875	18.875	0.00	7.292	0.000	0.000	0.000	0.000	0.000	0.000
1998	322	23	31	1116.536	23.118	D	0.000	17.509	17.509	0.00	5.015	0.000	0.000	0.000	0.000	0.000	0.000
1998	323	23	1	1090.063	32.672	D	0.000	23.129	23.129	0.00	14.382	0.000	0.000	0.000	0.000	0.000	0.000
1998	324	23	1	1090.063	32.672	D	0.000	23.251	23.251	0.00	14.585	0.000	0.000	0.000	0.000	0.000	0.000
1998	325	23	1	1090.063	32.672	D	0.000	19.029	19.029	0.00	7.549	0.000	0.000	0.000	0.000	0.000	0.000
1998	326	23	1	1090.063	32.672	D	0.000	20.571	20.571	0.00	10.118	0.000	0.000	0.000	0.000	0.000	0.000
1998	327	23	1	1090.063	32.672	D	0.000	20.605	20.605	0.00	10.175	0.000	0.000	0.000	0.000	0.000	0.000
1998	328	23	1	1090.063	32.672	D	0.000	18.413	18.413	0.00	6.522	0.000	0.000	0.000	0.000	0.000	0.000
1998	329	23	1	1090.063	32.672	D	0.000	22.119	22.119	0.00	12.698	0.000	0.000	0.000	0.000	0.000	0.000
1998	330	23	1	1090.063	32.672	D	0.000	19.005	19.005	0.00	7.509	0.000	0.000	0.000	0.000	0.000	0.000
1998	331	23	1	1090.063	32.672	D	0.000	20.579	20.579	0.00	10.132	0.000	0.000	0.000	0.000	0.000	0.000
1998	332	23	1	1090.063	32.672	D	0.000	20.920	20.920	0.00	10.701	0.000	0.000	0.000	0.000	0.000	0.000
1998	333	23	1	1090.063	32.672	D	0.000	20.561	20.561	0.00	10.101	0.000	0.000	0.000	0.000	0.000	0.000
1998	334	23	1	1090.063	32.672	D	0.000	21.452	21.452	0.00	11.586	0.000	0.000	0.000	0.000	0.000	0.000
1998	335	23	1	1090.063	32.672	D	0.000	18.883	18.883	0.00	7.305	0.000	0.000	0.000	0.000	0.000	0.000
1998	336	23	1	1090.063	32.672	D	0.000	17.905	17.905	0.00	5.676	0.000	0.000	0.000	0.000	0.000	0.000
1998	337	23	1	1090.063	32.672	D	0.000	18.118	18.118	0.00	6.031	0.000	0.000	0.000	0.000	0.000	0.000
1998	338	23	1	1090.063	32.672	D	0.000	16.331	16.331	0.00	3.052	0.000	0.000	0.000	0.000	0.000	0.000
1998	339	23	1	1090.063	32.672	D	0.000	17.664	17.664	0.00	5.273	0.000	0.000	0.000	0.000	0.000	0.000
1998	340	23	1	1090.063	32.672	D	0.000	16.443	16.443	0.00	3.238	0.000	0.000	0.000	0.000	0.000	0.000
1998	341	23	1	1090.063	32.672	D	0.000	20.155	20.155	0.00	9.424	0.000	0.000	0.000	0.000	0.000	0.000
1998	342	23	1	1090.063	32.672	D	0.000	17.701	17.701	0.00	5.335	0.000	0.000	0.000	0.000	0.000	0.000
1998	343	23	1	1090.063	32.672	D	0.000	20.574	20.574	0.00	10.123	0.000	0.000	0.000	0.000	0.000	0.000
1998	344	23	1	1090.063	32.672	D	0.000	21.822	21.822	0.00	12.204	0.000	0.000	0.000	0.000	0.000	0.000
1998	345	23	1	1090.063	32.672	D	0.000	24.430	24.430	0.00	16.550	0.000	0.000	0.000	0.000	0.000	0.000
1998	346	23	1	1090.063	32.672	D	0.000	24.781	24.781	0.00	17.134	0.000	0.000	0.000	0.000	0.000	0.000
1998	347	23	1	1090.063	32.672	D	0.000	22.281	22.281	0.00	12.969	0.000	0.000	0.000	0.000	0.000	0.000
1998	348	23	1	1090.063	32.672	D	0.000	16.122	16.122	0.00	2.704	0.000	0.000	0.000	0.000	0.000	0.000
1998	349	23	1	1090.063	32.672	D	0.000	22.151	22.151	0.00	12.752	0.000	0.000	0.000	0.000	0.000	0.000
1998	350	23	1	1090.063	32.672	D	0.000	22.339	22.339	0.00	13.065	0.000	0.000	0.000	0.000	0.000	0.000
1998	351	23	1	1090.063	32.672	D	0.000	16.246	16.246	0.00	2.911	0.000	0.000	0.000	0.000	0.000	0.000
1998	352	23	504	1096.327	41.124	D	0.048	15.566	15.615	0.31	1.777	0.002	0.016	0.000	0.000	0.000	0.030
1998	353	23	158	1008.817	21.229	D	0.109	15.202	15.311	0.72	1.169	0.002	0.026	0.000	0.000	0.000	0.081
1998	354	23	665	1074.296	36.865	D	0.098	15.260	15.359	0.64	1.267	0.003	0.032	0.000	0.000	0.000	0.063
1998	355	23	665	1074.296	36.865	D	0.018	17.721	17.740	0.10	5.369	0.001	0.008	0.000	0.000	0.000	0.010
1998	356	23	504	1096.327	41.124	D	0.006	16.631	16.637	0.04	3.551	0.000	0.004	0.000	0.000	0.000	0.002
1998	357	23	504	1096.327	41.124	D	0.000	18.225	18.225	0.00	6.209	0.000	0.000	0.000	0.000	0.000	0.000
1998	358	23	1	1090.063	32.672	D	0.000	21.352	21.352	0.00	11.420	0.000	0.000	0.000	0.000	0.000	0.000
1998	359	23	1	1090.063	32.672	D	0.000	23.148	23.148	0.00	14.413	0.000	0.000	0.000	0.000	0.000	0.000
1998	360	23	1	1090.063	32.672	D	0.000	17.615	17.615	0.00	5.191	0.000	0.000	0.000	0.000	0.000	0.000
1998	361	23	1	1090.063	32.672	D	0.000	21.936	21.936	0.00	12.393	0.000	0.000	0.000	0.000	0.000	0.000
1998	362	23	1	1090.063	32.672	D	0.000	17.291	17.291	0.00	4.652	0.000	0.000	0.000	0.000	0.000	0.000
1998	363	23	1	1090.063	32.672	D	0.000	21.251	21.251	0.00	11.252	0.000	0.000	0.000	0.000	0.000	0.000
1998	364	23	4	1109.871	31.743	D	0.000	20.790	20.790	0.00	10.483	0.000	0.000	0.000	0.000	0.000	0.000
1998	365	23	1	1090.063	32.672	D	0.000	18.632	18.632	0.00	6.887	0.000	0.000	0.000	0.000	0.000	0.000
1999	1	23	464	1112.439	29.719	D	0.050	17.777	17.827	0.28	5.461	0.007	0.034	0.000	0.000	0.000	0.009
1999	2	23	4	1109.871	31.743	D	1.166	19.451	20.617	6.00	8.252	0.152	0.739	0.000	0.000	0.000	0.275
1999	3	23	513	1072.086	36.423	D	0.910	20.965	21.875	4.34	10.776	0.094	0.656	0.000	0.000	0.000	0.159
1999	4	23	503	1096.650	38.900	D	0.399	20.965	21.364	1.90	10.776	0.048	0.293	0.000	0.000	0.000	0.058
1999	5	23	504	1096.327	41.124	D	0.036	23.245	23.280	0.15	14.574	0.005	0.028	0.000	0.000	0.000	0.003
1999	6	23	665	1074.296	36.865	D	0.010	21.361	21.371	0.05	11.435	0.002	0.007	0.000	0.000	0.000	0.001
1999	7	23	98	1096.696	-25.207	D	0.000	22.087	22.087	0.00	12.645	0.000	0.000	0.000	0.000	0.000	0.000
1999	8	23	1	1090.063	32.672	D	0.000	19.429	19.429	0.00	8.214	0.000	0.000	0.000	0.000	0.000	0.000
1999	9	23	1	1090.063	32.672	D	0.000	22.681	22.681	0.00	13.635	0.000	0.000	0.000	0.000	0.000	0.000
1999	10	23	1	1090.063	32.672	D	0.000	25.195	25.195	0.00	17.824	0.000	0.000	0.000	0.000	0.000	0.000
1999	11	23	1	1090.063	32.672	D	0.000	23.955	23.955	0.00	15.758	0.000	0.000	0.000	0.000	0.000	0.000
1999	12	23	1	1090.063	32.672	D	0.000	22.120	22.120	0.00	12.700	0.000	0.000	0.000	0.000	0.000	0.000
1999	13	23	1	1090.063	32.672	D	0.000	19.346	19.346	0.00	8.076	0.000	0.000	0.000	0.000	0.000	0.000
1999	14	23	1	1090.063	32.672	D	0.000	20.443	20.443	0.00	9.905	0.000	0.000	0.000	0.000	0.000	0.000
1999	15	23	1	1090.063	32.672	D	0.000	18.255	18.255	0.00	6.258	0.000	0.000	0.000	0.000	0.000	0.000
1999	16	23	1	1090.063	32.672	D	0.000	20.968	20.968	0.00	10.780	0.000	0.000	0.000	0.000	0.000	0.000
1999	17	23	1	1090.063	32.672	D	0.000	22.486	22.486	0.00	13.311	0.000	0.000	0.000	0.000	0.000	0.000

1999 18 23	1	1090.063	32.672	D	0.000	23.514	23.514	0.00	15.023	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1999 19 23	1	1090.063	32.672	D	0.000	23.795	23.795	0.00	15.492	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1999 20 23	1	1090.063	32.672	D	0.000	23.602	23.602	0.00	15.170	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1999 21 23	1	1090.063	32.672	D	0.000	18.451	18.451	0.00	6.584	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1999 22 23	1	1090.063	32.672	D	0.000	22.822	22.822	0.00	13.871	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1999 23 23	508	1087.331	33.945	D	0.877	19.482	20.359	4.50	8.304	0.075	0.494	0.000	0.000	0.000	0.309	
1999 24 23	513	1072.086	36.423	D	0.819	18.773	19.591	4.36	7.121	0.067	0.531	0.000	0.000	0.000	0.221	
1999 25 23	504	1096.327	41.124	D	0.047	17.963	18.009	0.26	5.771	0.006	0.028	0.000	0.000	0.000	0.013	
1999 26 23	1	1090.063	32.672	D	0.000	20.067	20.067	0.00	9.278	0.000	0.000	0.000	0.000	0.000	0.000	
1999 27 23	1	1090.063	32.672	D	0.000	17.409	17.409	0.00	4.849	0.000	0.000	0.000	0.000	0.000	0.000	
1999 28 23	1	1090.063	32.672	D	0.000	21.170	21.170	0.00	11.117	0.000	0.000	0.000	0.000	0.000	0.000	
1999 29 23	1	1090.063	32.672	D	0.000	20.278	20.278	0.00	9.631	0.000	0.000	0.000	0.000	0.000	0.000	
1999 30 23	1	1090.063	32.672	D	0.000	21.786	21.786	0.00	12.143	0.000	0.000	0.000	0.000	0.000	0.000	
1999 31 23	1	1090.063	32.672	D	0.000	20.242	20.242	0.00	9.569	0.000	0.000	0.000	0.000	0.000	0.000	
1999 32 23	1	1090.063	32.672	D	0.000	17.340	17.340	0.00	4.733	0.000	0.000	0.000	0.000	0.000	0.000	
1999 33 23	1	1090.063	32.672	D	0.000	18.239	18.239	0.00	6.231	0.000	0.000	0.000	0.000	0.000	0.000	
1999 34 23	1	1090.063	32.672	D	0.000	18.425	18.425	0.00	6.542	0.000	0.000	0.000	0.000	0.000	0.000	
1999 35 23	1	1090.063	32.672	D	0.000	20.275	20.275	0.00	9.626	0.000	0.000	0.000	0.000	0.000	0.000	
1999 36 23	1	1090.063	32.672	D	0.000	20.844	20.844	0.00	10.573	0.000	0.000	0.000	0.000	0.000	0.000	
1999 37 23	1	1090.063	32.672	D	0.000	20.769	20.769	0.00	10.448	0.000	0.000	0.000	0.000	0.000	0.000	
1999 38 23	1	1090.063	32.672	D	0.000	20.088	20.088	0.00	9.314	0.000	0.000	0.000	0.000	0.000	0.000	
1999 39 23	1	1090.063	32.672	D	0.000	20.736	20.736	0.00	10.393	0.000	0.000	0.000	0.000	0.000	0.000	
1999 40 23	1	1090.063	32.672	D	0.000	18.232	18.232	0.00	6.220	0.000	0.000	0.000	0.000	0.000	0.000	
1999 41 23	1	1090.063	32.672	D	0.000	17.881	17.881	0.00	5.634	0.000	0.000	0.000	0.000	0.000	0.000	
1999 42 23	1	1090.063	32.672	D	0.000	16.864	16.864	0.00	3.940	0.000	0.000	0.000	0.000	0.000	0.000	
1999 43 23	1	1090.063	32.672	D	0.000	15.400	15.400	0.00	1.501	0.000	0.000	0.000	0.000	0.000	0.000	
1999 44 23	1	1090.063	32.672	D	0.000	16.792	16.792	0.00	3.820	0.000	0.000	0.000	0.000	0.000	0.000	
1999 45 23	1	1090.063	32.672	D	0.000	16.864	16.864	0.00	3.940	0.000	0.000	0.000	0.000	0.000	0.000	
1999 46 23	1	1090.063	32.672	D	0.000	16.969	16.969	0.00	4.115	0.000	0.000	0.000	0.000	0.000	0.000	
1999 47 23	1	1090.063	32.672	D	0.000	21.151	21.151	0.00	11.085	0.000	0.000	0.000	0.000	0.000	0.000	
1999 48 23	1	1090.063	32.672	D	0.000	19.715	19.715	0.00	8.692	0.000	0.000	0.000	0.000	0.000	0.000	
1999 49 23	1	1090.063	32.672	D	0.000	20.870	20.870	0.00	10.616	0.000	0.000	0.000	0.000	0.000	0.000	
1999 50 23	1	1090.063	32.672	D	0.000	17.122	17.122	0.00	4.369	0.000	0.000	0.000	0.000	0.000	0.000	
1999 51 23	1	1090.063	32.672	D	0.000	19.274	19.274	0.00	7.957	0.000	0.000	0.000	0.000	0.000	0.000	
1999 52 23	1	1090.063	32.672	D	0.000	18.537	18.537	0.00	6.729	0.000	0.000	0.000	0.000	0.000	0.000	
1999 53 23	1	1090.063	32.672	D	0.000	21.099	21.099	0.00	10.998	0.000	0.000	0.000	0.000	0.000	0.000	
1999 54 23	1	1090.063	32.672	D	0.000	20.868	20.868	0.00	10.614	0.000	0.000	0.000	0.000	0.000	0.000	
1999 55 23	1	1090.063	32.672	D	0.000	23.650	23.650	0.00	15.249	0.000	0.000	0.000	0.000	0.000	0.000	
1999 56 23	1	1090.063	32.672	D	0.000	19.352	19.352	0.00	8.087	0.000	0.000	0.000	0.000	0.000	0.000	
1999 57 23	1	1090.063	32.672	D	0.000	17.646	17.646	0.00	5.244	0.000	0.000	0.000	0.000	0.000	0.000	
1999 58 23	1	1090.063	32.672	D	0.000	22.753	22.753	0.00	13.755	0.000	0.000	0.000	0.000	0.000	0.000	

--- Number of days with Extinction Change => 5.0 % : 1
--- Number of days with Extinction Change => 10.0 % : 0
--- Largest Extinction Change = 6.00 %

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CALPOST Version 5.2 Level 991104b
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Run-Length VISIBILITY

VISIB B _SN_F

(1/Mega-m)

RECEPTOR	COORDINATES (km)		TYPE	BEXT(Model)	BEXT(BKG)	BEXT(Total)	%CHANGE	F(RH)
499	1100.753	35.721	D	0.017	17.991	18.009	0.10	5.819

--- Number of recs with Extinction Change > 1.0 % : 0
--- Largest Extinction Change = 0.10 %

****
CALPOST Version 5.2 Level 991104b
****

24HR VISIBILITY

VISIB B _SN_F

(deciview)

									% of Modeled Extinction by Species					
YEAR DAY HR	RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)	%_SO4	%_NO3	%_OC	%_EC	%_PMC	%_PMF
1998 91 23	372	1123.759	13.586	D	4.752	4.713	0.039	2.535	8.70	46.76	0.00	0.00	0.00	44.54
1998 92 23	101	1124.139	9.843	D	5.435	5.355	0.080	4.306	12.88	62.10	0.00	0.00	0.00	25.02
1998 93 23	372	1123.759	13.586	D	4.850	4.765	0.084	2.675	11.12	58.10	0.00	0.00	0.00	30.77
1998 94 23	372	1123.759	13.586	D	4.694	4.690	0.004	2.474	9.01	50.35	0.00	0.00	0.00	40.69
1998 95 23	100	1126.005	0.430	D	5.631	5.622	0.009	5.076	12.92	65.30	0.00	0.00	0.00	21.81
1998 96 23	504	1096.327	41.124	D	4.772	4.772	0.000	2.693	16.67	51.18	0.00	0.00	0.00	31.91
1998 97 23	1	1090.063	32.672	D	4.447	4.447	0.000	1.833	0.00	0.00	0.00	0.00	0.00	0.00
1998 98 23	464	1112.439	29.719	D	4.746	4.719	0.027	2.550	8.42	62.12	0.00	0.00	0.00	29.46
1998 99 23	372	1123.759	13.586	D	4.916	4.785	0.132	2.726	7.15	52.11	0.00	0.00	0.00	40.74
1998 100 23	504	1096.327	41.124	D	5.495	5.334	0.160	4.246	12.67	56.38	0.00	0.00	0.00	30.95
1998 101 23	373	1121.201	11.831	D	5.706	5.556	0.151	4.883	17.31	66.66	0.00	0.00	0.00	16.03
1998 102 23	170	1004.814	42.629	D	6.886	6.885	0.001	9.013	25.99	63.63	0.00	0.00	0.00	10.45
1998 103 23	216	1094.329	-25.642	D	6.375	6.335	0.040	7.237	12.99	68.56	0.00	0.00	0.00	18.45
1998 104 23	101	1124.139	9.843	D	5.457	5.402	0.055	4.440	7.50	52.33	0.00	0.00	0.00	40.17
1998 105 23	311	1125.767	-1.263	D	4.895	4.893	0.002	3.019	7.36	63.72	0.00	0.00	0.00	28.90
1998 106 23	372	1123.759	13.586	D	4.538	4.524	0.014	2.036	9.85	36.16	0.00	0.00	0.00	53.99
1998 107 23	504	1096.327	41.124	D	4.663	4.651	0.013	2.368	13.25	42.71	0.00	0.00	0.00	44.05
1998 108 23	170	1004.814	42.629	D	6.590	6.590	0.000	8.048	22.48	49.12	0.00	0.00	0.00	28.85
1998 109 23	1	1090.063	32.672	D	4.674	4.674	0.000	2.431	0.00	0.00	0.00	0.00	0.00	0.00
1998 110 23	1	1090.063	32.672	D	5.031	5.031	0.000	3.398	0.00	0.00	0.00	0.00	0.00	0.00
1998 111 23	372	1123.759	13.586	D	4.559	4.557	0.002	2.122	7.78	37.81	0.00	0.00	0.00	54.43

1998	112	23	256	1117.517	-18.599	D	4.522	4.522	0.000	2.030	8.09	47.83	0.00	0.00	0.00	44.14
1998	113	23	311	1125.767	-1.263	D	6.287	6.287	0.000	7.087	7.47	60.79	0.00	0.00	0.00	31.54
1998	114	23	100	1126.005	0.430	D	4.804	4.790	0.014	2.741	9.25	46.42	0.00	0.00	0.00	44.35
1998	115	23	101	1124.139	9.843	D	5.051	4.998	0.053	3.308	11.64	52.93	0.00	0.00	0.00	35.43
1998	116	23	464	1112.439	29.719	D	5.125	5.066	0.059	3.493	15.71	50.92	0.00	0.00	0.00	33.37
1998	117	23	420	1119.289	21.236	D	4.921	4.863	0.058	2.939	15.95	45.78	0.00	0.00	0.00	38.27
1998	118	23	98	1096.696	-25.207	D	5.505	5.504	0.002	4.732	17.13	63.71	0.00	0.00	0.00	19.18
1998	119	23	372	1123.759	13.586	D	4.746	4.725	0.021	2.568	6.80	14.94	0.00	0.00	0.00	78.28
1998	120	23	202	1079.740	-26.187	D	6.994	6.848	0.146	8.891	17.21	65.02	0.00	0.00	0.00	17.76
1998	121	23	187	1037.943	-19.618	D	6.968	6.892	0.075	9.037	12.90	74.58	0.00	0.00	0.00	12.52
1998	122	23	170	1004.814	42.629	D	7.025	7.022	0.004	9.469	24.78	52.16	0.00	0.00	0.00	23.05
1998	123	23	101	1124.139	9.843	D	5.204	5.178	0.027	3.805	18.59	44.23	0.00	0.00	0.00	37.18
1998	124	23	311	1125.767	-1.263	D	5.290	5.274	0.016	4.074	22.77	48.25	0.00	0.00	0.00	28.99
1998	125	23	311	1125.767	-1.263	D	5.264	5.258	0.006	4.031	18.39	53.52	0.00	0.00	0.00	28.08
1998	126	23	311	1125.767	-1.263	D	5.118	5.114	0.003	3.628	17.14	57.58	0.00	0.00	0.00	25.25
1998	127	23	420	1119.289	21.236	D	4.601	4.600	0.001	2.236	11.65	34.84	0.00	0.00	0.00	53.62
1998	128	23	101	1124.139	9.843	D	5.063	4.993	0.070	3.292	14.11	54.42	0.00	0.00	0.00	31.47
1998	129	23	100	1126.005	0.430	D	6.030	5.873	0.157	5.819	17.24	63.31	0.00	0.00	0.00	19.45
1998	130	23	101	1124.139	9.843	D	5.483	5.407	0.076	4.453	20.28	55.50	0.00	0.00	0.00	24.22
1998	131	23	101	1124.139	9.843	D	5.300	5.220	0.080	3.924	18.63	53.87	0.00	0.00	0.00	27.50
1998	132	23	597	1067.362	10.849	D	6.006	5.950	0.055	6.052	22.16	63.63	0.00	0.00	0.00	14.21
1998	133	23	101	1124.139	9.843	D	5.056	5.053	0.004	3.457	11.80	49.44	0.00	0.00	0.00	38.76
1998	134	23	464	1112.439	29.719	D	5.025	5.025	0.000	3.380	12.75	38.74	0.00	0.00	0.00	48.43
1998	135	23	1	1090.063	32.672	D	5.751	5.751	0.000	5.455	0.00	0.00	0.00	0.00	0.00	0.00
1998	136	23	100	1126.005	0.430	D	4.715	4.701	0.014	2.503	6.64	32.95	0.00	0.00	0.00	60.40
1998	137	23	100	1126.005	0.430	D	5.303	5.281	0.022	4.095	9.60	63.05	0.00	0.00	0.00	27.35
1998	138	23	100	1126.005	0.430	D	5.474	5.452	0.022	4.584	8.96	65.64	0.00	0.00	0.00	25.41
1998	139	23	372	1123.759	13.586	D	4.771	4.760	0.012	2.659	7.31	54.51	0.00	0.00	0.00	38.18
1998	140	23	100	1126.005	0.430	D	4.435	4.423	0.012	1.771	7.62	46.16	0.00	0.00	0.00	46.21
1998	141	23	372	1123.759	13.586	D	4.535	4.531	0.004	2.054	11.99	33.04	0.00	0.00	0.00	55.02
1998	142	23	504	1096.327	41.124	D	4.858	4.841	0.017	2.877	16.11	38.85	0.00	0.00	0.00	45.05
1998	143	23	597	1067.362	10.849	D	7.372	7.369	0.004	10.657	30.10	56.36	0.00	0.00	0.00	13.53
1998	144	23	170	1004.814	42.629	D	6.874	6.873	0.001	8.973	35.46	49.26	0.00	0.00	0.00	15.24
1998	145	23	1	1090.063	32.672	D	5.024	5.024	0.000	3.379	0.00	0.00	0.00	0.00	0.00	0.00
1998	146	23	499	1100.753	35.721	D	4.846	4.831	0.015	2.852	13.99	49.86	0.00	0.00	0.00	36.15
1998	147	23	499	1100.753	35.721	D	5.768	5.728	0.040	5.387	18.13	57.74	0.00	0.00	0.00	24.14
1998	148	23	502	1097.787	36.638	D	5.986	5.982	0.004	6.148	10.99	44.85	0.00	0.00	0.00	44.18
1998	149	23	499	1100.753	35.721	D	5.134	5.087	0.047	3.552	12.97	56.68	0.00	0.00	0.00	30.35
1998	150	23	464	1112.439	29.719	D	4.864	4.857	0.007	2.922	18.84	36.34	0.00	0.00	0.00	44.82
1998	151	23	464	1112.439	29.719	D	4.631	4.615	0.016	2.274	17.43	33.57	0.00	0.00	0.00	49.00
1998	152	23	100	1126.005	0.430	D	4.932	4.929	0.003	3.118	14.41	38.45	0.00	0.00	0.00	47.18
1998	153	23	499	1100.753	35.721	D	4.999	4.917	0.082	3.086	7.11	37.98	0.00	0.00	0.00	54.91
1998	154	23	100	1126.005	0.430	D	5.298	5.296	0.001	4.139	7.36	61.02	0.00	0.00	0.00	31.58
1998	155	23	100	1126.005	0.430	D	5.135	5.134	0.002	3.682	18.04	56.13	0.00	0.00	0.00	25.80
1998	156	23	100	1126.005	0.430	D	4.782	4.782	0.000	2.719	6.36	55.82	0.00	0.00	0.00	37.93
1998	157	23	100	1126.005	0.430	D	5.990	5.990	0.001	6.171	10.03	66.03	0.00	0.00	0.00	23.77
1998	158	23	1	1090.063	32.672	D	5.088	5.088	0.000	3.555	0.00	0.00	0.00	0.00	0.00	0.00
1998	159	23	100	1126.005	0.430	D	5.233	5.232	0.001	3.957	9.02	57.82	0.00	0.00	0.00	33.11
1998	160	23	101	1124.139	9.843	D	5.257	5.251	0.006	4.010	16.28	49.82	0.00	0.00	0.00	33.85
1998	161	23	100	1126.005	0.430	D	5.948	5.948	0.001	6.044	8.23	66.72	0.00	0.00	0.00	24.79
1998	162	23	100	1126.005	0.430	D	5.175	5.172	0.003	3.788	7.92	53.95	0.00	0.00	0.00	38.12
1998	163	23	1	1090.063	32.672	D	4.703	4.703	0.000	2.507	0.00	0.00	0.00	0.00	0.00	0.00
1998	164	23	1	1090.063	32.672	D	4.666	4.666	0.000	2.409	0.00	0.00	0.00	0.00	0.00	0.00
1998	165	23	420	1119.289	21.236	D	4.886	4.885	0.000	2.999	15.22	55.01	0.00	0.00	0.00	29.37
1998	166	23	420	1119.289	21.236	D	4.745	4.742	0.003	2.611	13.64	49.26	0.00	0.00	0.00	37.11
1998	167	23	1	1090.063	32.672	D	4.572	4.572	0.000	2.160	0.00	0.00	0.00	0.00	0.00	0.00
1998	168	23	1	1090.063	32.672	D	4.756	4.756	0.000	2.648	0.00	0.00	0.00	0.00	0.00	0.00
1998	169	23	1	1090.063	32.672	D	4.673	4.673	0.000	2.428	0.00	0.00	0.00	0.00	0.00	0.00
1998	170	23	1	1090.063	32.672	D	4.638	4.638	0.000	2.335	0.00	0.00	0.00	0.00	0.00	0.00
1998	171	23	1	1090.063	32.672	D	4.635	4.635	0.000	2.328	0.00	0.00	0.00	0.00	0.00	0.00
1998	172	23	100	1126.005	0.430	D	4.784	4.784	0.000	2.724	8.89	6.52	0.00	0.00	0.00	84.98
1998	173	23	1	1090.063	32.672	D	4.961	4.961	0.000	3.204	0.00	0.00	0.00	0.00	0.00	0.00
1998	174	23	420	1119.289	21.236	D	4.965	4.962	0.003	3.207	16.79	32.74	0.00	0.00	0.00	50.54
1998	175	23	464	1112.439	29.719	D	5.325	5.325	0.000	4.219	22.44	42.49	0.00	0.00	0.00	35.07
1998	176	23	420	1119.289	21.236	D	4.930	4.924	0.006	3.104	12.91	42.82	0.00	0.00	0.00	44.26
1998	177	23	101	1124.139	9.843	D	4.852	4.844	0.009	2.885	15.82	53.21	0.00	0.00	0.00	30.97
1998	178	23	100	1126.005	0.430	D	4.649	4.649	0.000	2.364	19.23	42.48	0.00	0.00	0.00	38.40
1998	179	23	1	1090.063	32.672	D	4.530	4.530	0.000	2.049	0.00	0.00	0.00	0.00	0.00	0.00
1998	180	23	1	1090.063	32.672	D	4.660	4.660	0.000	2.394	0.00	0.00	0.00	0.00	0.00	0.00
1998	181	23	1	1090.063	32.672	D	5.875	5.875	0.000	5.825	0.00	0.00	0.00	0.00	0.00	0.00
1998	182	23	372	1123.759	13.586	D	5.502	5.502	0.000	4.726	9.89	37.66	0.00	0.00	0.00	49.15
1998	183	23	1	1090.063	32.672	D	5.603	5.603	0.000	5.021	0.00	0.00	0.00	0.00	0.00	0.00
1998	184	23	464	1112.439	29.719	D	7.707	7.707	0.000	11.853	19.11	65.56	0.00	0.00	0.00	14.67
1998	185	23	420	1119.289	21.236	D	6.342	6.342	0.000	7.258	33.44	29.47	0.00	0.00	0.00	30.89
1998	186	23	504	1096.327	41.124	D	5.533	5.532	0.001	4.813	23.19	47.43	0.00	0.00	0.00	29.37
1998	187	23	464	1112.439	29.719	D	5.980	5.958	0.022	6.075	20.81	61.58	0.00	0.00	0.00	17.61
1998	188	23	31	1116.536	23.118	D	5.803	5.803	0.000	5.609	61.97	18.88	0.00	0.00	0.00	15.96
1998	189	23	1	1090.063	32.672	D	5.728	5.728	0.000	5.387	0.00	0.00	0.00	0.00	0.00	0.00
1998	190	23	1	1090.063	32.672	D	4.620	4.620	0.000	2.288	0.00	0.00	0.00	0.00	0.00	0.00
1998	191	23	1	1090.063	32.672	D	4.800	4.800	0.000	2.769	0.00	0.00	0.00	0.00	0.00	0.00
1998	192	23	464	1112.439	29.719	D	5.673	5.656	0.017	5.174	22.90	45.78	0.00	0.00	0.00	31.32
1998	193	23	504	1096.327	41.124	D	5.453	5.448	0.005	4.571	22.23	42.88	0.00	0.00	0.00	34.90
1998	194	23	464	1112.439	29.719	D	4.738	4.734	0.004	2.590	12.67	46.88	0.00	0.00	0.00	40.45
1998	195	23	504	1096.327	41.124	D	5.638	5.623	0.015	5.079	15.93	62.53	0.00	0.00	0.00	21.53
1998	196	23	1	1090.063	32.672	D	5.700	5.700	0.000	5.304	0.00	0.00	0.00	0.00	0.00	0.00
1998	197	23	1	1090.063	32.672	D	5.163	5.163	0.000	3.762	0.00	0.00	0.00	0.00	0.00	0.00
1998	198	23	1	1090.063	32.672	D	5.063	5.063	0.000	3.486	0.00	0.00	0.00	0.00	0.00	0.00
1998	199	23	464	1112.439	29.719	D	5.682	5.680	0.002	5.247	16.64	48.18	0.00	0.00	0.00	35.29
1998	200	23	4	1109.871	31.743	D	4.941	4.913	0.028	3.074	18.71	38.31	0.00	0.00	0.00	42.97
1998	201	23	101	1124.139	9.843	D	4.960	4.879	0.081	2.982	18.16	53.33	0.00	0.00	0.00	28.51
1998	202	23	1	1090.063	32.672	D	4.423	4.423	0.000	1.771	0.00	0.00	0.00	0.00	0.00	0.00
1998	203	23	1	1090.063	32.672	D	4.498	4.498	0.000	1.968	0.00	0.00	0.00	0.00	0.00	0.00
1998	204	23	1	1090.063	32.672	D	5.068	5.068	0.000	3.499	0.00	0.00	0.00	0.00	0.00	0.00
1998	205	23	1	1090.063	32.672	D	4.872	4.872	0.000	2.962	0.00	0.00	0.00	0.00	0.00	0.00
1998	206	23	1	1090.063	32.672	D	5.478	5.478	0.000	4.657	0.00	0.00	0.00	0.00	0.00	0.00
1998	207	23	311	1125.767	-1.263	D	4.411	4.411	0.000	1.741	4.62	22.19	0.00	0.00	0.00	72.26
1998	208	23	372	1123.759	13.586	D	4.554	4.554	0.000	2.114	1.33	30.82	0.00	0.00	0.00	67.82
1998	209	23	1	1090.063	32.672	D	4.542	4.542	0.000	2.081	0.00	0.00	0.00	0.00	0.00	0.00
1998	210	23	1	1090.063	32.672	D	4.605	4.605	0.000	2.247	0.00	0.00	0.00	0.00	0.00	0.00
1998	211	23	1	1090.063	32.672	D	4.934	4.934	0.000	3.131	0.00	0.00	0.00	0.00	0.00	0.00
1998	212	23	464	1112.439	29.719	D	4.711	4.711	0.000	2.529	14.32	40.08	0.00	0.00	0.00	45.80
1998	213	23	372	1123.759	13.586	D	4.727	4.727	0.000	2.572	20.52	32.74	0.00	0.00	0.00	46.48
1998	214	23	100	1126.005	0.430	D	4.393	4.391	0.002	1.687	11.34	33.51	0.00	0.00	0.00	55.14
1998	215	23	100	1126.005	0.430	D	4.518	4.518	0.000	2.019	4.63	26.33	0.00	0.00	0.00	70.05
1998	216	23	1	1090.063	32.672	D	4.504	4.504	0.000	1.983	0.00	0.00	0.00	0.00	0.00	0.00

1998 217 23	1	1090.063	32.672	D	5.457	5.457	0.000	4.597	0.00	0.00	0.00	0.00	0.00	0.00
1998 218 23	1	1090.063	32.672	D	4.844	4.844	0.000	2.887	0.00	0.00	0.00	0.00	0.00	0.00
1998 219 23	1	1090.063	32.672	D	4.455	4.455	0.000	1.855	0.00	0.00	0.00	0.00	0.00	0.00
1998 220 23	1	1090.063	32.672	D	4.555	4.555	0.000	2.116	0.00	0.00	0.00	0.00	0.00	0.00
1998 221 23	100	1126.005	0.430	D	4.915	4.915	0.000	3.080	13.31	42.20	0.00	0.00	0.00	44.07
1998 222 23	100	1126.005	0.430	D	4.803	4.793	0.010	2.750	13.00	46.16	0.00	0.00	0.00	40.84
1998 223 23	100	1126.005	0.430	D	4.677	4.677	0.000	2.440	0.00	0.00	0.00	0.00	0.00	29.38
1998 224 23	1	1090.063	32.672	D	4.653	4.653	0.000	2.374	0.00	0.00	0.00	0.00	0.00	0.00
1998 225 23	1	1090.063	32.672	D	4.590	4.590	0.000	2.209	0.00	0.00	0.00	0.00	0.00	0.00
1998 226 23	1	1090.063	32.672	D	5.316	5.316	0.000	4.194	0.00	0.00	0.00	0.00	0.00	0.00
1998 227 23	1	1090.063	32.672	D	4.631	4.631	0.000	2.315	0.00	0.00	0.00	0.00	0.00	0.00
1998 228 23	1	1090.063	32.672	D	4.710	4.710	0.000	2.528	0.00	0.00	0.00	0.00	0.00	0.00
1998 229 23	372	1123.759	13.586	D	4.647	4.641	0.006	2.343	13.96	43.49	0.00	0.00	0.00	42.53
1998 230 23	372	1123.759	13.586	D	4.723	4.695	0.028	2.485	13.24	40.23	0.00	0.00	0.00	46.53
1998 231 23	101	1124.139	9.843	D	4.960	4.893	0.067	3.020	12.55	58.97	0.00	0.00	0.00	28.48
1998 232 23	101	1124.139	9.843	D	4.615	4.609	0.006	2.258	6.15	44.76	0.00	0.00	0.00	49.07
1998 233 23	464	1112.439	29.719	D	4.673	4.652	0.021	2.371	13.78	33.78	0.00	0.00	0.00	52.43
1998 234 23	101	1124.139	9.843	D	4.730	4.706	0.024	2.516	14.76	37.77	0.00	0.00	0.00	47.47
1998 235 23	372	1123.759	13.586	D	5.059	5.058	0.001	3.473	12.10	38.67	0.00	0.00	0.00	49.16
1998 236 23	372	1123.759	13.586	D	5.285	5.283	0.001	4.102	16.10	58.81	0.00	0.00	0.00	25.10
1998 237 23	1	1090.063	32.672	D	4.786	4.786	0.000	2.729	0.00	0.00	0.00	0.00	0.00	0.00
1998 238 23	100	1126.005	0.430	D	5.044	5.044	0.000	3.432	6.11	57.78	0.00	0.00	0.00	36.12
1998 239 23	100	1126.005	0.430	D	4.587	4.587	0.000	2.201	4.48	47.01	0.00	0.00	0.00	50.94
1998 240 23	256	1117.517	-18.599	D	4.503	4.503	0.000	1.980	5.84	49.72	0.00	0.00	0.00	44.57
1998 241 23	1	1090.063	32.672	D	5.260	5.260	0.000	4.036	0.00	0.00	0.00	0.00	0.00	0.00
1998 242 23	1	1090.063	32.672	D	5.276	5.276	0.000	4.081	0.00	0.00	0.00	0.00	0.00	0.00
1998 243 23	1	1090.063	32.672	D	4.881	4.881	0.000	2.987	0.00	0.00	0.00	0.00	0.00	0.00
1998 244 23	1	1090.063	32.672	D	4.974	4.974	0.000	3.242	0.00	0.00	0.00	0.00	0.00	0.00
1998 245 23	1	1090.063	32.672	D	4.731	4.731	0.000	2.581	0.00	0.00	0.00	0.00	0.00	0.00
1998 246 23	1	1090.063	32.672	D	4.882	4.882	0.000	2.991	0.00	0.00	0.00	0.00	0.00	0.00
1998 247 23	1	1090.063	32.672	D	4.628	4.628	0.000	2.308	0.00	0.00	0.00	0.00	0.00	0.00
1998 248 23	1	1090.063	32.672	D	4.751	4.751	0.000	2.637	0.00	0.00	0.00	0.00	0.00	0.00
1998 249 23	1	1090.063	32.672	D	4.764	4.764	0.000	2.671	0.00	0.00	0.00	0.00	0.00	0.00
1998 250 23	1	1090.063	32.672	D	4.614	4.614	0.000	2.273	0.00	0.00	0.00	0.00	0.00	0.00
1998 251 23	1	1090.063	32.672	D	4.526	4.526	0.000	2.040	0.00	0.00	0.00	0.00	0.00	0.00
1998 252 23	1	1090.063	32.672	D	4.470	4.470	0.000	1.893	0.00	0.00	0.00	0.00	0.00	0.00
1998 253 23	372	1123.759	13.586	D	4.856	4.846	0.010	2.892	7.70	41.81	0.00	0.00	0.00	50.48
1998 254 23	372	1123.759	13.586	D	4.793	4.791	0.002	2.744	5.44	54.24	0.00	0.00	0.00	40.35
1998 255 23	1	1090.063	32.672	D	4.831	4.831	0.000	2.850	0.00	0.00	0.00	0.00	0.00	0.00
1998 256 23	1	1090.063	32.672	D	5.091	5.091	0.000	3.562	0.00	0.00	0.00	0.00	0.00	0.00
1998 257 23	256	1117.517	-18.599	D	4.686	4.686	0.000	2.461	5.87	55.01	0.00	0.00	0.00	38.45
1998 258 23	100	1126.005	0.430	D	4.344	4.343	0.001	1.565	11.34	31.02	0.00	0.00	0.00	57.60
1998 259 23	101	1124.139	9.843	D	4.762	4.756	0.006	2.650	14.16	50.69	0.00	0.00	0.00	35.15
1998 260 23	1	1090.063	32.672	D	5.124	5.124	0.000	3.655	0.00	0.00	0.00	0.00	0.00	0.00
1998 261 23	420	1119.289	21.236	D	6.369	6.369	0.000	7.343	8.32	45.67	0.00	0.00	0.00	53.37
1998 262 23	1	1090.063	32.672	D	4.678	4.678	0.000	2.441	0.00	0.00	0.00	0.00	0.00	0.00
1998 263 23	372	1123.759	13.586	D	5.188	5.076	0.112	3.522	7.14	53.08	0.00	0.00	0.00	39.78
1998 264 23	311	1125.767	-1.263	D	5.214	5.212	0.003	3.900	8.69	70.29	0.00	0.00	0.00	20.99
1998 265 23	1	1090.063	32.672	D	5.064	5.064	0.000	3.490	0.00	0.00	0.00	0.00	0.00	0.00
1998 266 23	372	1123.759	13.586	D	4.971	4.962	0.009	3.209	6.02	51.61	0.00	0.00	0.00	42.38
1998 267 23	256	1117.517	-18.599	D	6.252	6.252	0.001	6.976	12.07	60.30	0.00	0.00	0.00	27.46
1998 268 23	1	1090.063	32.672	D	5.078	5.078	0.000	3.528	0.00	0.00	0.00	0.00	0.00	0.00
1998 269 23	1	1090.063	32.672	D	4.727	4.727	0.000	2.571	0.00	0.00	0.00	0.00	0.00	0.00
1998 270 23	100	1126.005	0.430	D	4.705	4.701	0.004	2.503	4.74	42.60	0.00	0.00	0.00	52.65
1998 271 23	1	1090.063	32.672	D	4.673	4.673	0.000	2.428	0.00	0.00	0.00	0.00	0.00	0.00
1998 272 23	1	1090.063	32.672	D	5.525	5.525	0.000	4.792	0.00	0.00	0.00	0.00	0.00	0.00
1998 273 23	1	1090.063	32.672	D	4.835	4.835	0.000	2.863	0.00	0.00	0.00	0.00	0.00	0.00
1998 274 23	311	1125.767	-1.263	D	5.000	5.000	0.000	3.312	7.70	44.67	0.00	0.00	0.00	51.65
1998 275 23	1	1090.063	32.672	D	5.108	5.108	0.000	3.611	0.00	0.00	0.00	0.00	0.00	0.00
1998 276 23	1	1090.063	32.672	D	5.310	5.310	0.000	4.177	0.00	0.00	0.00	0.00	0.00	0.00
1998 277 23	1	1090.063	32.672	D	4.939	4.939	0.000	3.145	0.00	0.00	0.00	0.00	0.00	0.00
1998 278 23	1	1090.063	32.672	D	4.982	4.982	0.000	3.262	0.00	0.00	0.00	0.00	0.00	0.00
1998 279 23	1	1090.063	32.672	D	5.470	5.470	0.000	4.635	0.00	0.00	0.00	0.00	0.00	0.00
1998 280 23	1	1090.063	32.672	D	5.242	5.242	0.000	3.985	0.00	0.00	0.00	0.00	0.00	0.00
1998 281 23	1	1090.063	32.672	D	5.537	5.537	0.000	4.827	0.00	0.00	0.00	0.00	0.00	0.00
1998 282 23	1	1090.063	32.672	D	6.451	6.451	0.000	7.604	0.00	0.00	0.00	0.00	0.00	0.00
1998 283 23	1	1090.063	32.672	D	6.672	6.672	0.000	8.314	0.00	0.00	0.00	0.00	0.00	0.00
1998 284 23	1	1090.063	32.672	D	6.090	6.090	0.000	6.476	0.00	0.00	0.00	0.00	0.00	0.00
1998 285 23	1	1090.063	32.672	D	5.727	5.727	0.000	5.383	0.00	0.00	0.00	0.00	0.00	0.00
1998 286 23	1	1090.063	32.672	D	6.850	6.850	0.000	8.897	0.00	0.00	0.00	0.00	0.00	0.00
1998 287 23	1	1090.063	32.672	D	5.188	5.188	0.000	3.834	0.00	0.00	0.00	0.00	0.00	0.00
1998 288 23	1	1090.063	32.672	D	4.977	4.977	0.000	3.249	0.00	0.00	0.00	0.00	0.00	0.00
1998 289 23	464	1112.439	29.719	D	6.647	6.638	0.009	8.204	12.31	61.50	0.00	0.00	0.00	26.17
1998 290 23	1	1090.063	32.672	D	6.583	6.583	0.000	8.026	0.00	0.00	0.00	0.00	0.00	0.00
1998 291 23	372	1123.759	13.586	D	5.770	5.770	0.000	5.511	6.63	48.06	0.00	0.00	0.00	45.21
1998 292 23	420	1119.289	21.236	D	5.835	5.743	0.092	5.432	7.28	39.10	0.00	0.00	0.00	53.62
1998 293 23	170	1004.814	42.629	D	5.899	5.877	0.022	5.832	9.97	74.68	0.00	0.00	0.00	15.35
1998 294 23	1	1090.063	32.672	D	7.759	7.759	0.000	12.044	0.00	0.00	0.00	0.00	0.00	0.00
1998 295 23	1	1090.063	32.672	D	7.225	7.225	0.000	10.159	0.00	0.00	0.00	0.00	0.00	0.00
1998 296 23	1	1090.063	32.672	D	9.128	9.128	0.000	17.355	0.00	0.00	0.00	0.00	0.00	0.00
1998 297 23	1	1090.063	32.672	D	8.060	8.060	0.000	13.148	0.00	0.00	0.00	0.00	0.00	0.00
1998 298 23	1	1090.063	32.672	D	8.091	8.091	0.000	13.263	0.00	0.00	0.00	0.00	0.00	0.00
1998 299 23	1	1090.063	32.672	D	8.001	8.001	0.000	12.928	0.00	0.00	0.00	0.00	0.00	0.00
1998 300 23	1	1090.063	32.672	D	7.190	7.190	0.000	10.039	0.00	0.00	0.00	0.00	0.00	0.00
1998 301 23	1	1090.063	32.672	D	5.566	5.566	0.000	4.913	0.00	0.00	0.00	0.00	0.00	0.00
1998 302 23	1	1090.063	32.672	D	6.520	6.520	0.000	7.824	0.00	0.00	0.00	0.00	0.00	0.00
1998 303 23	1	1090.063	32.672	D	8.002	8.002	0.000	12.932	0.00	0.00	0.00	0.00	0.00	0.00
1998 304 23	1	1090.063	32.672	D	8.195	8.195	0.000	13.656	0.00	0.00	0.00	0.00	0.00	0.00
1998 305 23	1	1090.063	32.672	D	8.761	8.761	0.000	15.860	0.00	0.00	0.00	0.00	0.00	0.00
1998 306 23	1	1090.063	32.672	D	9.184	9.184	0.000	17.590	0.00	0.00	0.00	0.00	0.00	0.00
1998 307 23	1	1090.063	32.672	D	8.308	8.308	0.000	14.085	0.00	0.00	0.00	0.00	0.00	0.00
1998 308 23	1	1090.063	32.672	D	9.071	9.071	0.000	17.121	0.00	0.00	0.00	0.00	0.00	0.00
1998 309 23	1	1090.063	32.672	D	7.395	7.395	0.000	10.748	0.00	0.00	0.00	0.00	0.00	0.00
1998 310 23	1	1090.063	32.672	D	7.723	7.723	0.000	11.912	0.00	0.00	0.00	0.00	0.00	0.00
1998 311 23	216	1094.329	-25.642	D	7.315	7.213	0.102	10.119	14.63	73.21	0.00	0.00	0.00	12.16
1998 312 23	189	1040.896	-28.418	D	7.261	7.255	0.005	10.263	11.87	78.07	0.00	0.00	0.00	10.08
1998 313 23	372	1123.759	13.586	D	6.602	6.597	0.005	8.071	13.92	67.11	0.00	0.00	0.00	18.96
1998 314 23	170	1004.814	42.629	D	6.738	6.738	0.000	8.527	2.22	95.18	0.00	0.00	0.00	0.59
1998 315 23	170	1004.814	42.629	D	8.052	8.050	0.002	13.111	11.34	72.14	0.00	0.00	0.00	16.48
1998 316 23	1	1090.063	32.672	D	8.121	8.121	0.000	13.375	0.00	0.00	0.00	0.00	0.00	0.00
1998 317 23	1	1090.063	32.672	D	8.120	8.120	0.000	13.372	0.00	0.00	0.00	0.00	0.00	0.00
1998 318 23	1	1090.063	32.672	D	9.240	9.240	0.000	17.824	0.00	0.00	0.00	0.00	0.00	0.00
1998 319 23	1	1090.063	32.672	D	8.189	8.189	0.000	13.635	0.00	0.00	0.00	0.00	0.00	0.00
1998 320 23	1	1090.063	32.672	D	7.173	7.173	0.000	9.980	0.00	0.00	0.00	0.00	0.00	0.00
1998 321 23	1	1090.063	32.672	D	6.353	6.353	0.000	7.292	0.00	0.00	0.00	0.00	0.00	0.00

1998	322	23	31	1116.536	23.118	D	5.601	5.601	0.000	5.015	1.57	71.56	0.00	0.00	0.00	0.25
1998	323	23	1	1090.063	32.672	D	8.385	8.385	0.000	14.382	0.00	0.00	0.00	0.00	0.00	0.00
1998	324	23	1	1090.063	32.672	D	8.438	8.438	0.000	14.585	0.00	0.00	0.00	0.00	0.00	0.00
1998	325	23	1	1090.063	32.672	D	6.434	6.434	0.000	7.549	0.00	0.00	0.00	0.00	0.00	0.00
1998	326	23	1	1090.063	32.672	D	7.213	7.213	0.000	10.118	0.00	0.00	0.00	0.00	0.00	0.00
1998	327	23	1	1090.063	32.672	D	7.230	7.230	0.000	10.175	0.00	0.00	0.00	0.00	0.00	0.00
1998	328	23	1	1090.063	32.672	D	6.105	6.105	0.000	6.522	0.00	0.00	0.00	0.00	0.00	0.00
1998	329	23	1	1090.063	32.672	D	7.938	7.938	0.000	12.698	0.00	0.00	0.00	0.00	0.00	0.00
1998	330	23	1	1090.063	32.672	D	6.421	6.421	0.000	7.509	0.00	0.00	0.00	0.00	0.00	0.00
1998	331	23	1	1090.063	32.672	D	7.217	7.217	0.000	10.132	0.00	0.00	0.00	0.00	0.00	0.00
1998	332	23	1	1090.063	32.672	D	7.381	7.381	0.000	10.701	0.00	0.00	0.00	0.00	0.00	0.00
1998	333	23	1	1090.063	32.672	D	7.208	7.208	0.000	10.101	0.00	0.00	0.00	0.00	0.00	0.00
1998	334	23	1	1090.063	32.672	D	7.632	7.632	0.000	11.586	0.00	0.00	0.00	0.00	0.00	0.00
1998	335	23	1	1090.063	32.672	D	6.357	6.357	0.000	7.305	0.00	0.00	0.00	0.00	0.00	0.00
1998	336	23	1	1090.063	32.672	D	5.825	5.825	0.000	5.676	0.00	0.00	0.00	0.00	0.00	0.00
1998	337	23	1	1090.063	32.672	D	5.943	5.943	0.000	6.031	0.00	0.00	0.00	0.00	0.00	0.00
1998	338	23	1	1090.063	32.672	D	4.905	4.905	0.000	3.052	0.00	0.00	0.00	0.00	0.00	0.00
1998	339	23	1	1090.063	32.672	D	5.689	5.689	0.000	5.273	0.00	0.00	0.00	0.00	0.00	0.00
1998	340	23	1	1090.063	32.672	D	4.973	4.973	0.000	3.238	0.00	0.00	0.00	0.00	0.00	0.00
1998	341	23	1	1090.063	32.672	D	7.008	7.008	0.000	9.424	0.00	0.00	0.00	0.00	0.00	0.00
1998	342	23	1	1090.063	32.672	D	5.710	5.710	0.000	5.335	0.00	0.00	0.00	0.00	0.00	0.00
1998	343	23	1	1090.063	32.672	D	7.214	7.214	0.000	10.123	0.00	0.00	0.00	0.00	0.00	0.00
1998	344	23	1	1090.063	32.672	D	7.803	7.803	0.000	12.204	0.00	0.00	0.00	0.00	0.00	0.00
1998	345	23	1	1090.063	32.672	D	8.932	8.932	0.000	16.550	0.00	0.00	0.00	0.00	0.00	0.00
1998	346	23	1	1090.063	32.672	D	9.075	9.075	0.000	17.134	0.00	0.00	0.00	0.00	0.00	0.00
1998	347	23	1	1090.063	32.672	D	8.012	8.012	0.000	12.969	0.00	0.00	0.00	0.00	0.00	0.00
1998	348	23	1	1090.063	32.672	D	4.776	4.776	0.000	2.704	0.00	0.00	0.00	0.00	0.00	0.00
1998	349	23	1	1090.063	32.672	D	7.953	7.953	0.000	12.752	0.00	0.00	0.00	0.00	0.00	0.00
1998	350	23	1	1090.063	32.672	D	8.038	8.038	0.000	13.065	0.00	0.00	0.00	0.00	0.00	0.00
1998	351	23	1	1090.063	32.672	D	4.853	4.853	0.000	2.911	0.00	0.00	0.00	0.00	0.00	62.39
1998	352	23	504	1096.327	41.124	D	4.456	4.425	0.031	1.777	3.57	34.03	0.00	0.00	0.00	73.92
1998	353	23	158	1008.817	21.229	D	4.260	4.188	0.072	1.169	2.17	23.91	0.00	0.00	0.00	64.24
1998	354	23	665	1074.296	36.865	D	4.291	4.227	0.064	1.267	3.18	32.58	0.00	0.00	0.00	53.19
1998	355	23	665	1074.296	36.865	D	5.732	5.722	0.010	5.369	4.87	41.94	0.00	0.00	0.00	29.70
1998	356	23	504	1096.327	41.124	D	5.090	5.087	0.004	3.551	7.30	62.96	0.00	0.00	0.00	25.98
1998	357	23	504	1096.327	41.124	D	6.002	6.002	0.000	6.209	11.01	63.42	0.00	0.00	0.00	0.00
1998	358	23	1	1090.063	32.672	D	7.586	7.586	0.000	11.420	0.00	0.00	0.00	0.00	0.00	0.00
1998	359	23	1	1090.063	32.672	D	8.393	8.393	0.000	14.413	0.00	0.00	0.00	0.00	0.00	0.00
1998	360	23	1	1090.063	32.672	D	5.661	5.661	0.000	5.191	0.00	0.00	0.00	0.00	0.00	0.00
1998	361	23	1	1090.063	32.672	D	7.855	7.855	0.000	12.393	0.00	0.00	0.00	0.00	0.00	0.00
1998	362	23	1	1090.063	32.672	D	5.476	5.476	0.000	4.652	0.00	0.00	0.00	0.00	0.00	0.00
1998	363	23	1	1090.063	32.672	D	7.538	7.538	0.000	11.252	0.00	0.00	0.00	0.00	0.00	0.00
1998	364	23	4	1109.871	31.743	D	7.319	7.319	0.000	10.483	0.91	82.86	0.00	0.00	0.00	6.87
1998	365	23	1	1090.063	32.672	D	6.223	6.223	0.000	6.887	0.00	0.00	0.00	0.00	0.00	0.00
1999	1	23	464	1112.439	29.719	D	5.781	5.753	0.028	5.461	13.21	67.76	0.00	0.00	0.00	19.02
1999	2	23	4	1109.871	31.743	D	7.235	6.653	0.582	8.252	13.05	63.37	0.00	0.00	0.00	23.58
1999	3	23	513	1072.086	36.423	D	7.828	7.403	0.425	10.776	10.36	72.17	0.00	0.00	0.00	17.47
1999	4	23	503	1096.650	38.900	D	7.591	7.403	0.189	10.776	12.06	73.41	0.00	0.00	0.00	14.53
1999	5	23	504	1096.327	41.124	D	8.450	8.435	0.015	14.574	13.98	77.32	0.00	0.00	0.00	8.70
1999	6	23	665	1074.296	36.865	D	7.594	7.590	0.004	11.435	16.25	74.35	0.00	0.00	0.00	9.35
1999	7	23	98	1096.696	-25.207	D	7.924	7.924	0.000	12.645	18.68	75.55	0.00	0.00	0.00	7.06
1999	8	23	1	1090.063	32.672	D	6.642	6.642	0.000	8.214	0.00	0.00	0.00	0.00	0.00	0.00
1999	9	23	1	1090.063	32.672	D	8.189	8.189	0.000	13.635	0.00	0.00	0.00	0.00	0.00	0.00
1999	10	23	1	1090.063	32.672	D	9.240	9.240	0.000	17.824	0.00	0.00	0.00	0.00	0.00	0.00
1999	11	23	1	1090.063	32.672	D	8.736	8.736	0.000	15.758	0.00	0.00	0.00	0.00	0.00	0.00
1999	12	23	1	1090.063	32.672	D	7.939	7.939	0.000	12.700	0.00	0.00	0.00	0.00	0.00	0.00
1999	13	23	1	1090.063	32.672	D	6.599	6.599	0.000	8.076	0.00	0.00	0.00	0.00	0.00	0.00
1999	14	23	1	1090.063	32.672	D	7.151	7.151	0.000	9.905	0.00	0.00	0.00	0.00	0.00	0.00
1999	15	23	1	1090.063	32.672	D	6.018	6.018	0.000	6.258	0.00	0.00	0.00	0.00	0.00	0.00
1999	16	23	1	1090.063	32.672	D	7.404	7.404	0.000	10.780	0.00	0.00	0.00	0.00	0.00	0.00
1999	17	23	1	1090.063	32.672	D	8.103	8.103	0.000	13.311	0.00	0.00	0.00	0.00	0.00	0.00
1999	18	23	1	1090.063	32.672	D	8.550	8.550	0.000	15.023	0.00	0.00	0.00	0.00	0.00	0.00
1999	19	23	1	1090.063	32.672	D	8.669	8.669	0.000	15.492	0.00	0.00	0.00	0.00	0.00	0.00
1999	20	23	1	1090.063	32.672	D	8.587	8.587	0.000	15.170	0.00	0.00	0.00	0.00	0.00	0.00
1999	21	23	1	1090.063	32.672	D	6.125	6.125	0.000	6.584	0.00	0.00	0.00	0.00	0.00	0.00
1999	22	23	1	1090.063	32.672	D	8.252	8.252	0.000	13.871	0.00	0.00	0.00	0.00	0.00	0.00
1999	23	23	508	1087.331	33.945	D	7.109	6.669	0.440	8.304	8.50	56.29	0.00	0.00	0.00	35.21
1999	24	23	513	1072.086	36.423	D	6.725	6.298	0.427	7.121	8.17	64.88	0.00	0.00	0.00	26.95
1999	25	23	504	1096.327	41.124	D	5.883	5.857	0.026	5.771	12.92	58.99	0.00	0.00	0.00	28.09
1999	26	23	1	1090.063	32.672	D	6.965	6.965	0.000	9.278	0.00	0.00	0.00	0.00	0.00	0.00
1999	27	23	1	1090.063	32.672	D	5.544	5.544	0.000	4.849	0.00	0.00	0.00	0.00	0.00	0.00
1999	28	23	1	1090.063	32.672	D	7.500	7.500	0.000	11.117	0.00	0.00	0.00	0.00	0.00	0.00
1999	29	23	1	1090.063	32.672	D	7.070	7.070	0.000	9.631	0.00	0.00	0.00	0.00	0.00	0.00
1999	30	23	1	1090.063	32.672	D	7.787	7.787	0.000	12.143	0.00	0.00	0.00	0.00	0.00	0.00
1999	31	23	1	1090.063	32.672	D	7.052	7.052	0.000	9.569	0.00	0.00	0.00	0.00	0.00	0.00
1999	32	23	1	1090.063	32.672	D	5.504	5.504	0.000	4.733	0.00	0.00	0.00	0.00	0.00	0.00
1999	33	23	1	1090.063	32.672	D	6.010	6.010	0.000	6.231	0.00	0.00	0.00	0.00	0.00	0.00
1999	34	23	1	1090.063	32.672	D	6.111	6.111	0.000	6.542	0.00	0.00	0.00	0.00	0.00	0.00
1999	35	23	1	1090.063	32.672	D	7.068	7.068	0.000	9.626	0.00	0.00	0.00	0.00	0.00	0.00
1999	36	23	1	1090.063	32.672	D	7.345	7.345	0.000	10.573	0.00	0.00	0.00	0.00	0.00	0.00
1999	37	23	1	1090.063	32.672	D	7.309	7.309	0.000	10.448	0.00	0.00	0.00	0.00	0.00	0.00
1999	38	23	1	1090.063	32.672	D	6.976	6.976	0.000	9.314	0.00	0.00	0.00	0.00	0.00	0.00
1999	39	23	1	1090.063	32.672	D	7.293	7.293	0.000	10.393	0.00	0.00	0.00	0.00	0.00	0.00
1999	40	23	1	1090.063	32.672	D	6.006	6.006	0.000	6.220	0.00	0.00	0.00	0.00	0.00	0.00
1999	41	23	1	1090.063	32.672	D	5.811	5.811	0.000	5.634	0.00	0.00	0.00	0.00	0.00	0.00
1999	42	23	1	1090.063	32.672	D	5.226	5.226	0.000	3.940	0.00	0.00	0.00	0.00	0.00	0.00
1999	43	23	1	1090.063	32.672	D	4.318	4.318	0.000	1.501	0.00	0.00	0.00	0.00	0.00	0.00
1999	44	23	1	1090.063	32.672	D	5.183	5.183	0.000	3.820	0.00	0.00	0.00	0.00	0.00	0.00
1999	45	23	1	1090.063	32.672	D	5.226	5.226	0.000	3.940	0.00	0.00	0.00	0.00	0.00	0.00
1999	46	23	1	1090.063	32.672	D	5.288	5.288	0.000	4.115	0.00	0.00	0.00	0.00	0.00	0.00
1999	47	23	1	1090.063	32.672	D	7.491	7.491	0.000	11.085	0.00	0.00	0.00	0.00	0.00	0.00
1999	48	23	1	1090.063	32.672	D	6.788	6.788	0.000	8.692	0.00	0.00	0.00	0.00	0.00	0.00
1999	49	23	1	1090.063	32.672	D	7.357	7.357	0.000	10.616	0.00	0.00	0.00	0.00	0.00	0.00
1999	50	23	1	1090.063	32.672	D	5.378	5.378	0.000	4.369	0.00	0.00	0.00	0.00	0.00	0.00
1999	51	23	1	1090.063	32.672	D	6.562	6.562	0.000	7.957	0.00	0.00	0.00	0.00	0.00	0.00
1999	52	23	1	1090.063	32.672	D	6.172	6.172	0.000	6.729	0.00	0.00	0.00	0.00	0.00	0.00
1999	53	23	1	1090.063	32.672	D	7.466	7.466	0.000	10.998	0.00	0.00	0.00	0.00	0.00	0.00
1999	54	23	1	1090.063	32.672	D	7.356	7.356	0.000	10.614	0.00	0.00	0.00	0.00	0.00	0.00
1999	55	23	1	1090.063	32.672	D	8.608	8.608	0.000	15.249	0.00	0.00	0.00	0.00	0.00	0.00
1999	56	23	1	1090.063	32.672	D	6.602	6.602	0.000	8.087	0.00	0.00	0.00	0.00	0.00	0.00
1999	57	23	1	1090.063	32.672	D	5.679	5.679	0.000	5.244	0.00	0.00	0.00	0.00	0.00	0.00
1999	58	23	1	1090.063	32.672	D	8.221	8.221	0.000	13.755	0.00	0.00	0.00	0.00	0.00	0.00

--- Number of days with Delta-Deciview => 0.50: 1
--- Number of days with Delta-Deciview => 1.00: 0

--- Largest Delta-Deciview = 0.582

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CALPOST Version 5.2 Level 991104b

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Run-Length VISIBILITY

VISIB B _SN_F

(deciview)

RECEPTOR	COORDINATES (km)		TYPE	DV(Total)	DV(BKG)	DELTA DV	F(RH)
499	1100.753	35.721	D	5.883	5.873	0.010	5.819

--- Number of recs with Delta-Deciview > 0.10: 0
--- Largest Delta-Deciview = 0.010

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SUMMARY SECTION

VISIB B _SN_F

(1/Mega-m)

RECEPTOR	COORDINATES (km)		TYPE	PEAK (YEAR,DAY,ENDING TIME)	FOR RANK	FOR AVERAGE PERIOD
104	1079.644	-13.861	DISCRETE	2.5335E+01 (1998,300,2300)	RANK 1	24 HOUR
1	1090.063	32.672	DISCRETE	2.5195E+01 (1998,318,2300)	RANK 2	24 HOUR
104	1079.644	-13.861	DISCRETE	2.5195E+01 (1998,317,2300)	RANK 3	24 HOUR

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*****************************************************************************************************************
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 Run Title:
    BP Cherry Point Refinery
    Ferndale, WA
    Class I Deposition

 ------------------------------------------------------------------------------

 INPUT GROUP: 1 -- General run control parameters
 --------------

     Option to run all periods found
     in the met. file(s)  (METRUN)        Default: 0   ! METRUN =   1  !

         METRUN = 0 - Run period explicitly defined below
         METRUN = 1 - Run all periods in CALPUFF data file(s)

     Starting date:    Year  (ISYR) --    No default   ! ISYR  =  1998   !
     (used only if     Month (ISMO) --    No default   ! ISMO  =  0   !
      METRUN = 0)      Day   (ISDY) --    No default   ! ISDY  =  0   !
                       Hour  (ISHR) --    No default   ! ISHR  =  0   !

     Number of hours to process (NHRS) -- No default   ! NHRS  =  0  !

     Process every hour of data?(NREP) -- Default: 1   ! NREP  =  1  !
      (1 = every hour processed,
       2 = every 2nd hour processed,
       5 = every 5th hour processed, etc.)

 Species & Concentration/Deposition Information
 ----------------------------------------------

      Species to process (ASPEC)       -- No default   ! ASPEC = S  !
      (ASPEC = VISIB for visibility processing)

      Layer/deposition code (ILAYER)   -- Default: 1   ! ILAYER = -3  !
        '1'  for CALPUFF concentrations,
        '-1' for dry deposition fluxes,
        '-2' for wet deposition fluxes,
        '-3' for wet+dry deposition fluxes.

      Scaling factors of the form:     -- Defaults:    ! A =  0.0    !
           X(new) = X(old) * A + B         A = 0.0    ! B =  0.0    !
        (NOT applied if A = B = 0.0)       B = 0.0

      Add Hourly Background Concentrations/Fluxes?
                              (LBACK)  -- Default: F   ! LBACK =  F !

 Receptor information
 --------------------

   Gridded receptors processed?    (LG) -- Default: F   ! LG  = F  !
   Discrete receptors processed?   (LD) -- Default: F   ! LD  = T  !
   CTSG Complex terrain receptors processed?
                                  (LCT) -- Default: F   ! LCT = F  !

 --Report results by DISCRETE receptor RING?
   (only used when LD = T)     (LDRING) -- Default: F   ! LDRING = F  !

 --Select range of DISCRETE receptors (only used when LD = T):

   Select ALL DISCRETE receptors by setting NDRECP flag to -1;
                                OR
```

```
 Select SPECIFIC DISCRETE receptors by entering a flag (0,1) for each
    0 = discrete receptor not processed
    1 = discrete receptor processed
 using repeated value notation to select blocks of receptors:
    23*1, 15*0, 12*1
 Flag for all receptors after the last one assigned is set to 0
 (NDRECP) -- Default: -1
! NDRECP = 1550*0, 221*1  !


--Select range of GRIDDED receptors (only used when LG = T):

       X index of LL corner (IBGRID) -- Default: -1      ! IBGRID = -1  !
           (-1 OR 1 <= IBGRID <= NX)

       Y index of LL corner (JBGRID) -- Default: -1      ! JBGRID = -1  !
           (-1 OR 1 <= JBGRID <= NY)

       X index of UR corner (IEGRID) -- Default: -1      ! IEGRID = -1  !
           (-1 OR 1 <= IEGRID <= NX)

       Y index of UR corner (JEGRID) -- Default: -1      ! JEGRID = -1  !
           (-1 OR 1 <= JEGRID <= NY)

  Note: Entire grid is processed if IBGRID=JBGRID=IEGRID=JEGRID=-1


--Specific gridded receptors can also be excluded from CALPOST
  processing by filling a processing grid array with 0s and 1s.  If the
  processing flag for receptor index (i,j) is 1 (ON), that receptor
  will be processed if it lies within the range delineated by IBGRID,
  JBGRID,IEGRID,JEGRID and if LG=T. If it is 0 (OFF), it will not be
  processed in the run.  By default, all array values are set to 1 (ON).

  Number of gridded receptor rows provided in Subgroup (1a) to
  identify specific gridded receptors to process
                          (NGONOFF) -- Default: 0       ! NGONOFF =  0  !

!END!


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Subgroup (1a) -- Specific gridded receptors included/excluded
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    Specific gridded receptors are excluded from CALPOST processing
    by filling a processing grid array with 0s and 1s.  A total of
    NGONOFF lines are read here.  Each line corresponds to one 'row'
    in the sampling grid, starting with the NORTHERNMOST row that
    contains receptors that you wish to exclude, and finishing with
    row 1 to the SOUTH (no intervening rows may be skipped).  Within
    a row, each receptor position is assigned either a 0 or 1,
    starting with the westernmost receptor.
       0 = gridded receptor not processed
       1 = gridded receptor processed

    Repeated value notation may be used to select blocks of receptors:
       23*1, 15*0, 12*1

    Because all values are initially set to 1, any receptors north of
    the first row entered, or east of the last value provided in a row,
    remain ON.

    (NGXRECP) -- Default: 1


 ------------------------------------------------------------------------------

 INPUT GROUP: 2 -- Visibility Parameters (ASPEC = VISIB)
 --------------
```

```
    Maximum relative humidity (%) used in particle growth curve
                              (RHMAX) -- Default: 98   ! RHMAX  = 98.0 !

    Modeled species to be included in computing the light extinction
     Include SULFATE?           (LVSO4) -- Default: T   ! LVSO4  = T  !
     Include NITRATE?           (LVNO3) -- Default: T   ! LVNO3  = T  !
     Include ORGANIC CARBON?    (LVOC)  -- Default: T   ! LVOC   = F  !
     Include COARSE PARTICLES?  (LVPMC) -- Default: T   ! LVPMC  = F  !
     Include FINE PARTICLES?    (LVPMF) -- Default: T   ! LVPMF  = T  !
     Include ELEMENTAL CARBON?  (LVEC)  -- Default: T   ! LVEC   = F  !

    And, when ranking for TOP-N, TOP-50, and Exceedance tables,
     Include BACKGROUND?        (LVBK)  -- Default: T   ! LVBK   = T  !

    Species name used for particulates in MODEL.DAT file
                  COARSE    (SPECPMC) -- Default: PMC ! SPECPMC = EC !
                  FINE      (SPECPMF) -- Default: PMF ! SPECPMF = PM10 !

Extinction Efficiency (1/Mm per ug/m**3)
----------------------------------------
    MODELED particulate species:
              PM  COARSE      (EEPMC) -- Default: 0.6 ! EEPMC  = 0.6 !
              PM  FINE        (EEPMF) -- Default: 1.0 ! EEPMF  = 10.0 !
    BACKGROUND particulate species:
              PM  COARSE    (EEPMCBK) -- Default: 0.6 ! EEPMCBK = 0.6 !
    Other species:
             AMMONIUM SULFATE (EESO4) -- Default: 3.0 ! EESO4  = 3.0 !
             AMMONIUM NITRATE (EENO3) -- Default: 3.0 ! EENO3  = 3.0 !
             ORGANIC CARBON   (EEOC)  -- Default: 4.0 ! EEOC   = 4.0 !
             SOIL             (EESOIL)-- Default: 1.0 ! EESOIL = 1.0 !
             ELEMENTAL CARBON (EEEC)  -- Default: 10. ! EEEC   = 10.0 !

Background Extinction Computation
---------------------------------

    Method used for background light extinction
                              (MVISBK) -- Default: 6   ! MVISBK =  2  !

         1 =  Supply single light extinction and hygroscopic fraction
              - IWAQM (1993) RH adjustment applied to hygroscopic background
                and modeled sulfate and nitrate
         2 =  Compute extinction from speciated PM measurements (A)
              - Hourly RH adjustment applied to observed and modeled sulfate
                and nitrate
              - RH factor is capped at RHMAX
         3 =  Compute extinction from speciated PM measurements (B)
              - Hourly RH adjustment applied to observed and modeled sulfate
                and nitrate
              - Receptor-hour excluded if RH>RHMAX
              - Receptor-day excluded if fewer than 6 valid receptor-hours
         4 =  Read hourly transmissometer background extinction measurements
              - Hourly RH adjustment applied to modeled sulfate and nitrate
              - Hour excluded if measurement invalid (missing, interference,
                or large RH)
              - Receptor-hour excluded if RH>RHMAX
              - Receptor-day excluded if fewer than 6 valid receptor-hours
         5 =  Read hourly nephelometer background extinction measurements
              - Rayleigh extinction value (BEXTRAY) added to measurement
              - Hourly RH adjustment applied to modeled sulfate and nitrate
              - Hour excluded if measurement invalid (missing, interference,
                or large RH)
              - Receptor-hour excluded if RH>RHMAX
              - Receptor-day excluded if fewer than 6 valid receptor-hours
         6 =  Compute extinction from speciated PM measurements
              - FLAG RH adjustment factor applied to observed and
                modeled sulfate and nitrate

     Additional inputs used for MVISBK = 1:
     --------------------------------------
      Background light extinction (1/Mm)
                              (BEXTBK) -- No default   ! BEXTBK = 12.0 !
```

```
 Percentage of particles affected by relative humidity
                          (RHFRAC) -- No default   ! RHFRAC = 0.0 !

Additional inputs used for MVISBK = 6:
--------------------------------------
 Extinction coefficients for hygroscopic species (modeled and
 background) are computed using a monthly RH adjustment factor
 in place of an hourly RH factor (VISB.DAT file is NOT needed).
 Enter the 12 monthly factors here (RHFAC).  Month 1 is January.

 (RHFAC)  -- No default      ! RHFAC = 4.4, 4.4, 4.1, 4.1,
                                       4.1, 3.4, 3.4, 3.4,
                                       5.8, 5.8, 5.8, 4.4 !

Additional inputs used for MVISBK = 2,3,6:
------------------------------------------
 Background extinction coefficients are computed from monthly
 CONCENTRATIONS of ammonium sulfate (BKSO4), ammonium nitrate (BKNO3),
 coarse particulates (BKPMC), organic carbon (BKOC), soil (BKSOIL), and
 elemental carbon (BKEC).  Month 1 is January.
 (ug/m**3)

 (BKSO4)  -- No default      ! BKSO4 = 0.1, 0.1, 0.1, 0.1,
                                       0.1, 0.1, 0.1, 0.1,
                                       0.1, 0.1, 0.1, 0.1 !
 (BKNO3)  -- No default      ! BKNO3 = 0.1, 0.1, 0.1, 0.1,
                                       0.1, 0.1, 0.1, 0.1,
                                       0.1, 0.1, 0.1, 0.1 !
 (BKPMC)  -- No default      ! BKPMC = 3.0, 3.0, 3.0, 3.0,
                                       3.0, 3.0, 3.0, 3.0,
                                       3.0, 3.0, 3.0, 3.0 !
 (BKOC)   -- No default      ! BKOC  = 0.5, 0.5, 0.5, 0.5,
                                       0.5, 0.5, 0.5, 0.5,
                                       0.5, 0.5, 0.5, 0.5 !
 (BKSOIL) -- No default      ! BKSOIL= 0.5, 0.5, 0.5, 0.5,
                                       0.5, 0.5, 0.5, 0.5,
                                       0.5, 0.5, 0.5, 0.5 !
 (BKEC)   -- No default      ! BKEC  = 0.02, 0.02, 0.02, 0.02,
                                       0.02, 0.02, 0.02, 0.02,
                                       0.02, 0.02, 0.02, 0.02 !

Additional inputs used for MVISBK = 2,3,5,6:
--------------------------------------------
 Extinction due to Rayleigh scattering is added (1/Mm)
                          (BEXTRAY) -- Default: 10.0 ! BEXTRAY = 10.0 !

!END!
-------------------------------------------------------------------------------

INPUT GROUP: 3 -- Output options
--------------

Output Units
------------
   Units for All Output       (IPRTU) -- Default: 1   ! IPRTU =  4   !
                    for            for
               Concentration    Deposition
      1 =         g/m**3         g/m**2/s
      2 =        mg/m**3        mg/m**2/s
      3 =        ug/m**3        ug/m**2/s
      4 =        ng/m**3        ng/m**2/s
      5 =      Odour Units

   Visibility: extinction expressed in 1/Mega-meters (IPRTU is ignored)


Averaging time(s) reported
--------------------------

   1-hr averages           (L1HR) -- Default: T   !   L1HR = F  !
```

```
3-hr averages            (L3HR) -- Default: T   !   L3HR = F  !

24-hr averages          (L24HR) -- Default: T   !  L24HR = F  !

Run-length averages     (LRUNL) -- Default: T   !  LRUNL = T  !

User-specified averaging time in hours - results for
an averaging time of NAVG hours are reported for
NAVG greater than 0:
                         (NAVG) -- Default: 0   !   NAVG =  0  !


Types of tabulations reported
-----------------------------

  1) Visibility: daily visibility tabulations are always reported
                 for the selected receptors when ASPEC = VISIB.
                 In addition, any of the other tabulations listed
                 below may be chosen to characterize the light
                 extinction coefficients.
                 [List file or Plot/Analysis File]


  2) Top 50 table for each averaging time selected
     [List file only]
                         (LT50) -- Default: T   !   LT50 = T  !

  3) Top 'N' table for each averaging time selected
     [List file or Plot file]
                        (LTOPN) -- Default: F   !  LTOPN = F  !

       -- Number of 'Top-N' values at each receptor
          selected (NTOP must be <= 4)
                         (NTOP) -- Default: 4   ! NTOP =  4   !

       -- Specific ranks of 'Top-N' values reported
          (NTOP values must be entered)
                 (ITOP(4) array) -- Default:     ! ITOP =  1 , 2 , 3 , 4   !
                                    1,2,3,4


  4) Threshold exceedance counts for each receptor and each averaging
     time selected
     [List file or Plot file]
                        (LEXCD) -- Default: F   !  LEXCD = F  !

        -- Identify the threshold for each averaging time by assigning a
           non-negative value (output units).

                                  -- Default: -1.0
           Threshold for  1-hr averages   (THRESH1) !  THRESH1 = 3.0E-02 !
           Threshold for  3-hr averages   (THRESH3) !  THRESH3 = -1.0  !
           Threshold for 24-hr averages  (THRESH24) ! THRESH24 = 3.0E-02 !
           Threshold for NAVG-hr averages (THRESHN) !  THRESHN = 3.0E-02 !


        -- Counts for the shortest averaging period selected can be
           tallied daily, and receptors that experience more than NCOUNT
           counts over any NDAY period will be reported.  This type of
           exceedance violation output is triggered only if NDAY > 0.

           Accumulation period(Days)
                          (NDAY) -- Default: 0   !    NDAY =  0  !
           Number of exceedances allowed
                        (NCOUNT) -- Default: 1   !  NCOUNT =  1  !


   5) Selected day table(s)

      Echo Option -- Many records are written each averaging period
      selected and output is grouped by day
```

```
[List file or Plot file]
                    (LECHO) -- Default: F   !  LECHO = F  !

Timeseries Option -- Averages at all selected receptors for
each selected averaging period are written to timeseries files.
Each file contains one averaging period, and all receptors are
written to a single record each averaging time.
[TSttUUUU.DAT files]
                    (LTIME) -- Default: F   !  LTIME = F  !

  -- Days selected for output
              (IECHO(366)) -- Default: 366*0
     ! IECHO  = 366*0  !
     (366 values must be entered)

Plot output options
-------------------

     Plot files can be created for the Top-N, Exceedance, and Echo
     tables selected above.  Two formats for these files are available,
     DATA and GRID.  In the DATA format, results at all receptors are
     listed along with the receptor location [x,y,val1,val2,...].
     In the GRID format, results at only gridded receptors are written,
     using a compact representation.  The gridded values are written in
     rows (x varies), starting with the most southern row of the grid.
     The GRID format is given the .GRD extension, and includes headers
     compatible with the SURFER(R) plotting software.

     A plotting and analysis file can also be created for the daily
     peak visibility summary output, in DATA format only.

     Generate Plot file output in addition to writing tables
     to List file?
                          (LPLT) -- Default: F   ! LPLT  = F !

     Use GRID format rather than DATA format,
     when available?
                          (LGRD) -- Default: F   ! LGRD  = F !


 Additional Debug Output
 -----------------------

    Output selected information to List file
     for debugging?
                         (LDEBUG) -- Default: F  ! LDEBUG  = F !

 !END!

-------------------------------------------------
NOTICE: Starting year in control file sets the
        expected century for the simulation.  All
        YY years are converted to YYYY years in
        the range:         1948        2047
-------------------------------------------------


*****************************************************************************************************************
**************
                                          CALPOST  Version 5.2          Level 991104b
*****************************************************************************************************************
**************



  CALPOST Control File Input Summary ------------------------

     Replace run data with data in Puff file 1=Y:    1
                     Run starting date -- year: 1998
                                         month:    0
```

```
                                               day:     0
                                        Julian day:     0
      Time at beginning of run  -     hour(0-23):     0
                                -          second:     0
                             Run length (hours):      0


Every hour of data processed -- NREP = 1


 Species & Concentration/Deposition Information
                                              Species: S
                             Layer of processed data:    -3
    (>0=conc, -1=dry flux, -2=wet flux, -3=wet & dry flux)
                        Multiplicative scaling factor: 0.0000E+00
                              Additive scaling factor: 0.0000E+00
                       Hourly background values used?: F


 Receptor information
                          Gridded receptors processed?: F
                         Discrete receptors processed?: T
       CTSG Complex terrain receptors processed?: F

 Discrete Receptors Processed

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```

Visibility Processing is NOT Selected

Output options

Units requested for output:	(ng/m**2/s)

Averaging time(s) selected

User-specified averaging time (NAVG hours):	0
1-hr averages:	F
3-hr averages:	F
24-hr averages:	F
NAVG-hr averages:	F
Length of run averages:	T

Output components selected

Top-50:	T
Top-N values at each receptor:	F
Exceedance counts at each receptor:	F
Output selected information for debugging:	F
Echo tables for selected days:	F
Time-series for selected days:	F

Plot file option

Plot files created:	F

IDENTIFICATION OF PROCESSED MODEL FILE ----------

CALPUFF 5.5 010730_1

Example merge application for nitrogen & sulfur deposition
Nitrogen deposition due to NOX, HNO3, NH4NO3, and (NH4)2SO4
Sulfur deposition due to SO2, (NH4)2SO4

Averaging time for values reported from model:
1 HOUR

Number of averaging periods in file from model:
7992

Chemical species names for each layer in model:

N	TF
S	TF

INPUT FILES

Default Name	Unit No.	File Name and Path
CALPOST.INP	5	deppost.inp
MODEL.DAT	4	D:\CALPUFF\6DEP.DAT

OUTPUT FILES

Default Name	Unit No.	File Name and Path
CALPOST.LST	8	D:\CALPUFF\6DEPSALP.LST

****
****
CALPOST Version 5.2 Level 991104b
****
****

S TF

TOP-50 7992 HOUR AVERAGE W+D DEPOSITION VALUES (ng/m**2/s)

YEAR	DAY	TIME(HHMM)	RECEPTOR	TYPE	W+D DEPOSITION	COORDINATES (km)	
1999	58	2300	(0,1609)	D	2.3197E-03	1236.247	20.960
1999	58	2300	(0,1637)	D	2.2597E-03	1237.553	20.105
1999	58	2300	(0,1654)	D	2.2492E-03	1237.948	17.786
1999	58	2300	(0,1664)	D	2.2355E-03	1238.366	15.358
1999	58	2300	(0,1565)	D	2.1362E-03	1240.367	18.081
1999	58	2300	(0,1665)	D	2.1299E-03	1240.731	15.875
1999	58	2300	(0,1610)	D	2.0936E-03	1240.482	23.720
1999	58	2300	(0,1630)	D	2.0375E-03	1241.669	23.413
1999	58	2300	(0,1638)	D	2.0270E-03	1242.304	21.031
1999	58	2300	(0,1655)	D	2.0266E-03	1242.724	18.603
1999	58	2300	(0,1666)	D	2.0241E-03	1243.097	16.394
1999	58	2300	(0,1563)	D	1.9889E-03	1242.042	26.353
1999	58	2300	(0,1639)	D	1.9236E-03	1244.453	21.503
1999	58	2300	(0,1559)	D	1.9185E-03	1244.063	23.818
1999	58	2300	(0,1566)	D	1.9165E-03	1245.048	19.338
1999	58	2300	(0,1629)	D	1.9120E-03	1243.635	26.250
1999	58	2300	(0,1667)	D	1.9109E-03	1245.642	16.610
1999	58	2300	(0,1694)	D	1.8973E-03	1246.543	11.996
1999	58	2300	(0,1593)	D	1.8362E-03	1248.638	5.578
1999	58	2300	(0,1685)	D	1.8332E-03	1247.760	14.669
1999	58	2300	(0,1747)	D	1.8193E-03	1249.173	2.607
1999	58	2300	(0,1656)	D	1.8078E-03	1247.453	19.643
1999	58	2300	(0,1668)	D	1.8060E-03	1248.007	17.130
1999	58	2300	(0,1631)	D	1.8041E-03	1246.442	24.232
1999	58	2300	(0,1695)	D	1.7999E-03	1248.910	12.517
1999	58	2300	(0,1712)	D	1.7967E-03	1249.356	9.980
1999	58	2300	(0,1628)	D	1.7953E-03	1246.044	26.551
1999	58	2300	(0,1739)	D	1.7774E-03	1250.260	5.367
1999	58	2300	(0,1748)	D	1.7628E-03	1250.765	3.072
1999	58	2300	(0,1560)	D	1.7224E-03	1248.143	24.717
1999	58	2300	(0,1574)	D	1.7110E-03	1250.671	15.306
1999	58	2300	(0,1696)	D	1.7092E-03	1251.170	13.015
1999	58	2300	(0,1582)	D	1.7082E-03	1251.624	10.474
1999	58	2300	(0,1669)	D	1.7080E-03	1250.265	17.628
1999	58	2300	(0,1567)	D	1.7063E-03	1249.741	20.028
1999	58	2300	(0,1723)	D	1.7049E-03	1251.992	8.269
1999	58	2300	(0,1640)	D	1.7035E-03	1249.252	22.217
1999	58	2300	(0,1564)	D	1.7005E-03	1247.862	27.520
1999	58	2300	(0,1594)	D	1.6842E-03	1252.902	4.684
1999	58	2300	(0,1749)	D	1.6829E-03	1253.029	3.571
1999	58	2300	(0,1697)	D	1.6188E-03	1253.478	13.295
1999	58	2300	(0,1686)	D	1.6187E-03	1252.946	15.699
1999	58	2300	(0,1713)	D	1.6159E-03	1253.961	11.111
1999	58	2300	(0,1670)	D	1.6131E-03	1252.546	18.017
1999	58	2300	(0,1657)	D	1.6096E-03	1251.991	20.530
1999	58	2300	(0,1740)	D	1.5992E-03	1255.156	6.218
1999	58	2300	(0,1763)	D	1.5966E-03	1255.715	1.644
1999	58	2300	(0,1750)	D	1.5942E-03	1255.579	3.791
1999	58	2300	(0,1698)	D	1.5299E-03	1255.737	13.795
1999	58	2300	(0,1583)	D	1.5296E-03	1256.252	11.498

```
*****************************************************************************************************************
**************                                                                                                  CALPOST  Version 5.2          Level 991104b
*****************************************************************************************************************
**************



 Run Title:
    BP Cherry Point Refinery
    Ferndale, WA
    Class I receptor concentrations

 ------------------------------------------------------------------------------

 INPUT GROUP: 1 -- General run control parameters
 --------------

      Option to run all periods found
      in the met. file(s)  (METRUN)        Default: 0   ! METRUN =   1  !

          METRUN = 0 - Run period explicitly defined below
          METRUN = 1 - Run all periods in CALPUFF data file(s)

      Starting date:    Year  (ISYR) --    No default   ! ISYR  =  1998   !
      (used only if     Month (ISMO) --    No default   ! ISMO  =  0    !
       METRUN = 0)      Day   (ISDY) --    No default   ! ISDY  =  0    !
                        Hour  (ISHR) --    No default   ! ISHR  =  0    !

      Number of hours to process (NHRS) -- No default   ! NHRS  =  0  !

      Process every hour of data?(NREP) -- Default: 1   ! NREP  =  1  !
       (1 = every hour processed,
        2 = every 2nd hour processed,
        5 = every 5th hour processed, etc.)

 Species & Concentration/Deposition Information
 ----------------------------------------------

       Species to process (ASPEC)       -- No default   ! ASPEC = nox  !
       (ASPEC = VISIB for visibility processing)

       Layer/deposition code (ILAYER)   -- Default: 1   ! ILAYER =  1  !
         '1'  for CALPUFF concentrations,
         '-1' for dry deposition fluxes,
         '-2' for wet deposition fluxes,
         '-3' for wet+dry deposition fluxes.

       Scaling factors of the form:     -- Defaults:    ! A =  0.0    !
             X(new) = X(old) * A + B          A = 0.0   ! B =  0.0    !
         (NOT applied if A = B = 0.0)         B = 0.0

       Add Hourly Background Concentrations/Fluxes?
                              (LBACK)  -- Default: F   ! LBACK =  F !

 Receptor information
 --------------------

   Gridded receptors processed?    (LG) -- Default: F   ! LG  = F  !
   Discrete receptors processed?   (LD) -- Default: F   ! LD  = T  !
   CTSG Complex terrain receptors processed?
                                  (LCT) -- Default: F   ! LCT = F  !

 --Report results by DISCRETE receptor RING?
   (only used when LD = T)      (LDRING) -- Default: F   ! LDRING = F  !

 --Select range of DISCRETE receptors (only used when LD = T):

   Select ALL DISCRETE receptors by setting NDRECP flag to -1;
                                 OR
   Select SPECIFIC DISCRETE receptors by entering a flag (0,1) for each
      0 = discrete receptor not processed
      1 = discrete receptor processed
   using repeated value notation to select blocks of receptors:
      23*1, 15*0, 12*1
   Flag for all receptors after the last one assigned is set to 0
   (NDRECP) -- Default: -1
                                                  ! NDRECP =  -1  !
```

```
--Select range of GRIDDED receptors (only used when LG = T):

      X index of LL corner (IBGRID) -- Default: -1      ! IBGRID = -1  !
          (-1 OR 1 <= IBGRID <= NX)

      Y index of LL corner (JBGRID) -- Default: -1      ! JBGRID = -1  !
          (-1 OR 1 <= JBGRID <= NY)

      X index of UR corner (IEGRID) -- Default: -1      ! IEGRID = -1  !
          (-1 OR 1 <= IEGRID <= NX)

      Y index of UR corner (JEGRID) -- Default: -1      ! JEGRID = -1  !
          (-1 OR 1 <= JEGRID <= NY)

  Note: Entire grid is processed if IBGRID=JBGRID=IEGRID=JEGRID=-1


--Specific gridded receptors can also be excluded from CALPOST
  processing by filling a processing grid array with 0s and 1s.  If the
  processing flag for receptor index (i,j) is 1 (ON), that receptor
  will be processed if it lies within the range delineated by IBGRID,
  JBGRID,IEGRID,JEGRID and if LG=T. If it is 0 (OFF), it will not be
  processed in the run.  By default, all array values are set to 1 (ON).

  Number of gridded receptor rows provided in Subgroup (1a) to
  identify specific gridded receptors to process
                          (NGONOFF) -- Default: 0       ! NGONOFF =  0  !

!END!


--------------
Subgroup (1a) -- Specific gridded receptors included/excluded
--------------

    Specific gridded receptors are excluded from CALPOST processing
    by filling a processing grid array with 0s and 1s.  A total of
    NGONOFF lines are read here.  Each line corresponds to one 'row'
    in the sampling grid, starting with the NORTHERNMOST row that
    contains receptors that you wish to exclude, and finishing with
    row 1 to the SOUTH (no intervening rows may be skipped).  Within
    a row, each receptor position is assigned either a 0 or 1,
    starting with the westernmost receptor.
       0 = gridded receptor not processed
       1 = gridded receptor processed

    Repeated value notation may be used to select blocks of receptors:
       23*1, 15*0, 12*1

    Because all values are initially set to 1, any receptors north of
    the first row entered, or east of the last value provided in a row,
    remain ON.

    (NGXRECP) -- Default: 1


--------------------------------------------------------------------------------

INPUT GROUP: 2 -- Visibility Parameters (ASPEC = VISIB)
--------------

    Maximum relative humidity (%) used in particle growth curve
                             (RHMAX) -- Default: 98    ! RHMAX  = 98.0 !

    Modeled species to be included in computing the light extinction
     Include SULFATE?          (LVSO4) -- Default: T    ! LVSO4  = T  !
     Include NITRATE?          (LVNO3) -- Default: T    ! LVNO3  = T  !
     Include ORGANIC CARBON?   (LVOC)  -- Default: T    ! LVOC   = F  !
     Include COARSE PARTICLES? (LVPMC) -- Default: T    ! LVPMC  = F  !
     Include FINE PARTICLES?   (LVPMF) -- Default: T    ! LVPMF  = T  !
     Include ELEMENTAL CARBON? (LVEC)  -- Default: T    ! LVEC   = F  !

    And, when ranking for TOP-N, TOP-50, and Exceedance tables,
     Include BACKGROUND?       (LVBK)  -- Default: T    ! LVBK   = T  !

    Species name used for particulates in MODEL.DAT file
                   COARSE    (SPECPMC) -- Default: PMC ! SPECPMC = EC !
```

```
                FINE       (SPECPMF) -- Default: PMF ! SPECPMF = PM10 !

Extinction Efficiency (1/Mm per ug/m**3)
----------------------------------------
    MODELED particulate species:
            PM  COARSE      (EEPMC) -- Default: 0.6 ! EEPMC  = 0.6 !
            PM  FINE        (EEPMF) -- Default: 1.0 ! EEPMF  = 10.0 !
    BACKGROUND particulate species:
            PM  COARSE    (EEPMCBK) -- Default: 0.6 ! EEPMCBK = 0.6 !
    Other species:
            AMMONIUM SULFATE (EESO4) -- Default: 3.0 ! EESO4  = 3.0 !
            AMMONIUM NITRATE (EENO3) -- Default: 3.0 ! EENO3  = 3.0 !
            ORGANIC CARBON   (EEOC)  -- Default: 4.0 ! EEOC   = 4.0 !
            SOIL             (EESOIL)-- Default: 1.0 ! EESOIL = 1.0 !
            ELEMENTAL CARBON (EEEC)  -- Default: 10. ! EEEC   = 10.0 !

Background Extinction Computation
---------------------------------

    Method used for background light extinction
                            (MVISBK) -- Default: 6   ! MVISBK =  2  !

        1 =  Supply single light extinction and hygroscopic fraction
             - IWAQM (1993) RH adjustment applied to hygroscopic background
               and modeled sulfate and nitrate
        2 =  Compute extinction from speciated PM measurements (A)
             - Hourly RH adjustment applied to observed and modeled sulfate
               and nitrate
             - RH factor is capped at RHMAX
        3 =  Compute extinction from speciated PM measurements (B)
             - Hourly RH adjustment applied to observed and modeled sulfate
               and nitrate
             - Receptor-hour excluded if RH>RHMAX
             - Receptor-day excluded if fewer than 6 valid receptor-hours
        4 =  Read hourly transmissometer background extinction measurements
             - Hourly RH adjustment applied to modeled sulfate and nitrate
             - Hour excluded if measurement invalid (missing, interference,
               or large RH)
             - Receptor-hour excluded if RH>RHMAX
             - Receptor-day excluded if fewer than 6 valid receptor-hours
        5 =  Read hourly nephelometer background extinction measurements
             - Rayleigh extinction value (BEXTRAY) added to measurement
             - Hourly RH adjustment applied to modeled sulfate and nitrate
             - Hour excluded if measurement invalid (missing, interference,
               or large RH)
             - Receptor-hour excluded if RH>RHMAX
             - Receptor-day excluded if fewer than 6 valid receptor-hours
        6 =  Compute extinction from speciated PM measurements
             - FLAG RH adjustment factor applied to observed and
               modeled sulfate and nitrate

    Additional inputs used for MVISBK = 1:
    --------------------------------------
     Background light extinction (1/Mm)
                            (BEXTBK) -- No default   ! BEXTBK = 12.0 !
     Percentage of particles affected by relative humidity
                            (RHFRAC) -- No default   ! RHFRAC = 0.0 !

    Additional inputs used for MVISBK = 6:
    --------------------------------------
     Extinction coefficients for hygroscopic species (modeled and
     background) are computed using a monthly RH adjustment factor
     in place of an hourly RH factor (VISB.DAT file is NOT needed).
     Enter the 12 monthly factors here (RHFAC).  Month 1 is January.

     (RHFAC)  -- No default      ! RHFAC = 4.4, 4.4, 4.1, 4.1,
                                           4.1, 3.4, 3.4, 3.4,
                                           5.8, 5.8, 5.8, 4.4 !

    Additional inputs used for MVISBK = 2,3,6:
    ------------------------------------------
     Background extinction coefficients are computed from monthly
     CONCENTRATIONS of ammonium sulfate (BKSO4), ammonium nitrate (BKNO3),
     coarse particulates (BKPMC), organic carbon (BKOC), soil (BKSOIL), and
     elemental carbon (BKEC).  Month 1 is January.
     (ug/m**3)

     (BKSO4)  -- No default      ! BKSO4 = 0.1, 0.1, 0.1, 0.1,
                                           0.1, 0.1, 0.1, 0.1,
```

```
                                        0.1, 0.1, 0.1, 0.1 !
(BKNO3)  -- No default      ! BKNO3 = 0.1, 0.1, 0.1, 0.1,
                                        0.1, 0.1, 0.1, 0.1,
                                        0.1, 0.1, 0.1, 0.1 !
(BKPMC)  -- No default      ! BKPMC = 3.0, 3.0, 3.0, 3.0,
                                        3.0, 3.0, 3.0, 3.0,
                                        3.0, 3.0, 3.0, 3.0 !
(BKOC)   -- No default      ! BKOC  = 0.5, 0.5, 0.5, 0.5,
                                        0.5, 0.5, 0.5, 0.5,
                                        0.5, 0.5, 0.5, 0.5 !
(BKSOIL) -- No default      ! BKSOIL= 0.5, 0.5, 0.5, 0.5,
                                        0.5, 0.5, 0.5, 0.5,
                                        0.5, 0.5, 0.5, 0.5 !
(BKEC)   -- No default      ! BKEC  = 0.02, 0.02, 0.02, 0.02,
                                        0.02, 0.02, 0.02, 0.02,
                                        0.02, 0.02, 0.02, 0.02 !

Additional inputs used for MVISBK = 2,3,5,6:
-------------------------------------------
 Extinction due to Rayleigh scattering is added (1/Mm)
                        (BEXTRAY) -- Default: 10.0 ! BEXTRAY = 10.0 !

!END!
-------------------------------------------------------------------------------

INPUT GROUP: 3 -- Output options
--------------

Output Units
------------
   Units for All Output        (IPRTU) -- Default: 1   ! IPRTU =  3   !
                   for              for
               Concentration    Deposition
      1 =         g/m**3          g/m**2/s
      2 =        mg/m**3         mg/m**2/s
      3 =        ug/m**3         ug/m**2/s
      4 =        ng/m**3         ng/m**2/s
      5 =      Odour Units

   Visibility: extinction expressed in 1/Mega-meters (IPRTU is ignored)


Averaging time(s) reported
--------------------------

   1-hr averages            (L1HR) -- Default: T   !   L1HR = F  !

   3-hr averages            (L3HR) -- Default: T   !   L3HR = F  !

   24-hr averages          (L24HR) -- Default: T   !  L24HR = F  !

   Run-length averages     (LRUNL) -- Default: T   !  LRUNL = T  !

   User-specified averaging time in hours - results for
   an averaging time of NAVG hours are reported for
   NAVG greater than 0:
                           (NAVG) -- Default: 0   !   NAVG =  0  !


Types of tabulations reported
-----------------------------

   1) Visibility: daily visibility tabulations are always reported
                  for the selected receptors when ASPEC = VISIB.
                  In addition, any of the other tabulations listed
                  below may be chosen to characterize the light
                  extinction coefficients.
                  [List file or Plot/Analysis File]


   2) Top 50 table for each averaging time selected
      [List file only]
                           (LT50) -- Default: T   !   LT50 = T  !

   3) Top 'N' table for each averaging time selected
      [List file or Plot file]
                          (LTOPN) -- Default: F   !  LTOPN = F  !

       -- Number of 'Top-N' values at each receptor
```

```
selected (NTOP must be <= 4)
                    (NTOP) -- Default: 4    ! NTOP =  4    !

 -- Specific ranks of 'Top-N' values reported
    (NTOP values must be entered)
            (ITOP(4) array) -- Default:      ! ITOP =  1 , 2 , 3 , 4    !
                               1,2,3,4


4) Threshold exceedance counts for each receptor and each averaging
   time selected
   [List file or Plot file]
                     (LEXCD) -- Default: F    !  LEXCD = F  !

    -- Identify the threshold for each averaging time by assigning a
       non-negative value (output units).

                                -- Default: -1.0
       Threshold for  1-hr averages    (THRESH1) !  THRESH1 = 3.0E-02 !
       Threshold for  3-hr averages    (THRESH3) !  THRESH3 = -1.0   !
       Threshold for 24-hr averages   (THRESH24) ! THRESH24 = 3.0E-02 !
       Threshold for NAVG-hr averages (THRESHN) !  THRESHN = 3.0E-02 !


    -- Counts for the shortest averaging period selected can be
       tallied daily, and receptors that experience more than NCOUNT
       counts over any NDAY period will be reported.  This type of
       exceedance violation output is triggered only if NDAY > 0.

       Accumulation period(Days)
                      (NDAY) -- Default: 0    !    NDAY =  0  !
       Number of exceedances allowed
                    (NCOUNT) -- Default: 1    !  NCOUNT =  1  !


5) Selected day table(s)

   Echo Option -- Many records are written each averaging period
   selected and output is grouped by day
   [List file or Plot file]
                      (LECHO) -- Default: F    !  LECHO = F  !

   Timeseries Option -- Averages at all selected receptors for
   each selected averaging period are written to timeseries files.
   Each file contains one averaging period, and all receptors are
   written to a single record each averaging time.
   [TSttUUUU.DAT files]
                      (LTIME) -- Default: F    !  LTIME = F  !

     -- Days selected for output
                 (IECHO(366)) -- Default: 366*0
        ! IECHO  = 366*0  !
        (366 values must be entered)

Plot output options
-------------------

   Plot files can be created for the Top-N, Exceedance, and Echo
   tables selected above.  Two formats for these files are available,
   DATA and GRID.  In the DATA format, results at all receptors are
   listed along with the receptor location [x,y,val1,val2,...].
   In the GRID format, results at only gridded receptors are written,
   using a compact representation.  The gridded values are written in
   rows (x varies), starting with the most southern row of the grid.
   The GRID format is given the .GRD extension, and includes headers
   compatible with the SURFER(R) plotting software.

   A plotting and analysis file can also be created for the daily
   peak visibility summary output, in DATA format only.

   Generate Plot file output in addition to writing tables
   to List file?
                             (LPLT) -- Default: F    ! LPLT  = F !

   Use GRID format rather than DATA format,
   when available?
                             (LGRD) -- Default: F    ! LGRD  = F !
```

```
Additional Debug Output
-----------------------

   Output selected information to List file
    for debugging?
                              (LDEBUG) -- Default: F  ! LDEBUG  = F !

 !END!

-------------------------------------------------
NOTICE: Starting year in control file sets the
        expected century for the simulation.  All
        YY years are converted to YYYY years in
        the range:          1948        2047
-------------------------------------------------

*****************************************************************************************************************
**************
                                          CALPOST  Version 5.2          Level 991104b
*****************************************************************************************************************
**************



  CALPOST Control File Input Summary -------------------------

     Replace run data with data in Puff file 1=Y:    1
                      Run starting date -- year: 1998
                                           month:    0
                                             day:    0
                                       Julian day:    0
         Time at beginning of run  -  hour(0-23):    0
                                   -      second:    0
                             Run length (hours):    0


  Every hour of data processed -- NREP = 1


   Species & Concentration/Deposition Information
                                         Species: NOX
                         Layer of processed data:    1
     (>0=conc, -1=dry flux, -2=wet flux, -3=wet & dry flux)
                   Multiplicative scaling factor: 0.0000E+00
                         Additive scaling factor: 0.0000E+00
                  Hourly background values used?: F


   Receptor information
                    Gridded receptors processed?: F
                   Discrete receptors processed?: T
       CTSG Complex terrain receptors processed?: F

   Discrete Receptors Processed

   (All Discrete Receptors are Used)


   Visibility Processing is NOT Selected



   Output options
                      Units requested for output:   (ug/m**3)

   Averaging time(s) selected
       User-specified averaging time (NAVG hours):     0
                                     1-hr averages:     F
                                     3-hr averages:     F
                                    24-hr averages:     F
                                  NAVG-hr averages:     F
                           Length of run averages:     T

   Output components selected
                                            Top-50:     T
                    Top-N values at each receptor:     F
               Exceedance counts at each receptor:     F
```

Output selected information for debugging: F
Echo tables for selected days: F
Time-series for selected days: F

Plot file option
Plot files created: F

IDENTIFICATION OF PROCESSED MODEL FILE ----------

CALPUFF 5.5 010730_1

BP Cherry Point Cogeneration
Ferndale, WA
Case 6, Class I receptors

Averaging time for values reported from model:
1 HOUR

Number of averaging periods in file from model:
7992

Chemical species names for each layer in model:
SO2 1
NOX 1
PM10 1

********** NOTICE **********
NDRECP array reset to full range: all 1s

INPUT FILES

Default Name	Unit No.	File Name and Path
CALPOST.INP	5	D:\CALPUFF\CONPOST.INP
MODEL.DAT	4	D:\CALPUFF\6CONCC.DAT

OUTPUT FILES

Default Name	Unit No.	File Name and Path
CALPOST.LST	8	D:\CALPUFF\6CONCNOX.LST

****
CALPOST Version 5.2 Level 991104b
****

NOX 1

TOP-50 7992 HOUR AVERAGE CONCENTRATION VALUES (ug/m**3)

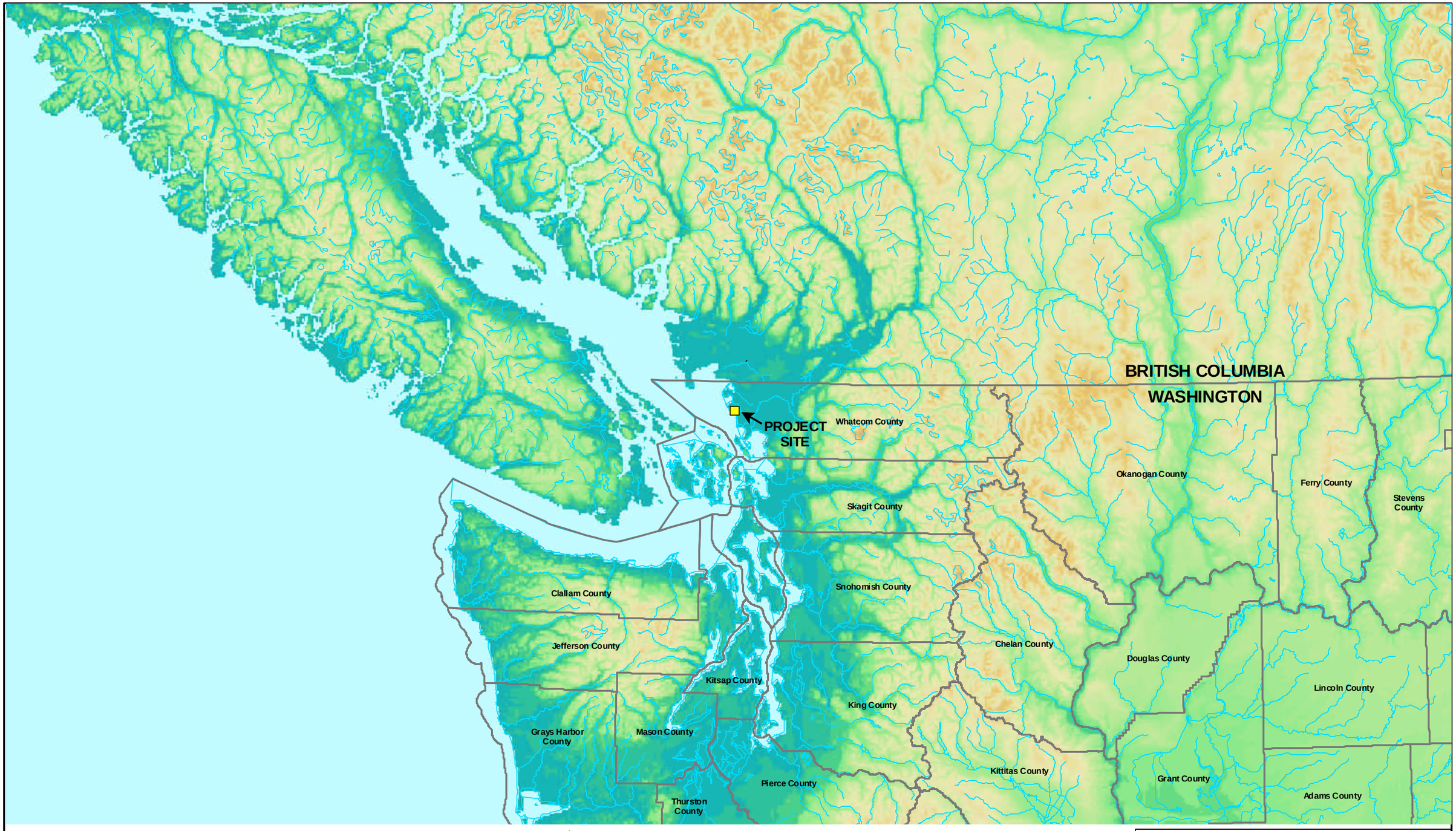
YEAR	DAY	TIME(HHMM)	RECEPTOR	TYPE	CONCENTRATION	COORDINATES (km)	
1999	58	2300	(0,1609)	D	5.2860E-03	1236.247	20.960
1999	58	2300	(0,1637)	D	5.1649E-03	1237.553	20.105
1999	58	2300	(0,1654)	D	5.1544E-03	1237.948	17.786
1999	58	2300	(0,1664)	D	5.1367E-03	1238.366	15.358
1999	58	2300	(0,1565)	D	4.9190E-03	1240.367	18.081
1999	58	2300	(0,1665)	D	4.9143E-03	1240.731	15.875
1999	58	2300	(0,1610)	D	4.8102E-03	1240.482	23.720
1999	58	2300	(0,1630)	D	4.6987E-03	1241.669	23.413
1999	58	2300	(0,1666)	D	4.6961E-03	1243.097	16.394
1999	58	2300	(0,1655)	D	4.6934E-03	1242.724	18.603
1999	58	2300	(0,1638)	D	4.6865E-03	1242.304	21.031
1999	58	2300	(0,1563)	D	4.5903E-03	1242.042	26.353

1999	58	2300	(0,1833)	D	4.4914E-03	1189.288	126.399
1999	58	2300	(0,1639)	D	4.4769E-03	1244.453	21.503
1999	58	2300	(0,1566)	D	4.4690E-03	1245.048	19.338
1999	58	2300	(0,1667)	D	4.4677E-03	1245.642	16.610
1999	58	2300	(0,1559)	D	4.4593E-03	1244.063	23.818
1999	58	2300	(0,1694)	D	4.4560E-03	1246.543	11.996
1999	58	2300	(0,1629)	D	4.4379E-03	1243.635	26.250
1999	58	2300	(0,1827)	D	4.3607E-03	1188.809	128.796
1999	58	2300	(0,1593)	D	4.3530E-03	1248.638	5.578
1999	58	2300	(0,1747)	D	4.3287E-03	1249.173	2.607
1999	58	2300	(0,1685)	D	4.3186E-03	1247.760	14.669
1999	58	2300	(0,1712)	D	4.2593E-03	1249.356	9.980
1999	58	2300	(0,1695)	D	4.2586E-03	1248.910	12.517
1999	58	2300	(0,1668)	D	4.2567E-03	1248.007	17.130
1999	58	2300	(0,1656)	D	4.2514E-03	1247.453	19.643
1999	58	2300	(0,1739)	D	4.2354E-03	1250.260	5.367
1999	58	2300	(0,1631)	D	4.2305E-03	1246.442	24.232
1999	58	2300	(0,1748)	D	4.2136E-03	1250.765	3.072
1999	58	2300	(0,1628)	D	4.2056E-03	1246.044	26.551
1999	58	2300	(0,1785)	D	4.1322E-03	1191.635	126.884
1999	58	2300	(0,1723)	D	4.0813E-03	1251.992	8.269
1999	58	2300	(0,1582)	D	4.0809E-03	1251.624	10.474
1999	58	2300	(0,1696)	D	4.0759E-03	1251.170	13.015
1999	58	2300	(0,1574)	D	4.0736E-03	1250.671	15.306
1999	58	2300	(0,1824)	D	4.0677E-03	1189.563	131.406
1999	58	2300	(0,1560)	D	4.0673E-03	1248.143	24.717
1999	58	2300	(0,1669)	D	4.0606E-03	1250.265	17.628
1999	58	2300	(0,1749)	D	4.0521E-03	1253.029	3.571
1999	58	2300	(0,1594)	D	4.0513E-03	1252.902	4.684
1999	58	2300	(0,1567)	D	4.0501E-03	1249.741	20.028
1999	58	2300	(0,1640)	D	4.0370E-03	1249.252	22.217
1999	58	2300	(0,1828)	D	4.0177E-03	1191.176	129.268
1999	58	2300	(0,1564)	D	4.0150E-03	1247.862	27.520
1999	58	2300	(0,1817)	D	3.9776E-03	1189.091	133.770
1999	58	2300	(0,1816)	D	3.9154E-03	1188.572	136.108
1999	58	2300	(0,1786)	D	3.9077E-03	1190.759	131.630
1999	58	2300	(0,1713)	D	3.8966E-03	1253.961	11.111
1999	58	2300	(0,1697)	D	3.8959E-03	1253.478	13.295

Figures

Figure 2-1

Regional Map



LEGEND

- Streams
- Washington County Lines

N

0 15 30 Miles

0 24 48 Kilometers

Scale 1" = 30 Miles / 48.6 Kilometers

Map Projection:
Washington State Plane North NAD 83, Units Feet

Source: Washington Department of Transportation, Washington Department of Ecology, Interior Columbia River Basin Ecosystem Management Project (ICBEMP), British Columbia Ministry of Water, Land and Air Protection

REGIONAL MAP

BP CHERRY POINT COGENERATION PROJECT

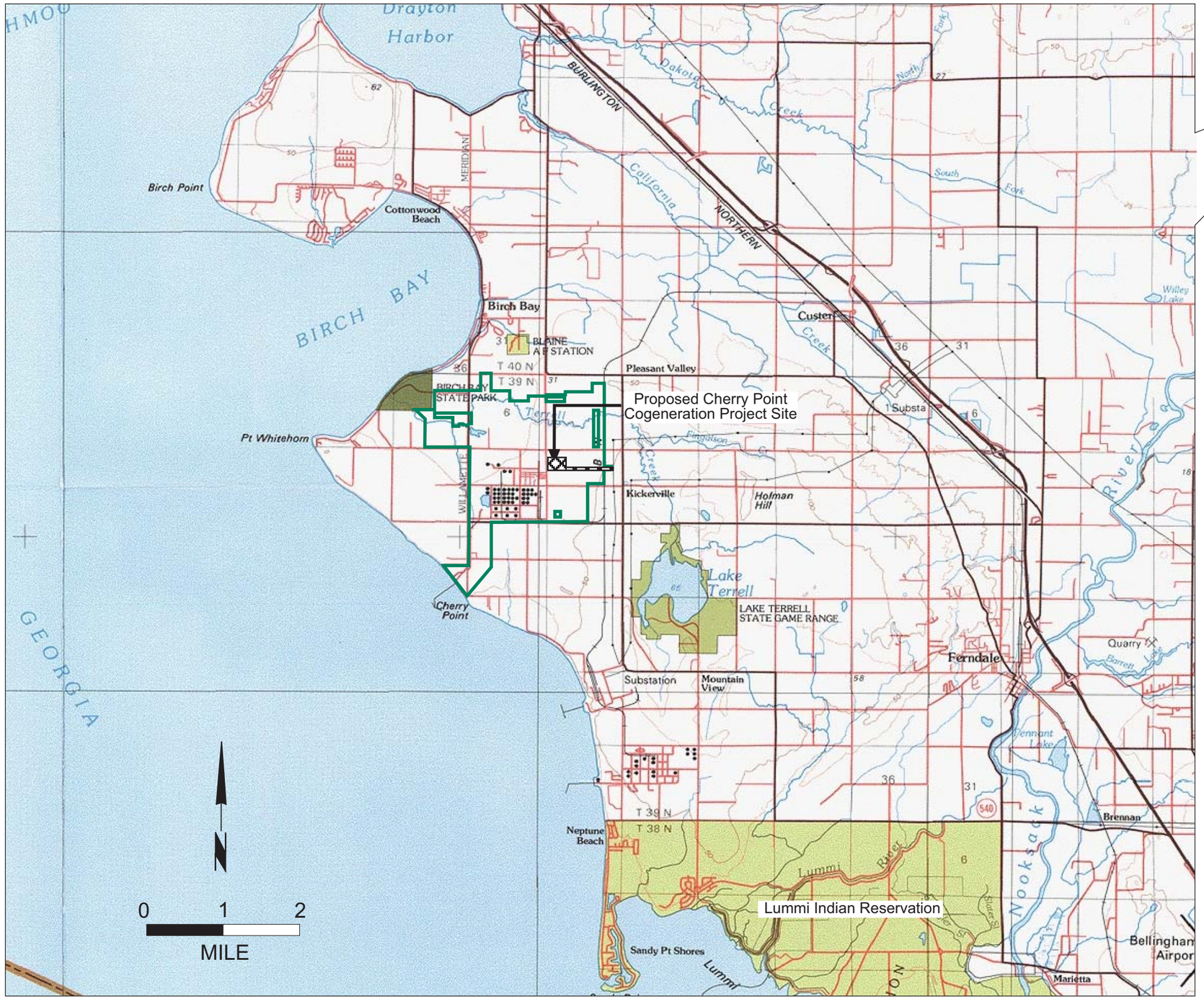
Drawn: GKL	App'd:	Date: Jun 06, 2002	Figure: 2-1

L:/projects/2001/0131421/700/GIS/APRS/0131421700_052202.apr

Golder Associates

Figure 2-2

Vicinity Map



LEGEND

Approximate BP Property Boundary

Proposed Cherry Point Cogeneration Project Site and Transmission Line Corridor

Prepared by: Golder Associates

FIGURE **2-2**

CHERRY POINT COGENERATION VICINITY MAP

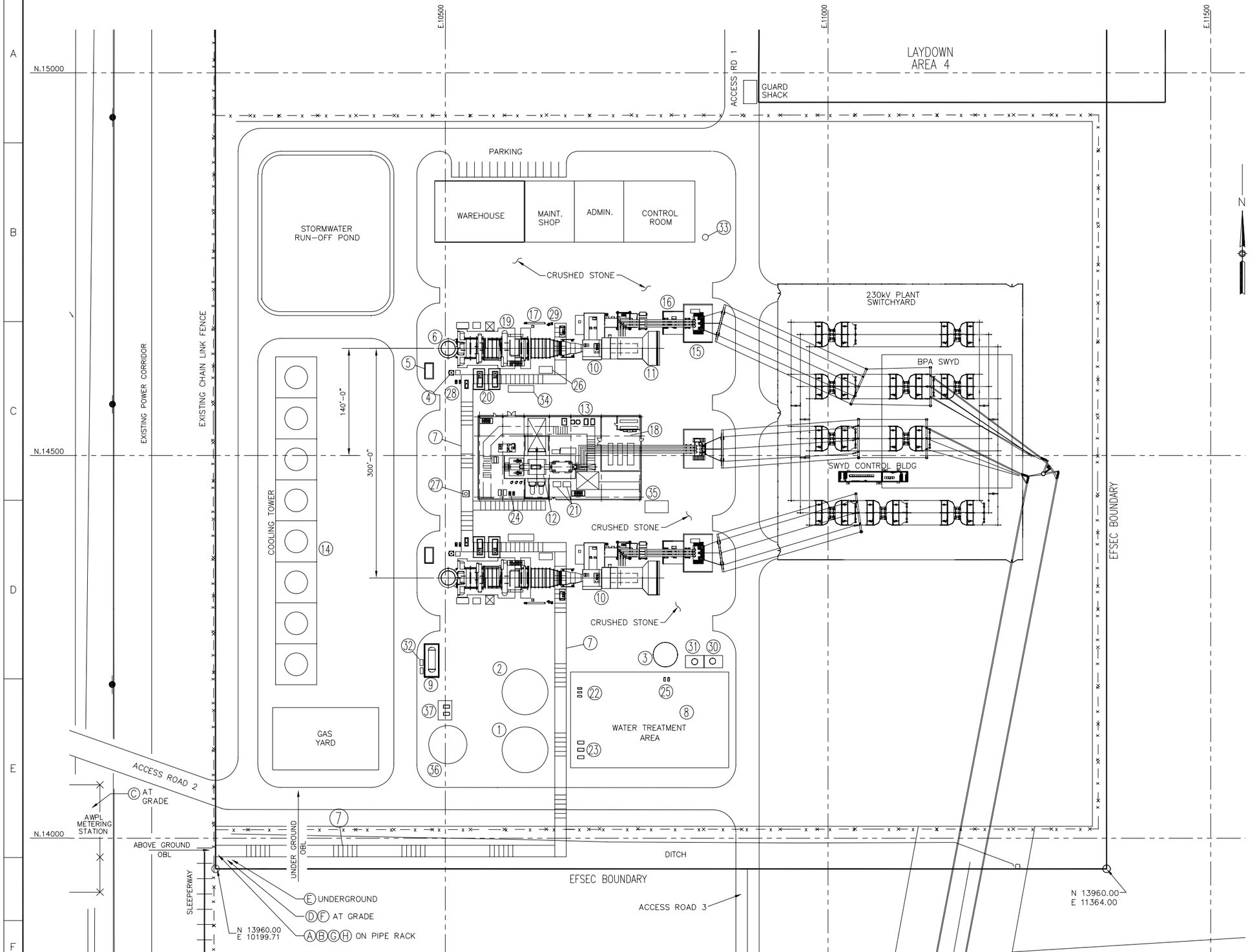
BP/CHERRY POINT COGENERATION PROJECT/WA

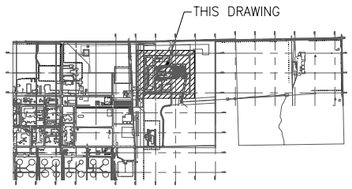
DRAWING NO. 0131421700fg01 DATE 06/04/02 DRAWN BY EL

Golder Associates

Figure 2-3

Site Plan (Base Case)





KEY PLAN

EQUIPMENT LIST

EQUIPMENT DESCRIPTION

1. BFW & CONDENSATE STORAGE TANK
2. DEMINERALIZED WATER STORAGE TANK
3. NEUTRALIZATION TANK
4. BOILER BLOW DOWN DRUM
5. CEMS ENCLOSURE
6. STACK
7. PIPE RACK
8. DEMIN. SYSTEM & CHEMICAL FEED EQUIPMENT
9. AQUEOUS AMMONIA STORAGE TANK
10. GAS TURBINE GENERATORS
11. CT AIR INTAKE
12. STEAM TURBINE GENERATOR
13. PLANT/INSTRUMENT AIR COMPRESSORS SKID
14. COOLING TOWER
15. STEP UP TRANSFORMER
16. AUXILIARY TRANSFORMER
17. FUEL GAS HEATER
18. ELECTRICAL SWITCHGEAR & EQUIPMENT AREA
19. HEAT RECOVERY STEAM GENERATOR
20. HP/IP BOILER FEED WATER PUMPS
21. VACUUM PRIMING PUMPS
22. DEMINERALIZED WATER PUMPS
23. BFW/CONDENSATE TRANSFER PUMPS
24. CLOSED LOOP COOLING WATER PUMPS
25. NEUTRALIZATION TANK TRANSFER PUMPS
26. DUCT BURNER SKID
27. OILY WATER SUMP PUMP
28. BLOW DOWN WATER SUMP PUMP
29. FUEL GAS FILTER SEPARATOR
30. ACID STORAGE TANK
31. CAUSTIC STORAGE TANK
32. AQUEOUS AMMONIA VAPORIZER
33. SANITARY LIFT STATIONS
34. POWER DISTRIBUTION CENTER (PDC)
35. EMERGENCY DIESEL GENERATOR
36. RAW WATER STORGAGE TANK
37. FIRE WATER PUMP BUILDING

LEGEND

- LAYDOWN AND PARKING
- COGEN FENCE BOUNDARY
- EFSEC BOUNDARY
- UTILITY PIPE RACK

- A — EXTRACTION STEAM EXPORT
- B — RETURN CONDENSATE
- C — NATURAL GAS
- D — REFINERY FUEL GAS
- E — INDUSTRIAL WATER
- F — FACILITY WASTE / PROCESS WATER
- G — POTABLE WATER
- H — DATA HIGHWAY

APPROVED: later
REGISTERED PROFESSIONAL ENGINEER NO. later
STATE OF WAW

ISSUE	DATE	DESCRIPTION	BY	CHK'D

PB Power
A Division of Parsons Brinckerhoff Quade & Douglas Inc.
75 ARLINGTON STREET, BOSTON, MASS. 02116

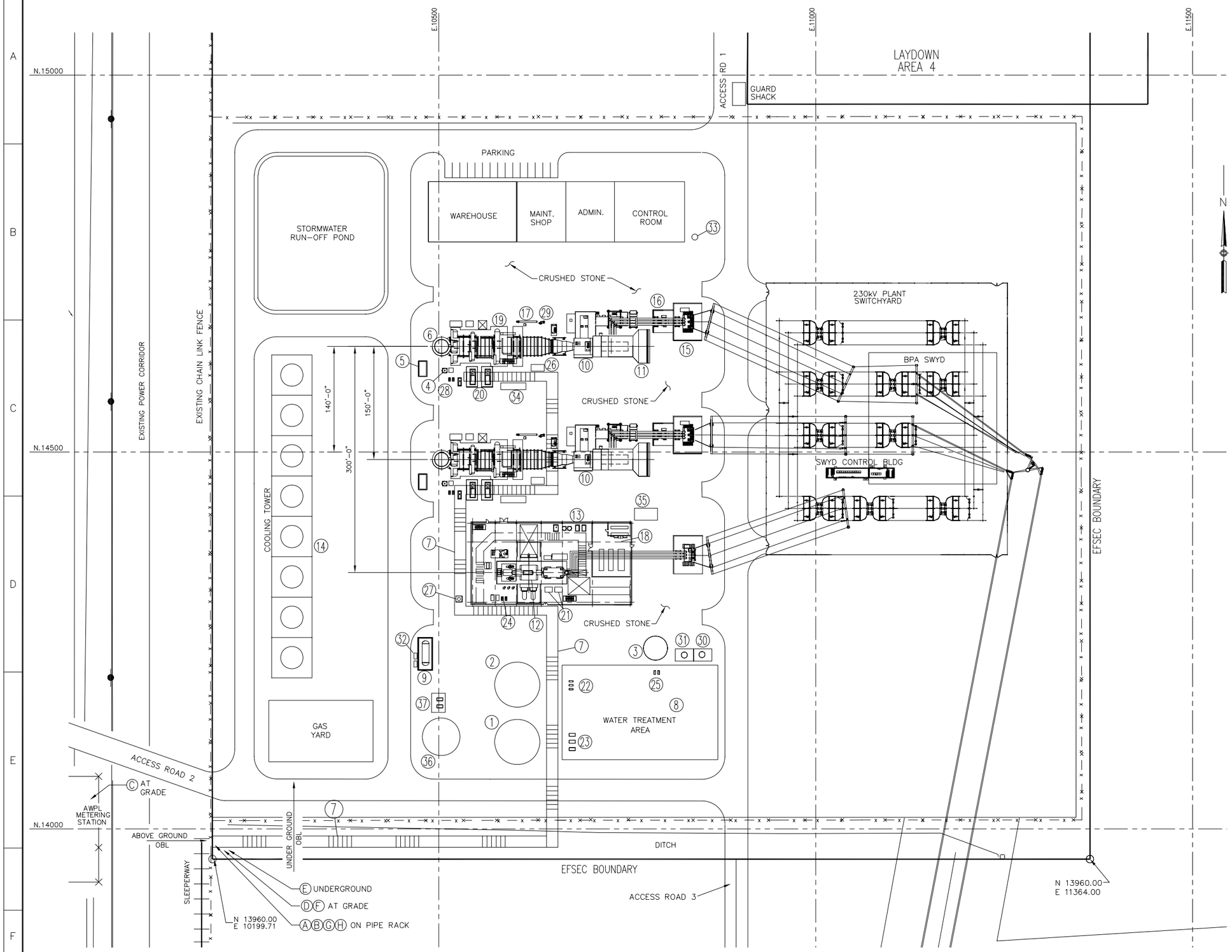
bp
CHERRY POINT

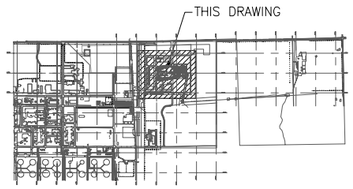
ALTERNATIVE 1
PLOT PLAN

DR. JCM
DES.
CHK.
APPROVED DATE
PRINCIPAL IN CHARGE DATE
DRAWING NO. FIG 2-3
REV. A
SHEET OF

Figure 2-4

Site Plan (Alternate Case)





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- G — POTABLE WATER
- H — DATA HIGHWAY

APPROVED: later
REGISTERED PROFESSIONAL ENGINEER NO. later
STATE OF WA

ISSUE	DATE	DESCRIPTION	BY	CHK'D

PB Power
A Division of Parsons Brinckerhoff Quade & Douglas Inc.
75 ARLINGTON STREET, BOSTON, MASS. 02116

bp
CHERRY POINT

ALTERNATIVE 2
PLOT PLAN

DR. JCM
DES.
CHK.
APPROVED DATE
PRINCIPAL IN CHARGE DATE

DRAWING NO. FIG 2-4
REV A
SHEET OF

FORMS

PSD APPLICABILITY FORM

This form is an aid to help determine if a proposed project will be required to undergo PSD review. Please submit this form with the cover sheet of the Notice of Construction application to the Local Air Authority. For locations in eastern Washington where the Department of Ecology is the delegated local air authority, submit this form to the appropriate Ecology Regional Office.

It is the responsibility of the applicant to ensure that all preconstruction permits are obtained before commencement of construction.

COMPANY INFORMATION

Company or owner name: Cherry Point Cogeneration Project

Mailing address: 4519 Grandview Road

Blaine, WA 98230

Facility address: same

Contact: Mr. Mark Moore

Telephone: 360-371-1200

Facility industrial classification and SIC: Turbines and turbine generator sets; SIC Code 3511

PROCESS INFORMATION AND EMISSIONS CALCULATIONS

This section is intended to furnish a best estimate of annual emissions and sufficient information for agency technical staff to verify the applicant's conclusions in answering the questions in the next section. Please provide:

(1) A description of the process with a flow diagram indicating points of emissions to the air.

(2) Design and operating parameters for the process (i.e., hours of operation per year, maximum and normal production rates, fuel and raw material requirements).

(3) Estimates of the potential emissions for all air pollutants from each emissions point and a description of the method or basis used to make the emission estimates (in enough detail so that one can follow the logic and the calculation steps). Potential emissions are based on the maximum rate from each emission point taking into account air pollution control equipment.

For either a new or modified source, calculate its potential to emit each regulated pollutant based on operation at maximum capacity (such as 8760 hours/year) with emissions control equipment operating.

For a modified source, subtract the actual emissions of the existing source from the potential to emit of the modified source to calculate the emissions increase(decrease). Actual emissions are the average of the last 24 months of operation, if that period is representative of normal operations.

Regulated Pollutant Under PSD	Potential To Emit Tons/Year	Actual Emissions Tons/Year	Emissions Increase (Decrease)	Significant PSD Rate Tons/Year
Carbon Monoxide	158			100
Nitrogen oxides	220			40
Sulfur dioxide	51			40
Particulate matter PM_{10}	262			25 15
Ozone (VOCs)	58			40
Lead (elemental)	0			0.6
Fluorides	0			3
Sulfuric acid mist	35			7
Total reduced sulfur (including H_2S)	0			10
Reduced sulfur compounds (including H_2S)	0			10
Municipal waste combustor organics Dioxins and furans Metals	0			 $3.5x10^{-6}$ 15
Municipal waste combustor acid gasses	0			40

QUESTION 1

Does the proposed source or, in the case of a modification to a source, the existing source fall within one of the following 28 source categories?

1. Fossil fuel-fired steam electric plants of more than 250 million Btu/hr heat input
2. Coal cleaning plants with thermal dryers
3. Kraft pulp mills
4. Portland cement plants
5. Primary zinc smelters
6. Iron and steel mill plants
7. Primary aluminum ore reduction plants
8. Primary copper smelters
9. Municipal incinerators capable of charging more than 250 tons of refuse per day
10. Hydrofluoric acid plants
11. Sulfuric acid plants
12. Nitric acid plants
13. Petroleum refineries
14. Lime plants
15. Phosphate rock processing plants
16. Coke oven batteries
17. Sulfur recovery plants
18. Carbon black plants (furnace process)
19. Primary lead smelters
20. Fuel conversion plants
21. Sintering plants
22. Secondary metal production plants
23. Chemical process plants
24. Fossil fuel boilers (or combinations) totaling more than 250 million Btu/hr heat input
25. Petroleum storage and transfer units with a total storage capacity exceeding 300,000 barrels
26. Taconite ore processing plants
27. Glass fiber processing plants
28. Charcoal production plants

YES__X_ (Please circle number.) GO TO QUESTION 2.

NO_____ GO TO QUESTION 3.

QUESTION 2

Will emissions of any one regulated pollutant (including fugitive emissions) from the proposed or existing source potentially exceed 100 tons per year?

YES_X_ GO TO QUESTION 6.

NO_____ PSD IS NOT REQUIRED. DO NOT ANSWER ANY MORE QUESTIONS. SUBMIT THIS FORM WITH THE NOTICE OF CONSTRUCTION APPLICATION.

QUESTION 3

Does the proposed source or, in the case of a modification to a source, the existing source fall within one of the following source categories?

1. Municipal Incinerators (≥ 50 tons/day)
2. Asphalt concrete plants
3. Storage vessels for petroleum liquids, ≥40,000 gallons, construction after 06/11/73 and prior to 05/19/78.
4. Storage vessels for petroleum liquids, ≥40,000 gallons, construction after 05/18/78
5. Sewage treatment plants with sludge incinerators
6. Phosphate fertilizer industry: Plants manufacturing wet-process phosphoric acid, superphosphoric acid, diammonium phosphate, triple superphosphate, and granular triple superphosphate storage facilities.
7. Glass melting furnace ≥ 4,555 kilograms glass/day, (except all electric melters)
8. Grain elevators
9. Stationary gas turbines ≥ 10.7 gigajoules/hour heat input
10. Lead acid battery manufacturing plants
11. Automobile and light-duty truck assembly plant surface coating operations

YES____ (Please Circle Number) GO TO QUESTION 4

NO_____ GO TO QUESTION 5

QUESTION 4

Will the emissions of any one regulated pollutant (including fugitive emissions) from the proposed or existing source potentially exceed 250 tons/year?

YES____ GO TO QUESTION 6

NO_____ PSD IS NOT REQUIRED. DO NOT ANSWER ANY MORE QUESTIONS. SUBMIT THIS FORM WITH THE NOTICE OF CONSTRUCTION APPLICATION.

QUESTION 5

Will emissions of any one pollutant (not including fugitive emissions) from the proposed or existing source potentially exceed 250 tons per year?

YES____ GO TO QUESTION 6.

NO_____ PSD IS NOT REQUIRED. DO NOT ANSWER ANY MORE QUESTIONS. SUBMIT THIS FORM WITH THE NOTICE OF CONSTRUCTION APPLICATION.

QUESTION 6

Is the project located within 10 kilometers (6.2 miles) of the boundary of a Class I area? Class I areas in Washington State are Mount Rainier National Park, North Cascade National Park, Olympic National Park, Alpine Lakes Wilderness Area, Glacier Peak Wilderness Area, Goat Rocks Wilderness Area, Mount Adams Wilderness Area, Pasayten Wilderness Area, and the Spokane Indian Reservation.

YES____ PSD REVIEW IS REQUIRED IF THE IMPACT OF ANY REGULATED POLLUTANT IS EQUAL TO OR GREATER THAN 1 $\mu g/m^3$, (24-hour average).

NO_X___ CONTINUE

QUESTION 7

Is the proposed project a

1. _X_ new source? GO TO QUESTION 8.
2. ____ modification, expansion, or addition to an existing source? GO TO QUESTION 9.

QUESTION 8

For which regulated pollutants does the potential to emit of the new source exceed the PSD significant rate? __CO, NO_x, SO2, particulate matter, VOCs, sulfuric acid mist_____

PSD REVIEW IS REQUIRED FOR THESE POLLUTANTS. YOU MUST MEET WITH THE DEPARTMENT OF ECOLOGY TO DISCUSS THE PSD APPLICATION PROCEDURE.

QUESTION 9

For which regulated pollutants do the emissions increase from the modified source exceed the PSD significant rate?

_____

_____

PSD REVIEW IS REQUIRED FOR THESE POLLUTANTS. YOU MUST MEET WITH THE DEPARTMENT OF ECOLOGY TO DISCUSS THE PSD APPLICATION PROCEDURE.

NOTICE OF CONSTRUCTION AND APPLICATION FOR APPROVAL

Northwest Air Pollution Authority
1600 South Second Street
Mount Vernon, WA 98273-5202
360-428-1617

TO CONSTRUCT, INSTALL, ESTABLISH OR ALTER AN AIR CONTAMINANT SOURCE AND/OR CONTROL FACILITY

SOURCE NAME
Cherry Point Cogeneration Project

CONTACT PERSON Mr. Mark Moore
TELEPHONE # 360-371-1200
LOCATION OF ACTIVITY
BP Cherry Point Refinery

MAILING ADDRESS 4519 Grandview Road
CITY Blaine STATE WA ZIP 98230
PHONE 360-371-1757

TYPE OF PROCESS Combined-cycle natural gas-fired combustion turbine cogeneration facility
SIZE OR CAPACITY 520-570 megawatts
PROCESS EQUIPMENT OR APPARATUS INVOLVED Two General Electric 7FA or Siemens SGT6-5000F Combustion Turbines, two heat recovery steam generators, one steam turbine.

SIC CODE 3511

SPECIFY AIR CONTAMINANTS PRODUCED
NO_X, CO, VOC, SO_2, PM, and toxic air pollutants

CONTROL APPARATUS INVOLVED AND ESTIMATED EFFICIENCY Selective Catalyst Reduction for approximately 80% removal efficiency for NOX and Oxidation Catalyst for approximately 87% removal efficiency for CO and 30% for VOC.

FACILITY OPERATING FREQUENCY
8,760 hours per year
PROJECTED COMPLETION DATE 2009
IF YOU ARE CONSTRUCTING IDENTICAL UNITS, HOW MANY? Not applicable

A $110.00 FILING FEE & NEW SOURCE REVIEW FEE MUST ACCOMPANY THIS APPLICATION

APPLICANT'S NAME Mark Moore

SIGNATURE _____

TITLE _____

DATE _____

OFFICE USE ONLY

N.O.C. # _____ RECPT #_____ DATE_____
REGIST. # _____

ASSIGNED TO_____

DATE:
APPLICATION RECEIVED __/__/__
PUBLIC NOTICE GIVEN __/__/__
PUBLIC HEARING __/__/__
APPROVAL ISSUED __/__/__
INIT. INSPECTION __/__/__
SOURCE TEST COMPLETE __/__/__

SEPA: LEAD AGENCY_____
DATE ISSUED: DNS__/__/__EIS__/__/__

TYPE OF SOURCE (circle) PSD NSPS NESHAPS

PERMITTED EMISSIONS: SO_2 _____
NO_X _____ PM_{10} _____
VOC _____ CO _____
OPACITY _____
TOXICS _____

PLAN EXAMINATION FEE _____
SEPA PROCESSING FEE _____
LEGAL PUBLICATION _____

TOTAL FEE DUE_____

DATE BILLED_____ INVOICE _____

DATE RECEIVED_____RECPT #_____