Application

Gateway Power Plant
Application for Permit to Construct

P-060005
001-00215

Submitted to:

Idaho Department of Environmental Quality
Boise, Idaho

Submitted for:

Mountain View Power, Inc.
Boise, Idaho

Prepared by:

Arcadis-Greystone
Greenwood Village, Colorado

January 2006

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an ARCADIS company

✓ J. Hull, BR
Bill 2
Kevin
DE/AKS/S

Mountain View Power, Inc.

RECEIVED

FEB 01 2006

Department of Environmental Quality
State Air Program

January 31, 2006

Bill Rogers
Regional Permit Program Coordinator
Idaho Department of Environmental Quality
1410 N. Hilton
Boise, Idaho 83706

Dear Mr. Rogers

Attached are two copies of an application on behalf of Mountain View Power, Inc for an air quality Permit to Construct (PTC) the Gateway Power Plant southeast of the City of Boise. Also attached is a check for $1,000.00 to initiate the permit processing.

The Gateway Power Plant will be a synthetic minor facility by limiting its annual emissions of criteria air pollutants to less than 250 tons per year. In general, this facility is predicted to have very low impacts on the local air quality.

I am also requesting the opportunity to review a draft of the proposed PTC prior to this being finalized or issued for public review.

If you have any questions please contact me at 208-331-1898, or Gordon Frisbie of Arcadis-Greystone at 303-850-0930 or gfrisbie@arcadis-us.com.

Sincerely,

Randall L Williams
for

Bob Looper
Mountain View Power

Attachment
c: Ron Williams

1015 West Hays Street Boise, Idaho 83702 Phone 208 331-1898 Fax 208 343-1218

GREYSTONE®

Environmental Consultants, Inc.

Application

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State Air Program

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1.0 Introduction

Mountain View Power, Inc. proposes to construct and operate the Gateway Power Plant (GPP). GPP will generate electricity using clean burning combustion turbine (CT) technology. The CT will be a Siemens 501F (S 501F) with a nominal rating of 180 MW at 59°F (greater than 200 MW at -20°F). The CT will operate in simple cycle mode and will be fired on natural gas.

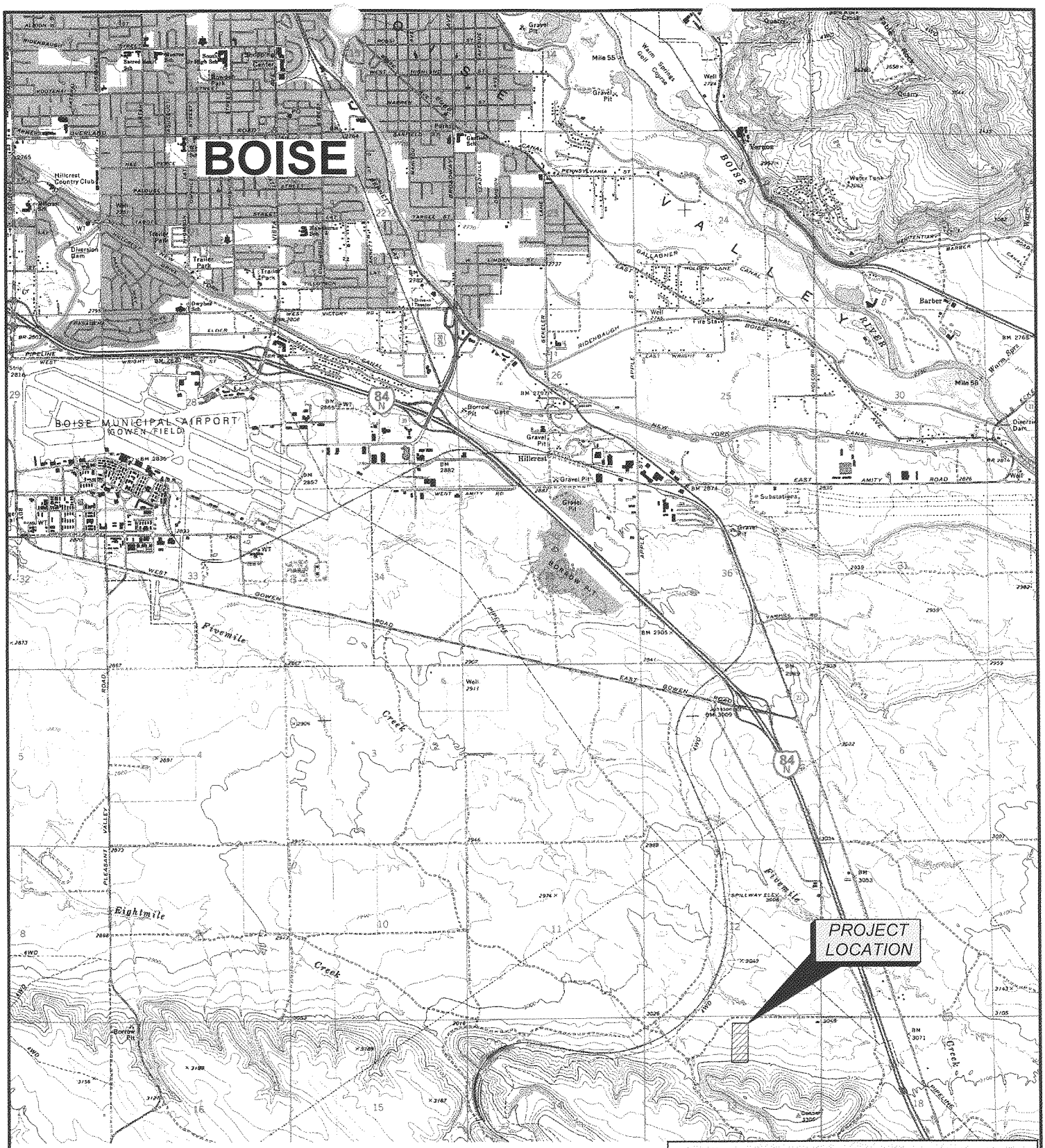
The power plant will comply with federally enforceable restrictions to limit emissions of criteria pollutants to less than 250 tons per year (ton/yr) as a synthetic minor source.

Idaho Department of Environmental Quality (DEQ) PTC application forms are presented in **Appendix A**.

2.0 Project Location

GPP is located in the City of Boise, Idaho approximately 0.7 miles west of Interstate 84 at the South Eisenman Road exit (**Figure 2-1**). This location is designated as a Class II airshed under federal and state air quality regulations. The air quality at this location is in attainment for all federal and state Class II air quality standards. The nearest federal Class I airsheds to the project site would include:

- The Sawtooth Wilderness (95 km)
- Craters of the Moon National Monument (204 km)



Source: USGS 7.5' Quadrangle, Boise South, Idaho (1976)

NORTH

500 0 500 1000 Feet

GATEWAY POWER PLANT

FIGURE 2-1

SITE LOCATION MAP

ANALYSIS AREA: ADA COUNTY, IDAHO	
Date: 04/28/05	File: P1833 SITE.dwg
Drawn By: JLJ	Layout:FIG2-1

3.0 Source Descriptions

GPP will be based on the simple cycle power generation process. The emission sources associated with this process will include:

- An S 501F Combustion Turbine (CT01)
- Fuel Dew Point Heater (FH01)

Figure 3-1 presents a site layout or GPP.

3.1 Combustion Turbine Process

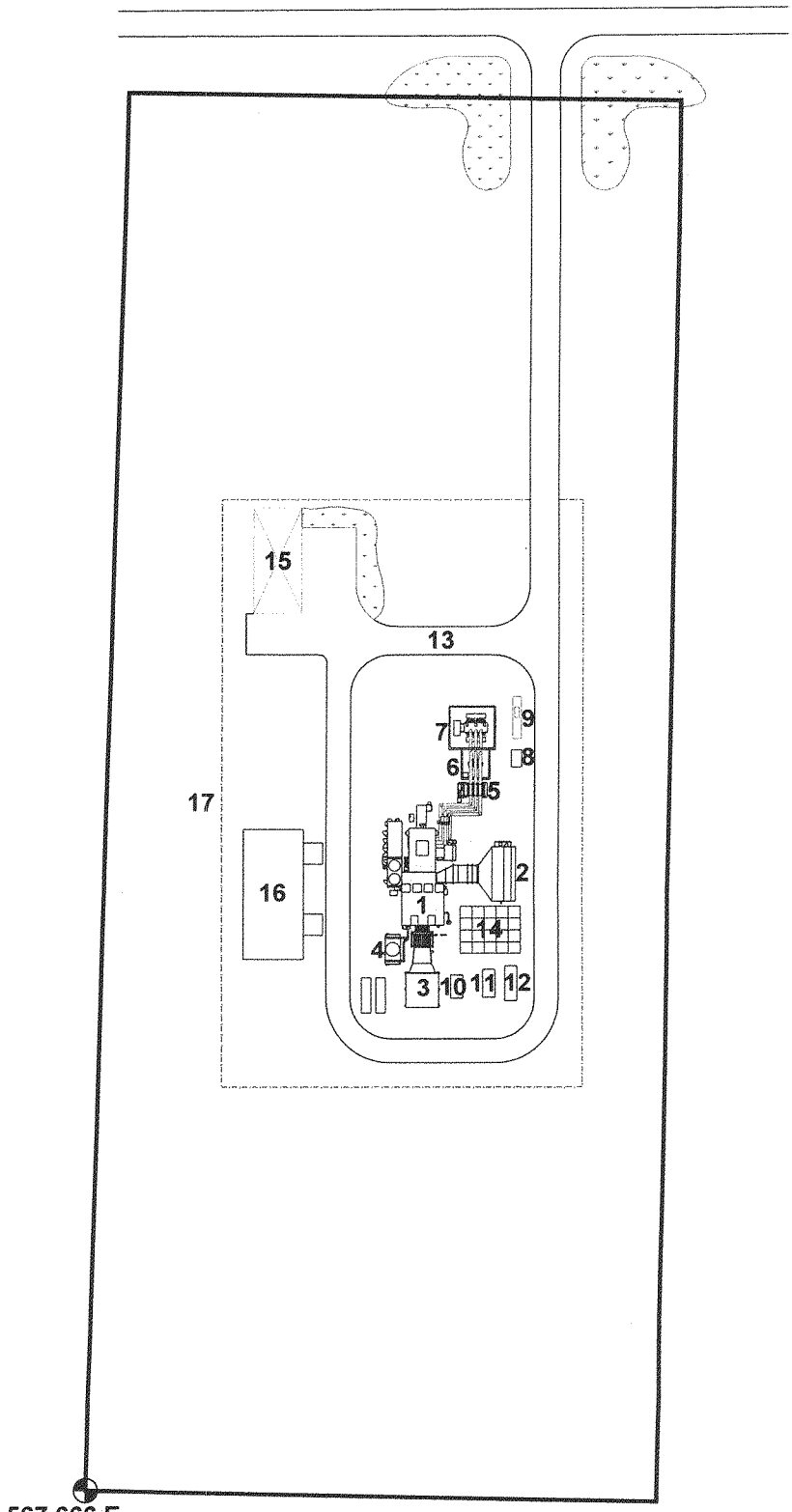
CT01 will be a simple cycle combustion turbine, and will primarily be used to generate electric power to meet peak system load requirements. The S 501F combustion turbine is capable of rapid start-up thus permitting the plant to quickly respond to system demand. CT01 will have a nominal rating of 180 MW at 59°F (greater than 200MW at -20 °F). **Figure 3-2** presents a process flow diagram for the simple cycle combustion turbine process.

The CT will be a single-shaft machine of single casing design. The compressor and turbine have a common rotor supported by two bearings: one located at the inlet side of the compressor and the second located at the exhaust side of the turbine. The rotor is an assembly of discs, each carrying one row of blades, and hollow shaft section, all held together by a pre-stressed central through bolt. The turbine rotor is internally air-cooled.

An air inlet system provides filtered air to the CT compressor. The system will be equipped with multistage, static filters, and an evaporative cooler to enhance performance at ambient temperatures greater than 50°F. Following the compressor, a ring combustor is connected to the common outer casing of the turbine. Natural gas is injected into the combustion chamber and ignited. The hot combustion gases expand through the turbine section of the CT, causing the main shaft to rotate and drive the electric generators and CT compressors. A uniform exhaust gas temperature field is distributed over the full cross sectional area of the diffuser that directs the combustion gases to the turbine blades.

3.2 Fuel Dew Point Heater

A fuel dew point heater with a rated heat input capacity of 3.6 million BTU per hour will also be operated at the GPP site. The dew point heater will treat incoming fuel to optimize CT performance. This heater will be fired with natural gas.



567,666 E
4,817,927 N
Zone 11

LEGEND

1 Combustion Turbine Enclosure
2 Combustion Turbine Inlet Filter
3 Exhaust Stack
4 Rotor Air Cooler (Fin Fan Type)
5 Generator Circuit Breaker
6 Auxiliary Transformer
7 Main Set Up Transformer
8 Medium Voltage Switchgear
9 Oily/Water Separator
10 CEMS Enclosure
11 Fuel Gas Dew Point Heater
12 Fuel Gas Conditioning Skid
13 Plant Roads
14 Crane Pad
15 Administration Building
16 Maintenance Building
17 Fence Line

NORTH

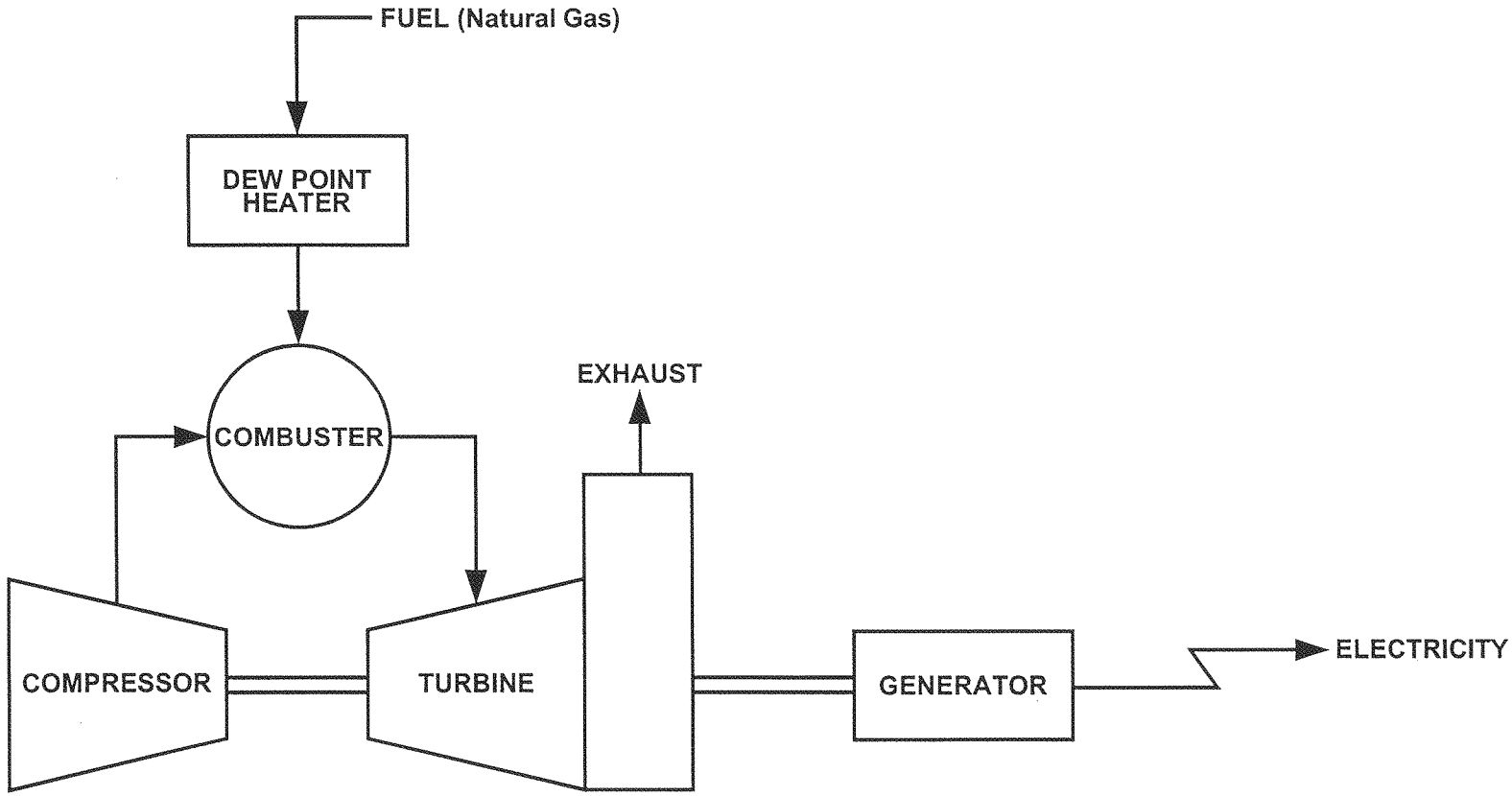
50 0 50 100 Feet

GATEWAY POWER PLANT

FIGURE 3-1

SITE LAYOUT

ANALYSIS AREA: ADA COUNTY, IDAHO	
Date: 09/27/05	File: P1833 SITE.dwg
Drawn By: JLJ	Layout FIG3-1



NORTH

NOT TO SCALE

GATEWAY POWER PLANT	
FIGURE 3-2	
PROCESS FLOW DIAGRAM	
ANALYSIS AREA: ADA COUNTY, IDAHO	
Date: 1/12/2006	File: P1833 SITE.dwg
Drawn By: JLJ	Layout:FIG3-2

4.0 Project Emissions

A spreadsheet containing operating parameters at various operating conditions has been provided in **Appendix B**. The engineering and emissions data were provided by Siemens Westinghouse, and were used to calculate the emissions and stack parameters required for the dispersion modeling. Air emissions from CT01 will include nitrogen oxides (NO_x), carbon monoxide (CO), non-methane-ethane volatile organic compounds (VOC), particulate matter with a nominal diameter less than 10 micrometers and 2.5 micrometers (PM_{10} and $PM_{2.5}$), sulfur dioxide (SO_2), and various toxic air pollutants (TAPs).

CT emissions of NO_x, CO, and VOC are typically reported in units of parts per million, dry volume basis, corrected to 15 percent oxygen (ppmvd@15% O_2 or ppm). Sample calculations for converting ppm to pounds per hour (lb/hr) values have been presented in Appendix B.

Emissions rates were evaluated over the range of expected relative humidity and ambient temperatures as well as the range of CT operating loads. These also included emissions occurring during startup and shutdown operations. Startup and shutdown operations will cover the load range from 0 to 60 percent, and normal operations will include the loads from 60 to 100 percent.

Table 4-1 presents the range of operating and ambient parameters that were included in the modeling analysis.

Table 4-1 Range of Ambient and Operating Parameters

Ambient Temperatures (°F)	-20, 0, 50, 100, 110
Ambient Relative Humidity	100%, 60%, 10%
Operating Loads	Startup/shutdown, 60%, 70%, 80%, 90%, 100%

Using the data presented in **Appendix B**, the maximum hourly emissions were combined with startup and shutdown data for calculating maximum annual emissions. If the resulting annual emissions were estimated to be greater than 249 tons per year, the annual emissions were arbitrarily set to 249 tons per year.

Table 4-2 presents the emission summary for all operating scenarios. These values represent the worst-case emission profile for this facility. The hourly emissions of NO_x, CO, and VOC represent a shutdown event and a startup event with operations for the remainder of the period occurring in the normal load range.

Table 4-2 Maximum GPP Emission Rates

Pollutant	lb/hr	ton/yr
NO_x	92.1	249
CO	1644.9	249
VOC	159.0	120.0
SO_2	111.6	249
PM_{10}	31.0	135.7

4.1 Emission Controls

Ultra Dry Low NO_x (DLN++) combustors will limit emissions of NO_x to 10 parts per million dry volume basis corrected to 15 percent oxygen (ppmvd @ 15% O_2) at operating loads above 70 percent.

NO_x concentrations at normal operating loads between 60 and 70 percent are expected to be 12.5 ppmvd @ 15% O_2. These higher concentrations were accounted for in the modeling analysis.

Emissions of CO, VOC, TAPs, PM_{10}, and $PM_{2.5}$ will be controlled with efficient combustion. Emissions of SO_2 will be controlled through the use of low sulfur natural gas.

$PM_{2.5}$ emission rates were conservatively assumed to be equivalent to PM_{10} emission rates.

Table 4-3 presents a summary of the maximum normal operation emission rates for NO_x, CO, PM_{10}, $PM_{2.5}$, and SO_2. SO_2 emissions based on the maximum "pipeline quality natural gas" sulfur concentration of 20 grains per 100 dry standard cubic feet (gr/100dscf). Actual natural gas sulfur concentrations are expected to be less than 2 gr/100dscf. The maximum emission rates were accounted for in the dispersion modeling.

Table 4-3 Maximum Normal Operation Emission Rates

Pollutant	Operations	Emission Rate	Units
NO_x	60% to 70% Load	12.5	ppm
	70% to 100% Load	10	ppm
CO	60% to 70% Load	50	ppm
	70% to 100% Load	10	ppm
PM_{10} and $PM_{2.5}$	All Normal Loads	18.4 to 31.0	lb/hr
SO_2	All Normal Loads	58.0 to 111.4	lb/hr

4.2 CT Startup and Shutdown Emissions

During the startup and shutdown of a CT, short term elevated emissions of NO_x, CO, and VOC may exceed the hourly values shown in **Table 4-3**. Because emissions of PM_{10} and SO_2 are related

to fueling rates and operating loads, these emissions would typically be lower than normal operation emissions during startup and shutdown events.

Startup and shutdown events are expected to be less than 1 hour each, and there may be as many as 10 startup events per day and 400 startup events per year.

Depending on the averaging period, emissions corresponding to a conservative schedule of startups were combined with normal operation (60 to 100 percent load) emissions. For example, 10 hours of startup and shutdown emissions would be combined with 14 hours of normal emissions to calculate a 24 hour average. These averages were compared to continuous normal operation emissions and the maximum of these two values were used in the dispersion modeling analysis. Maximum startup and shutdown emission rates and duration of these events are presented on **Table 4-4**.

Table 4-4 Startup and Shutdown Emission Rates

Operating Scenario	Emission Rates (pounds per hour)					Duration (hours)
	NO_x	CO	VOC	SO_2	PM_{10} and $PM_{2.5}$	
Startup	83.64	1514.63	146.58	65.63	9.59	0.68
Shutdown	101.99	1811.25	174.87	81.94	11.64	0.53

Depending on the averaging period, emissions corresponding to a conservative schedule of startups were combined with normal operation (60 to 100 percent load) emissions. These averages were compared to continuous normal operation emissions and the maximum of these two values were used in the dispersion modeling analysis. Table 4-5 presents the startup and shutdown schedules used in this analysis.

Table 4-5 Startup Schedules

Averaging Period (hours)	Number of Startups
1	1
3	3
8	8
24	10
8760	400

To maintain conservatism in the emission estimates, no downtime was assumed to occur between a shutdown and startup for the multiple startup schedules.

In addition, because shutdown emissions are slightly greater than startups, these schedules also account for multiple power trips during the 1, 3, and 8-hour averaging periods. During a startup power trip, the load will drop back to zero percent and the grid synchronization process must be repeated. The result is an extended period of startup. The schedules presented above assume the CT will always be in startup or shutdown during the 1, 3, or 8-hour period.

4.3 Compliance Monitoring

A compliance monitoring plan and certification are presented in **Appendix C**. The compliance monitoring plan has been presented to ensure the synthetic minor status of GPP.

5.0 Impact Analysis

This section describes the air pollutant dispersion modeling setup. The following modeling and analysis methods for the air quality impact assessment will be discussed:

- Ambient air quality standards
- Background pollutant concentrations
- Local terrain
- Model selection, setup, and default parameters
- Meteorological data selection and processing
- CT load analysis

5.1 Ambient Air Quality Standards

Table 5-1 presents the ambient air quality criteria that were used to assess the results of the dispersion modeling. State of Idaho standards are equivalent to the National Ambient Air Quality Standards (NAAQS) presented in this table. These standards are presented in concentration units of micrograms per cubic meter ($\mu g/m^3$).

Table 5-1 Summary of Regulatory Ambient Air Concentrations

Pollutant	Averaging Period	NAAQS ($\mu g/m^3$)
NO_2	Annual Mean	100
CO	1-Hour	40,000
	8-Hour	10,000
PM_{10}	24-Hour	150
	Annual Mean	50
SO_2	3-Hour	1,300
	24-Hour	365
	Annual Mean	80

5.2 Background Pollutant Concentrations

Table 5-2 presents the DEQ default criteria pollutant background concentrations that were used for this modeling analysis. These values were added to the estimated GPP impacts to assess any potential cumulative impact.

Table 5-2 Default Criteria Pollutant Concentrations

Pollutant	Averaging Period	Background Conc. ($\mu g/m^3$)
NO_2	Annual	32
CO	1-Hour	10,200
	8-Hour	3,400
PM_{10}	24-Hour	84
	Annual	27
$PM_{2.5}$	24-Hour	Undefined
	Annual	Undefined
SO_2	3-Hour	42
	24-Hour	26
	Annual	8

5.3 Local Terrain

The terrain in the vicinity of the proposed site includes simple, intermediate, and complex terrain. The terrain to the north, east, and west of the facility site is primarily simple terrain. The terrain to the south is a combination of intermediate and complex terrain. The nearest complex terrain (terrain with elevations above stack height) exists approximately 1 km to the south of the facility site. Complex terrain also exists north of the Boise River, approximately 3 km northeast of the proposed plant location.

5.4 Model Selection and Setup

The Industrial Source Complex Short Term model (ISCST3, version 02035) was used for the GPP ambient impact analyses. The ISCST3 model is a steady-state, multiple-source, Gaussian dispersion model designed for use with stack emission sources situated in terrain where ground-level elevations can exceed the stack heights of the emission sources.

5.4.1 Model Setup

The following regulatory default options were used:

- Final plume rise
- Stack tip downwash
- Buoyancy induced dispersion
- Calm processing
- Missing data routine not used
- Default wind profile exponents (rural) = 0.07, 0.07, 0.10, 0.15, 0.35, 0.55
- Default vertical temperature gradients = 0.0,0.0,0.0,0.0,0.02, 0.035
- "Upper Bound" values used for supersquat buildings

- No exponential decay for Rural Mode

The ISCST3 modeling employed the final plume rise option, as recommended in the USEPA Modeling Guidelines. Buoyancy-induced dispersion, which accounts for the buoyant growth of a plume, caused by entrainment of ambient air, was also included in the modeling because of the relatively warm exit temperature and subsequent buoyant nature of the exhaust plumes. As recommended by the USEPA Modeling Guidelines, stack tip downwash was included.

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 assigned.

The calm processing option allows the user to direct the program to exclude hours with persistent calm winds in the calculation of concentrations for each averaging period. This option is generally recommended by the USEPA Modeling Guidelines for regulatory applications. The ISCST3 model recognizes a calm wind condition as a wind speed of 0 meters per second (if ASCII data are input) and a wind direction equal to that of the previous hour. The calm processing option in ISCST3 will then exclude these hours from the calculation of concentrations for the various averaging periods.

5.4.2 Building Downwash and Good Engineering Practice

Building wake effects were included for both point sources and all structures and buildings at the proposed facility. The ISCST3 wake effect inputs were generated using the Building Profile Input Program (BPIP). **Figure 3-1** shows the source and building locations included in the analysis. BPIP was also used to analyze Good Engineering Practice (GEP) stack heights (Hg) = H + 1.5 (L) for the point sources. This demonstrated that the modeled stack heights did not exceed GEP limits.

Table 5-3 presents the dimensions of the buildings and structures associated with the GPP. Although the combustion turbines will not have a rectangular structure, the dimensions presented below provide a conservative approximation for air dispersion modeling.

Table 5-3 Building Dimensions

Building/Structure	East-West Length (m)	North-South Length (m)	Height (m)
CT01	11	38	6.5
CT01 Stack	9	10	18.3
Administration Bldg	13	28	5.6
Maintenance Bldg	16	34	5.5
Gas Heater	3	8	1.8
Gas Filter	3	10	1.8
Inlet Filter	10	15	15.5
Transformer	13	19	7.1

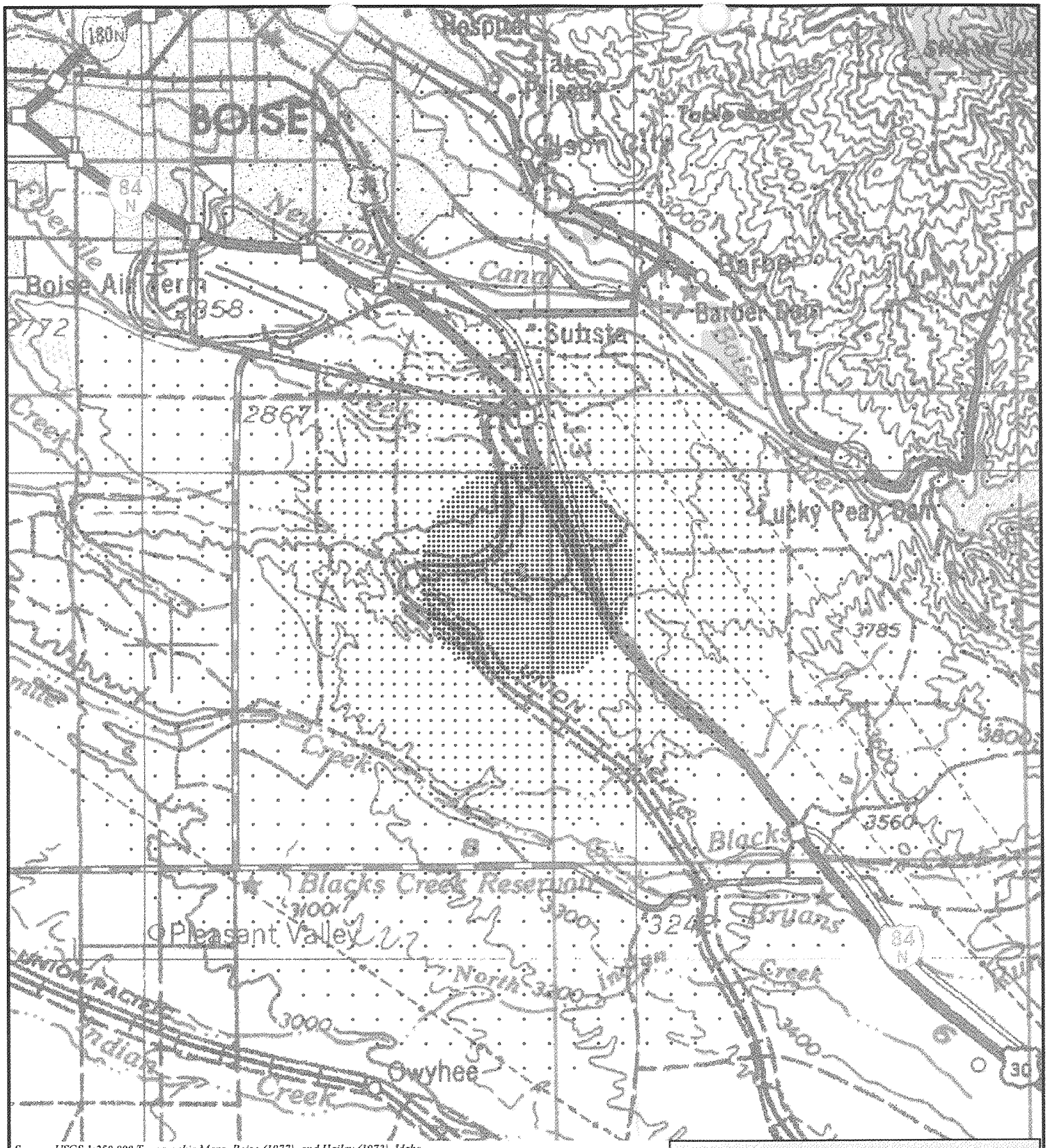
5.4.3 Ambient Air Impact Receptor Grid

Receptors at 25-meter intervals were placed around the facility's fence line. Outside this fence line, receptors were placed according to the criteria shown in **Table 5-4**. A map of the receptor grid is presented in **Figure 5-1**.

Table 5-4 Ambient Receptor Locations

From	To	Receptor Spacing (m)
Fence Line	2.0 km	100
2.0 km	5.0 km	250
5.0 km	10.0 km	500

The receptor elevation values were obtained by importing the UTM easting and northing coordinates of the dispersion modeling grid into Microimages' TNT Mips image processing software. These grid points were overlaid on 30 meter USGS digital elevation models (DEM) to extract the elevation value at each location. Each 30 meter digital elevation model is coincident with (or has the same extent as) the associated 7.5 minute USGS quadrangle.



Source: USGS 1:250,000 Topographic Maps, Boise (1977), and Hailey (1973), Idaho

NORTH

4500 0 4500 9000 Feet

GATEWAY POWER PLANT

FIGURE 5-1

DISPERSION MODELING RECEPTOR GRID

ANALYSIS AREA: ADA COUNTY, IDAHO	
Date: 04/28/05	File: P1833 SITE.dwg
Drawn By: JLJ	Layout:FIG5-1

5.5 Meteorological Data

5.5.1 Data Selection

Five years of surface and mixing height data (1986 through 1990) were used for the dispersion modeling. The surface data were obtained from the National Climatic Data Center (NCDC) SAMSON data compact disc for Boise Airport, and concurrent twice daily mixing height data were obtained from the USEPA SCRAM website for the same monitoring location.

5.5.2 Data Processing

Surface and mixing height data were processed by PCRAMMET into an ISCST3 meteorological data set. A stability class for each hour of data was calculated as part of this processing.

5.6 CT Load Analysis

The CT load analysis included all normal operating emissions and exhaust data over the expected range of operating loads and ambient conditions. **Appendix B** presents the range of exhaust data used in this analysis.

5.7 Criteria Pollutant Impact Analysis

The load analysis evaluated impacts from all criteria pollutant emissions. For each load and ambient condition, the normal emissions were combined with startup and shutdown emissions and compared to normal emissions without startup or shutdown events.

For each operating scenario, the CT emissions were represented as source groups that reflect each operating scenario. Plot files for each source group were generated for each pollutant and averaging period. These plot files were post-processed to determine the maximum impacts and worst-case operating scenarios.

5.8 Toxic Air Pollutant (TAP) Impact Analysis

Because it was necessary to evaluate impacts for 11 different TAPs, these were evaluated using exhaust parameters for a single operating scenario. The operating scenario that resulted in the maximum 1-hour CO impact was used as the worst-case scenario for the TAP analysis. In other

words, the exhaust parameters associated with the maximum 1-hour CO impact were used to model each of the TAP impacts.

A single run with unit emissions (1.0 grams per second [gm/s]) for each source were performed for each meteorological year. Because the individual sources were modeled separately (i.e. each source represents a separate source group), scaling the impacts with the ratio of actual emissions over unit emissions produces an accurate result.

To ensure the conservatism of this analysis, the maximum TAP emission rates over all operating scenarios were used in the dispersion modeling post-processing. To demonstrate the accuracy of the post-processing, sample runs using actual emissions for a specific TAP were also evaluated.

5.9 Fuel Dew Point Heater Cavity Analysis

Cavity influences of the CT01 structure on emissions from the fuel dew point heater were evaluated using the SCREEN3 dispersion model. Model inputs included stack and exhaust data for the dew point heater and dimensions of the CT01 structure.

Because only a single stack was modeled, an emission rate of 1.0 gm/s was used in the SCREEN3 run. The resulting impact was then be apportioned by the estimated dew point heater emission rates for each criteria pollutant.

The impacts estimated by SCREEN3 represent a 1-hour averaging period. For other averaging periods, the factors on **Table 5-5** from the SCREEN3 Users Guide (USEPA 1995) were used.

Table 5-5 SCREEN3 Averaging Period Factors

Averaging Period	Factor
3-Hour	0.9
8-Hour	0.7
24-Hour	0.4
Annual	0.08

5.10 Model Results

5.10.1 Estimated Impacts - Criteria Pollutants

The resulting estimated ambient concentrations from the GPP facility are shown on **Table 5-6**. These results represent the maximum impacts from all operating scenarios. These also include impacts from the fuel heater. For NAAQS impacts, the background concentrations presented in **Section 5.2** have been added to the facility impacts.

Figures 5-2 through **5-8** present estimated the facility impacts over the Boise region. These figures show contours of estimated impacts from GPP without background air quality included. These contours show that the general air quality impact will be insignificant.

Electronic copies of the calculations and input and output dispersion modeling files have been provided on a CD that accompanies this application.

Table 5-6 Modeled Air Quality Impacts

Pollutant	Averaging Period	Operating Scenario		Maximum Facility Impact ($\mu g/m^3$)	Impact with Background ($\mu g/m^3$)	Percent of NAAQS
		CT Load (percent)	Ambient Temperature (°F)			
NO_2	Annual	60	-20	6.2	38.2	38.2%
CO	1-Hour	60	110	1224.9	11424.9	28.6%
	8-Hour	60	110	200.9	3600.9	36.0%
PM_{10}	24-Hour	60	-20	3.1	87.1	58.1%
	Annual	60	-20	0.5	27.5	54.9%
$PM_{2.5}$	24-Hour	60	-20	3.1	3.1	6.3%
	Annual	60	-20	0.5	0.5	0.9%
SO_2	3-Hour	60	-20	89.2	131.2	10.1%
	24-Hour	60	-20	20.9	46.9	12.9%
	Annual	60	-20	3.1	11.1	13.9%

5.10.2 Estimated Impacts - TAPs

TAP emissions were estimated using USEPA emission factors from AP-42 Tables 3.1-3 for the CT and Table 1.4-3 for the fuel heater. Because the CT emissions are much greater than those from the fuel heater, only the pollutants included in AP-42 Table 3.1-3 were included in this analysis.

The emission factors for each TAP were used to estimate emissions using the maximum fueling rates for all operating scenarios.

Table 5-7 presents the estimated TAP emissions and impacts, and how these relate to DEQ emission and impact standards (IDAPA 58.01.01.585 and 586).

The TAP emission rates and impacts assume continuous operations and no emission controls.

Table 5-7 Maximum TAP Impacts

TAP	24-Hour Impact ($\mu g/m^3$)	24-Hour AAC ($\mu g/m^3$)	Annual Impact ($\mu g/m^3$)	Annual AACC ($\mu g/m^3$)
1,3-Butadiene	NA	NA	1.98E-06	3.60E-03
Acetaldehyde	NA	NA	1.84E-04	4.50E-01
Acrolein	5.26E-04	1.25E+01	NA	NA
Benzene	NA	NA	1.15E-04	1.20E-01
Ethylbenzene	2.64E-03	2.18E+04	NA	NA
Formaldehyde	NA	NA	4.11E-03	7.70E-02
Naphthalene	1.07E-04	2.50E+03	NA	NA
PAH (as Benzo(a)pyrene)	NA	NA	1.01E-05	3.00E-04
Propylene Oxide	2.39E-03	2.40E+03	NA	NA
Toluene	1.08E-02	1.88E+04	NA	NA
Xylene (Total)	5.26E-03	2.18E+04	NA	NA

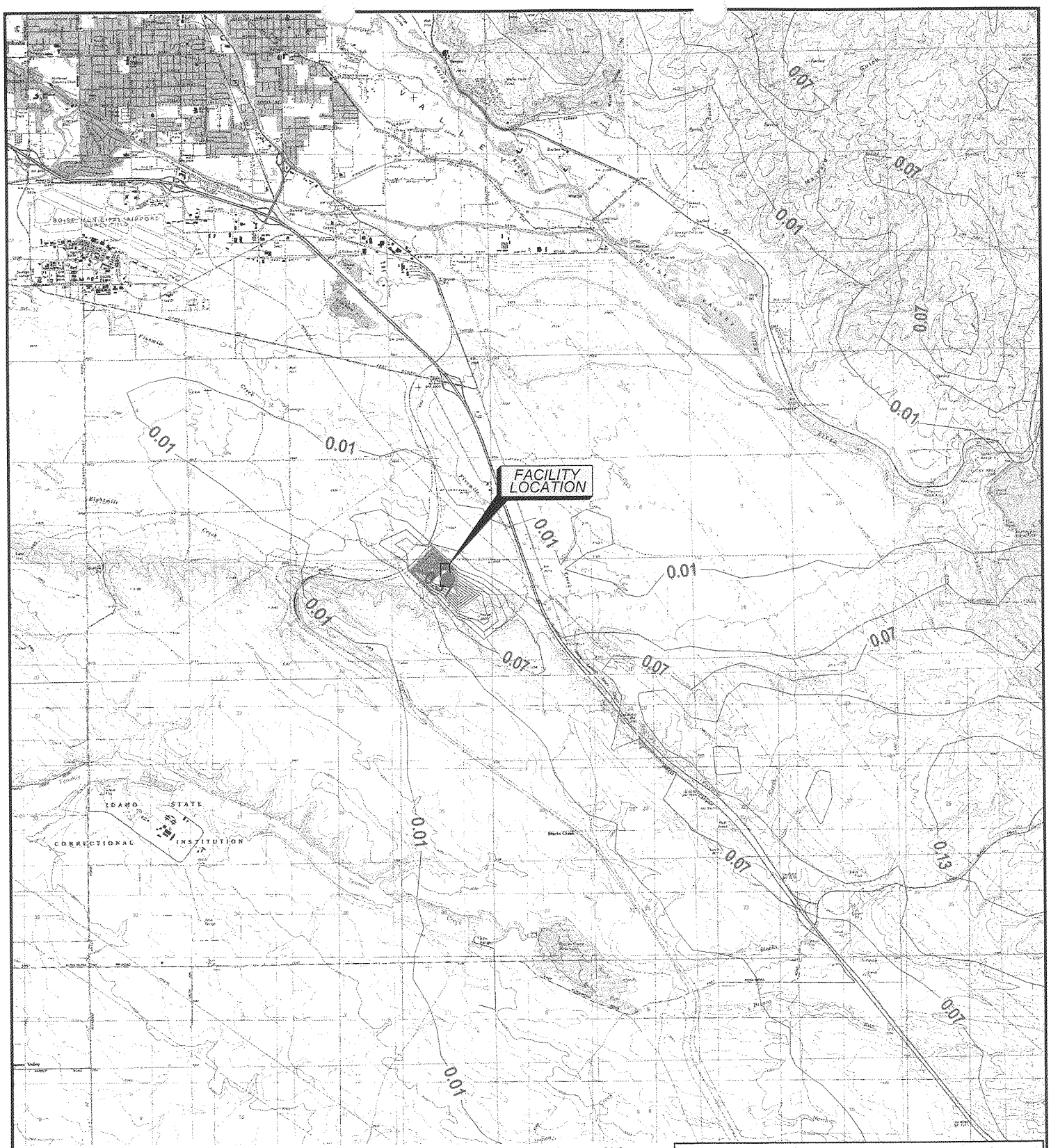
NA = No criteria have been established

5.10.3 Fuel Fuel Dew Point Heater Cavity Impacts

Table 5-8 presents the maximum impacts from the dew point heater SCREEN3 cavity analysis. These impacts were estimated to occur 16 meters from the source. Although these impacts are not predicted to occur in ambient air (i.e. beyond the facility fence line), all estimated impacts were below the NAAQS.

Table 5-8 Maximum Dew Point Heater Cavity Impacts

Pollutant	5.10.3.1.1 Averaging Period	Cavity Impact ($\mu g/m^3$)
NO_2	Annual	14.56
CO	1-Hour	152.87
	8-Hour	107.01
PM_{10}	24-Hour	5.53
	Annual	1.11
SO_2	3-Hour	82.71
	24-Hour	36.76
	Annual	7.35



Source: USGS 7.5' Quadrangles; Boise South (1976), Indian Creek Reservoir (1992), Owyhee (1992), Lucky Peak (1972), Idaho

LEGEND - All units expresed in micrograms per cubic meter (µg/m³)

Location of Estimated Maximum Facility Impact = 4.13

Estimated Ambient Concentrations from Facility

Ambient Air Quality Standard	100
Background	32
Contour Interval	0.03

NORTH

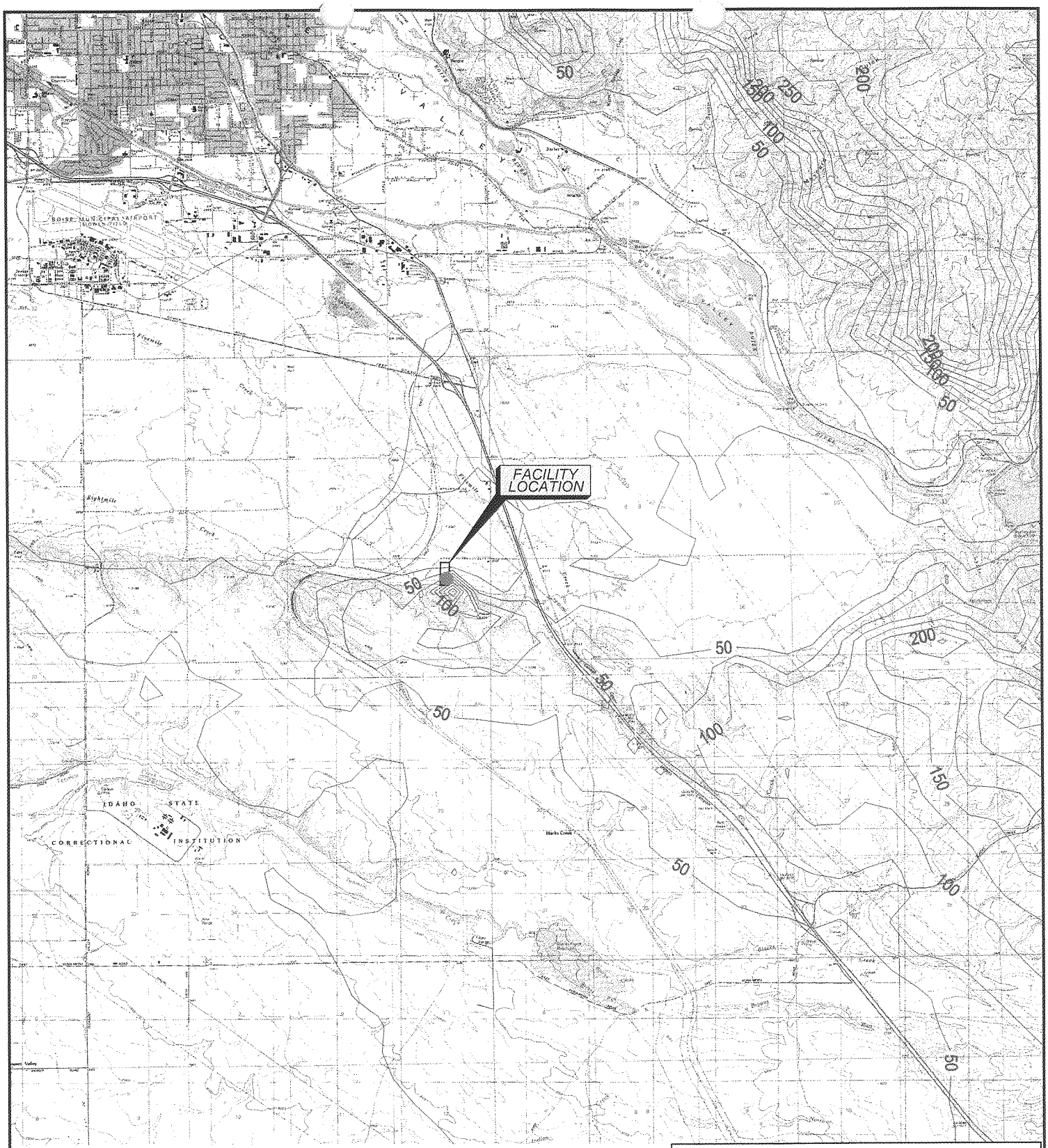
3500 0 3500 7000 Feet

GATEWAY POWER PLANT

FIGURE 5-2

NITROGEN OXIDES ANNUAL IMPACTS

ANALYSIS AREA: ADA COUNTY, IDAHO	
Date: 09/26/05	File: P1833_Air-Quality_Figs.dwg
Drawn By: JLJ	Layout:FIG5-2



Source: USGS 7.5' Quadrangles; Boise South (1976), Indian Creek Reservoir (1992), Owyhee (1992), Lucky Peak (1972), Idaho

LEGEND - All units expresed in micrograms per cubic meter (μg/m³)

● Location of Estimated Maximum Facility Impact = 1,227.81

——— Estimated Ambient Concentrations from Facility

Ambient Air Quality Standard	40,000
Background	10,200
Contour Interval	25

NORTH

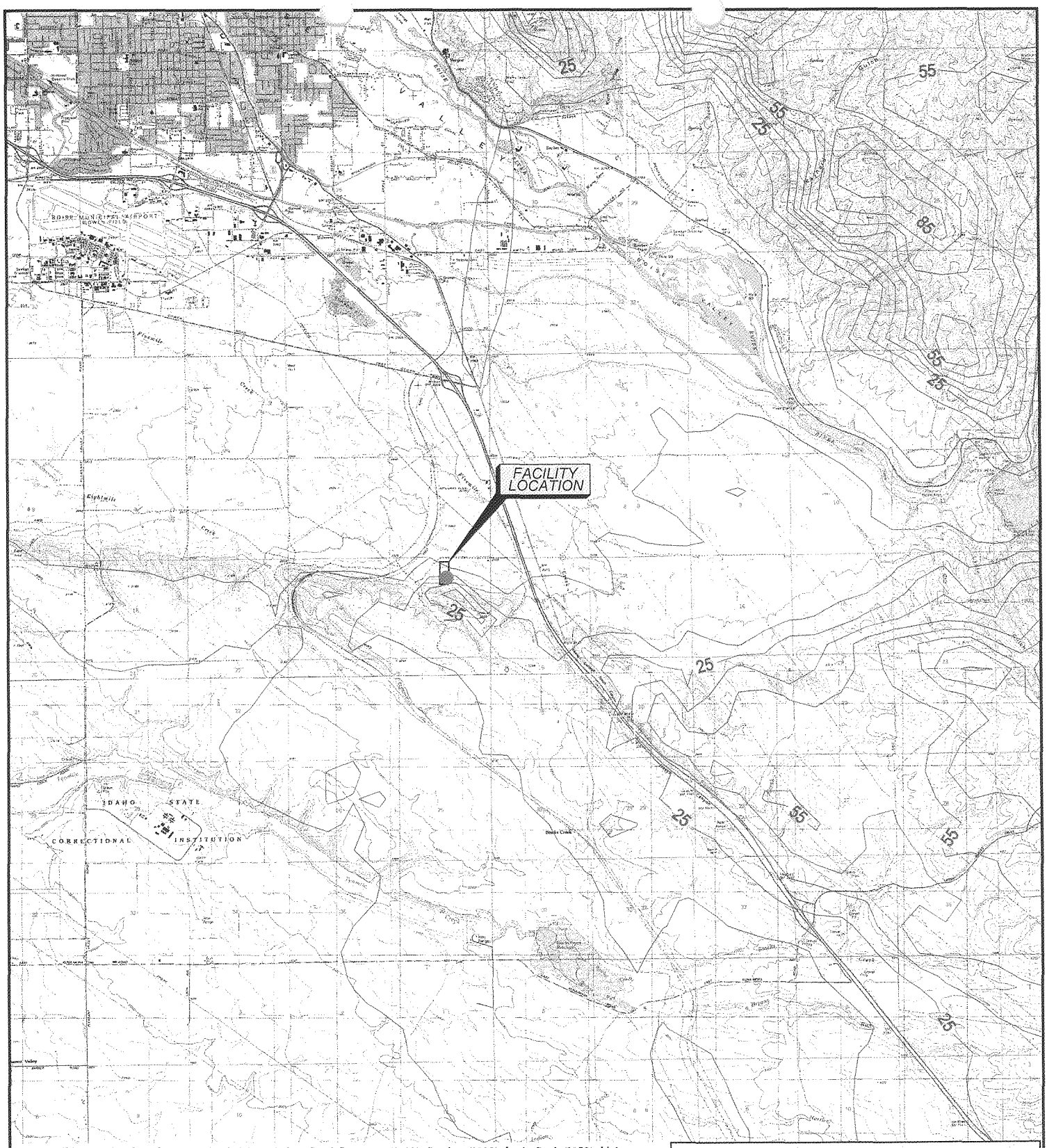
3500 0 3500 7000 Feet

GATEWAY POWER PLANT

FIGURE 5-3

CARBON MONOXIDE
1-HOUR IMPACTS

ANALYSIS AREA: ADA COUNTY, IDAHO	
Date: 09/26/05	File: P1833_Air-Quality_Figs.dwg
Drawn By: JLJ	Layout:FIG5-3



Source: USGS 7.5' Quadrangles; Boise South (1976), Indian Creek Reservoir (1992), Owyhee (1992), Lucky Peak (1972), Idaho

LEGEND - All units expresed in micrograms per cubic meter (µg/m³)

Location of Estimated Maximum Facility Impact = 200.91

Estimated Ambient Concentrations from Facility

Ambient Air Quality Standard	10,000
Background	3,400
Contour Interval	10

NORTH

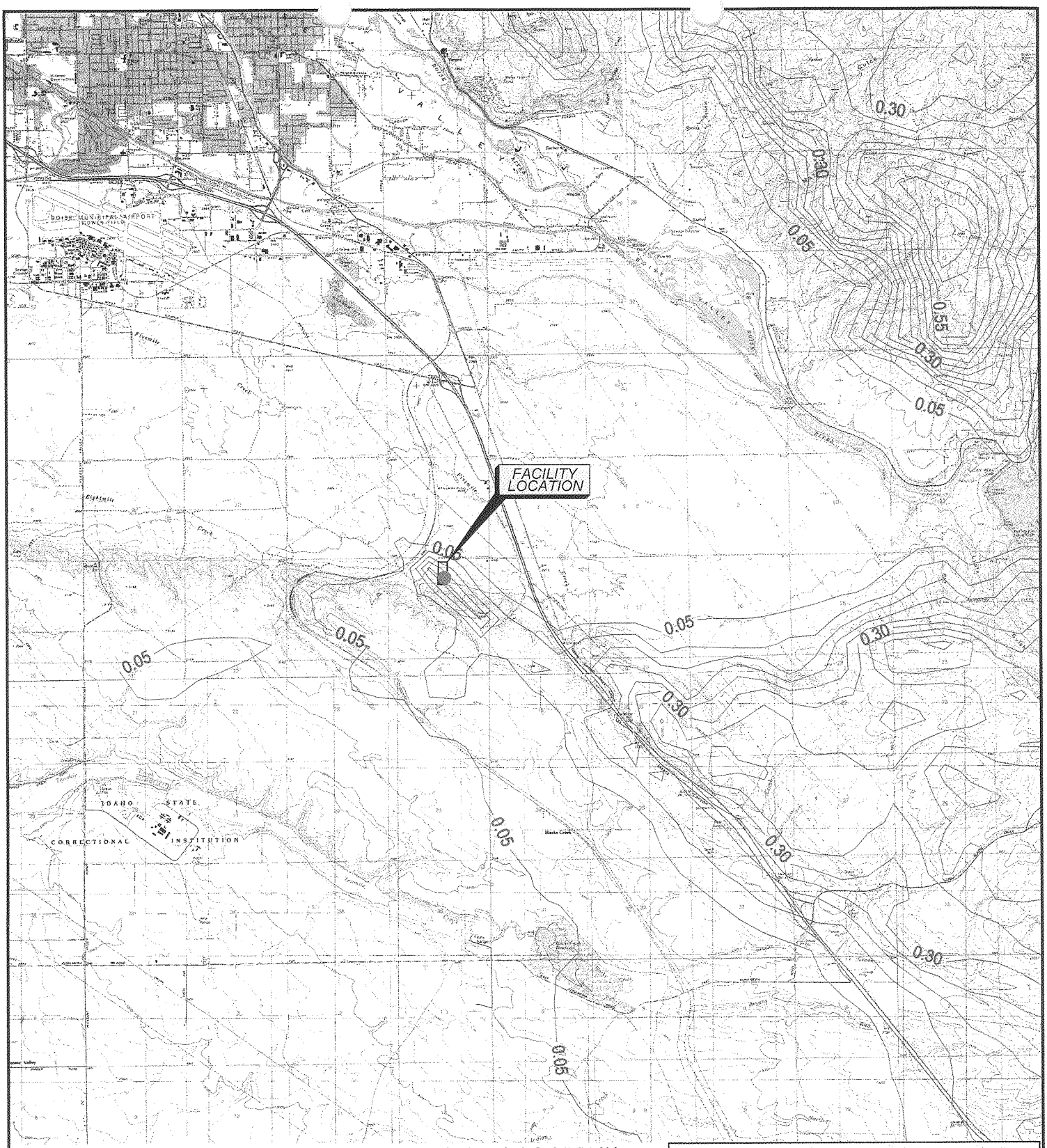
3500 0 3500 7000 Feet

GATEWAY POWER PLANT

FIGURE 5-4

CARBON MONOXIDE 8-HOUR IMPACTS

ANALYSIS AREA: ADA COUNTY, IDAHO	
Date: 09/26/05	File: P1833_Air-Quality_Figs.dwg
Drawn By: JLJ	Layout:FIG5-4



Source: USGS 7.5' Quadrangles: Boise South (1976), Indian Creek Reservoir (1992), Owyhee (1992), Lucky Peak (1972), Idaho

LEGEND - All units expresed in micrograms per cubic meter (µg/m³)

Location of Estimated Maximum Facility Impact = 2.78

Estimated Ambient Concentrations from Facility

Ambient Air Quality Standard	50
Background	84
Contour Interval	0.05

NORTH

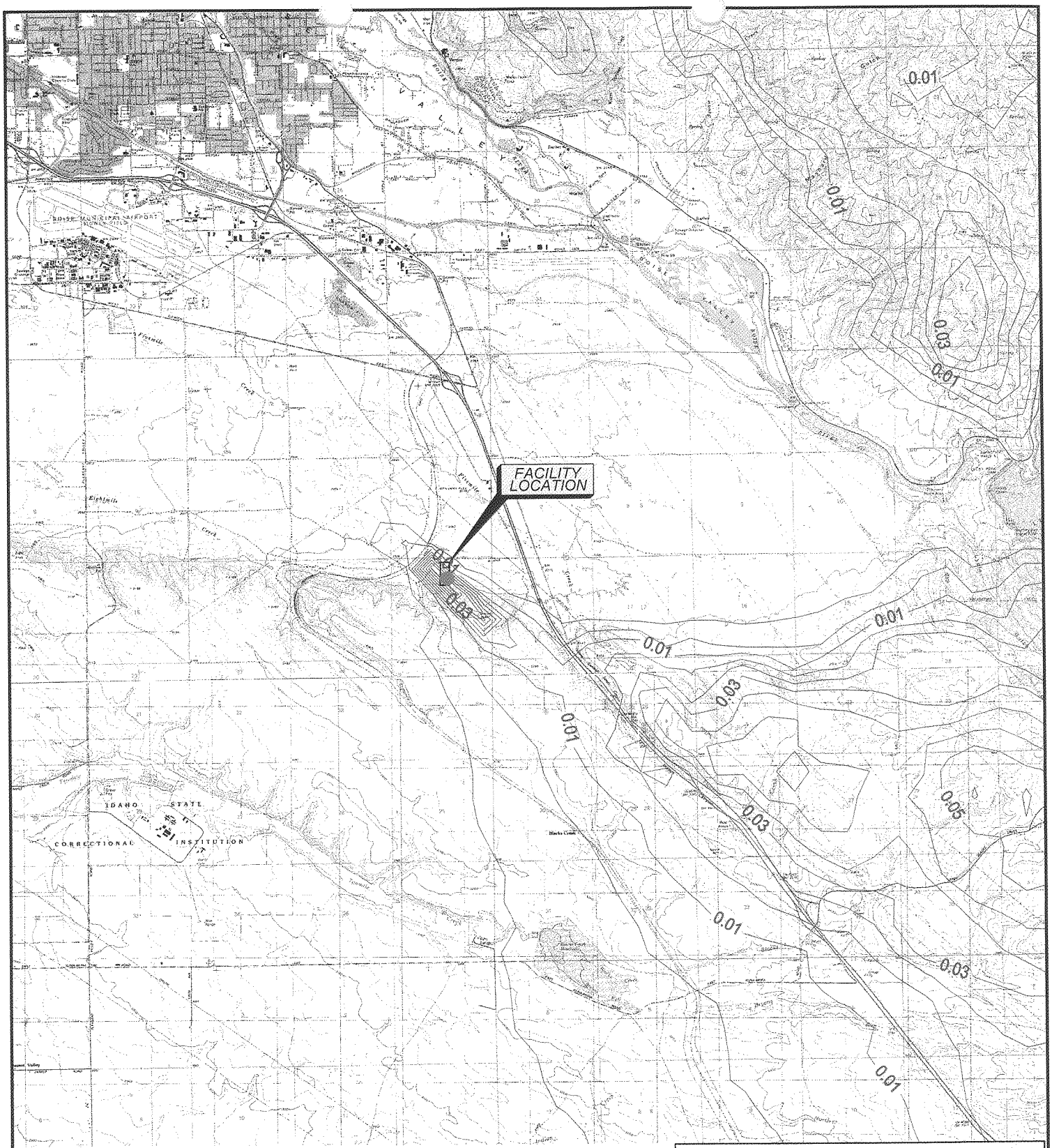
3500 0 3500 7000 Feet

GATEWAY POWER PLANT

FIGURE 5-5

PARTICULATE MATER (PM10/PM2.5)
24-HOUR IMPACTS

ANALYSIS AREA: ADA COUNTY, IDAHO	
Date: 09/26/05	File: P1833_Air-Quality_Figs.dwg
Drawn By: JLJ	Layout:FIG5-5



Source: USGS 7.5' Quadrangles; Boise South (1976), Indian Creek Reservoir (1992), Owyhee (1992), Lucky Peak (1972), Idaho

LEGEND - All units expresed in micrograms per cubic meter (μg/m³)

Location of Estimated Maximum Facility Impact = 0.31

Estimated Ambient Concentrations from Facility

Ambient Air Quality Standard	150
Background	27
Contour Interval	0.005

NORTH

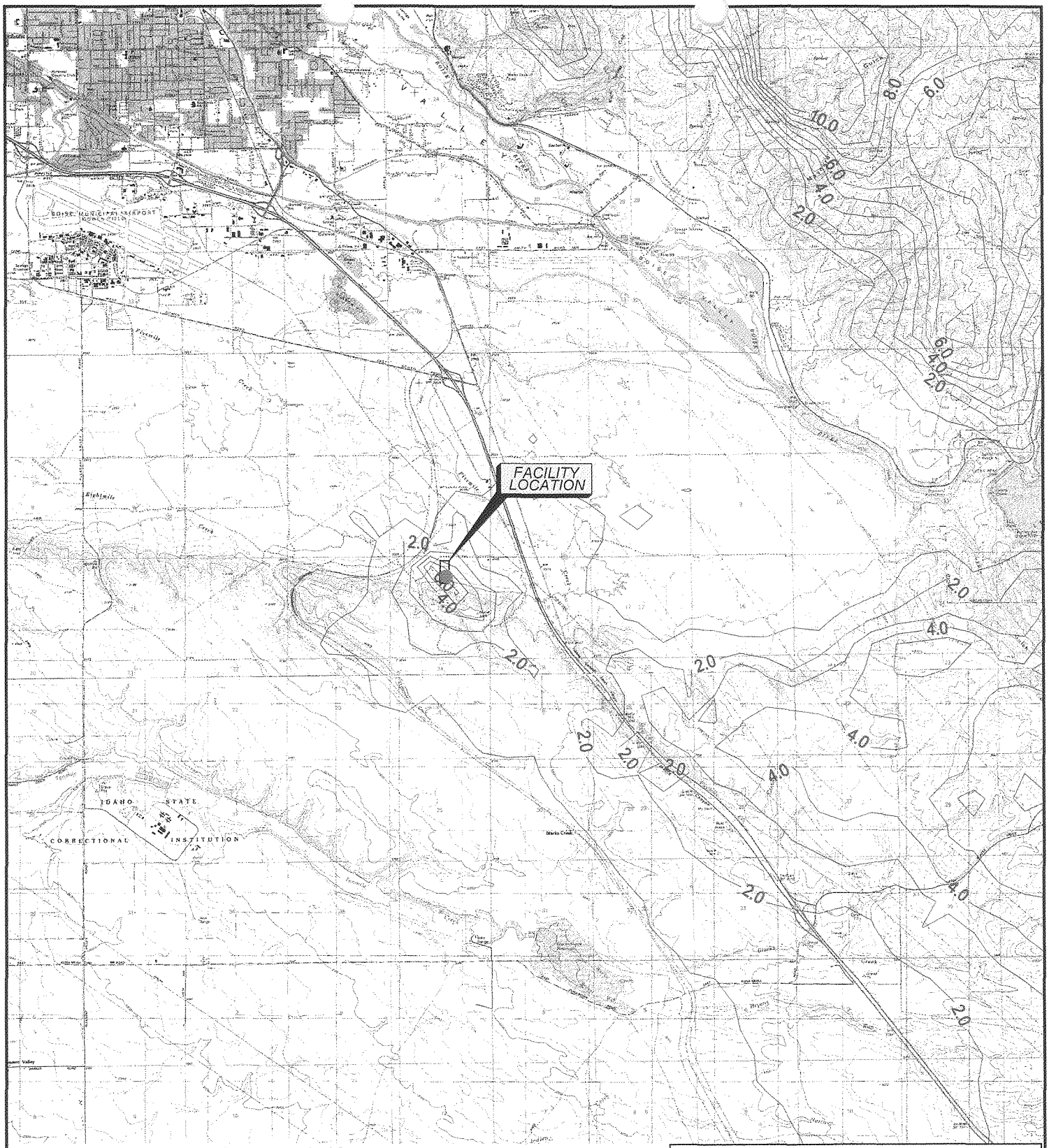
3500 0 3500 7000 Feet

GATEWAY POWER PLANT

FIGURE 5-6

PARTICULATE MATER (PM10/PM2.5) ANNUAL IMPACTS

ANALYSIS AREA: ADA COUNTY, IDAHO	
Date: 09/26/05	File: P1833_Air-Quality_Figs.dwg
Drawn By: JLJ	Layout:FIG5-6



Source: USGS 7.5' Quadrangles; Boise South (1976), Indian Creek Reservoir (1992), Owyhee (1992), Lucky Peak (1972), Idaho

LEGEND - All units expresed in micrograms per cubic meter (µg/m³)

● Location of Estimated Maximum Facility Impact = 89.18

——— Estimated Ambient Concentrations from Facility

Ambient Air Quality Standard	1,300
Background	42
Contour Interval	0.1

NORTH

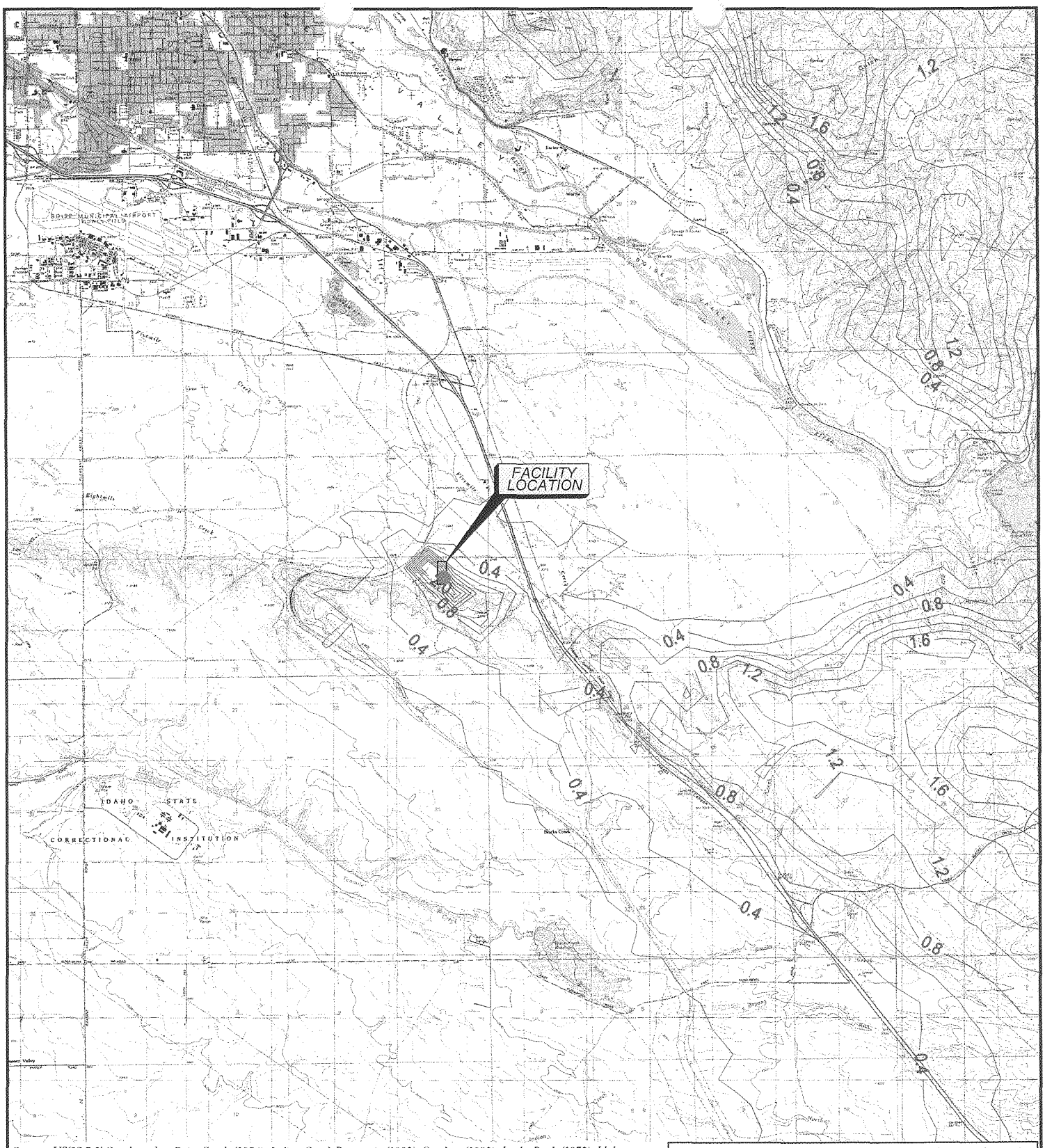
3500 0 3500 7000 Feet

GATEWAY POWER PLANT

FIGURE 5-7

SULFUR DIOXIDE
3-HOUR IMPACTS

ANALYSIS AREA: ADA COUNTY, IDAHO	
Date: 09/26/05	File: P1833_Air-Quality_Figs.dwg
Drawn By: JLJ	Layout:FIG5-7



Source: USGS 7.5' Quadrangles; Boise South (1976), Indian Creek Reservoir (1992), Owyhee (1992), Lucky Peak (1972), Idaho

LEGEND - All units expresed in micrograms per cubic meter (μg/m³)

● Location of Estimated Maximum Facility Impact = 20.92

——— Estimated Ambient Concentrations from Facility

Ambient Air Quality Standard	365
Background	26
Contour Interval	0.2

NORTH

3500 0 3500 7000 Feet

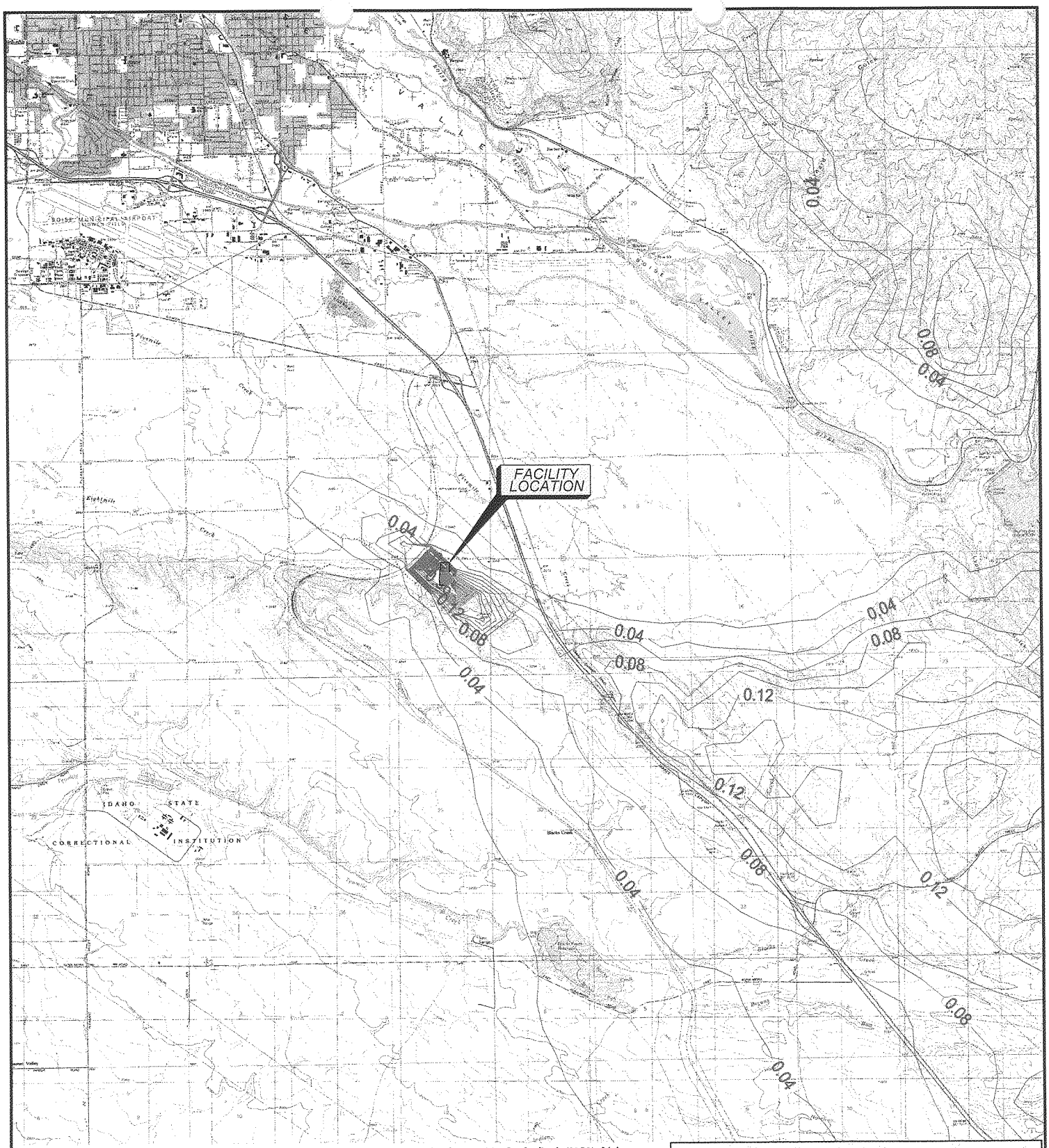
GATEWAY POWER PLANT

FIGURE 5-8

SULFUR DIOXIDE
24-HOUR IMPACTS

ANALYSIS AREA: ADA COUNTY, IDAHO

Date: 09/26/05	File: P1833_Air-Quality_Figs.dwg
Drawn By: JLJ	Layout:FIG5-8



Source: USGS 7.5' Quadrangles: Boise South (1976), Indian Creek Reservoir (1992), Owyhee (1992), Lucky Peak (1972), Idaho

LEGEND - All units expresed in micrograms per cubic meter (μg/m³)

Location of Estimated Maximum Facility Impact = 3.14

Estimated Ambient Concentrations from Facility and Background

Ambient Air Quality Standard	78
Background	8
Contour Interval	0.02

NORTH

3500 0 3500 7000 Feet

GATEWAY POWER PLANT

FIGURE 5-9

SULFUR DIOXIDE ANNUAL IMPACTS

ANALYSIS AREA: ADA COUNTY, IDAHO	
Date: 09/26/05	File: P1833_Air-Quality_Figs.dwg
Drawn By: JLJ	Layout:FIG5-9

6.0 References

United States Environmental Protection Agency (USEPA), 1995. SCREEN3 Model User's Guide. U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Emissions, Monitoring, and Analysis Division, Research Triangle Park, North Carolina.

Appendix A - IDEQ Application Forms

STATE OF IDAHO
DEPARTMENT OF ENVIRONMENTAL QUALITY

APPLICATION TO CONSTRUCT AN AIR POLLUTION EMITTING FACILITY
(IDAPA 58.01.01.200-.225)

SECTION 1: GENERAL INFORMATION

1. COMPANY AND DIVISION NAME **Mountain View Power, Inc**			
2. MAILING ADDRESS **1015 West Hays**		COUNTY **Ada**	NUMBER OF FULL-TIME EMPLOYEES **7**
3. CITY **Boise**	STATE **Idaho**	ZIP CODE **83702**	TELEPHONE NUMBER **(208) 331-1898**
4. PERSON TO CONTACT **Robert Looper**		TITLE **President**	
5. EXACT PLANT LOCATION *(IDENTIFY LOCALITY, AND INCLUDE UTM COORDINATES IF KNOWN)* **567,751 meters 4,818,055 meters Zone II**			
6. GENERAL NATURE OF BUSINESS AND KINDS OF PRODUCTS **Generate Electricity**			

7. REASON FOR APPLICATION	8. LIST ALL FACILITIES WITHIN THE STATE THAT ARE UNDER YOUR CONTROL OR UNDER COMMON CONTROL AND HAVE EMISSIONS TO THE AIR. IF NONE, SO STATE.	
[X] permit to construct a new facility		
[ ] permit to modify an existing source permit number	NAME	LOCATION
	None	
[ ] permit to construct a new source at an existing facility		
[ ] change of owner or location permit number		
current owner		

9. ESTIMATED CONSTRUCTION START DATE **May 1, 2006**	ESTIMATED COMPLETION DATE **July 1, 2006**
10. NAME AND TITLE OF OWNER OR RESPONSIBLE OFFICIAL **Robert Looper, President**, Ronald Williams, Vice President	

11. In accordance with IDAPA 58.01.01.123 (*Rules for the Control of Air Pollution in Idaho*), I Ronald L. Williams, certify based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate, and complete.

SIGNATURE Ronald L Williams V. P. & General Counsel DATE 1/31/06

The following information, at a minimum, must be included in the application package in order for the application to be determined complete:

- *A scaled plot plan clearly showing property boundaries and stack and building locations;*
- *All calculations and assumptions used to estimate emissions;*
- *Manufacturer's guarantees for stated control efficiencies of all control equipment;*
- *A description of potential fugitive emissions;*
- *A narrative description of the facility and the process from feed material in to final product out;*
- *A process flow diagram; and*
- *Any other information required by the DEQ to determine the application complete.*

STATE OF IDAHO

APPLICATION TO CONSTRUCT AN AIR POLLUTION EMITTING FACILITY

SECTION 2: FUEL-BURNING EQUIPMENT *(complete a separate page for each unit)*

1. APPLICANT'S REFERENCE NUMBER				
CT01				
2. EQUIPMENT MANUFACTURER AND MODEL NUMBER	3. RATED HEAT INPUT CAPACITY	4. BURNER UNIT TYPE (use code)	5. HEAT USAGE	
			% process	% space heating
Siemens 501F Combustion Turbine	**1,819 MMBtu/hr**	**10. Turbine**		

6. FUEL DATA		Primary	Secondary
	fuel type (use code)	**1**	
	percent sulfur	**Unknown**	
	percent ash	**Unknown**	
	percent nitrogen	**Unknown**	
	percent carbon	**Unknown**	
	percent hydrogen	**Unknown**	
	percent moisture	**Unknown**	
	heat content	**935.1 (LHV)**	
	(percent by weight or volume)		

9. POLLUTION CONTROL EQUIPMENT	Primary	Secondary
type	**DLN++ NOx Combustors**	
manufacturer	**Siemens**	
model number		
% efficiency	**~80**	

MANUFACTURER GUARANTEED_____ yes ___x___ no

(Include guarantee)

for wet scrubbers:

water flow ___**NA**___ gpm

pressure drop___**NA**_____ inches of water

7. FUEL CONSUMPTION		Primary	Secondary
	Maximum amount		
	burned/hour	**1,949 Mscf**	
	Normal amount		
	burned/year	**17,073 MMscf**	

for baghouse:

air/cloth ratio:

pressure drop ____**NA**____ inches of water

Fly ash reinjection? ____ yes ___**X**___ no ____ n.a.

8. OPERATING SCHEDULE			
	Hours per day	**24**	
	Days per week	**7**	
	Weeks per year	**52**	

10. STACK OR EXHAUST DATA (Nominal)		
Stack ID	**CT01**	
Height	**60**	ft
Exit diameter	**28**	ft
Exit gas volume	**2,306,398**	acfm
Exit gas temperature	**1,081**	F

(Include a separate page for each stack if multiple stacks or vents are used)

11. CRITERIA POLLUTANT ESTIMATED EMISSIONS									
Particulates	lb/hr	**31.0**	tons/yr	**135.6**	Nitrogen oxides	lb/hr	**91.7**	Tons/yr	**247.1**
Sulfur dioxide	lb/hr	**111.4**	tons/yr	**248.0**	Volatile organic compounds	lb/hr	**159.0**	Tons/yr	**102.3**
Carbon monoxide	lb/hr	**1,644.6**	tons/yr	**247.4**					

(Include calculations and assumptions)

FUEL CODES	BURNER CODES	
1. Natural gas	1. Spreader stoker	7. Underfeed stoker
2. Oil *(specify ASTM grade number)*	2. Chain or traveling grate	8. Tangentially fired
3. Wood *(specify chips, bark, shavings sander dust*	3. Hand fired	9. Horizontally fired
	4. Cyclone furnace	10. Other *(specify)*
4. Coal *(specify bituminous, antracite, lignite)*	5. Wet bottom *(pulverized coal)*	
5. Other *(specify)*	6. Dry bottom *(pulverized coal)*	

STATE OF IDAHO

APPLICATION TO CONSTRUCT AN AIR POLLUTION EMITTING FACILITY

SECTION 2: FUEL-BURNING EQUIPMENT *(complete a separate page for each unit)*

1. APPLICANT'S REFERENCE NUMBER					
FH01					
2. EQUIPMENT MANUFACTURER AND MODEL NUMBER	3. RATED HEAT INPUT CAPACITY	4. BURNER UNIT TYPE (use code)	5. HEAT USAGE		
Fuel Dew Point Heater	**3.6 MMBtu/hr**	**9.**	% process	% space heating	
			100		

6. FUEL DATA		Primary	Secondary
	fuel type (use code)	**1**	
	percent sulfur	**Unknown**	
	percent ash	**Unknown**	
	percent nitrogen	**Unknown**	
	percent carbon	**Unknown**	
	percent hydrogen	**Unknown**	
	percent moisture	**Unknown**	
	heat content	**935.1 (LHV)**	
	(percent by weight or volume)		

9. POLLUTION CONTROL EQUIPMENT	Primary	Secondary
Type	None	
manufacturer		
model number		
% efficiency		

MANUFACTURER GUARANTEED_____ yes ___x___ no

(Include guarantee)

for wet scrubbers:

water flow ___NA____ gpm

pressure drop___NA_____ inches of water

7. FUEL CONSUMPTION		Primary	Secondary
	Maximum amount		
	burned/hour	**0.0039 MMscf**	
	Normal amount		
	burned/year	**33.7 MMscf**	

for baghouse:

air/cloth ratio:

pressure drop ____NA___ inches of water

Fly ash reinjection? ___ yes __X__ no ___ n.a.

8. OPERATING SCHEDULE			
	Hours per day	**24**	
	Days per week	**7**	
	Weeks per year	**52**	

10. STACK OR EXHAUST DATA (Nominal)		
Stack ID	**FH01**	
Height	**18**	ft
Exit diameter	**2.0**	ft
Exit gas volume	**2,369**	acfm
Exit gas temperature	**1,000**	F

(Include a separate page for each stack if multiple stacks or vents are used)

11. CRITERIA POLLUTANT ESTIMATED EMISSIONS									
Particulates	lb/hr	**0.03**	tons/yr	**0.1**	Nitrogen oxides	lb/hr	**0.44**	tons/yr	**1.9**
Sulfur dioxide	lb/hr	**0.22**	tons/yr	**1.0**	Volatile organic coumpounds	lb/hr	**0.05**	tons/yr	**0.2**
Carbon monoxide	lb/hr	**0.37**	tons/yr	**1.6**					

(Include calculations and assumptions)

FUEL CODES	BURNER CODES	
1. Natural gas	1. Spreader stoker	7. Underfeed stoker
2. Oil *(specify ASTM grade number)*	2. Chain or traveling grate	8. Tangentially fired
3. Wood *(specify chips, bark, shavings sander dust*	3. Hand fired	9. Horizontally fired
	4. Cyclone furnace	10. Other *(specify)*
4. Coal *(specify bituminous, antracite, lignite)*	5. Wet bottom *(pulverized coal)*	
5. Other *(specify)*	6. Dry bottom *(pulverized coal)*	

Appendix B - Engine Operating Parameters and Emissions

Appendix B-1 - Manufacturer Data

SIEMENS

Idaho Power, East Boise

Estimated SGT6-5000F Gas Turbine Performance
Simple Cycle / Dry Low NOx Combustor
SGen6-1000A / 0.90 Power Factor

SITE CONDITIONS:	CASE 1	CASE 2	CASE 3	CASE 4	CASE 5	CASE 6	CASE 7	CASE 8	CASE 9	CASE 10	CASE 11	CASE 12	CASE 13	CASE 14	CASE 16
FUEL TYPE	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas
LOAD LEVEL	BASE	70%	60%	BASE	BASE	90%	80%	70%	60%	BASE	BASE	BASE	60%	BASE	80%
NET FUEL HEATING VALUE, Btu/lbm (LHV)	20981	20981	20981	20981	20981	20981	20981	20981	20981	20981	20981	20981	20981	20981	20981
GROSS FUEL HEATING VALUE, Btu/lbm (HHV)	23299	23299	23299	23299	23299	23299	23299	23299	23299	23299	23299	23299	23299	23299	23299
EVAPORATIVE COOLER STATUS/EFFECTIVENES	OFF	OFF	OFF	85%	OFF	OFF	OFF	OFF	OFF	85%	OFF	85%	OFF	OFF	OFF
AMBIENT DRY BULB TEMPERATURE, °F	110.0	110.0	110.0	100.0	100.0	100.0	100.0	100.0	100.0	90.0	90.0	59.0	59.0	50.0	50.0
AMBIENT WET BULB TEMPERATURE, °F	67.9	67.9	67.9	62.7	62.7	62.7	62.7	62.7	62.7	62.3	62.3	51.3	51.3	43.5	43.5
AMBIENT RELATIVE HUMIDITY, %	10%	10%	10%	10%	10%	10%	10%	10%	10%	20%	20%	60%	60%	60%	60%
BAROMETRIC PRESSURE, psia	13.152	13.152	13.152	13.152	13.152	13.152	13.152	13.152	13.152	13.152	13.152	13.152	13.152	13.152	13.152
COMPRESSOR INLET TEMPERATURE, °F	110.0	110.0	110.0	73.5	100.0	100.0	100.0	100.0	100.0	66.0	90.0	52.3	59.0	50.0	50.0
INLET PRESSURE LOSS, in. H2O (Total)	3.2	2.1	1.8	3.6	3.3	2.9	2.5	2.2	1.9	3.7	3.5	3.9	2.1	3.9	2.9
EXHAUST PRESSURE LOSS, in. H2O (Total)	6.2	4.0	3.5	7.3	6.5	5.6	4.9	4.2	3.6	7.5	6.8	7.9	4.2	8.0	6.0
EXHAUST PRESSURE LOSS, in. H2O (Static)	3.7	2.4	2.1	4.4	3.9	3.4	2.9	2.5	2.2	4.5	4.1	4.8	2.6	4.8	3.6
GAS TURBINE PERFORMANCE:															
GROSS POWER OUTPUT, kW	141130	98379	84113	166590	147564	132682	117793	102893	87984	172141	154403	181383	105614	182466	145763
GROSS HEAT RATE, Btu/kWh (LHV)	9695.8	10662.2	11279.7	9261.8	9564	9741	10077	10488	11073	9170.6	9446.4	9032.6	10379.9	9010	9475
GROSS HEAT RATE, Btu/kWh (HHV)	10766.9	11840.1	12525.9	10285.0	10621	10817	11190	11646	12296	10183.7	10490.0	10030.4	11526.6	10005	10521
FUEL FLOW, lbm/hr	65219	49994	45220	73539	67268	61601	56573	51432	46435	75241	69517	78087	52250	78353	65823
HEAT INPUT, mmBtu/hr (LHV)	1368	1049	949	1543	1411	1292	1187	1079	974	1579	1459	1638	1096	1644	1381
HEAT INPUT, mmBtu/hr (HHV)	1520	1165	1054	1713	1567	1435	1318	1198	1082	1753	1620	1819	1217	1826	1534
EXHAUST TEMPERATURE, °F	1127.1	1127.1	1127.1	1098.2	1117	1117	1117	1117	1117	1090.0	1109.2	1076.9	1081.3	1074	1074
EXHAUST FLOW, lbm/hr	3127804.5	2521281.8	2340477.9	3413994.8	3213266	2978147	2779582	2582440	2392246	3487281.6	3292028.4	3606051.0	2615354.6	3629509	3141772
EXHAUST GAS COMPOSITION (% BY VOLUME):															
OXYGEN	12.80	13.19	13.39	12.32	12.82	12.91	13.03	13.20	13.40	12.37	12.69	12.44	13.11	12.56	12.79
CARBON DIOXIDE	3.63	3.46	3.37	3.73	3.65	3.60	3.55	3.47	3.38	3.74	3.67	3.76	3.48	3.76	3.65
WATER	8.11	7.76	7.59	9.55	7.90	7.82	7.71	7.56	7.38	9.24	8.28	8.75	7.96	8.21	7.99
NITROGEN	74.58	74.72	74.79	73.53	74.76	74.79	74.83	74.89	74.96	73.79	74.48	74.18	74.58	74.60	74.69
ARGON	0.87	0.88	0.88	0.86	0.88	0.88	0.88	0.88	0.88	0.87	0.87	0.87	0.87	0.87	0.88
MOLECULAR WEIGHT	28.40	28.42	28.43	28.25	28.42	28.43	28.43	28.44	28.46	28.28	28.38	28.34	28.40	28.40	28.41
NET EMISSIONS: Based on USEPA test methods															
NOx, ppmvd @ 15% O2	20	20	25	20	20	20	20	20	25	20	20	20	25	20	20
NOx, lbm/hr as NO2	113	87	98	128	117	107	98	89	101	131	121	136	113	136	115
CO, ppmvd @ 15% O2	10	10	50	10	10	10	10	10	50	10	10	10	50	10	10
CO, lbm/hr	35	26	120	39	36	33	30	27	123	40	37	41	138	41	35
SO2, lbm/hr	0.9	0.7	0.7	1.1	1.0	0.9	0.8	0.7	0.7	1.1	1.0	1.1	0.8	1.1	0.9
VOC, ppmvd @ 15% O2 as CH4	1.2	2.3	10.0	1.2	1.2	2.3	2.3	2.3	10.0	1.2	1.2	1.2	10.0	1.2	2.3
VOC, lbm/hr as CH4	2.4	3.5	13.7	2.7	2.4	4.3	3.9	3.6	14.0	2.7	2.5	2.8	15.8	2.8	4.6
PARTICULATES, lbm/hr	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0

NOTES:

- Performance is based on new and clean condition.
- Gross power output is at the generator terminals minus excitation losses. It does not include econopac auxiliary load losses.
- Estimated GT Performance values are dependent upon receiving test tolerances equal to measurement uncertainty calculated in accordance with ASME PTC 19.1-1998.
- VOC's consist of total hydrocarbons excluding methane and ethane and is expressed in terms of methane.
- Gas fuel composition is 98% CH4, 0.6% C2H6, 1.4% N2, 0.2 grains of sulfur per 100 SCF.
- Gas fuel must be in compliance with the SWPC Gas Fuel Spec (21T0306 Rev.11).
- Particulates are per US EPA Method 5/202 (front and back half).
- Average temperature of the gas fuel is 60°F.
- Maximum gross power is 210,305 kW.
- Please be advised that the information contained in this transmittal has been prepared and is being transmitted per customer request specifically for information purposes only. Such information is not intended to be used for evaluation of plant design and/or performance relative to contractual commitments. Data included in any permit application or Environmental Impact Statement are strictly the customer's responsibility.

SIEMENS

Based on USAabc rev 2-3
September 12, 2005

SITE CONDITIONS:	CASE 17	CASE 18	CASE 19	CASE 20	CASE 21	CASE 22	CASE 23	CASE 24	CASE 25	CASE 26
FUEL TYPE	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas
LOAD LEVEL	70%	60%	BASE	90%	80%	70%	60%	95%	70%	60%
NET FUEL HEATING VALUE, Btu/lbm (LHV)	20981	20981	20981	20981	20981	20981	20981	20981	20981	20981
GROSS FUEL HEATING VALUE, Btu/lbm (HHV)	23299	23299	23299	23299	23299	23299	23299	23299	23299	23299
EVAPORATIVE COOLER STATUS/EFFECTIVENES:	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
AMBIENT DRY BULB TEMPERATURE, °F	50.0	50.0	0.0	0.0	0.0	0.0	0.0	-20.0	-20.0	-20.0
AMBIENT WET BULB TEMPERATURE, °F	43.5	43.5	0.0	0.0	0.0	0.0	0.0	-20.0	-20.0	-20.0
AMBIENT RELATIVE HUMIDITY, %	60%	60%	100%	100%	100%	100%	100%	100%	100%	100%
BAROMETRIC PRESSURE, psia	13.152	13.152	13.152	13.152	13.152	13.152	13.152	13.152	13.152	13.152
COMPRESSOR INLET TEMPERATURE, °F	50.0	50.0	0.0	0.0	0.0	0.0	0.0	-20.0	-20.0	-20.0
INLET PRESSURE LOSS, in. H2O (Total)	2.5	2.1	4.1	3.5	3.1	2.6	2.2	3.9	2.6	2.2
EXHAUST PRESSURE LOSS, in. H2O (Total)	5.1	4.3	9.2	7.9	6.9	5.9	4.9	9.0	6.2	5.2
EXHAUST PRESSURE LOSS, in. H2O (Static)	3.1	2.6	5.5	4.8	4.2	3.6	3.0	5.4	3.7	3.1
GAS TURBINE PERFORMANCE:										
GROSS POWER OUTPUT, kW	127387	108994	208121	187235	166327	145396	124445	208280	153078	131036
GROSS HEAT RATE, Btu/kWh (LHV)	9804	10273	8757	8918	9186	9496	9922	8731.6	9386.0	9795.4
GROSS HEAT RATE, Btu/kWh (HHV)	10887	11408	9724	9903	10201	10545	11019	9696.3	10422.9	10877.6
FUEL FLOW, lbm/hr	59524	53367	86865	79584	72822	65803	58852	86679	68480	61177
HEAT INPUT, mmBtu/hr (LHV)	1249	1120	1823	1670	1528	1381	1235	1819	1437	1284
HEAT INPUT, mmBtu/hr (HHV)	1387	1243	2024	1854	1697	1533	1371	2020	1596	1425
EXHAUST TEMPERATURE, °F	1074	1074	1043	1043	1043	1043	1043	1032.4	1032.4	1032.4
EXHAUST FLOW, lbm/hr	2899776	2664035	3934295	3653050	3398294	3134636	2871337	3902169.6	3223900.6	2948839.6
EXHAUST GAS COMPOSITION (% BY VOLUME):										
OXYGEN	12.95	13.15	12.49	12.60	12.73	12.90	13.09	12.45	12.82	13.01
CARBON DIOXIDE	3.58	3.49	3.85	3.80	3.74	3.66	3.58	3.87	3.71	3.62
WATER	7.85	7.68	7.75	7.65	7.53	7.38	7.20	7.70	7.37	7.20
NITROGEN	74.74	74.81	75.04	75.08	75.12	75.18	75.25	75.09	75.22	75.29
ARGON	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
MOLECULAR WEIGHT	28.42	28.43	28.46	28.46	28.47	28.48	28.49	28.46	28.48	28.50
NET EMISSIONS: Based on USEPA test methods										
NOx, ppmvd @ 15% O2	20	25	20	20	20	20	25	20	20	25
NOx, lbm/hr as NO2	104	116	151	138	127	114	128	151	119	133
CO, ppmvd @ 15% O2	10	50	10	10	10	10	50	10	10	50
CO, lbm/hr	32	141	46	42	39	35	156	46	36	162
SO2, lbm/hr	0.9	0.8	1.2	1.1	1.0	0.9	0.9	1.2	1.0	0.9
VOC, ppmvd @ 15% O2 as CH4	2.3	10.0	1.2	2.3	2.3	2.3	10.0	1.2	2.3	10.0
VOC, lbm/hr as CH4	4.1	16.1	3.2	5.5	5.1	4.6	17.8	3.1	4.8	18.5
PARTICULATES, lbm/hr	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0

East Boise - Estimated Startup and Shutdown Emissions
SGT6-5000F (W501FD) Gas Turbine in Simple Cycle Operation - Rev. 00

Mode	-20 °F - Normal Startup/Shutdown - Maximum Ramp (13.4 MW/min)					
	NO_X	CO	SO_2	VOC	PM	Time (minutes)
Startup on Gas	46.3	622	0.24	60.4	3.9	30
Shutdown on Gas	43.9	562	0.23	54.5	3.5	21

Mode	90 °F - Normal Startup/Shutdown - Maximum Ramp (13.4 MW/min)					
	NO_X	CO	SO_2	VOC	PM	Time (minutes)
Startup on Gas	38.3	537	0.20	52.3	3.8	26
Shutdown on Gas	35.9	480	0.19	46.6	3.5	17

Mode	-20 °F - Normal Startup/Shutdown - Moderate Ramp (8 MW/min)					
	NO_X	CO	SO_2	VOC	PM	Time (minutes)
Startup on Gas	71.8	900	0.39	87.1	5.7	41
Shutdown on Gas	69.4	840	0.38	81.1	5.4	32

Mode	90 °F - Normal Startup/Shutdown - Moderate Ramp (8 MW/min)					
	NO_X	CO	SO_2	VOC	PM	Time (minutes)
Startup on Gas	58.5	765	0.31	74.1	5.6	34
Shutdown on Gas	56.2	707	0.30	68.4	5.2	25

Mode	-20 °F - Optional Fast Startup/Shutdown - Maximum Ramp (30 MW/min)					
	NO_X	CO	SO_2	VOC	PM	Time (minutes)
Startup on Gas	19.9	259	0.11	25.1	1.6	12
Shutdown on Gas	16.9	184	0.09	17.6	1.2	7

Mode	90 °F - Optional Fast Startup/Shutdown - Maximum Ramp (30 MW/min)					
	NO_X	CO	SO_2	VOC	PM	Time (minutes)
Startup on Gas	16.4	222	0.09	21.6	1.6	11
Shutdown on Gas	13.4	150	0.07	14.4	1.2	6

General Notes

1.) Data is for one gas turbine unit.
2.) Gas fuel must be in compliance with Siemens Fuel Specifications.
3.) Emissions estimates are at the gas turbine exhaust stack outlet and exclude ambient air contributions.
4.) Emissions estimates are based on new and clean conditions.
5.) VOC consist of total hydrocarbons excluding methane and ethane and are expressed in terms of methane (CH_4).
6.) Particulate (PM) emissions are based on USEPA Methods 5/202 and assume a max. fuel sulfur content of 0.2 grains S/100 scf.
7.) Please be advised that the information contained in this transmittal has been prepared and is being transmitted per customer request specifically for information purposes only. Such information is not intended to be used for evaluation of plant design and/or performance relative to contractual commitments. Data included in any permit application or Environmental Impact Statement is strictly the customer's responsibility. Siemens is available to review permit application data upon request.

Startup / Shutdown Emissions Notes

1.) Startup emissions estimates are from gas turbine ignition through 100% load.
2.) Normal startup assumes 14 minutes from turning gear to synchronization.
3.) Normal shutdown assumes 100% load to FSNL (full speed no load) with 5-minute cooldown at FSNL.
4.) Optional Fast startup assumes 5 minutes from turning gear to synchronization.
5.) Optional Fast shutdown assumes 100% load to FSNL with no cooldown at FSNL.
6.) Operator actions do not extend startup or shutdown.
7.) It is assumed that there is no restriction from the interconnected utility for loading the gas turbine from synchronization to 100% load within the time considered for the startups.

East Boise - Estimated Startup and Shutdown Emissions

SGT6-5000F (W501FD) Gas Turbine in Simple Cycle Operation - Rev. 01

Mode	-20 °F - Normal Startup/Shutdown - Moderate Ramp (8 MW/min)	-20 °F - Normal Startup/Shutdown - Moderate Ramp (8 MW/min)	
	NO_X - DLN	NO_X - DLN ++	Time (Minutes)
Startup on Gas	71.8	49.7	41
Shutdown on Gas	69.4	47.3	32

General Notes

1.) Data is for one gas turbine unit.
2.) Gas fuel must be in compliance with Siemens Fuel Specifications.
3.) Emissions estimates are at the gas turbine exhaust stack outlet and exclude ambient air contributions.
4.) Emissions estimates are based on new and clean conditions.
5.) Please be advised that the information contained in this transmittal has been prepared and is being transmitted per customer request specifically for information purposes only. Such information is not intended to be used for evaluation of plant design and/or performance relative to contractual commitments. Data included in any permit application or Environmental Impact Statement is strictly the customer's responsibility. Siemens is available to review permit application data upon request.

Startup / Shutdown Emissions Notes

1.) Startup emissions estimates are from gas turbine ignition through 100% load.
2.) Normal startup assumes 14 minutes from turning gear to synchronization.
3.) Normal shutdown assumes 100% load to FSNL (full speed no load) with 5-minute cooldown at FSNL.
4.) Operator actions do not extend startup or shutdown.
5.) It is assumed that there is no restriction from the interconnected utility for loading the gas turbine from synchronization to 100% load within the time considered for the startups.

Sivalls Inc., Odessa, Texas

Quotation Number:	
Job Order Number:	59437
Customer:	Siemens - Bennett Mtn.
Service:	Indirect Heater
Calculation By:	JSB
7/12/04	4:04:12 PM

COMBUSTION CALCULATIONS

Item	Value	Min.	Max.
Data Entry			
Total Nominal Heat Duty, MMBTU/hr:	3.6	0	300
Total Actual Heat Duty, MMBTU/hr:	3.05	0	300
Thermal Efficiency, %:	70.	0	100
Excess Air, %:	0.	0	1000
Stack Gas Temperature, °F:	1000.	800	2000
Stack Diameter, inches:	24 in. o.d.	na	na
Number of Fire Tubes:	1	na	na
Standards			
Flue to Fuel Ratio, cu.ft./cu.ft.:	11.62	0	100
Air to Fuel Ratio, cu.ft./cu.ft.:	10.47	0	100
Fuel Gas HHV, BTU/SCF:	1000.	700	1200
Calculated Values (Total Emmisions Data)			
Fuel Gas Usage, SCF/hr:	4357.1429		
Flue Gas Generated, SCF/hr:	50630.		
Actual Flue Gas Rate (including execess air), ACF/hr:	142153.4615		
Stack Cross Sectional Area, sq.ft.:	3.1134		
Actual Stack Gas Velocity ft/sec:	12.683		
Sulfur Dioxide, lbs/hr:	0.0026143		
Nitrogen Oxides, lbs/hr:	0.4357143		
Carbon Monoxide, lbs/hr:	0.366		
Particulates (filterable), lbs/hr:	0.0082786		
Particulates (condensible), lbs/hr:	0.0248357		
Total Organic Compounds, lbs/hr:	0.0479286		

NOTE: SO2 is based on 0.2 grains hydrogen sulfide/ 100 SCF of fuel

REFERENCE: U.S. Evironmental Protection Agency, "Compilation of Air Pollutant Emission Factors", July 1998, Tables 1.4-1 to 1.4-3

Appendix B-2 - CT Emissions and Exhaust Calculations

Gateway Power Plant
Calculation Constants

Calculation Constants

Pollutant	Mol Wt lb/lbmol
NO2	46
CO	28
VOC (as CH4)	16
SO2	64
Formaldehyde	30

Fuel	Natural Gas			
Fuel S Content	20	gr/100dscf	28.571	lb/MMdscf
Nat Gas Heat Content (LHV)	20981.11	BTU/lb	935.1	BTU/scf
Nat Gas Heat Content (HHV)	23299	BTU/lb	1038.4	BTU/scf
Exhaust Molar Density =	359	scf/lb-mol		
Base Temperature =	460	deg R		
Standard Temperature =	32	deg F		
Standard Pressure =	14.7	psi		
PM10 Factor =	10.0	mg/m3		
Heat Rate and Exhaust Flow Adjustment Factor =			1	
Site Elevation	3065	feet		
Site Ambient Pressure	13.09	psi		
Emission Rate Contingency	10%			

Gateway Power Plant
Performance Data

Simple Cycle

Scenario	Load	Ambient Temp (F)	Ambient RH (%)	Evap Cooler	Inlet Temp (F)	Gross CT Output (kW)	CT Heat Rate (LHV) (BTU/kWh)	Net CT Heat Const (LHV) (BTU/h)	Adjusted CT Heat Const (LHV) (BTU/h)	Gross CT Heat Const (HHV) (BTU/h)	Adjusted CT Heat Const (HHV) (BTU/h)
W060N1	60%	-20	100%	OFF	-20	131,036	9,795	1,283,557,098	1,283,557,098	1,425,358,325	1,425,358,325
W060N2	60%	0	100%	OFF	0	124,445	9,922	1,234,783,221	1,234,783,221	1,371,196,144	1,371,196,144
W060N3	60%	50	60%	OFF	50	108,994	10,273	1,119,696,341	1,119,696,341	1,243,395,018	1,243,395,018
W060N4	60%	59	60%	OFF	59	105,614	10,380	1,096,266,663	1,096,266,663	1,217,376,942	1,217,376,942
W060N6	60%	100	10%	OFF	100	87,984	11,073	974,256,380	974,256,380	1,081,887,549	1,081,887,549
W060N7	60%	110	10%	OFF	110	84,113	11,280	948,768,924	948,768,924	1,053,584,360	1,053,584,360
W070N1	70%	-20	100%	OFF	-20	153,078	9,386	1,436,786,156	1,436,786,156	1,595,515,394	1,595,515,394
W070N2	70%	0	100%	OFF	0	145,396	9,496	1,380,612,591	1,380,612,591	1,533,136,043	1,533,136,043
W070N3	70%	50	60%	OFF	50	127,387	9,804	1,248,870,589	1,248,870,589	1,386,839,817	1,386,839,817
W070N6	70%	100	10%	OFF	100	102,893	10,488	1,079,095,431	1,079,095,431	1,198,308,715	1,198,308,715
W070N7	70%	110	10%	OFF	110	98,379	10,662	1,048,934,352	1,048,934,352	1,164,815,584	1,164,815,584
W080N2	80%	0	100%	OFF	0	166,327	9,186	1,527,886,665	1,527,886,665	1,696,680,249	1,696,680,249
W080N3	80%	50	60%	OFF	50	145,763	9,475	1,381,037,321	1,381,037,321	1,533,607,695	1,533,607,695
W080N6	80%	100	10%	OFF	100	117,793	10,077	1,186,967,909	1,186,967,909	1,318,098,426	1,318,098,426
W090N2	90%	0	100%	OFF	0	187,235	8,918	1,669,751,720	1,669,751,720	1,854,217,875	1,854,217,875
W090N3	90%	50	60%	OFF	50	164,125	9,188	1,507,913,055	1,507,913,055	1,674,500,051	1,674,500,051
W090N6	90%	100	10%	OFF	100	132,682	9,741	1,292,464,516	1,292,464,516	1,435,249,792	1,435,249,792
W100N1	95%	-20	100%	OFF	-20	208,280	8,732	1,818,620,536	1,818,620,536	2,019,533,004	2,019,533,004
W100N2	100%	0	100%	OFF	0	208,121	8,757	1,822,514,361	1,822,514,361	2,023,857,000	2,023,857,000
W100N3	100%	50	60%	OFF	50	182,466	9,010	1,643,936,425	1,643,936,425	1,825,550,630	1,825,550,630
W100Y4	100%	59	60%	85.00%	52	181,383	9,033	1,638,352,218	1,638,352,218	1,819,349,507	1,819,349,507
W100N5	100%	90	20%	OFF	90	154,403	9,446	1,458,550,777	1,458,550,777	1,619,684,466	1,619,684,466
W100Y5	100%	90	20%	85.00%	66	172,141	9,171	1,578,633,763	1,578,633,763	1,753,033,644	1,753,033,644
W100N6	100%	100	10%	OFF	100	147,564	9,564	1,411,359,202	1,411,359,202	1,567,279,392	1,567,279,392
W100Y6	100%	100	10%	85.00%	74	166,590	9,262	1,542,921,870	1,542,921,870	1,713,376,472	1,713,376,472
W100N7	100%	110	10%	OFF	110	141,130	9,696	1,368,361,654	1,368,361,654	1,519,531,681	1,519,531,681

Gateway Power Plant
Performance Data

Simple Cycle

Scenario	Load	Ambient Temp (F)	Ambient RH (%)	Fuel Usage (scf/hr)	Mfg's Exhaust Flow (lb/hr)	Adjusted Exhaust Flow (1) (lb/hr)	Exhaust Flow Wet (lbmol/hr)	Exhaust Flow Dry (lbmol/hr)	Exhaust Flow Dry @15%O2 (lbmol/hr)	Exhaust Flow (scfm)	Exhaust Flow (dscfm@ 15%O2)	Exhaust Temp (F)
W060N1	60%	-20	100%	1,372,655	2,948,840	2,948,840	103,489	96,038	111,703	619,209	765,036	1032
W060N2	60%	0	100%	1,320,495	2,871,337	2,871,337	100,784	93,525	107,469	603,025	737,778	1043
W060N3	60%	50	60%	1,197,419	2,664,035	2,664,035	93,704	86,511	97,468	560,664	677,490	1074
W060N4	60%	59	60%	1,172,363	2,615,355	2,615,355	92,095	84,768	95,429	551,032	666,782	1081
W060N6	60%	100	10%	1,041,884	2,392,246	2,392,246	84,077	77,870	84,831	503,059	590,483	1117
W060N7	60%	110	10%	1,014,627	2,340,478	2,340,478	82,326	76,082	82,614	492,586	577,666	1127
W070N1	70%	-20	100%	1,536,520	3,223,901	3,223,901	113,187	104,840	125,139	677,236	855,441	1032
W070N2	70%	0	100%	1,476,447	3,134,636	3,134,636	110,070	101,949	120,257	658,583	823,967	1043
W070N3	70%	50	60%	1,335,560	2,899,776	2,899,776	102,036	94,026	108,798	610,516	754,450	1074
W070N6	70%	100	10%	1,154,000	2,582,440	2,582,440	90,798	83,934	94,032	543,272	652,967	1117
W070N7	70%	110	10%	1,121,746	2,521,282	2,521,282	88,722	81,834	91,406	530,853	637,496	1127
W080N2	80%	0	100%	1,633,944	3,398,294	3,398,294	119,368	110,384	133,063	714,216	910,215	1043
W080N3	80%	50	60%	1,476,901	3,141,772	3,141,772	110,587	101,747	120,292	661,680	832,535	1074
W080N6	80%	100	10%	1,269,361	2,779,582	2,779,582	97,762	90,227	103,413	584,941	716,693	1117
W090N2	90%	0	100%	1,785,657	3,653,050	3,653,050	128,351	118,536	145,399	767,968	993,268	1043
W090N3	90%	50	60%	1,612,584	3,375,374	3,375,374	118,841	109,204	131,326	711,063	907,490	1074
W090N6	90%	100	10%	1,382,180	2,978,147	2,978,147	104,772	96,580	112,589	626,886	779,130	1117
W100N1	95%	-20	100%	1,944,859	3,902,170	3,902,170	137,102	126,540	158,339	820,329	1,078,565	1032
W100N2	100%	0	100%	1,949,023	3,934,295	3,934,295	138,264	127,554	158,685	827,279	1,082,834	1043
W100N3	100%	50	60%	1,758,049	3,629,509	3,629,509	127,817	117,326	143,157	764,772	987,922	1074
W100Y4	100%	59	60%	1,752,078	3,606,051	3,606,051	127,256	116,119	142,663	761,413	991,706	1077
W100N5	100%	90	20%	1,559,795	3,292,028	3,292,028	115,997	106,388	127,034	694,047	881,680	1109
W100Y5	100%	90	20%	1,688,214	3,487,282	3,487,282	123,306	111,911	137,463	737,778	963,048	1090
W100N6	100%	100	10%	1,509,328	3,213,266	3,213,266	113,065	104,129	122,934	676,506	849,770	1117
W100Y6	100%	100	10%	1,650,023	3,413,995	3,413,995	120,865	109,318	134,353	723,173	945,788	1098
W100N7	100%	110	10%	1,463,346	3,127,805	3,127,805	110,151	101,220	119,191	659,068	827,204	1127

Gateway Power Plant
Performance Data

Simple Cycle

Scenario	Load	Ambient Temp (F)	Ambient RH (%)	Calc Exhaust Flow (acfm)	Molecular Weights (lb/lbmol) 39.92 Ar	28.01 N2	32.00 O2	44.01 CO2	18.02 H2O	Total Wet	Total Dry	Total Mol Wt Wet (lb/lbmol)	Total Mol Wt Dry (lb/lbmol)	Wet Exhaust Analysis (% Volume) Ar	N2	O2
W060N1	60%	-20	100%	2,099,791	0.88%	75.29%	13.01%	3.62%	7.20%	1.00	0.93	28.49	29.31	0.95%	81.13%	14.02%
W060N2	60%	0	100%	2,058,770	0.88%	75.25%	13.09%	3.58%	7.20%	1.00	0.93	28.49	29.30	0.95%	81.09%	14.11%
W060N3	60%	50	60%	1,953,645	0.88%	74.81%	13.15%	3.49%	7.68%	1.00	0.92	28.43	29.30	0.95%	81.03%	14.24%
W060N4	60%	59	60%	1,929,844	0.87%	74.58%	13.11%	3.48%	7.96%	1.00	0.92	28.40	29.30	0.95%	81.03%	14.25%
W060N6	60%	100	10%	1,802,867	0.88%	74.96%	13.40%	3.38%	7.38%	1.00	0.93	28.45	29.28	0.95%	80.93%	14.46%
W060N7	60%	110	10%	1,776,449	0.88%	74.79%	13.39%	3.37%	7.59%	1.00	0.92	28.43	29.28	0.95%	80.92%	14.48%
W070N1	70%	-20	100%	2,296,570	0.88%	75.22%	12.82%	3.71%	7.37%	1.00	0.93	28.48	29.32	0.95%	81.21%	13.84%
W070N2	70%	0	100%	2,248,451	0.88%	75.18%	12.90%	3.66%	7.38%	1.00	0.93	28.48	29.31	0.95%	81.17%	13.92%
W070N3	70%	50	60%	2,127,355	0.88%	74.74%	12.95%	3.58%	7.85%	1.00	0.92	28.42	29.31	0.95%	81.11%	14.06%
W070N6	70%	100	10%	1,947,001	0.88%	74.89%	13.20%	3.47%	7.56%	1.00	0.92	28.44	29.29	0.95%	81.01%	14.28%
W070N7	70%	110	10%	1,914,454	0.88%	74.72%	13.19%	3.46%	7.76%	1.00	0.92	28.42	29.29	0.95%	81.01%	14.30%
W080N2	80%	0	100%	2,438,390	0.88%	75.12%	12.73%	3.74%	7.53%	1.00	0.92	28.47	29.32	0.95%	81.24%	13.77%
W080N3	80%	50	60%	2,305,635	0.88%	74.69%	12.79%	3.65%	7.99%	1.00	0.92	28.41	29.31	0.95%	81.18%	13.91%
W080N6	80%	100	10%	2,096,318	0.88%	74.83%	13.03%	3.55%	7.71%	1.00	0.92	28.43	29.30	0.95%	81.08%	14.12%
W090N2	90%	0	100%	2,621,903	0.88%	75.08%	12.60%	3.80%	7.65%	1.00	0.92	28.46	29.33	0.95%	81.29%	13.64%
W090N3	90%	50	60%	2,477,716	0.88%	74.64%	12.67%	3.71%	8.11%	1.00	0.92	28.40	29.32	0.95%	81.23%	13.78%
W090N6	90%	100	10%	2,246,641	0.88%	74.79%	12.91%	3.60%	7.82%	1.00	0.92	28.43	29.31	0.95%	81.13%	14.01%
W100N1	95%	-20	100%	2,781,812	0.88%	75.09%	12.45%	3.87%	7.70%	1.00	0.92	28.46	29.33	0.95%	81.36%	13.49%
W100N2	100%	0	100%	2,824,398	0.88%	75.04%	12.49%	3.85%	7.75%	1.00	0.92	28.45	29.33	0.95%	81.34%	13.54%
W100N3	100%	50	60%	2,664,865	0.87%	74.60%	12.56%	3.76%	8.21%	1.00	0.92	28.40	29.32	0.95%	81.28%	13.68%
W100Y4	100%	59	60%	2,659,018	0.87%	74.18%	12.44%	3.76%	8.75%	1.00	0.91	28.34	29.33	0.95%	81.30%	13.63%
W100N5	100%	90	20%	2,474,717	0.87%	74.48%	12.69%	3.67%	8.28%	1.00	0.92	28.38	29.32	0.95%	81.21%	13.84%
W100Y5	100%	90	20%	2,598,511	0.87%	73.79%	12.37%	3.74%	9.24%	1.00	0.91	28.28	29.33	0.95%	81.30%	13.63%
W100N6	100%	100	10%	2,424,471	0.88%	74.76%	12.82%	3.65%	7.90%	1.00	0.92	28.42	29.31	0.95%	81.17%	13.92%
W100Y6	100%	100	10%	2,560,479	0.86%	73.53%	12.32%	3.73%	9.55%	1.00	0.90	28.25	29.33	0.95%	81.30%	13.63%
W100N7	100%	110	10%	2,376,849	0.87%	74.58%	12.80%	3.63%	8.11%	1.00	0.92	28.40	29.31	0.95%	81.16%	13.93%

Gateway Power Plant
Emission Calculation Summary

Simple Cycle

Engine	Load	Inlet Temp (F)	Inlet RH (%)	NOx Conc (ppmvd@15%O2)	Calc NOx as NO2 (lb/hr)	CO Conc (ppmvd@15%O2)	Calc CO (lb/hr)
W060N1	60%	-20	100%	12.5	70.7	50	172.0
W060N2	60%	0	100%	12.5	68.0	50	165.5
W060N3	60%	50	60%	12.5	61.6	50	150.1
W060N4	60%	59	60%	12.5	60.4	50	147.0
W060N6	60%	100	10%	12.5	53.7	50	130.6
W060N7	60%	110	10%	12.5	52.3	50	127.2
W070N1	70%	-20	100%	10	63.3	10	38.5
W070N2	70%	0	100%	10	60.8	10	37.0
W070N3	70%	50	60%	10	55.1	10	33.5
W070N6	70%	100	10%	10	47.6	10	29.0
W070N7	70%	110	10%	10	46.3	10	28.2
W080N2	80%	0	100%	10	67.3	10	41.0
W080N3	80%	50	60%	10	60.9	10	37.0
W080N6	80%	100	10%	10	52.3	10	31.9
W090N2	90%	0	100%	10	73.6	10	44.8
W090N3	90%	50	60%	10	66.5	10	40.4
W090N6	90%	100	10%	10	57.0	10	34.7
W100N1	95%	-20	100%	10	80.1	10	48.8
W100N2	100%	0	100%	10	80.3	10	48.9
W100N3	100%	50	60%	10	72.4	10	44.1
W100Y4	100%	59	60%	10	72.2	10	43.9
W100N5	100%	90	20%	10	64.3	10	39.1
W100Y5	100%	90	20%	10	69.6	10	42.3
W100N6	100%	100	10%	10	62.2	10	37.9
W100Y6	100%	100	10%	10	68.0	10	41.4
W100N7	100%	110	10%	10	60.3	10	36.7

Gateway Power Plant
Emission Calculation Summary

Simple Cycle

Engine	Load	Inlet Temp (F)	VOC Conc (ppmvd@15%O2)	Calc VOC (lb/hr)	Calc SO2 (lb/hr)	Calc SO2 (lb/MMBTU)	Calc PM (lb/hr)	Calc PM (lb/MMBTU)
W060N1	60%	-20	10.0	19.7	78.4	0.0611	23.2	0.0181
W060N2	60%	0	10.0	18.9	75.5	0.0611	22.6	0.0183
W060N3	60%	50	10.0	17.2	68.4	0.0611	21.0	0.0187
W060N4	60%	59	10.0	16.8	67.0	0.0611	20.6	0.0188
W060N6	60%	100	10.0	14.9	59.5	0.0611	18.8	0.0193
W060N7	60%	110	10.0	14.5	58.0	0.0611	18.4	0.0194
W070N1	70%	-20	2.3	5.1	87.8	0.0611	25.3	0.0176
W070N2	70%	0	2.3	4.9	84.4	0.0611	24.6	0.0179
W070N3	70%	50	2.3	4.4	76.3	0.0611	22.8	0.0183
W070N6	70%	100	2.3	3.8	65.9	0.0611	20.3	0.0188
W070N7	70%	110	2.3	3.7	64.1	0.0611	19.9	0.0189
W080N2	80%	0	2.3	5.4	93.4	0.0611	26.7	0.0175
W080N3	80%	50	2.3	4.9	84.4	0.0611	24.8	0.0179
W080N6	80%	100	2.3	4.2	72.5	0.0611	21.9	0.0184
W090N2	90%	0	2.3	5.9	102.0	0.0611	28.7	0.0172
W090N3	90%	50	2.3	5.3	92.1	0.0611	26.6	0.0176
W090N6	90%	100	2.3	4.6	79.0	0.0611	23.5	0.0182
W100N1	95%	-20	1.2	3.3	111.1	0.0611	30.7	0.0169
W100N2	100%	0	1.2	3.4	111.4	0.0611	31.0	0.0170
W100N3	100%	50	1.2	3.0	100.5	0.0611	28.6	0.0174
W100Y4	100%	59	1.2	3.0	100.1	0.0611	28.5	0.0174
W100N5	100%	90	1.2	2.7	89.1	0.0611	26.0	0.0178
W100Y5	100%	90	1.2	2.9	96.5	0.0611	27.6	0.0175
W100N6	100%	100	1.2	2.6	86.2	0.0611	25.3	0.0179
W100Y6	100%	100	1.2	2.8	94.3	0.0611	27.1	0.0175
W100N7	100%	110	1.2	2.5	83.6	0.0611	24.7	0.0180

Gateway Power Plant
Startup Emissions Data

Startup Emissions - Simple Cycle

Contingency Increase 15%

		CT1 (LB)				Duration
Condition	**NOx**	**CO**	**VOC**	**SO2**	**PM**	**(min)**
Startup	49.7	900.0	87.1	39.0	5.7	41.0

Shutdown Emissions - Simple Cycle

		CT1 (LB)				Duration
Condition	**NOx**	**CO**	**VOC**	**SO2**	**PM**	**(min)**
Shutdown	47.3	840.0	81.1	38.0	5.4	32.0

Calculations
Startup/Shutdown Emissions

		CT1 (LB/HR)				Duration
Condition	**NOx**	**CO**	**VOC**	**SO2**	**PM**	**(hrs)**
Startup	83.64	1514.63	146.58	65.63	9.59	0.68
Shutdown	101.99	1811.25	174.87	81.94	11.64	0.53

Gateway Power Plant
Startup Schedule

Startup Schedules and Downtime

	Averaging Period				
	1	3	8	24	8760
Number of Starts	1	3	8	10	400
Downtime (hours)	0	0	0	0	0

Gateway Power Plant
Calculated Maximum Emission Matrix (gm/s)

				NOx	CO	VOC	SO2	PM10
1-Hour	W060N1	60%	-20	11.56	207.40	20.05	9.89	2.92
3-Hour	W060N1	60%	-20	11.56	207.40	20.05	9.89	2.92
8-Hour	W060N1	60%	-20	11.56	207.40	20.05	9.89	2.92
24-Hour	W060N1	60%	-20	10.25	115.32	11.34	9.89	2.92
Annual	W060N1	60%	-20	9.06	31.95	3.45	9.89	2.92
1-Hour	W060N2	60%	0	11.56	207.40	20.05	9.52	2.85
3-Hour	W060N2	60%	0	11.56	207.40	20.05	9.52	2.85
8-Hour	W060N2	60%	0	11.56	207.40	20.05	9.52	2.85
24-Hour	W060N2	60%	0	10.08	114.91	11.29	9.52	2.85
Annual	W060N2	60%	0	8.74	31.18	3.36	9.52	2.85
1-Hour	W060N3	60%	50	11.56	207.40	20.05	9.18	2.65
3-Hour	W060N3	60%	50	11.56	207.40	20.05	9.18	2.65
8-Hour	W060N3	60%	50	11.56	207.40	20.05	9.18	2.65
24-Hour	W060N3	60%	50	9.68	113.95	11.18	8.91	2.65
Annual	W060N3	60%	50	7.98	29.34	3.15	8.66	2.65
1-Hour	W060N4	60%	59	11.56	207.40	20.05	9.18	2.60
3-Hour	W060N4	60%	59	11.56	207.40	20.05	9.18	2.60
8-Hour	W060N4	60%	59	11.56	207.40	20.05	9.18	2.60
24-Hour	W060N4	60%	59	9.60	113.75	11.16	8.82	2.60
Annual	W060N4	60%	59	7.83	28.97	3.11	8.49	2.60
1-Hour	W060N6	60%	100	11.56	207.40	20.05	9.18	2.37
3-Hour	W060N6	60%	100	11.56	207.40	20.05	9.18	2.37
8-Hour	W060N6	60%	100	11.56	207.40	20.05	9.18	2.37
24-Hour	W060N6	60%	100	9.18	112.73	11.04	8.35	2.37
Annual	W060N6	60%	100	7.03	27.02	2.89	7.60	2.37
1-Hour	W060N7	60%	110	11.56	207.40	20.05	9.18	2.32
3-Hour	W060N7	60%	110	11.56	207.40	20.05	9.18	2.32
8-Hour	W060N7	60%	110	11.56	207.40	20.05	9.18	2.32
24-Hour	W060N7	60%	110	9.10	112.52	11.02	8.25	2.32
Annual	W060N7	60%	110	6.86	26.62	2.84	7.42	2.32
1-Hour	W070N1	70%	-20	11.56	207.40	20.05	11.07	3.20
3-Hour	W070N1	70%	-20	11.56	207.40	20.05	11.07	3.20
8-Hour	W070N1	70%	-20	11.56	207.40	20.05	11.07	3.20
24-Hour	W070N1	70%	-20	9.79	106.97	10.42	11.07	3.20
Annual	W070N1	70%	-20	8.18	16.05	1.71	11.07	3.20
1-Hour	W070N2	70%	0	11.56	207.40	20.05	10.64	3.11
3-Hour	W070N2	70%	0	11.56	207.40	20.05	10.64	3.11
8-Hour	W070N2	70%	0	11.56	207.40	20.05	10.64	3.11
24-Hour	W070N2	70%	0	9.63	106.88	10.41	10.64	3.11
Annual	W070N2	70%	0	7.89	15.87	1.69	10.64	3.11
1-Hour	W070N3	70%	50	11.56	207.40	20.05	9.62	2.88
3-Hour	W070N3	70%	50	11.56	207.40	20.05	9.62	2.88
8-Hour	W070N3	70%	50	11.56	207.40	20.05	9.62	2.88
24-Hour	W070N3	70%	50	9.27	106.66	10.38	9.62	2.88
Annual	W070N3	70%	50	7.20	15.45	1.63	9.62	2.88
1-Hour	W070N6	70%	100	11.56	207.40	20.05	9.18	2.56
3-Hour	W070N6	70%	100	11.56	207.40	20.05	9.18	2.56
8-Hour	W070N6	70%	100	11.56	207.40	20.05	9.18	2.56
24-Hour	W070N6	70%	100	8.80	106.37	10.35	8.75	2.56
Annual	W070N6	70%	100	6.31	14.91	1.56	8.36	2.56
1-Hour	W070N7	70%	110	11.56	207.40	20.05	9.18	2.51
3-Hour	W070N7	70%	110	11.56	207.40	20.05	9.18	2.51
8-Hour	W070N7	70%	110	11.56	207.40	20.05	9.18	2.51
24-Hour	W070N7	70%	110	8.72	106.32	10.34	8.64	2.51
Annual	W070N7	70%	110	6.15	14.81	1.55	8.14	2.51
1-Hour	W080N2	80%	0	11.56	207.40	20.05	11.78	3.37
3-Hour	W080N2	80%	0	11.56	207.40	20.05	11.78	3.37
8-Hour	W080N2	80%	0	11.56	207.40	20.05	11.78	3.37
24-Hour	W080N2	80%	0	10.04	107.12	10.44	11.78	3.37
Annual	W080N2	80%	0	8.66	16.34	1.75	11.78	3.37
1-Hour	W080N3	80%	50	11.56	207.40	20.05	10.64	3.12
3-Hour	W080N3	80%	50	11.56	207.40	20.05	10.64	3.12
8-Hour	W080N3	80%	50	11.56	207.40	20.05	10.64	3.12
24-Hour	W080N3	80%	50	9.64	106.88	10.41	10.64	3.12
Annual	W080N3	80%	50	7.89	15.87	1.69	10.64	3.12
1-Hour	W080N6	80%	100	11.56	207.40	20.05	9.18	2.76

Gateway Power Plant
Calculated Maximum Emission Matrix (gm/s)

				NOx	CO	VOC	SO2	PM10
3-Hour	W080N6	80%	100	11.56	207.40	20.05	9.18	2.76
8-Hour	W080N6	80%	100	11.56	207.40	20.05	9.18	2.76
24-Hour	W080N6	80%	100	9.10	106.55	10.37	9.16	2.76
Annual	W080N6	80%	100	6.87	15.25	1.61	9.15	2.76
1-Hour	W090N2	90%	0	11.56	207.40	20.05	12.87	3.62
3-Hour	W090N2	90%	0	11.56	207.40	20.05	12.87	3.62
8-Hour	W090N2	90%	0	11.56	207.40	20.05	12.87	3.62
24-Hour	W090N2	90%	0	10.43	107.36	10.48	12.87	3.62
Annual	W090N2	90%	0	9.40	16.79	1.81	12.87	3.62
1-Hour	W090N3	90%	50	11.56	207.40	20.05	11.62	3.36
3-Hour	W090N3	90%	50	11.56	207.40	20.05	11.62	3.36
8-Hour	W090N3	90%	50	11.56	207.40	20.05	11.62	3.36
24-Hour	W090N3	90%	50	9.98	107.09	10.44	11.62	3.36
Annual	W090N3	90%	50	8.56	16.28	1.74	11.62	3.36
1-Hour	W090N6	90%	100	11.56	207.40	20.05	9.96	2.96
3-Hour	W090N6	90%	100	11.56	207.40	20.05	9.96	2.96
8-Hour	W090N6	90%	100	11.56	207.40	20.05	9.96	2.96
24-Hour	W090N6	90%	100	9.39	106.73	10.39	9.96	2.96
Annual	W090N6	90%	100	7.43	15.59	1.65	9.96	2.96
1-Hour	W100N1	95%	-20	11.56	207.40	20.05	14.01	3.87
3-Hour	W100N1	95%	-20	11.56	207.40	20.05	14.01	3.87
8-Hour	W100N1	95%	-20	11.56	207.40	20.05	14.01	3.87
24-Hour	W100N1	95%	-20	10.84	107.61	10.32	14.01	3.87
Annual	W100N1	95%	-20	10.18	17.27	1.51	14.01	3.87
1-Hour	W100N2	100%	0	11.56	207.40	20.05	14.05	3.90
3-Hour	W100N2	100%	0	11.56	207.40	20.05	14.05	3.90
8-Hour	W100N2	100%	0	11.56	207.40	20.05	14.05	3.90
24-Hour	W100N2	100%	0	10.85	107.62	10.32	14.05	3.90
Annual	W100N2	100%	0	10.20	17.28	1.51	14.05	3.90
1-Hour	W100N3	100%	50	11.56	207.40	20.05	12.67	3.61
3-Hour	W100N3	100%	50	11.56	207.40	20.05	12.67	3.61
8-Hour	W100N3	100%	50	11.56	207.40	20.05	12.67	3.61
24-Hour	W100N3	100%	50	10.36	107.32	10.30	12.67	3.61
Annual	W100N3	100%	50	9.27	16.71	1.47	12.67	3.61
1-Hour	W100Y4	100%	59	11.56	207.40	20.05	12.63	3.59
3-Hour	W100Y4	100%	59	11.56	207.40	20.05	12.63	3.59
8-Hour	W100Y4	100%	59	11.56	207.40	20.05	12.63	3.59
24-Hour	W100Y4	100%	59	10.34	107.31	10.30	12.63	3.59
Annual	W100Y4	100%	59	9.24	16.69	1.47	12.63	3.59
1-Hour	W100N5	100%	90	11.56	207.40	20.05	11.24	3.28
3-Hour	W100N5	100%	90	11.56	207.40	20.05	11.24	3.28
8-Hour	W100N5	100%	90	11.56	207.40	20.05	11.24	3.28
24-Hour	W100N5	100%	90	9.85	107.01	10.28	11.24	3.28
Annual	W100N5	100%	90	8.30	16.12	1.43	11.24	3.28
1-Hour	W100Y5	100%	90	11.56	207.40	20.05	12.17	3.48
3-Hour	W100Y5	100%	90	11.56	207.40	20.05	12.17	3.48
8-Hour	W100Y5	100%	90	11.56	207.40	20.05	12.17	3.48
24-Hour	W100Y5	100%	90	10.18	107.21	10.29	12.17	3.48
Annual	W100Y5	100%	90	8.93	16.50	1.45	12.17	3.48
1-Hour	W100N6	100%	100	11.56	207.40	20.05	10.88	3.19
3-Hour	W100N6	100%	100	11.56	207.40	20.05	10.88	3.19
8-Hour	W100N6	100%	100	11.56	207.40	20.05	10.88	3.19
24-Hour	W100N6	100%	100	9.72	106.93	10.27	10.88	3.19
Annual	W100N6	100%	100	8.05	15.97	1.42	10.88	3.19
1-Hour	W100Y6	100%	100	11.56	207.40	20.05	11.89	3.41
3-Hour	W100Y6	100%	100	11.56	207.40	20.05	11.89	3.41
8-Hour	W100Y6	100%	100	11.56	207.40	20.05	11.89	3.41
24-Hour	W100Y6	100%	100	10.08	107.15	10.29	11.89	3.41
Annual	W100Y6	100%	100	8.74	16.39	1.45	11.89	3.41
1-Hour	W100N7	100%	110	11.56	207.40	20.05	10.55	3.11
3-Hour	W100N7	100%	110	11.56	207.40	20.05	10.55	3.11
8-Hour	W100N7	100%	110	11.56	207.40	20.05	10.55	3.11
24-Hour	W100N7	100%	110	9.60	106.86	10.27	10.55	3.11
Annual	W100N7	100%	110	7.82	15.83	1.41	10.55	3.11

Gateway Power Plant
Modeling Exhaust Data Summary

Model Input Data - English Units

Rectangular Stack = 27 feet by 22 feet = 28 feet equivalent diam

Engine	Load	Ambient Temp (F)	Ambient RH (%)	Evap Cooler	Exhaust Flow (acfm)	Exhaust Temp (F)	Exit Diam (ft)	Exit Height (ft)
W060N1	60%	-20	100%	OFF	2,108,915	1,032	28	60
W060N2	60%	0	100%	OFF	2,067,716	1,043	28	60
W060N3	60%	50	60%	OFF	1,962,134	1,074	28	60
W060N4	60%	59	60%	OFF	1,938,229	1,081	28	60
W060N6	60%	100	10%	OFF	1,810,700	1,117	28	60
W060N7	60%	110	10%	OFF	1,784,168	1,127	28	60
W070N1	70%	-20	100%	OFF	2,306,549	1,032	28	60
W070N2	70%	0	100%	OFF	2,258,221	1,043	28	60
W070N3	70%	50	60%	OFF	2,136,599	1,074	28	60
W070N6	70%	100	10%	OFF	1,955,461	1,117	28	60
W070N7	70%	110	10%	OFF	1,922,773	1,127	28	60
W080N2	80%	0	100%	OFF	2,448,985	1,043	28	60
W080N3	80%	50	60%	OFF	2,315,654	1,074	28	60
W080N6	80%	100	10%	OFF	2,105,426	1,117	28	60
W090N2	90%	0	100%	OFF	2,633,296	1,043	28	60
W090N3	90%	50	60%	OFF	2,488,482	1,074	28	60
W090N6	90%	100	10%	OFF	2,256,403	1,117	28	60
W100N1	95%	-20	100%	OFF	2,793,899	1,032	28	60
W100N2	100%	0	100%	OFF	2,836,670	1,043	28	60
W100N3	100%	50	60%	OFF	2,676,445	1,074	28	60
W100Y4	100%	59	60%	85%	2,670,572	1,077	28	60
W100N5	100%	90	20%	OFF	2,485,470	1,109	28	60
W100Y5	100%	90	20%	85%	2,609,802	1,090	28	60
W100N6	100%	100	10%	OFF	2,435,006	1,117	28	60
W100Y6	100%	100	10%	85%	2,571,605	1,098	28	60
W100N7	100%	110	10%	OFF	2,387,176	1,127	28	60

Model Input Data - Metric Units

Engine	Load	Ambient Temp (F)	Ambient RH (%)	Evap Cooler	Exit Height (m)	Exit Temp (K)	Exit Vel (m/s)	Exit Diam (m)
W060N1	60%	-20	100%	OFF	18.29	828.8	18.04	8.382
W060N2	60%	0	100%	OFF	18.29	834.4	17.68	8.382
W060N3	60%	50	60%	OFF	18.29	851.6	16.78	8.382
W060N4	60%	59	60%	OFF	18.29	855.9	16.58	8.382
W060N6	60%	100	10%	OFF	18.29	875.9	15.49	8.382
W060N7	60%	110	10%	OFF	18.29	881.4	15.26	8.382
W070N1	70%	-20	100%	OFF	18.29	828.8	19.73	8.382
W070N2	70%	0	100%	OFF	18.29	834.4	19.31	8.382
W070N3	70%	50	60%	OFF	18.29	851.6	18.27	8.382
W070N6	70%	100	10%	OFF	18.29	875.9	16.72	8.382
W070N7	70%	110	10%	OFF	18.29	881.4	16.44	8.382
W080N2	80%	0	100%	OFF	18.29	834.4	20.94	8.382
W080N3	80%	50	60%	OFF	18.29	851.6	19.80	8.382
W080N6	80%	100	10%	OFF	18.29	875.9	18.01	8.382
W090N2	90%	0	100%	OFF	18.29	834.4	22.52	8.382
W090N3	90%	50	60%	OFF	18.29	851.6	21.28	8.382
W090N6	90%	100	10%	OFF	18.29	875.9	19.30	8.382
W100N1	95%	-20	100%	OFF	18.29	828.8	23.89	8.382
W100N2	100%	0	100%	OFF	18.29	834.4	24.26	8.382
W100N3	100%	50	60%	OFF	18.29	851.6	22.89	8.382
W100Y4	100%	59	60%	0.85	18.29	853.5	22.84	8.382
W100N5	100%	90	20%	OFF	18.29	871.5	21.26	8.382
W100Y5	100%	90	20%	0.85	18.29	860.8	22.32	8.382
W100N6	100%	100	10%	OFF	18.29	875.9	20.82	8.382
W100Y6	100%	100	10%	0.85	18.29	865.3	21.99	8.382
W100N7	100%	110	10%	OFF	18.29	881.4	20.42	8.382

Gateway Power Plant
HAP Impact Analysis

HAP Analysis - AP-42 Factors

HAP Name	1,3-Butadiene	Acetaldehyde	Acrolein	Benzene	Ethylbenzene	Formaldehyde	Naphthalene	PAH (as BaP)	Propylene Ox	Toluene	Xylene (Total)
AP-42 Factor (lb/MMBTU)	4.3E-07	4.0E-05	6.4E-06	1.2E-05	3.2E-05	7.1E-04	1.3E-06	2.2E-06	2.9E-05	1.3E-04	6.4E-05

Engine	Load	Ambient Temp (F)	Ambient RH (%)	Adjusted CT Heat Const (HHV) (MMBTU/h)	1,3-Butadiene (lb/hr)	Acetaldehyde (lb/hr)	Acrolein (lb/hr)	Benzene (lb/hr)	Ethylbenzene (lb/hr)	Formaldehyde (lb/hr)	Naphthalene (lb/hr)	PAH (as BaP) (lb/hr)	Propylene (lb/hr)	Toluene (lb/hr)	Xylene (Total) (lb/hr)
W060N1	60%	-19.99998	100%	1,425.36	6.1E-04	5.7E-02	9.1E-03	1.7E-02	4.6E-02	1.0E+00	1.9E-03	3.1E-03	4.1E-02	1.9E-01	9.1E-02
W060N2	60%	0.00014	100%	1,371.20	5.9E-04	5.5E-02	8.8E-03	1.6E-02	4.4E-02	9.7E-01	1.8E-03	3.0E-03	4.0E-02	1.8E-01	8.8E-02
W060N3	60%	50	60%	1,243.40	5.3E-04	5.0E-02	8.0E-03	1.5E-02	4.0E-02	8.8E-01	1.6E-03	2.7E-03	3.6E-02	1.6E-01	8.0E-02
W060N4	60%	59	60%	1,217.38	5.2E-04	4.9E-02	7.8E-03	1.5E-02	3.9E-02	8.6E-01	1.6E-03	2.7E-03	3.5E-02	1.6E-01	7.8E-02
W060N6	60%	100	10%	1,081.89	4.7E-04	4.3E-02	6.9E-03	1.3E-02	3.5E-02	7.7E-01	1.4E-03	2.4E-03	3.1E-02	1.4E-01	6.9E-02
W060N7	60%	110	10%	1,053.58	4.5E-04	4.2E-02	6.7E-03	1.3E-02	3.4E-02	7.5E-01	1.4E-03	2.3E-03	3.1E-02	1.4E-01	6.7E-02
W070N1	70%	-19.99998	100%	1,595.52	6.9E-04	6.4E-02	1.0E-02	1.9E-02	5.1E-02	1.1E+00	2.1E-03	3.5E-03	4.6E-02	2.1E-01	1.0E-01
W070N2	70%	0.00014	100%	1,533.14	6.6E-04	6.1E-02	9.8E-03	1.8E-02	4.9E-02	1.1E+00	2.0E-03	3.4E-03	4.4E-02	2.0E-01	9.8E-02
W070N3	70%	50	60%	1,386.84	6.0E-04	5.5E-02	8.9E-03	1.7E-02	4.4E-02	9.8E-01	1.8E-03	3.1E-03	4.0E-02	1.8E-01	8.9E-02
W070N6	70%	99.999988	10%	1,198.31	5.2E-04	4.8E-02	7.7E-03	1.4E-02	3.8E-02	8.5E-01	1.6E-03	2.6E-03	3.5E-02	1.6E-01	7.7E-02
W070N7	70%	110	10%	1,164.82	5.0E-04	4.7E-02	7.5E-03	1.4E-02	3.7E-02	8.3E-01	1.5E-03	2.6E-03	3.4E-02	1.5E-01	7.5E-02
W080N2	80%	0.00014	100%	1,696.68	7.3E-04	6.8E-02	1.1E-02	2.0E-02	5.4E-02	1.2E+00	2.2E-03	3.7E-03	4.9E-02	2.2E-01	1.1E-01
W080N3	80%	50	60%	1,533.61	6.6E-04	6.1E-02	9.8E-03	1.8E-02	4.9E-02	1.1E+00	2.0E-03	3.4E-03	4.4E-02	2.0E-01	9.8E-02
W080N6	80%	100	10%	1,318.10	5.7E-04	5.3E-02	8.4E-03	1.6E-02	4.2E-02	9.4E-01	1.7E-03	2.9E-03	3.8E-02	1.7E-01	8.4E-02
W090N2	90%	0.00014	100%	1,854.22	8.0E-04	7.4E-02	1.2E-02	2.2E-02	5.9E-02	1.3E+00	2.4E-03	4.1E-03	5.4E-02	2.4E-01	1.2E-01
W090N3	90%	50	60%	1,674.50	7.2E-04	6.7E-02	1.1E-02	2.0E-02	5.4E-02	1.2E+00	2.2E-03	3.7E-03	4.9E-02	2.2E-01	1.1E-01
W090N6	90%	100	10%	1,435.25	6.2E-04	5.7E-02	9.2E-03	1.7E-02	4.6E-02	1.0E+00	1.9E-03	3.2E-03	4.2E-02	1.9E-01	9.2E-02
W100N1	95%	-19.99998	100%	2,019.53	8.7E-04	8.1E-02	1.3E-02	2.4E-02	6.5E-02	1.4E+00	2.6E-03	4.4E-03	5.9E-02	2.6E-01	1.3E-01
W100N2	100%	0.00014	100%	2,023.86	8.7E-04	8.1E-02	1.3E-02	2.4E-02	6.5E-02	1.4E+00	2.6E-03	4.5E-03	5.9E-02	2.6E-01	1.3E-01
W100N3	100%	50	60%	1,825.55	7.8E-04	7.3E-02	1.2E-02	2.2E-02	5.8E-02	1.3E+00	2.4E-03	4.0E-03	5.3E-02	2.4E-01	1.2E-01
W100Y4	100%	59	60%	1,819.35	7.8E-04	7.3E-02	1.2E-02	2.2E-02	5.8E-02	1.3E+00	2.4E-03	4.0E-03	5.3E-02	2.4E-01	1.2E-01
W100N5	100%	89.999998	20%	1,619.68	7.0E-04	6.5E-02	1.0E-02	1.9E-02	5.2E-02	1.1E+00	2.1E-03	3.6E-03	4.7E-02	2.1E-01	1.0E-01
W100Y5	100%	90	20%	1,753.03	7.5E-04	7.0E-02	1.1E-02	2.1E-02	5.6E-02	1.2E+00	2.3E-03	3.9E-03	5.1E-02	2.3E-01	1.1E-01
W100N6	100%	100	10%	1,567.28	6.7E-04	6.3E-02	1.0E-02	1.9E-02	5.0E-02	1.1E+00	2.0E-03	3.4E-03	4.5E-02	2.0E-01	1.0E-01
W100Y6	100%	100	10%	1,713.38	7.4E-04	6.9E-02	1.1E-02	2.1E-02	5.5E-02	1.2E+00	2.2E-03	3.8E-03	5.0E-02	2.2E-01	1.1E-01
W100N7	100%	110	10%	1,519.53	6.5E-04	6.1E-02	9.7E-03	1.8E-02	4.9E-02	1.1E+00	2.0E-03	3.3E-03	4.4E-02	2.0E-01	9.7E-02
Maximum					**8.7E-04**	**8.1E-02**	**1.3E-02**	**2.4E-02**	**6.5E-02**	**1.4E+00**	**2.6E-03**	**4.5E-03**	**5.9E-02**	**2.6E-01**	**1.3E-01**
Maximum at 50 deg F					**7.3E-04**	**6.8E-02**	**1.1E-02**	**2.0E-02**	**5.4E-02**	**1.2E+00**	**2.2E-03**	**3.7E-03**	**4.9E-02**	**2.2E-01**	**1.1E-01**

Gateway Power Plant
HAP Impact Analysis

HAP Analysis - AP-42 Factors

Engine	Load	Ambient Temp (F)	Ambient RH (%)	1,3-Butadiene (g/s)	Acetaldehyde (g/s)	Acrolein (g/s)	Benzene (g/s)	Ethylbenzene (g/s)	Formaldehyde (g/s)	Naphthalene (g/s)	PAH (as BaP) (g/s)	Propylene (g/s)	Toluene (g/s)	Xylene (g/s)
W060N1	60%	-19.99998	100%	7.7E-05	7.2E-03	1.2E-03	2.2E-03	5.8E-03	1.3E-01	2.3E-04	4.0E-04	5.2E-03	2.3E-02	1.2E-02
W060N2	60%	0.00014	100%	7.4E-05	6.9E-03	1.1E-03	2.1E-03	5.5E-03	1.2E-01	2.2E-04	3.8E-04	5.0E-03	2.2E-02	1.1E-02
W060N3	60%	50	60%	6.7E-05	6.3E-03	1.0E-03	1.9E-03	5.0E-03	1.1E-01	2.0E-04	3.4E-04	4.5E-03	2.0E-02	1.0E-02
W060N4	60%	59	60%	6.6E-05	6.1E-03	9.8E-04	1.8E-03	4.9E-03	1.1E-01	2.0E-04	3.4E-04	4.5E-03	2.0E-02	9.8E-03
W060N6	60%	100	10%	5.9E-05	5.5E-03	8.7E-04	1.6E-03	4.4E-03	9.7E-02	1.8E-04	3.0E-04	4.0E-03	1.8E-02	8.7E-03
W060N7	60%	110	10%	5.7E-05	5.3E-03	8.5E-04	1.6E-03	4.3E-03	9.4E-02	1.7E-04	2.9E-04	3.9E-03	1.7E-02	8.5E-03
W070N1	70%	-19.99998	100%	8.7E-05	8.0E-03	1.3E-03	2.4E-03	6.4E-03	1.4E-01	2.6E-04	4.4E-04	5.8E-03	2.6E-02	1.3E-02
W070N2	70%	0.00014	100%	8.3E-05	7.7E-03	1.2E-03	2.3E-03	6.2E-03	1.4E-01	2.5E-04	4.3E-04	5.6E-03	2.5E-02	1.2E-02
W070N3	70%	50	60%	7.5E-05	7.0E-03	1.1E-03	2.1E-03	5.6E-03	1.2E-01	2.3E-04	3.8E-04	5.1E-03	2.3E-02	1.1E-02
W070N6	70%	99.999988	10%	6.5E-05	6.0E-03	9.7E-04	1.8E-03	4.8E-03	1.1E-01	2.0E-04	3.3E-04	4.4E-03	2.0E-02	9.7E-03
W070N7	70%	110	10%	6.3E-05	5.9E-03	9.4E-04	1.8E-03	4.7E-03	1.0E-01	1.9E-04	3.2E-04	4.3E-03	1.9E-02	9.4E-03
W080N2	80%	0.00014	100%	9.2E-05	8.6E-03	1.4E-03	2.6E-03	6.8E-03	1.5E-01	2.8E-04	4.7E-04	6.2E-03	2.8E-02	1.4E-02
W080N3	80%	50	60%	8.3E-05	7.7E-03	1.2E-03	2.3E-03	6.2E-03	1.4E-01	2.5E-04	4.3E-04	5.6E-03	2.5E-02	1.2E-02
W080N6	80%	100	10%	7.1E-05	6.6E-03	1.1E-03	2.0E-03	5.3E-03	1.2E-01	2.2E-04	3.7E-04	4.8E-03	2.2E-02	1.1E-02
W090N2	90%	0.00014	100%	1.0E-04	9.4E-03	1.5E-03	2.8E-03	7.5E-03	1.7E-01	3.0E-04	5.1E-04	6.8E-03	3.0E-02	1.5E-02
W090N3	90%	50	60%	9.1E-05	8.4E-03	1.4E-03	2.5E-03	6.8E-03	1.5E-01	2.7E-04	4.6E-04	6.1E-03	2.7E-02	1.4E-02
W090N6	90%	100	10%	7.8E-05	7.2E-03	1.2E-03	2.2E-03	5.8E-03	1.3E-01	2.4E-04	4.0E-04	5.2E-03	2.4E-02	1.2E-02
W100N1	95%	-19.99998	100%	1.1E-04	1.0E-02	1.6E-03	3.1E-03	8.1E-03	1.8E-01	3.3E-04	5.6E-04	7.4E-03	3.3E-02	1.6E-02
W100N2	100%	0.00014	100%	1.1E-04	1.0E-02	1.6E-03	3.1E-03	8.2E-03	1.8E-01	3.3E-04	5.6E-04	7.4E-03	3.3E-02	1.6E-02
W100N3	100%	50	60%	9.9E-05	9.2E-03	1.5E-03	2.8E-03	7.4E-03	1.6E-01	3.0E-04	5.1E-04	6.7E-03	3.0E-02	1.5E-02
W100Y4	100%	59	60%	9.9E-05	9.2E-03	1.5E-03	2.8E-03	7.3E-03	1.6E-01	3.0E-04	5.0E-04	6.7E-03	3.0E-02	1.5E-02
W100N5	100%	89.999998	20%	8.8E-05	8.2E-03	1.3E-03	2.5E-03	6.5E-03	1.5E-01	2.7E-04	4.5E-04	5.9E-03	2.7E-02	1.3E-02
W100Y5	100%	90	20%	9.5E-05	8.8E-03	1.4E-03	2.7E-03	7.1E-03	1.6E-01	2.9E-04	4.9E-04	6.4E-03	2.9E-02	1.4E-02
W100N6	100%	100	10%	8.5E-05	7.9E-03	1.3E-03	2.4E-03	6.3E-03	1.4E-01	2.6E-04	4.3E-04	5.7E-03	2.6E-02	1.3E-02
W100Y6	100%	100	10%	9.3E-05	8.6E-03	1.4E-03	2.6E-03	6.9E-03	1.5E-01	2.8E-04	4.8E-04	6.3E-03	2.8E-02	1.4E-02
W100N7	100%	110	10%	8.2E-05	7.7E-03	1.2E-03	2.3E-03	6.1E-03	1.4E-01	2.5E-04	4.2E-04	5.6E-03	2.5E-02	1.2E-02
Maximum				**1.10E-04**	**1.02E-02**	**1.63E-03**	**3.06E-03**	**8.17E-03**	**1.81E-01**	**3.32E-04**	**5.62E-04**	**7.40E-03**	**3.32E-02**	**1.63E-02**
Maximum at 50 deg F				**9.20E-05**	**8.56E-03**	**1.37E-03**	**2.57E-03**	**6.85E-03**	**1.52E-01**	**2.78E-04**	**4.71E-04**	**6.21E-03**	**2.78E-02**	**1.37E-02**

Appendix B-3 - Fuel Heater Data and Calculations

Gateway Power Plant

Fuel Heater Data

Operating Data

Operating Hours	8760		
Fuel Heat content (HHV)	1200	Btu/scf	
Fuel Heat content (LHV)	935	Btu/scf	
Fuel S Content	20	gr/100dscf	28.571429 lb/MMdscf
Fuel Heater Heat Input	3.6	MMBTU/hr	
Fuel Heater Fuel Input	0.0039	MMscf/hr	
	33,728,342	scf/yr	

Emissions Data

	Emission Factor (lb/MMscf)	Emissions (lb/hr)	(gm/s)	(ton/yr)
NOx (lb/MMscf)		0.4357	0.0549	1.9084
CO (lb/MMscf)		0.3660	0.0462	1.6031
VOC (lb/MMscf)		0.0479	0.0060	0.2098
SOx (as SO2) (lb/MMscf)		0.2200	0.0277	0.9637
PM10 (front and back) (lb/MMscf)		0.0331	0.0042	0.1450

Note: NOx, CO, VOC, and PM based on manufacturer data. SO2 based on fuel sulfur concent

Stack Data

Exhaust Temperature	1000	F	811	K
Exhaust Gas Flow	2369	acfm	67.09	acmm
Exhaust Diameter	2.00	ft	0.61	m
Exhaust Velocity	12.57	ft/s	3.83	m/s
Exhaust Height Above Ground	18.0	ft	5.49	m

Gateway Power Plant

Fuel Heater HAP Emissions Estimates

	1,3-Butadiene	Acetaldehyde	Acrolein	Benzene	Ethylbenzene	Formaldehyde
AP-42 Factor (lb/MMscf)				2.1E-03		7.5E-02
Estimated Emissions (lb/hr)	0.0E+00	0.0E+00	0.0E+00	8.1E-06	0.0E+00	2.9E-04
Estimated Emissions (gm/s)	0.00E+00	0.00E+00	0.00E+00	1.02E-06	0.00E+00	3.64E-05

Emission Factors from AP-42 Table 1.4-3

Gateway Power Plant

Fuel Heater HAP Emissions Estimates

	Naphthalene	PAH (as BAP)	Propylene Oxide	Toluene	Xylene (Total)
AP-42 Factor (lb/MMscf)		1.2E-06		3.4E-03	
Estimated Emissions (lb/hr)	0.0E+00	4.6E-09	0.0E+00	1.3E-05	0.0E+00
Estimated Emissions (gm/s)	0.00E+00	5.83E-10	0.00E+00	1.65E-06	0.00E+00

Emission Factors from AP-42 Table 1.4-3

Gateway Power Plant

Fuel Heater Cavity Impact Calculations

Modeled Emission Rate = 1 gm/s
Cavity Impact = 3312 ug/m^3

		Facility Emissions (gm/s)	Averaging Factor	Cavity Impact (ug/m^3)
NO2	Annual	0.0549	0.08	14.56
CO	1-Hour	0.0462	1	152.87
	8-Hour	0.0462	0.7	107.01
PM10	24-Hour	0.0042	0.4	5.53
	Annual	0.0042	0.08	1.11
SO2	3-Hour	0.0277	0.9	82.71
	24-Hour	0.0277	0.4	36.76
	Annual	0.0277	0.08	7.35

Appendix B-4 - Sample Calculations

Gateway Power Plant
Sample CT Emission Calculation

Sample Exhaust Flow and NOx Mass Emission Rate Calculation

Engine	Load (%)	Ambient Temp (F)
W100N2	100%	0

Exhaust Flow	3,934,295	lb/hr	Engineering Data
Exhaust Mol Weight Wet	28.45	lb/lbmol	Engineering Data
Exhaust Mol Weight Dry	29.33	lb/lbmol	Engineering Data
Exhaust H2O	7.75%		Engineering Data
Exhaust O2 Wet	12.49%		Engineering Data
Ehaust O2 Dry	13.54%		Engineering Data
Ideal Gas Density	359	scf/lbmol	
NOx Mol Weight	46	lb/lbmol	
Exhaust Temp	1,043	deg F	
Base Temperature	460	deg F	
Standard Temperature	32	deg F	
Ambient Pressure	13.09	psi	
Standard Pressure	14.70	psi	

Exhaust Flow

$$\frac{3{,}934{,}295\ \text{lb}}{1\ \text{hr}} * \frac{1\ \text{lbmol}}{28.45\ \text{lb}} = 138{,}264\ \frac{\text{lbmol wet}}{\text{hr}}$$

$$138{,}264\ \frac{\text{lbmol wet}}{\text{hr}} * 359\ \frac{\text{scf}}{\text{lbmol}} = 49{,}636{,}740\ \frac{\text{scf}}{\text{hr}}$$

$$49{,}636{,}740\ \frac{\text{scf}}{\text{hr}} * \left(\frac{460 + 1{,}043}{460 + 32}\right) * \frac{14.70}{13.09} = 170{,}200{,}198\ \frac{\text{acf}}{\text{hr}}$$

$$170{,}200{,}198\ \frac{\text{acf}}{\text{hr}} * \frac{1\ \text{hr}}{60\ \text{min}} = 2{,}836{,}670\ \frac{\text{acf}}{\text{min}}$$

Mass Emission Calculation

Remove H2O from Exhaust

H2O Volume $\quad 138{,}264\ \text{lbmol} * 7.75\% = 10{,}710\ \frac{\text{lbmol H2O}}{\text{hr}}$

$138{,}264\ \text{lbmol} - 10{,}710 = 127{,}554\ \frac{\text{lbmol exhaust dry}}{\text{hr}}$

Correct to 15% O2

$21.00\% - 13.54\% = 7.46\%$

$21.00\% - 15.00\% = 6.00\%$

$$127{,}554 * \left(\frac{7.46\%}{6.00\%}\right) = 158{,}685\ \frac{\text{lbmol exhaust dry corrected to 15\% O2}}{\text{hr}}$$

NOx Emissions = $\quad 12.5$ ppmvd @ 15% O2

$$158{,}685 * \frac{12.5}{1.00\text{E+06}} = 2.0\ \frac{\text{lbmol NOx}}{\text{hr}}$$

$$\frac{2.0\ \text{lbmol NOx}}{1\ \text{hr}} * \frac{46\ \text{lb}}{1\ \text{lbmol}} = 91.2\ \frac{\text{lb NOx}}{\text{hr}}$$

10% Contingency $\quad 91.2 * (1 + 0.10) = 100.4\ \frac{\text{lb NOx}}{\text{hr}}$

File - sample-calc1.xls, Sheet - Sample-NOx-W, Date - 1/11/2006, G. Frisbie

Gateway Power Plant
Sample CT Emission Calculation

Sample Exhaust Flow and CO Mass Emission Rate Calculation

Engine	Load (%)	Ambient Temp (F)
W060N1	60%	-20

Exhaust Flow	2,948,840	lb/hr	Engineering Data
Exhaust Mol Weight Wet	28.49	lb/lbmol	Engineering Data
Exhaust Mol Weight Dry	29.31	lb/lbmol	Engineering Data
Exhaust H2O	7.20%		Engineering Data
Exhaust O2 Wet	13.01%		Engineering Data
Ehaust O2 Dry	14.02%		Engineering Data
Ideal Gas Density	359	scf/lbmol	
CO Mol Weight	28	lb/lbmol	
Exhaust Temp	1,032	deg F	
Base Temperature	460	deg F	
Standard Temperature	32	deg F	
Ambient Pressure	13.09	psi	
Standard Pressure	14.70	psi	

Exhaust Flow

$$\frac{2{,}948{,}840\ \text{lb}}{1\ \text{hr}} * \frac{1\ \text{lbmol}}{28.49\ \text{lb}} = 103{,}489\ \frac{\text{lbmol wet}}{\text{hr}}$$

$$103{,}489\ \frac{\text{lbmol wet}}{\text{hr}} * 359\ \frac{\text{scf}}{\text{lbmol}} = 37{,}152{,}540\ \frac{\text{scf}}{\text{hr}}$$

$$37{,}152{,}540\ \frac{\text{scf}}{\text{hr}} * \left(\frac{460 + 1{,}032}{460 + 32}\right) * \frac{14.70}{13.09} = 126{,}534{,}900\ \frac{\text{acf}}{\text{hr}}$$

$$126{,}534{,}900\ \frac{\text{acf}}{\text{hr}} * \frac{1\ \text{hr}}{60\ \text{min}} = 2{,}108{,}915\ \frac{\text{acf}}{\text{min}}$$

Mass Emission Calculation

Remove H2O from Exhaust

H2O Volume $\quad 103{,}489\ \text{lbmol} * 7.20\% = 7{,}451\ \frac{\text{lbmol H2O}}{\text{hr}}$

$103{,}489\ \text{lbmol} - 7{,}451 = 96{,}038\ \frac{\text{lbmol exhaust dry}}{\text{hr}}$

Correct to 15% O2

$21.00\% - 14.02\% = 6.98\%$

$21.00\% - 15.00\% = 6.00\%$

$96{,}038 * \left(\frac{6.98\%}{6.00\%}\right) = 111{,}703\ \frac{\text{lbmol exhaust dry corrected to 15\% O2}}{\text{hr}}$

CO Emissions = $\quad 50$ ppmvd @ 15% O2

$$111{,}703 * \frac{50}{1.00\text{E}+06} = 5.6\ \frac{\text{lbmol CO}}{\text{hr}}$$

$$\frac{5.6}{1}\ \frac{\text{lbmol NOx}}{\text{hr}} * \frac{28}{1}\ \frac{\text{lb}}{\text{lbmol}} = 156.4\ \frac{\text{lb CO}}{\text{hr}}$$

10% Contingency $\quad 156.4 * (1 + 0.10) = 172.0\ \frac{\text{lb CO}}{\text{hr}}$

File - sample-calc1.xls, Sheet - Sample-CO-W, Date - 1/11/2006, G. Frisbie

Gateway Power Plant
Sample CT Emission Calculation

Sample Exhaust Flow and VOC Mass Emission Rate Calculation

Engine	Load (%)	Ambient Temp (F)
W060N1	60%	-20

Exhaust Flow	2,948,840	lb/hr	Engineering Data
Exhaust Mol Weight Wet	28.49	lb/lbmol	Engineering Data
Exhaust Mol Weight Dry	29.31	lb/lbmol	Engineering Data
Exhaust H2O	7.20%		Engineering Data
Exhaust O2 Wet	13.01%		Engineering Data
Ehaust O2 Dry	14.02%		Engineering Data
Ideal Gas Density	359	scf/lbmol	
VOC Mol Weight	16	lb/lbmol	
Exhaust Temp	1,032	deg F	
Base Temperature	460	deg F	
Standard Temperature	32	deg F	
Ambient Pressure	13.09	psi	
Standard Pressure	14.70	psi	

Exhaust Flow

$$\frac{2{,}948{,}840\ \text{lb}}{1\ \text{hr}} * \frac{1\ \text{lbmol}}{28.49\ \text{lb}} = 103{,}489\ \frac{\text{lbmol wet}}{\text{hr}}$$

$$103{,}489\ \frac{\text{lbmol wet}}{\text{hr}} * 359\ \frac{\text{scf}}{\text{lbmol}} = 37{,}152{,}540\ \frac{\text{scf}}{\text{hr}}$$

$$37{,}152{,}540\ \frac{\text{scf}}{\text{hr}} * \left(\frac{460 + 1{,}032}{460 + 32}\right) * \frac{14.70}{13.09} = 126{,}534{,}900\ \frac{\text{acf}}{\text{hr}}$$

$$126{,}534{,}900\ \frac{\text{acf}}{\text{hr}} * \frac{1\ \text{hr}}{60\ \text{min}} = 2{,}108{,}915\ \frac{\text{acf}}{\text{min}}$$

Mass Emission Calculation

Remove H2O from Exhaust

H2O Volume: $103{,}489\ \text{lbmol} * 7.20\% = 7{,}451\ \frac{\text{lbmol H2O}}{\text{hr}}$

$103{,}489\ \text{lbmol} - 7{,}451 = 96{,}038\ \frac{\text{lbmol exhaust dry}}{\text{hr}}$

Correct to 15% O2

$21.00\% - 14.02\% = 6.98\%$

$21.00\% - 15.00\% = 6.00\%$

$96{,}038 * \left(\frac{6.98\%}{6.00\%}\right) = 111{,}703\ \frac{\text{lbmol exhaust dry corrected to 15\% O2}}{\text{hr}}$

VOC Emissions = 10 ppmvd @ 15% O2

$111{,}703 * \frac{10}{1.00\text{E+}06} = 1.1\ \frac{\text{lbmol VOC}}{\text{hr}}$

$$\frac{1.1}{1}\ \frac{\text{lbmol NOx}}{\text{hr}} * \frac{16}{1}\ \frac{\text{lb}}{\text{lbmol}} = 17.9\ \frac{\text{lb VOC}}{\text{hr}}$$

10% Contingency: $17.9 * (1 + 0.10) = 19.7\ \frac{\text{lb VOC}}{\text{hr}}$

File - sample-calc1.xls, Sheet - Sample-VOC-W, Date - 1/11/2006, G. Frisbie

Gateway Power Plant
Sample CT Emission Calculation

Sample SO2 Calculation

Engine	Load (%)	Ambient Temp (F)
W100N2	100%	0

Fuel Sulfur Concentration =	20	gr/100dscf
Fuel Heat Content (LHV) =	935.1	BTU/scf
Heat Input =	1,823	MMBTU/hr
S Mol Weight	32	lb
SO2 Mol Weight	64	lb

Calculate Fuel Flow

$$1{,}822{,}514{,}361 \frac{\text{BTU}}{\text{hr}} * \frac{1 \text{ scf}}{935 \text{ BTU}} = 1{,}949{,}023 \frac{\text{scf}}{\text{hr}}$$

$$1{,}949{,}023 \frac{\text{scf}}{\text{hr}} * \frac{1 \text{ 100scf}}{100 \text{ scf}} = 19{,}490 \frac{\text{100scf}}{\text{hr}}$$

Calculate Sulfur Emissions

$$19{,}490 \frac{\text{100scf}}{\text{hr}} * \frac{20.00 \text{ gr S}}{\text{100scf}} = 389{,}805 \frac{\text{gr S}}{\text{hr}}$$

$$389{,}805 \frac{\text{gr}}{\text{hr}} * \frac{1 \text{ lb}}{7{,}000 \text{ gr}} = 55.6864 \frac{\text{lb S}}{\text{hr}}$$

$$55.6864 \frac{\text{lb S}}{\text{hr}} * \frac{64 \text{ lb SO2}}{32 \text{ lb S}} = 111.37 \frac{\text{lb SO2}}{\text{hr}}$$

Gateway Power Plant
Sample CT Emission Calculation

Sample PM10 Calculation

Engine	Load (%)	Ambient Temp (F)
W100N2	100%	0

PM10 Factor = 10 mg/m^3

Unit Conversions 0.03 m^3/ft^3
2.20E-06 lb/mg

Exhaust Flow 827,279 std ft^3/min
49,636,740 std ft^3/hr

PM10 Emissions

$$10 \frac{mg}{m^3} * 0.03 \frac{m^3}{ft^3} * 2.20E-06 \frac{lb}{mg} = 6.24E-07 \frac{lb}{ft^3}$$

$$6.24E-07 \frac{lb}{ft^3} * 49,636,740 \frac{ft^3}{hr} = 30.96 \frac{lb}{hr}$$

Gateway Power Plant
Sample CT Emission Calculation

Sample Calculation for Combined Normal and Startup Emissions
Maximum Annual NOx Calculations

Maximum Continuous Steady State Emissions (from worksheet Sample-NOx-W)

$$100.4 \text{ lb/hr} * \frac{454 \text{ gm/lb}}{3600 \text{ s/hr}} = 12.66 \text{ gm/s}$$

Annual NOx

Normal Emmision Rate =	100.37 lb/hr		
Startup =	83.64 lb/hr	for	0.68 hrs
Shutdown =	101.99 lb/hr	for	0.53 hrs

Assume 400 starts per year

Startup =	83.64	*	0.68	*	400	=	22862.00 lbs		
Shutdowns	101.99	*	0.53	*	400	=	21758.00 lbs		
Total					486.67	hrs	44620.00 lbs		
Downtime Hot		400	*	0 hrs		=	0 hrs		
							0 hrs		
Normal	100.37	*	(8760	-	486.67	-	0.00)	=	830380.40 lbs

$$\text{Result} \quad \frac{44620.00 + 830380.40}{8760} = 99.89 \text{ lb/hr}$$

$$99.89 * \frac{454 \text{ gm/lb}}{3600 \text{ s/hr}} = 12.60 \text{ gm/s}$$

Gateway Power Plant
Sample CT Emission Calculation

Sample Calculation for Combined Normal and Startup Emissions
Maximum Annual CO Calculations

Maximum Continuous Steady State Emissions (from worksheet Sample-CO-W)

172.0	lb/hr	*	454 / 3600	gm/lb / s/hr	=	21.69	gm/s

Annual CO

Normal Emmision Rate =	172.02	lb/hr		
Startup =	1514.63	lb/hr	for	0.68 hrs
Shutdown =	1811.25	lb/hr	for	0.53 hrs

Assume 400 starts per year

Startup =	1514.63	*	0.68	*	400	=	414000.00	lbs	
Shutdowns	1811.25	*	0.53	*	400	=	386400.00	lbs	
Total					486.67	hrs	800400.00	lbs	

Downtime Hot	400	*	0 hrs			=	0	hrs			
							0	hrs			
Normal	172.02	*	(	8760	-	486.67	-	0.00)	=	1423204.41	lbs

Result	800400.00 / 8760	+	1423204.41	=	253.84	lb/hr

253.84	*	454 / 3600	gm/lb / s/hr	=	32.01	gm/s

Gateway Power Plant
Sample CT Emission Calculation

Sample Calculation for Combined Normal and Startup Emissions
Maximum Annual VOC Calculations

Maximum Continuous Steady State Emissions (from worksheet Sample-VOC-W)

$$19.7 \text{ lb/hr} * \frac{454 \text{ gm/lb}}{3600 \text{ s/hr}} = 2.48 \text{ gm/s}$$

Annual VOC

Normal Emmision Rate =	19.66 lb/hr		
Startup =	146.58 lb/hr	for	0.68 hrs
Shutdown =	174.87 lb/hr	for	0.53 hrs

Assume 400 starts per year

Startup =	146.58	*	0.68	*	400	=	40066.00 lbs	
Shutdowns	174.87	*	0.53	*	400	=	37306.00 lbs	
Total					486.67	hrs	77372.00 lbs	

Downtime Hot 400 * 0 hrs = 0 hrs
0 hrs

Normal 19.66 * (8760 - 486.67 - 0.00) = 162651.93 lbs

Result $\frac{77372.00 + 162651.93}{8760}$ = 27.40 lb/hr

$$27.40 * \frac{454 \text{ gm/lb}}{3600 \text{ s/hr}} = 3.46 \text{ gm/s}$$

Gateway Power Plant
Sample CT Emission Calculation

Sample Calculation for Combined Normal and Startup Emissions
Maximum Annual SO2 Calculations

Maximum Continuous Steady State Emissions (from worksheet Sample-SO2-W)

111.4	lb/hr	*	454	gm/lb	=	14.05	gm/s
			3600	s/hr			

Annual SO2

Normal Emmision Rate =	111.37 lb/hr		
Startup =	65.63 lb/hr	for	0.68 hrs
Shutdown =	81.94 lb/hr	for	0.53 hrs

Assume **400 starts per year**

Startup =	65.63	*	0.68	*	400	=	17940.00	lbs
Shutdowns	81.94	*	0.53	*	400	=	17480.00	lbs
Total					486.67	hrs	35420.00	lbs

Downtime Hot	400	*	0 hrs	=	0	hrs
					0	hrs

Normal	111.37	*	(	8760	-	486.67	-	0.00	)	=	921423.92 lbs

Result	35420.00	+	921423.92	=	109.23	lb/hr
			8760			

109.23	*	454	gm/lb	=	13.77	gm/s
		3600	s/hr			

Gateway Power Plant
Sample CT Emission Calculation

Sample Calculation for Combined Normal and Startup Emissions
Maximum Annual PM10 Calculations

Maximum Continuous Steady State Emissions (from worksheet Sample-PM10-W)

31.0	lb/hr	*	454	gm/lb	=	3.90	gm/s
			3600	s/hr			

Annual PM10

Normal Emmision Rate =	30.96 lb/hr		
Startup =	9.59 lb/hr	for	0.68 hrs
Shutdown =	11.64 lb/hr	for	0.53 hrs

Assume 400 starts per year

Startup =	9.59	*	0.68	*	400	=	2622.00	lbs
Shutdowns	11.64	*	0.53	*	400	=	2484.00	lbs
Total					486.67	hrs	5106.00	lbs

Downtime Hot	400	*	0 hrs	=	0	hrs
					0	hrs

Normal	30.96	*	(	8760	-	486.67	-	0.00	)	=	256137.29 lbs

Result	5106.00	+	256137.29	=	29.82	lb/hr
			8760			

29.82	*	454	gm/lb	=	3.76	gm/s
		3600	s/hr			

Gateway Power Plant
Sample CT Emission Calculation

Sample Calculation for Combined Normal and Startup Emissions
NOx Calculations for Modeling (Annual Averaging Period)

Continuous Steady State Emissions

Case	Load	Amb Temp
W060N1	60%	-20

$$70.7 \text{ lb/hr} * \frac{454 \text{ gm/lb}}{3600 \text{ s/hr}} = 8.91 \text{ gm/s}$$

Annual NOx

Normal Emmision Rate =	70.65 lb/hr		
Startup =	83.64 lb/hr	for	0.68 hrs
Shutdown =	101.99 lb/hr	for	0.53 hrs

Assume 400 starts per year

Startup =	83.64	*	0.68	*	400	=	22862.00 lbs		
Shutdowns	101.99	*	0.53	*	400	=	21758.00 lbs		
Total					486.67	hrs	44620.00 lbs		
Downtime Hot		400	*	0 hrs		=	0 hrs		
							0 hrs		
Normal	70.65	*	(8760	-	486.67	-	0.00)	=	584530.38 lbs

$$\text{Result} \quad \frac{44620.00 + 584530.38}{8760} = 71.82 \text{ lb/hr}$$

$$71.82 * \frac{454 \text{ gm/lb}}{3600 \text{ s/hr}} = 9.06 \text{ gm/s}$$

Gateway Power Plant
Sample CT Emission Calculation

Sample Calculation for Combined Normal and Startup Emissions
CO Calculations for Modeling (1-hr Averaging Period)

Continuous Steady State Emissions

Case	Load	Amb Temp
W060N7	60%	110

$$\frac{127.2 \text{ lb/hr} * 454 \text{ gm/lb}}{3600 \text{ s/hr}} = 16.04 \text{ gm/s}$$

1-Hr CO

Normal Emmision Rate =	127.22 lb/hr		
Startup =	1514.63 lb/hr	for	0.68 hrs
Shutdown =	1811.25 lb/hr	for	0.53 hrs

Assume **1 Startup per 1-hr Period**

Startup =	1514.63	*	0.68	*	1	=	1035.00 lbs		
Shutdowns	1811.25	*	0.53	*	1	=	966.00 lbs		
Total					1.22	hrs	2001.00 lbs		
Normal	127.22	* (	1	-	1.22)	=	-27.57 lbs =		0 lbs

Result

$$\frac{2001.00 + 0.00}{1.22} = 1644.66 \text{ lb/hr}$$

$$\frac{1644.66 * 454 \text{ gm/lb}}{3600 \text{ s/hr}} = \mathbf{207.41 \text{ gm/s}}$$

Gateway Power Plant
Sample CT Emission Calculation

Sample Calculation for Combined Normal and Startup Emissions
CO Calculations for Modeling (8-hr Averaging Period)

Continuous Steady State Emissions

Case	Load	Amb Temp
W060N7	60%	110

$$\frac{127.22 \text{ lb/hr} * 454 \text{ gm/lb}}{3600 \text{ s/hr}} = 16.04 \text{ gm/s}$$

8-Hour CO

Normal Emmision Rate =	127.22 lb/hr		
Startup =	1514.63 lb/hr	for	0.68 hours
Shutdown =	1811.25 lb/hr	for	0.53

Assume **8 Startups per 8-hr Period**

Startup	1514.63	*		0.68	*	8	=	8280.00	
Shutdowns	1811.25	*		0.53	*	8	=	7728.00	
Total						9.73	hrs	16008.00 lbs	
Normal	127.22	*	(	8	-	9.73)	=	-220.52 lbs =	0 lbs

$$\text{Result} \quad \frac{16008.00 + 0.00}{9.73} = 1644.66 \text{ lb/hr}$$

$$\frac{1644.66 * 454 \text{ gm/lb}}{3600 \text{ s/hr}} = \mathbf{207.41 \text{ gm/s}}$$

Gateway Power Plant
Sample CT Emission Calculation

Sample Calculation for Combined Normal and Startup Emissions
SO2 Calculations for Modeling (3-hr Averaging Period)

Continuous Steady State Emissions

Case	Load	Amb Temp
W060N1	60%	-20

78.44 lb/hr * (454 gm/lb / 3600 s/hr) = 9.89 gm/s

3-Hour SO2

Normal Emmision Rate =	78.44 lb/hr			
Startup =	65.63 lb/hr	for	0.68	hours
Shutdown =	81.94 lb/hr	for	0.53	hours

Assume **3 Startup per 3-hr Period**

Startup	65.63	*	0.68	*	3	=	134.55		
Shutdowns	81.94	*	0.53	*	3	=	131.10		
Total					3.65	hrs	265.65 lbs		
Normal	78.44	*	(3	-	3.65)	=	-50.98 lbs =		0 lbs
Result	265.65 / 3.65	+	0.00	=	72.78 lb/hr				

72.78 * (454 gm/lb / 3600 s/hr) = **9.18 gm/s**

Gateway Power Plant
Sample CT Emission Calculation

Sample Calculation for Combined Normal and Startup Emissions
SO2 Calculations for Modeling (24-hr Averaging Period)

Continuous Steady State Emissions

Case	Load	Amb Temp
W060N1	60%	-20

$$78.44 \text{ lb/hr} * \frac{454 \text{ gm/lb}}{3600 \text{ s/hr}} = 9.89 \text{ gm/s}$$

24-Hour SO2

Normal Emmision Rate =	78.44 lb/hr		
Startup =	65.63 lb/hr	for	0.68 hours
Shutdown =	81.94 lb/hr	for	0.53

Assume **10 Startups per 24-hr Period**

Startup	65.63	*	0.68	*	10	=	448.50		
Shutdowns	81.94	*	0.53	*	10	=	437.00		
Total					12.17	hrs	885.50 lbs		
Normal	78.44	*	(24	-	12.17)	=	928.18 lbs =	928.18 lbs	

$$\text{Result} \quad \frac{885.50 + 928.18}{24} = 75.57 \text{ lb/hr}$$

$$75.57 * \frac{454 \text{ gm/lb}}{3600 \text{ s/hr}} = \mathbf{9.53 \text{ gm/s}}$$

Gateway Power Plant
Sample CT Emission Calculation

Sample Calculation for Combined Normal and Startup Emissions
SO2 Calculations for Modeling (Annual Averaging Period)

Continuous Steady State Emissions

Case	Load	Amb Temp
W060N1	60%	-20

$$78.44 \text{ lb/hr} * \frac{454 \text{ gm/lb}}{3600 \text{ s/hr}} = 9.89 \text{ gm/s}$$

Annual SO2

Normal Emmision Rate =	78.44 lb/hr		
Startup =	65.63 lb/hr	for	0.68 hours
Shutdown =	81.94 lb/hr	for	0.53

Assume 400 Startups per Annual Period

Startup	65.63	*	0.68	*	400	=	17940.00	
Shutdowns	81.94	*	0.53	*	400	=	17480.00	
Total					486.67	hrs	35420.00	lbs

Normal 78.44 * (8760 - 486.67) = 648938.76 lbs

Result $\frac{35420.00 + 648938.76}{8760} = 78.12$ lb/hr

$$78.12 * \frac{454 \text{ gm/lb}}{3600 \text{ s/hr}} = \mathbf{9.85 \text{ gm/s}}$$

Gateway Power Plant
Sample CT Emission Calculation

Sample Calculation for Combined Normal and Startup Emissions
PM10 Calculations for Modeling (24-hr Averaging Period)

Continuous Steady State Emissions

Case	Load	Amb Temp
W060N1	60%	-20

$$23.17 \text{ lb/hr} * \frac{454 \text{ gm/lb}}{3600 \text{ s/hr}} = 2.92 \text{ gm/s}$$

24-Hour PM10

Normal Emmision Rate =	23.17 lb/hr		
Startup =	9.59 lb/hr	for	0.68 hours
Shutdown =	11.64 lb/hr	for	0.53

Assume **10 Startups per 24-hr Period**

Startup	9.59	*	0.68	*	10	=	65.55		
Shutdowns	11.64	*	0.53	*	10	=	62.10		
Total					12.17	hrs	127.65 lbs		
Normal	23.17	*	(24	-	12.17)	=	274.21 lbs =		274.21 lbs

Result $\frac{127.65 + 274.21}{24} = 16.74$ lb/hr

$$16.74 * \frac{454 \text{ gm/lb}}{3600 \text{ s/hr}} = \mathbf{2.11 \text{ gm/s}}$$

Gateway Power Plant
Sample CT Emission Calculation

Sample Calculation for Combined Normal and Startup Emissions
PM10 Calculations for Modeling (Annual Averaging Period)

Continuous Steady State Emissions

Case	Load	Amb Temp
W060N1	60%	-20

$$23.17 \text{ lb/hr} * \frac{454 \text{ gm/lb}}{3600 \text{ s/hr}} = 2.92 \text{ gm/s}$$

Annual PM10

Normal Emmision Rate =	23.17 lb/hr			
Startup =	9.59 lb/hr	for	0.68	hrs
Shutdown =	11.64 lb/hr	for	0.53	hrs

Assume 400 Startups per Annual Period

Startup	9.59	*	0.68	*	400	=	2622.00	lbs
Shutdowns	11.64	*	0.53	*	400	=	2484.00	lbs
Total					486.67	hrs	5106.00	lbs

Normal 23.17 * (8760 - 486.67) = 191715.87 lbs

Result

$$\frac{5106.00 + 191715.87}{8760} = 22.47 \text{ lb/hr}$$

$$22.47 * \frac{454 \text{ gm/lb}}{3600 \text{ s/hr}} = \mathbf{2.83 \text{ gm/s}}$$

Gateway Power Plant
Sample Heater Emission Calculation

Fuel Heater Sample NOx Calculation

Hours per Day	24	
Hours per Year	8760	
NOx Emis Factor =	100.0	lb/MMscf (AP-42 Table 1.4-1)
Fuel Heat Content (LHV) =	935	BTU/scf
Fuel Heater Heat Input =	3.6	MMBTU/hr

Calculate Fuel Flow

$$2 \frac{\text{MMBTU}}{\text{hr}} * \frac{1}{935} \frac{\text{MMscf}}{\text{MMBTU}} = 0.0021 \frac{\text{MMscf}}{\text{hr}}$$

Calculate NOx Emissions

$$0.0021 \frac{\text{MMscf}}{\text{hr}} * 100.0 \frac{\text{lb}}{\text{MMBTU}} = 0.21 \frac{\text{lb}}{\text{hr}}$$

Instantaneous Emissions

$$0.21 \frac{\text{lb}}{\text{hr}} * \frac{454}{3600} \frac{\text{gm-hr}}{\text{lb-s}} = 0.03 \frac{\text{gm}}{\text{s}}$$

Daily Emissions

$$0.03 \frac{\text{gm}}{\text{s}} * \frac{24}{24} \frac{\text{hr}}{\text{hr}} = 0.03 \frac{\text{gm}}{\text{s}}$$

Gateway Power Plant
Sample Heater Emission Calculation

Fuel Heater Sample CO Calculation

Hours per Day	24	
Hours per Year	8760	
CO Emis Factor =	84.0	lb/MMscf (AP-42 Table 1.4-1)
Fuel Heat Content (LHV) =	935	BTU/scf
Fuel Heater Heat Input =	3.6	MMBTU/hr

Calculate Fuel Flow

$$2 \frac{\text{MMBTU}}{\text{hr}} * \frac{1}{935} \frac{\text{MMscf}}{\text{MMBTU}} = 0.0021 \frac{\text{MMscf}}{\text{hr}}$$

Calculate CO Emissions

$$0.0021 \frac{\text{MMscf}}{\text{hr}} * 84.0 \frac{\text{lb}}{\text{MMBTU}} = 0.18 \frac{\text{lb}}{\text{hr}}$$

Instantaneous Emissions

$$0.18 \frac{\text{lb}}{\text{hr}} * \frac{454}{3600} \frac{\text{gm-hr}}{\text{lb-s}} = 0.02 \frac{\text{gm}}{\text{s}}$$

Daily Emissions

$$0.02 \frac{\text{gm}}{\text{s}} * \frac{24}{24} \frac{\text{hr}}{\text{hr}} = 0.02 \frac{\text{gm}}{\text{s}}$$

Gateway Power Plant
Sample Heater Emission Calculation

Fuel Heater Sample VOC Calculation

Hours per Day	24	
Hours per Year	8760	
VOC Emis Factor =	5.5	lb/MMscf (AP-42 Table 1.4-2)
Fuel Heat Content (LHV) =	935	BTU/scf
Fuel Heater Heat Input =	3.6	MMBTU/hr

Calculate Fuel Flow

$$2 \frac{\text{MMBTU}}{\text{hr}} * \frac{1}{935} \frac{\text{MMscf}}{\text{MMBTU}} = 0.0021 \frac{\text{MMscf}}{\text{hr}}$$

Calculate VOC Emissions

$$0.0021 \frac{\text{MMscf}}{\text{hr}} * 5.5 \frac{\text{lb}}{\text{MMBTU}} = 0.01 \frac{\text{lb}}{\text{hr}}$$

Instantaneous Emissions

$$0.01 \frac{\text{lb}}{\text{hr}} * \frac{454}{3600} \frac{\text{gm-hr}}{\text{lb-s}} = 0.001 \frac{\text{gm}}{\text{s}}$$

Daily Emissions

$$0.001 \frac{\text{gm}}{\text{s}} * \frac{24}{24} \frac{\text{hr}}{\text{hr}} = 0.001 \frac{\text{gm}}{\text{s}}$$

Gateway Power Plant
Sample Heater Emission Calculation

Fuel Heater Sample SO2 Calculation

Hours per Day	24
Hours per Year	8760

Fuel Sulfur Concentration =	20	gr/100dscf
Fuel Heat Content (LHV) =	935	BTU/scf
Heat Input =	3.6	MMBTU/hr
S Mol Weight	32	lb
SO2 Mol Weight	64	lb

Calculate Fuel Flow

$$\frac{3{,}600{,}000\ \text{BTU}}{\text{hr}} * \frac{1\ \text{scf}}{935\ \text{BTU}} = \frac{3{,}850\ \text{scf}}{\text{hr}}$$

$$\frac{3{,}850\ \text{scf}}{\text{hr}} * \frac{1\ \text{100scf}}{100\ \text{scf}} = \frac{39\ \text{100scf}}{\text{hr}}$$

Calculate Sulfur Emissions

$$\frac{39\ \text{100scf}}{\text{hr}} * \frac{20.00\ \text{gr S}}{\text{100scf}} = \frac{770.05\ \text{gr S}}{\text{hr}}$$

$$\frac{770.05\ \text{gr}}{\text{hr}} * \frac{1\ \text{lb}}{7{,}000\ \text{gr}} = \frac{0.1100\ \text{lb S}}{\text{hr}}$$

$$\frac{0.1100\ \text{lb S}}{\text{hr}} * \frac{64\ \text{lb SO2}}{32\ \text{lb S}} = \frac{0.2200\ \text{lb SO2}}{\text{hr}}$$

$$\frac{0.2200\ \text{lb}}{\text{hr}} * \frac{1\ \text{hr}}{3.6\ \text{MMBTU}} = \frac{0.0611\ \text{lb}}{\text{MMBTU}}$$

Instantaneous Emissions

$$\frac{0.2200\ \text{lb}}{\text{hr}} * \frac{454\ \text{gm-hr}}{3600\ \text{lb-s}} = \frac{0.0277\ \text{gm}}{\text{s}}$$

Daily Emissions

$$\frac{0.0277\ \text{gm}}{\text{s}} * \frac{24\ \text{hr}}{24\ \text{hr}} = \frac{0.0277\ \text{gm}}{\text{s}}$$

Annual Emissions

$$\frac{0.0277\ \text{gm}}{\text{s}} * \frac{8760\ \text{hr}}{8760\ \text{hr}} = \frac{0.0277\ \text{gm}}{\text{s}}$$

$$\frac{0.0277\ \text{gm}}{\text{s}} * \frac{31{,}536{,}000\ \text{s}}{1\ \text{yr}} * \frac{1\ \text{ton}}{908{,}000\ \text{gm}} = \frac{0.96\ \text{ton}}{\text{yr}}$$

Gateway Power Plant
Sample Heater Emission Calculation

Fuel Heater Sample PM10 Calculation

Hours per Day	24	
Hours per Year	8760	
PM10 Emis Factor =	7.6	lb/MMscf (AP-42 Table 1.4-2)
Fuel Heat Content (LHV) =	935	BTU/scf
Fuel Heater Heat Input =	3.6	MMBTU/hr

Calculate Fuel Flow

$$2 \frac{\text{MMBTU}}{\text{hr}} * \frac{1}{935} \frac{\text{MMscf}}{\text{MMBTU}} = 0.0021 \frac{\text{MMscf}}{\text{hr}}$$

Calculate PM10 Emissions

$$0.0021 \frac{\text{MMscf}}{\text{hr}} * 7.6 \frac{\text{lb}}{\text{MMBTU}} = 0.02 \frac{\text{lb}}{\text{hr}}$$

Instantaneous Emissions

$$0.02 \frac{\text{lb}}{\text{hr}} * \frac{454}{3600} \frac{\text{gm-hr}}{\text{lb-s}} = 0.00 \frac{\text{gm}}{\text{s}}$$

Daily Emissions

$$0.002 \frac{\text{gm}}{\text{s}} * \frac{24}{24} \frac{\text{hr}}{\text{hr}} = 0.002 \frac{\text{gm}}{\text{s}}$$

Appendix C - Compliance Monitoring and Certification

Gateway Power Plant
Synthetic Minor Compliance Plan and Certification

CT01 at the Gateway Power Plant may have potential air emissions of NO_x, SO_2, and CO in excess of 250 tons per year (ton/yr). Therefore, annual emissions of any criteria pollutant from this source will be limited to less than 250 ton/yr through a combination of continuous monitoring and enforceable permit restrictions.

As this facility will be applicable to Phase II Acid Rain regulations, NO_x and SO_2 emissions will be monitored with continuous emission monitoring systems (CEMS) that will comply with the Title IV requirements in 40 CFR Part 75 (Continuous Emission Monitoring). NO_x and a diluent gas will be monitored in the exhaust gas stream. SO_2 emissions will be assessed using an approved fuel sulfur monitoring schedule. CO emissions will be monitored using the appropriate CEMS specification in 40 CFR Part 60 Appendix B.

The continuous monitoring systems will follow all applicable certification and quality assurance procedures included in the regulations cited above.

NO_x, SO_2, and CO emissions will be monitored, using the above methods, at all times when the equipment is operating including startups, shutdowns, and malfunctions. This monitoring will begin as soon as the initial commissioning and calibration of the power plant, emission controls, and monitoring equipment are completed.

Idaho DEQ will be notified whenever its rolling 12-month average emission rate of any criteria pollutant exceeds 240 tons. If the rolling 12-month average emission rate of any criteria pollutant reaches 249 tons, CT01 will cease operations through the remainder of the month.

Based on information and belief formed after reasonable inquiry, the statements and information in this document are true, accurate, and complete.

Ronald L Williams — 1/31/06

, Mountain View Energy, Inc. — Date

Ronald L. Williams
V. P & General Counsel

Mountain View Power - Boise

DE/AKS/SF

GREYSTONE®

Environmental Consultants, Inc.

C: Bill Rogers
Kevin S.
June H.
BRO

January 31, 2006

Bill Rogers
Regional Permit Program Coordinator
Idaho Department of Environmental Quality
1410 N. Hilton
Boise, Idaho 83706

Dear Mr. Rogers

Here are the electronic data and modeling files for the Gateway Power Plant Permit to Construct application.

Sincerely,

Gordon Frisbie
Air Quality Specialist

Attachment – Data and Modeling CD

RECEIVED
FEB 0 1 2006
Department of Environmental Quality
State Air Program

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