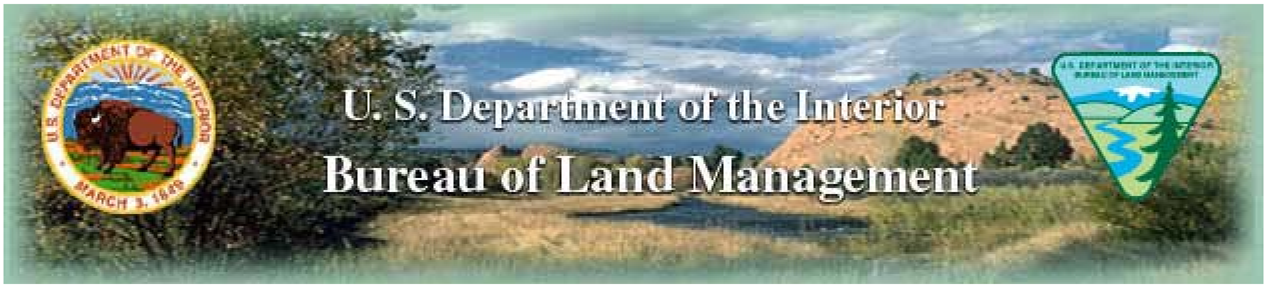

U.S. BUREAU OF LAND MANAGEMENT

Miles City Field Office

Dispersion Modeling Protocol for Ambient Air Quality Impact Assessment

Supplement to Statewide Final Oil and Gas Environmental Impact Statement and Amendment of the Powder River and Billings Resource Management Plans

Prepared By: ALL Consulting

April 2006

DISPERSION MODELING PROTOCOL

FOR AMBIENT AIR QUALITY IMPACT ASSESSMENT

Supplement to Statewide Final Oil and Gas Environmental Impact Statement and Amendment of the Powder River and Billings Resource Management Plans

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1.0 INTRODUCTION

The Bureau of Land Management, Miles City Field Office (BLM) has identified a need to analyze the air impacts from additional CBNG development alternatives as evaluated within a Supplement to the Final Statewide Oil and Gas Environmental Impact Statement (SEIS) and Proposed Amendment of the Powder River (PRBO&G) and Billings Resource Management Plans (BLM, 2003). This document presents a protocol that describes methodologies for an air quality study to assess potential impacts on air quality and air quality related values (AQRVs) for coal bed natural gas (CBNG) development alternatives. The results of this analysis will update the air impacts for the SEIS being prepared by BLM.

The purpose of this document is to describe how the study is to be conducted, in addition to providing an opportunity for reviewers to provide input to the proposed assessment methodologies before the assessment is initiated. Reviewers of this protocol are expected to include the BLM, Federal Land Managers (FLMs) of affected areas, United States Environmental Protection Agency (USEPA), Wyoming Department of Environmental Quality (WDEQ) and Montana Department of Environmental Quality (MDEQ), Northern Cheyenne Tribe, Crow Tribe, and Montana Board of Oil and Gas Conservation. The current version of this protocol (Revision 1, dated April 1, 2006) incorporates comments received from the review of the original document (dated February 2006).

This assessment protocol is based primarily on the air quality modeling guidelines of the USEPA, guidelines of the National Park Service (NPS) and the United States Forest Service (USFS), and guidance documents of the WDEQ, and the MDEQ.

The USEPA's CALPUFF model was used in both the air quality assessment done for the original PRBO&G EIS (Argonne model, 2002), as well as the ongoing PRB Coal Review (ENSR model, 2005) sponsored by both the Wyoming and Montana BLM state offices. For this model, the established grid, receptors, and emission inventory will be used as a basis for conducting the proposed work. Meteorological data will be updated using 3 years of data (Years 2001, 2002, and 2003). The project domain to be modeled includes most of Wyoming and Montana, and portions of Utah, North Dakota, South Dakota, Idaho and Nebraska (**Figure 1-1**). Detailed meteorological data for the modeling domain will be determined by the mesoscale meteorological model (MM5) and CALMET meteorological models. The proposed assessment will use the CALPUFF modeling system for both near-field and far-field analyses of air impacts and AQRVs (visibility and acid deposition).

The remainder of this protocol describes the air quality analysis in further detail and provides a list of tasks to be performed. Chapters 2.0 through 6.0 provide an overview of the assessment approach and proposed air quality model; describe model input data, including emission inventory data, meteorological data, background ambient air quality and AQRV data; describe modeling and post-processing of model output data; and reporting of the study's results.

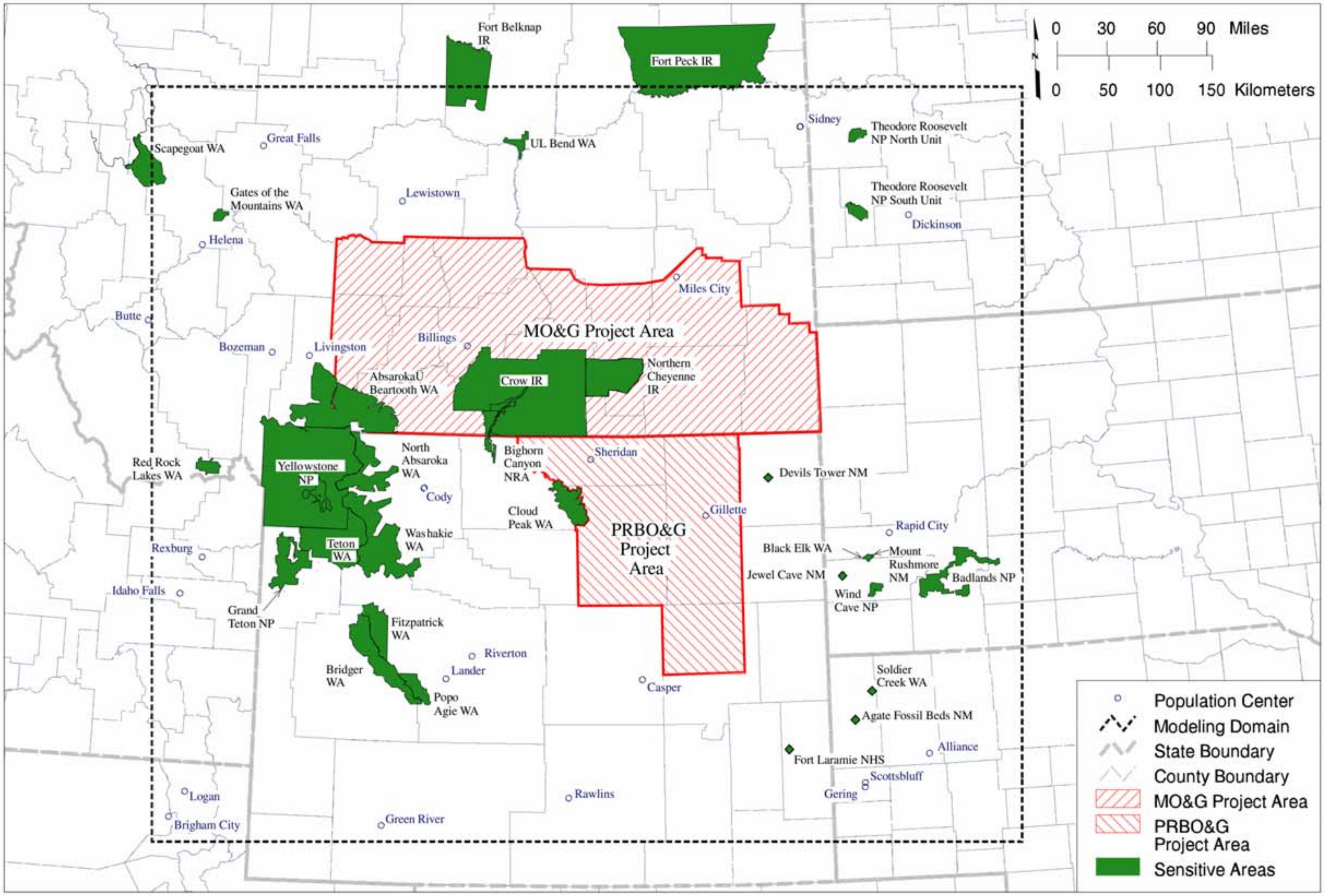

Figure 1-1 Modeling Domain, Project Areas, Population Centers, and Sensitive Areas for the MO&G Project

1.1 Project Description

This air quality study will assess the air impacts of additional SEIS alternatives from CBNG-related development in the PRB on Class I and sensitive Class II areas (**Figure 1-1**). Where data can be obtained, the assessment will update the 2002 base year from the ENSR Study to a new 2004 base year. Impacts and projected changes in impacts will be evaluated in comparison to current operations or the new 2004 base year. A new base year of 2004 was selected because it is the latest year that emissions data are expected to be available. The 2004 base year data will include updated emission sources from the ENSR Study, the Argonne Study, and a lawsuit filed with the U.S. District Court for Montana by the Environmental Defense Fund (Environmental Defense, 2004). Emission inventory source updates will include new or updated permit applications, new annual air emissions inventory submittals to states within the modeling domain, source emissions data from the Western Regional Air Partnership database, any revised USEPA emissions factors, and the use of reported actual emissions or representative actual emissions across all sources.

The study will model the new 2004 base year and three predictive scenarios. The first predictive scenario will be a peak period assessment from implementation of the Preferred Alternative from the Final Statewide Oil and Gas Environmental Impact Statement. The second and third scenarios will consider the peak period assessment(s) from two Phased Development Alternatives. Separate periods (years) may be used for different pollutants.

Following completion of the updated base year modeling (separate base year results using the 3 years of meteorological data and determined from a maximum impact consideration; i.e. base year results to be used for comparison against predictive model runs will be selected from the separate base year runs using each of the 3 years of meteorological data and selecting the year which shows the most reasonably conservative impacts within the study area) and the three predictive scenario analyses, a report will be prepared to document the results of the CALPUFF modeling. The report will include a comparison of the base year results to monitored data for 2004, a comparison of base year results to modeled air impacts and AQRVs for the predictive scenarios, and a comparison of all modeled air impacts to applicable state and federal standards and guideline values. These results will be presented showing numerical comparisons in tables and with maps of the near-field impacts (including the Crow and Northern Cheyenne Indian Reservations) showing the location(s) and corresponding concentration(s) of modeled impacts with respect to sensitive areas and geographic locations within the modeling domain.

As an additional task, the report will include an assessment for an additional future period that includes a discussion of the air impacts from the proposed construction and implementation of the Tongue River Railroad and the Roundup Power Plant. The assessment of impacts for this future year will include any corresponding air impacts resulting from the three CBNG development alternatives and any cumulative air impacts from other modeled sources. For the Tongue River Railroad and the Roundup Power Plant, this analysis will be based on an evaluation of air impact data contained within the respective EISs prepared for these projects. For the three CBNG development scenarios, this analysis will be based on the modeled predictive year adjusted on the basis of the rate of development for each of the CBNG development scenarios.

1.2 Study Tasks

The following tasks will be performed for this air quality study and AQRV impact assessment.

- Update the emission inventory database used in the Argonne air model conducted for the Montana statewide Oil and Gas EIS (Argonne model) and the ENSR PRB Coal Review model (ENSR model) by revising/updating the emission rates, as needed. This may include new or updated emission sources to establish a new 2004 base year, new emissions sources from any portions of the states comprising the modeling domain, and updating project emissions estimates based upon current CBNG project assumptions and findings. When reported actual emissions are not available (i.e., some states do not collect actual emissions data for minor sources, only potential emissions may be available for some sources, and many permitted sources are never built or do not operate at full capacity), potential emissions will be converted to representative actual emissions (in such cases those sources will be modeled at 70 percent of their potential to emit). Emission sources outside of the modeling domain will not be included.

- Update the base year modeled impacts by using 3 newer years of meteorological data (years 2001, 2002, and 2003). These years represent the latest years for which basic MM5 data sets are available. The analysis will use actual emissions to model impacts for the three years separately. The year with the highest pollutant impacts (prioritized as PM_{10}, visibility, then NO_x) will be selected as the meteorological data for use to model the predictive scenarios in this study.

- Evaluate source emission data for the list of 67 potential additional sources identified in the Environmental Defense Fund vs. Norton lawsuit. Include these new emissions sources as appropriate. (Note: An initial review has shown that at least some of these sources are outside of the modeling domain).

- Assess the predicted cumulative air quality impacts of the base year sources and three modeled CBNG development alternatives (the original EIS Preferred Alternative and two Phased Development Alternatives) at Class I areas and specified Class II areas of concern. Include a comparison to ambient monitored data for the base year, the National Ambient Air Quality Standards (NAAQS), State Ambient Air Quality Standards (SAAQS), and PSD increments.

- Assess the predicted cumulative air quality impacts of the base year sources and three modeled CBNG development alternatives (the original EIS Preferred Alternative and two Phased Development Alternatives) on visibility degradation and atmospheric deposition at Class I areas and specified Class II areas of concern, and on the acid neutralizing capacity (ANC) of identified lakes.

- Assess the estimated cumulative air impacts from construction of the Tongue River Railroad and the Roundup Power Plant and other modeled sources upon ambient air concentrations and on visibility degradation and atmospheric deposition at the Class I areas and specified Class II areas of concern, and on the ANC of identified lakes. The impacts for the two construction projects will be modeled separately and added to the cumulative impacts from other source groups.

- Prepare a written report (Technical Support Document) of the study's findings.

2.0 OVERVIEW OF ASSESSMENT APPROACH

For this analysis, the CALPUFF modeling system will be used to estimate potential impacts on near-field and far-field air quality and far-field AQRVs that would result from air pollutant emissions associated with the base year emission sources, CBNG activities, and all other modeled sources. The CALPUFF modeling domain for this air quality study will be identical to that used in the original PRBO&G EIS analysis. The same receptor sets used in the ENSR model will be used for both far-field and near-field analyses, including the encompassed mandatory Class I areas (with the receptor sets recommended by the National Park Service), tribal-designated Class I areas, Class II areas of concern, and other sensitive areas within the modeling domain.

This air quality study will include an updated base year emissions inventory database for the year 2004 to include updates of the ENSR Coal Study base year sources and updated emissions inventory databases from both the Argonne and ENSR analyses for the predictive scenarios. Any emission sources that are included in this study may be revised to represent actual emissions to assure consistent, comparative results. A representative background value for the criteria pollutants will be added to all modeled results to account for natural source, distance source, and other non-point source emissions. Further, this study will include as many of the emission sources from the list of 67 identified in a lawsuit filed by Environmental Defense for which data can be obtained and which are located within the modeling domain.

Three years of meteorological data (years 2001, 2002, and 2003) will be analyzed to update the meteorological database for use in the CALPUFF modeling for the current study.

The outputs from the air quality modeling will be used to assess potential impacts on near-field and far-field air quality and far-field AQRVs. Air quality impact assessments will be conducted:

- By comparing air quality impacts resulting from the base year emissions alone. The results will be compared to 2004 ambient monitored concentrations and applicable NAAQS and SAAQS.

- By comparing peak air quality impacts resulting from three SEIS alternative scenarios. The results will be compared to the applicable NAAQS and SAAQS, PSD increments, and the base year results.

- By evaluating the air quality impacts resulting from the three SEIS alternative scenarios for an additional peak period that includes the development and implementation of both the Tongue River Railroad and the Roundup Power Plant. The results will be compared to the applicable NAAQS and SAAQS and the PSD increments.

Existing data and modeling results of any PSD increment studies affecting the project area will be presented, discussed, and compared to the PSD increments; however, there will be no new study of increment-consuming emissions or of expected increment consumption from this study.

AQRVs to be evaluated will include visibility and acidic deposition. Visibility impacts will be assessed at the far-field receptors located in sensitive receptor areas by using the procedure provided by the FLMs' Air Quality Related Values Workgroup (FLAG) (Method 2) and by the method specified by EPA's Best Available Retrofit Technology (BART) guideline (Method 6), which is also used for tracking progress under the Regional Haze Rule. The FLAG procedure uses an assumed natural background visibility reference level and visibility parameter equations recommended by FLAG. Under the FLAG method, estimated visibility degradation will be compared to the established significance thresholds. Method 6 results will be presented as consistent with the BART guideline. That is, the 98th percentile (or 8th highest day per year) for each year will be presented in addition to the number of days of impacts above 0.5 and 1.0 change in deciviews and the maximum change in deciviews. The FLAG background will be used for both Method 2 and Method 6 assessments. Results of both analyses will be reported.

Acidic deposition impacts will be assessed by predicted annual total deposition fluxes of sulfur and nitrogen compounds at several sensitive lakes. If the predicted acidic depositions values are above the deposition analysis thresholds (DAT) established by the FLM, then an additional analysis in terms of acid neutralizing capacity (ANC) will be conducted. The ANC results will be compared against threshold based on USFS recommended prediction methods (USFS 2000) and the total terrestrial deposition loading method in Fox et al. (1989). These lakes are provided in Section 5.

3.0 AIR QUALITY MODELING ANALYSIS

An air quality modeling analysis will be conducted for the current proposed study to assess potential impacts on ambient air quality and AQRVs in the modeling domain from existing and projected sources to include proposed CBNG activities. The CALPUFF modeling system (Scire et al. 2000) was promulgated on April 15, 2003 and is EPA's preferred/recommended model for long-range transport beyond 50 km. CALPUFF can also be used to assess impacts within 50 km. When appropriate, the modeling procedure will follow recommendations in the Interagency Workgroup on Air Quality Modeling (IWAQM) and FLAG documents for the assessment of both near-and far-field impacts. This analysis will use CALPUFF in the refined mode to address the air quality impacts of pollution transported over relatively long distances.

The air quality modeling analysis will use the actual emission rates (or estimated actual emission rates) for all sources. In any situation where actual emissions data is not available, the analysis will estimate actual (70 percent of listed potential emission) emission estimates. The 70 percent factor is based upon discussions with the Wyoming DEQ concerning a representative emissions factor based upon permitted annual allowable emission rates.

For consistency, other CALPUFF model options and assumptions on background concentrations of chemical species to be used in this study will be based on those used in the ENSR and Argonne modeling studies when appropriate. For example, the ambient ratio method, which assumes a conversion rate of 75 percent, will be used for the oxides of nitrogen (NO_x) to NO_2 conversion rate, according to USEPA guidance (40 CFR 51, Appendix W).

Concentrations of SO_2, NO_2, PM_{10}, $PM_{2.5}$, sulfur and nitrogen deposition, as well as visibility impairment (aerosol light extinction) will be predicted at selected receptor locations described in Section 3.2. Hazardous Air Pollutants (HAPs) concentrations will be predicted at the project near-field receptors to include receptor locations within the Northern Cheyenne and Crow reservations.

NO_X can be a major component of the emissions in the region. CALPUFF simulates the oxidation of NO_X to nitrate and calculates the equilibrium between sulfate, nitrate, nitric acid, and ammonia to determine how much of the converted NO_x is particulate nitrate and how much is gaseous nitric acid.

The outputs from the modeling program will be hourly values of direct concentrations, which will be processed using CALPOST to compute 3-hour, 24-hour, and annual average direct concentration predictions. Visibility and deposition estimates will be daily values, and annual total sulfur and nitrogen deposition flux increments will be derived from the daily values.

3.1 Model Selection and Computational Domain

The CALPUFF modeling system has three main components:

- CALMET (Version 5.711 - the diagnostic three-dimensional meteorological model);
- CALPUFF (Version 5.754 - the transport and dispersion mode); and
- CALPOST (Version 5.6393 - the post-processor).

The CALPUFF modeling system is designed to:

- Treat time-varying point and area sources;
- Model domains from tens of meters to hundreds of kilometers from a source;
- Predict results for averaging times ranging form 1 hour to 1 year;
- Be applied to inert pollutants and those subject to linear removal and chemical conversion mechanisms; and
- Be applied to rough or complex terrain situations.

CALPUFF is a lagrangian puff model with the capability to simulate regional-scale, long-range dispersion as well as local-scale, short-range dispersion (Scire et al. 2000a).

The modeling domain for the current study will be identical to that used in the CALMET/CALPUFF modeling conducted for the PRBO&G EIS, which includes portions of Wyoming, Montana, North Dakota, South Dakota, Nebraska, Idaho, and Utah. The spatial extent of the domain is 840-km (east-west) x 720-km (north-south). The design allows for 210 x 180 grid cells and a 4-km grid element size. That size domain requires the use of a Lambert Conformal Projection (LCP) grid system as follows:

- Central reference LCP point (longitude, latitude) = (-105.0°, 44.0°);
- Standard latitude parallels at 30° and 60°; and
- Grid origin (SW Corner) offset from central reference point = (-420 kilometer [km], -360 km).

The following CALPUFF options also will be selected:

- Pasquil-Gifford (P-G) dispersion coefficients;
- Transitional plume rise;
- Stack tip downwash;

- Transition of horizontal dispersion to time-dependent (Heffter) growth rates;
- Building downwash effects (based upon data availability); and
- Chemical transformation based on the MESOPUFF II algorithms.

3.2 Assessment Areas and Receptor Grids

The modeling domain (**Figure 1-1**) for the near-field impact assessment extends at least 50 km in all directions beyond the boundaries of the air quality study area and (in most cases) beyond the Class I and sensitive Class II receptors of interest, as recommenced by FLAG guidance. Near-field receptor locations will be arranged to obtain the maximum estimated concentrations that result from the sources identified in this air quality study. These receptor locations will be in areas with high emission density, with additional receptors in populated areas (e.g., where populations exceed 200 or more) within the near-field modeling domain. The near-field receptor grid will be spaced at 1-km intervals. Near-field receptors that are within 1 km of a source will be deleted from the receptor set. In addition, the placement of receptors within the Class I and sensitive Class II areas will follow the standard receptor sets recommended by the National Park Service when available. For those sensitive areas that are not contained in the NPS database of receptors, a receptor set will be developed within the sensitive area's boundary and a grid spacing dependant on the spatial coverage of the sensitive area. The elevation of these receptors will be obtained by using Digital Elevation Model data for the 1:250,000 quads with 90-m horizontal resolution (USGS 2000).

Each of the following Class I areas and specified Class II areas of concern are within the modeling domain and will be included in the analysis:

- Badlands Wilderness Area (Class I, NPS);
- Wind Cave National Park (Class I, NPS);
- Bridger Wilderness Area (Class I, USFS);
- Fitzpatrick Wilderness Area (Class I, USFS);
- Washakie Wilderness Area (Class I, USFS);
- North Abasaroka Wilderness Area (Class I, USFS);
- Northern Cheyenne Reservation (Class I, Northern Cheyenne Tribal Council);
- Devils Tower National Monument (Class II, NPS);

- Mount Rushmore National Memorial (Class II, NPS);
- Jewel Cave National Monument (Class II, NPS);
- Agate Fossil Beds National Monument (Class II, NPS),
- Fort Laramie National Historic Site (Class II, NPS),
- Black Elk Wilderness Area (Class II, USFS);
- Soldier Creek Wilderness Area (Class II, USFS);
- Cloud Peak Wilderness Area (Class II, USFS);
- Yellowstone National Park (Class I, NPS);
- Grand Teton National Park (Class I, NPS);
- Teton Wilderness Area (Class II, USFS);
- Absaroka-Beartooth Wilderness Area (Class II, USFS)
- Bighorn Canyon National Recreation Area (Class II, NPS);
- Popo Agie Wilderness Area (Class II, USFS);
- Wind River Roadless Area (Class II, Shoshone and Arapaho Joint Tribal Business Council);
- Crow Indian Reservation (Class II, Crow Tribal Council); and
- Theodore Roosevelt National Park (Class I, NPS).

In addition, for those Class I and sensitive Class II areas that are near the edge of the modeling domain modeled impacts at receptors within these areas might be associated with model inaccuracies and uncertainties due to puffs inability to recirculate. Therefore, estimates of potential impacts to these areas will be made by placing representative receptors no nearer than 25 km from the edge of the modeling domain. These areas include:

- Bob Marshall Wilderness Area;
- Gates of the Mountains Wilderness Area;
- Lee Metcalf Wilderness Area, Spanish Peaks Unit;

- Lee Metcalf Wilderness Area, Taylor Hillgard Unit;
- Red Rock Lakes Wilderness Area;
- Jedediah Smith Wilderness Area;
- Mount Naomi Wilderness Area;
- Wellsville Mountain Wilderness Area;
- U.L. Bend Wilderness Area;
- Fort Peck Indian Reservation;
- Scapegoat Wilderness Area; and
- Ft. Belknap Wilderness Area.

The locations of the above sensitive receptor areas as well as other sensitive areas within the modeling domain are shown in **Figure 3-1**.

3.3 Proposed Emission Scenarios and Source Groupings

In order to be able to easily evaluate impacts due to a specific scenario or scenarios, the air quality modeling for the current project will be designed so that source contributions for project sources and other emission source groups for each scenario can be readily separated. The modeled results will be reported for each group individually as well as for all sources combined. The source groups proposed for this study include:

- Montana CBNG construction sources
- Montana CBNG operational sources
- Wyoming CBNG construction sources
- Wyoming CBNG operational sources
- EDF vs. Norton lawsuit sources
- Montana conventional Oil & Gas sources
- Wyoming conventional Oil & Gas sources

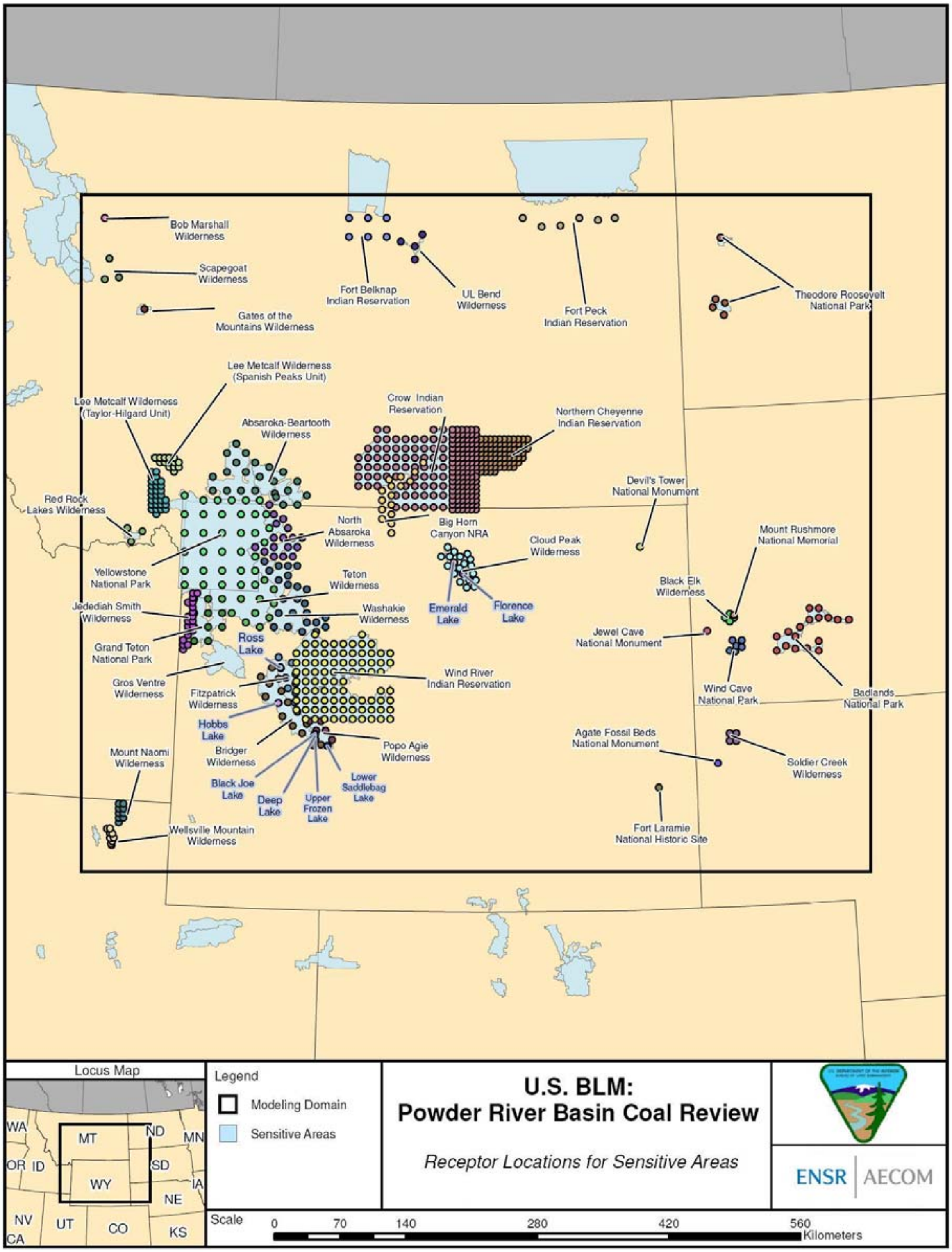

Figure 3-1: Sensitive Area Receptor Locations

- Power plants
- Montana coal related sources
- Wyoming coal related sources
- Tongue River Railroad
- Roundup Power Plant
- Other sources (i.e., urban area sources, refineries, mining, mineral handling, and other non-coal or non-oil & gas sources, etc.)

A series of separate emissions scenarios representing base year emissions and projections of emissions for three alternative scenarios will be developed and modeled. For the predictive scenarios, RFFAs will be developed for each source group except for the two “other” groups and the “EDF vs. Norton” source group. These RFFAs may be represented by factional increases (i.e., CBNG, conventional O&G, and coal related activities) and/or by specific increases in individual sources (i.e., power plants, coal mine operations, etc.).

Results generated by the CALPUFF modeling system, in concert with other natural resource information, are used to interpret potential air quality impacts resulting from implementing various proposed CBNG scenarios. The model's greatest value is its use in identifying potential maximum impact areas for the scenarios. Generated results should not be considered an absolute measure against verifiable standards, nor by themselves provide the answer as to the effects of implementing a given scenario. Modeled results represent estimates of the air impacts to a project area’s cumulative development history and the areas natural resiliency and variability.

4.0 MODEL INPUT DATA

The modeling effort will use a single model (i.e., CALPUFF) to evaluate impacts and changes in impacts to air quality and AQRVs resulting from increased development to include CBNG activities in the PRB. The air quality analyses will assess impacts from CBNG and other development activity for the base year, and will assess the maximum impacts for three predicted CBNG development scenarios (SEIS Alternatives).

4.1 Emissions Inventory Data

The base year and projected future emissions will be actual reported emissions or estimated actual emissions based upon appropriate USEPA emission factors, equations, data, and best available control technology (BACT) for anticipated levels of construction and operational activities. Actual emissions from sources, both existing and projected, will be based on guidance from the USEPA and state environmental agencies.

The emissions scenarios represent a key component of conducting the air quality analyses. The following emissions scenarios will be analyzed for their potential impacts.

1. Base Year Scenario. A base year emissions database representative of year 2004 operations will be developed. The base year scenario will include emissions sources from the ENSR model. Emission sources from the Argonne model after converting that data from potential emissions to representative actual emissions. Source emissions data from the Western Regional Air Partnership database, where those data can be updated from 2002 to 2004. In addition, any of the list of 67 additional emission sources identified in an Environmental Defense Fund vs. Norton lawsuit (see **Appendix B**) will be included where actual emissions data for those sources can be determined and they are located within the modeling domain.

2. SEIS Alternative Assessments. The project's second task is to model three projected SEIS emissions scenarios. The first of these scenarios represents the CBNG development for the original EIS Preferred Alternative. The second and third scenarios represent the scenarios for two Phased CBNG development Alternatives.

3. Additional Cumulative Impacts Assessment. The third task is an assessment of a future year that represents the cumulative impacts considering the three CBNG development scenarios addressed above plus the development and implementation of the Tongue River Railroad and the Roundup Power Plant. The Tongue River Railroad and the Roundup Power Plant will each be modeled as a separate source group. Their individual and/or combined impacts will then be considered relative to the cumulative impacts of the CBNG scenarios. Emission rates will be based on data presented in the respective EISs for the two development projects.

4.1.1 PRB CBNG Sources

4.1.1.1 Construction-related Emissions

Estimates of construction-related actual emissions will focus on emissions of particulate matter (PM) with aerodynamic diameters equal to or less than 10 microns (PM_{10}) and less than 2.5 microns ($PM_{2.5}$). Fugitive PM emissions from the construction of well site facilities and roads will be computed on the basis of USEPA emission factors for construction activity, along with state permitting guidance for estimating emissions. Emissions of road dust generated from construction vehicles will be estimated by using the USEPA unpaved road emission factor equation (USEPA 2003a), work done by the Western Regional Air Partnership (WRAP) on fugitive road dust emissions, and anticipated volume of project traffic. Fugitive dust emissions from construction equipment and vehicles will be computed by using applicable USEPA emission factors (USEPA 2003a) and estimated usage levels of construction equipment and vehicles. Construction site emissions will be treated as area sources. Exhaust emissions and road dust emissions also will be treated similarly because exact locations of roads to be built are not known. Vehicle traffic emissions from secondary population growth are not included in this analysis.

4.1.1.2 Operational Emissions

For the operational phase, emissions of pollutants (nitrogen dioxide [NO_2], sulfur dioxide [SO_2], PM_{10}, and HAPs will be estimated for compressors (including booster compressors, field compressors, and pipeline compressors), other equipment, road traffic, and road-maintenance activities. Emission estimates for HAPs will be made for benzene, n-hexane, toluene, ethylbenzene, xylene, and formaldehyde. Where not directly provided, the HAP emission rates will be developed from the emission rates for NO_X and adjusted by an emission rate factor.

Emission rates will be computed on the basis of the emission factors and the anticipated level of operational activities (number of projected wells, load factors, and hours of operation per year). The emissions for compressors will be estimated for short- and long-term modeling analyses, assuming that compressor engines will be operating continuously at load factors of 100 percent for short-term and 70 percent for long-term. Although emissions from some minor sources, such as CBNG development, may be temporary at specific sites, the emissions estimate will include an expected level of such activity (and emissions) for the base year and for predicted scenarios. State air permitting agencies will be contacted for updated emission rates as needed in this analysis.

Emissions of road dust from vehicles traveling on access roads will be estimated by using the USEPA unpaved road emission factor equation (USEPA 2003a), the work done by the WRAP on fugitive road dust emissions, and anticipated volume of project traffic. Fugitive dust emissions from access-road maintenance activities will be estimated on the basis of the USEPA emissions for construction activity (USEPA 2000a) and the anticipated level of road-maintenance activity.

4.1.2 Other Sources

An updated emissions inventory database for both the new base year and for any predicted scenario year modeling will be prepared. The emissions inventory database from the ENSR model will be revised as necessary to update it to the 2004 base year, any recent new source additions, and to remove any duplication with other inventory sources. Further, the list of 67 additional emission sources identified in the lawsuit filed following a review of the Argonne Study will be included where actual emissions data can be determined and where emission sources are located within the modeling domain. As described in Section 4.1.1, emissions inventory data (including stack parameters) for proposed sources will be prepared on the basis of the current engineering design estimates.

Emissions inventory data for sources projected to be in operation in a future year(s) will be obtained from state environmental departments and/or from appropriate project EISs. Only sources with state-approved air permit applications will be included. These data sets will be reviewed to ensure that no source is counted more than once.

Any revision or updating of data in the existing Argonne or ENSR emissions inventory databases that becomes necessary because of changes in design or operation (including facility shutdowns), or because more appropriate emission factors have become available, will be performed.

4.2 Meteorological Data

Hourly three-dimensional meteorological data fields for three years (2001, 2002, and 2003) will be used in this analysis. The meteorological database will be developed using a 4- by 4-km grid resolution. This modeling analysis will examine all three individual year data sets. As determined in the baseline year modeling, the meteorological year resulting in the highest impacts of PM_{10}, visibility, and NO_X (in that priority) will be selected as the meteorological data for use in this study.

CALMET, one of the three main components of the CALPUFF modeling system, includes a diagnostic wind model that combines surface and upper-air meteorological data with diagnostic effects of terrain and other factors in order to generate three-dimensional wind fields (Scire et al. 2000b). It also includes other interpolation algorithms that generate three-dimensional temperature, pressure, and other meteorological variables and two-dimensional precipitation fields. For areas with complex terrain and sparse wind observations, a diagnostic wind model cannot accurately depict the complex flow fields by using surface observation data alone. In those situations, CALMET defines the synoptic-scale flow features by using the output from a coarse grid (12- or 36-km) resolution simulation of a prognostic meteorological model (e.g., Penn State/NCAR MM5 and then better characterizes the local wind variations at a finer scale (e.g., 4 km) by using its diagnostic wind algorithms and local surface observations.

The Step 1 wind field for the project domain will be developed by using three years of MM5 data available at 36-km resolution for 2001 and 2003 and at 12-km resolution for 2002 combined with 4-km terrain and landuse data as depicted throughout the modeling domain. The terrain and landuse data will be developed from USGS 1:250,000 DEM and 1:250,000 Composite Theme Grid (CTG) files. Additional surface and upper-air meteorological data collected from sites in the modeling domain will be used in the production of the Step 2 wind field. Precipitation data and other meteorological input data (i.e. hourly CASTNET meteorological data) will then incorporated into the final output of CALMET that will be used to drive the CALPUFF model. Figure 4-1 depicts the location of the meteorological data sources used as input data to the CALMET model .

Table 4-1 presents the preliminary user-defined parameters that define the CALMET domain and the weighting values to be used in developing the CALMET fields. These input parameters may be changed during the course of the modeling. Any input parameter changes will be identified and justified in the report.

Table 4-1 Preliminary CALMET User-defined Fields Not Specified in IWAQM Appendix A

Variable	Description	Value
NX	Number of east-west grid cells	210
NY	Number of north-south grid cells	180
DGRIDKM	Meteorology grid spacing (km)	4
NZ	Number of vertical layers of input meteorology	12
ZFACE	Vertical cell face heights (meters [m])	0.,20.,40.,80.,120.,180.,260.,400. ,600.,800.,1200.,2000.,3000.
IEXTRP	Extrapolation of surface winds to upper layers	-4
RMAX1	Maximum surface over-land extrapolation radius (km)	20
RMAX2	Maximum aloft over-land extrapolation radius (km)	50
RMAX3	Maximum over-water extrapolation radius (km)	500
TERRAD	Radius of influence of terrain features (km)	10
R1	Relative weight at surface of Step 1 field and observations	10
R2	Relative weight aloft of Step 1 field and observations	25
IPROG	Gridded initial prognostic wind field – MM5 data	14
RMIN	Minimum radius of influence for wind field interpolation	0.1
IKINE	Wind field representations	OFF

4.3 Ambient Air Quality and AQRV Data

The existing ambient air quality levels, visibility, wet nitrogen (N) and sulfur (S) deposition, and lake chemistry parameters in and around the study area are described in several recently published EISs for proposed activities in the modeling domain (e.g., BLM 1999; EIC 2000). The most recent, available, and representative ambient concentrations of criteria pollutants monitored within the project area will be used to define background air quality levels for this study.

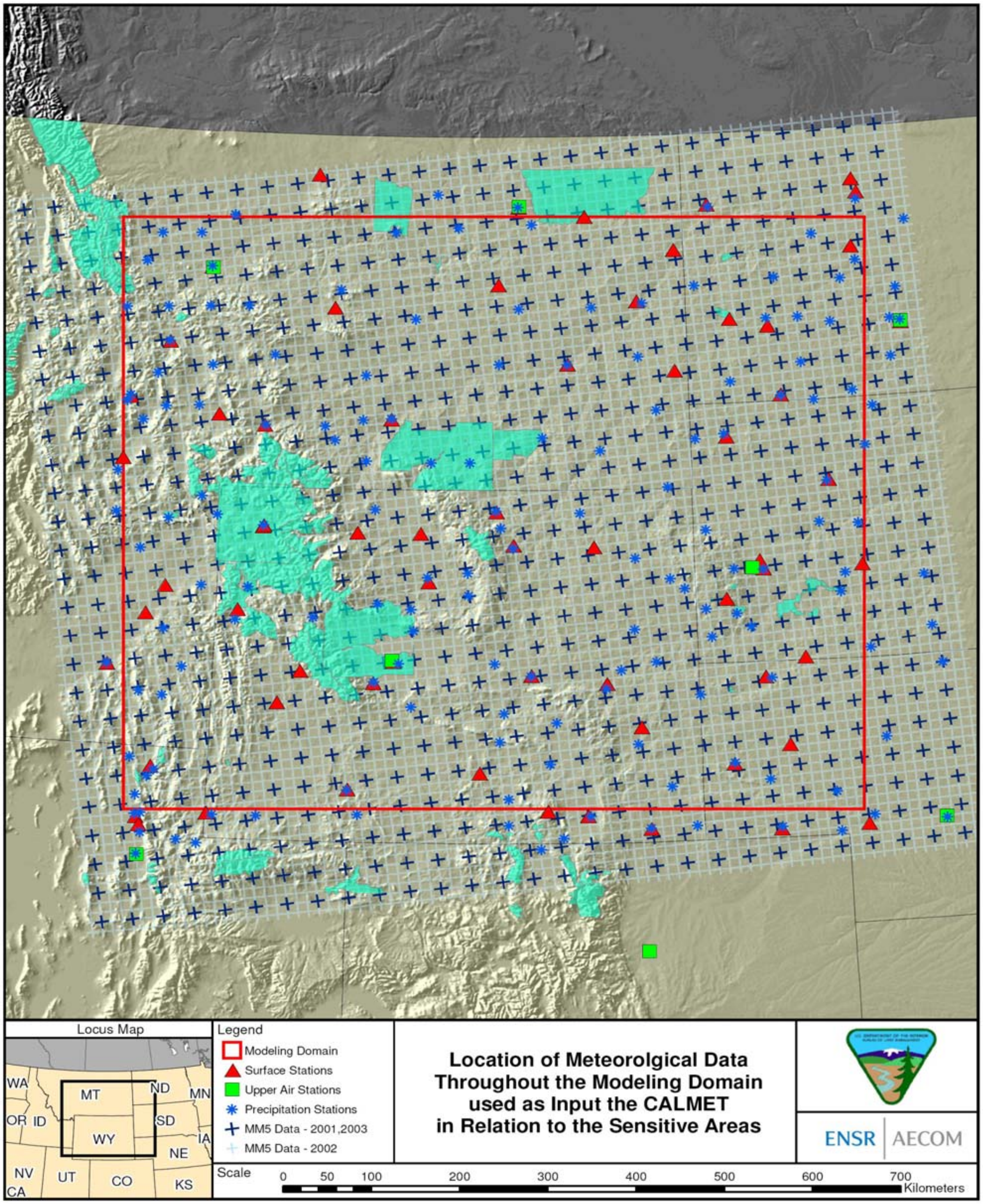

Figure 4-1 Location of Meteorological Data Stations

The background data will be used in the current study to establish total impacts for criteria pollutants based on the long-term (annual average) and short-term (24-hour and less) maximum (or H_2H) concentrations consistent with applicable standards for the region. These data will also be utilized for comparison with baseline modeled impacts.

The data selected for use in this analysis are further described in the following sections. Additional data on ambient air quality, visibility, and atmospheric deposition that have become available since the preparation of the PRBO&G EIS will be obtained and evaluated.

4.3.1 Criteria Pollutants

For the 2004 base year, the analysis will compare modeled concentrations to the most recent monitored data available. The technical analysis will be based upon monitored air quality data, actual emissions estimates, or estimates of actual data for 2004. Every attempt will be made to include the most recent, accurate, and site-specific data in this analysis.

A new NAAQS for $PM_{2.5}$ was promulgated by the EPA on July 18, 1997. As both permitted and actual data is not always available for this pollutant, this study proposes to use a ratio of PM_{10} to $PM_{2.5}$ to supplement any missing $PM_{2.5}$ emissions data. This ratio will be based upon the nearest available monitored data that exists for both pollutants.

4.3.2 Chemical Species

For use in the empirical chemical transformation algorithm of the CALPUFF model, concurrent hourly ozone data from representative EPA Airs and CASTNET monitoring sites within the modeling domain will be used to create a time and spatially varying ozone database to be used as input to CALPUFF. In the absence of hourly data, a regional representative background ozone concentration value will be used. This value will be calculated based on monthly averages of all available representative hourly data within the modeling domain. Some of those ozone monitoring sites include Yellowstone National Park; Pinedale, Wyoming; Centennial, Wyoming; and Theodore Roosevelt National Park. Data from the WDEQ's ozone monitoring site at Thunder Basin and other WDEQ ozone monitoring sites, if available, will also be considered in developing the hourly database file and the monthly background ozone values to be used in the model.

This study will use an NH_3 background concentration of 5 ppb. The use of this value is consistent with the Coal Study and is more conservative than the 2 ppb value suggested by the North Dakota Department of Health for BART modeling assessments. Valid new data from within the modeling domain will be included in defining the background ambient air quality and AQRV levels for this analysis.

5.0 ASSESSMENT AND REPORTING OF AIR QUALITY IMPACTS

To evaluate the significance of predicted air quality impacts, the results of air quality modeling and post-processing will be compared with applicable standards and criteria and reported as described in the following subsections. As noted in Section 3, modeled results must be interpreted in consideration of all applicable limitations. Modeled results should be used in concert with other data to further identify concerns or propose further investigations.

5.1 Prevention of Significant Deterioration of Air Quality

The potential air quality concentration impacts predicted at the Class I and Class II areas that result from the contributions from identified sources will be compared with the allowable increments under the PSD air quality regulation. This comparison to the PSD Class I and II increments does not represent a regulatory PSD increment consumption analysis.

The allowable PSD increments for Class I and Class II areas are given in **Table 5-1**.

Table 5-1 PSD Increments for Class I and Class II Areas

		Allowable Increment ($\mu g/m^3$)		
PSD Class	**Pollutant**	**Annual Arithmetic Mean**	**24-hour Maximum**	**3-hour Maximum**
Class I	NO_2	2.5	-	-
	SO_2	2	5	25
	PM_{10}	4	8	-
Class II	NO_2	25	-	-
	SO_2	20	91	512
	PM_{10}	17	30	-

This study will investigate and report on the current status of formal PSD Increment consumption studies affecting the project area. Protection of the PSD Class I areas is the sole responsibility of the states, under USEPA oversight. This will not be a formal increment consumption study, rather it will be a reporting of such studies both historical and on-going. Due to implementation of the Regional Haze BART rule, there will likely be large reductions in PSD increment consumption. The mandated emission reductions of SO_2, NO_x, and PM_{10} associated with this rule will be implemented in the 2013-2015 time frame, which is generally consistent with the time period of interest on this study of CBNG development. Due to these pending emission reductions and other on-going increment studies within the modeling domain, this study will not include a PSD increment consumption analysis. Results of the investigation into the status of on-going PSD increment studies will be included in the project report.

5.2 Ambient Air Quality

5.2.1 Criteria Pollutants

The total potential concentrations (source criteria pollutant concentrations plus ambient background values) will be estimated at project area receptors and compared with applicable health- and welfare-related NAAQS and SAAQS.

The NAAQS and SAAQS for the states, parts of which are located within the modeling domain (**Figure 1-1)** are established for NO_2, SO_2, PM_{10}, $PM_{2.5}$, O_3, CO, and lead (Pb). Given the insignificant levels of potential volatile organic compounds and Pb emissions from project sources, neither the O_3 nor the Pb standard will be addressed in this analysis.

All modeled result comparisons will be presented in tabular form and contoured plots in the project report. Where possible and for pollutants whose modeled impact is near or above a national or state standard, the report will present the modeled results as contoured plots that depict not only the maximum impact but also the spatial extent of the pollutant's impact.

New NAAQS for O_3 and $PM_{2.5}$ were promulgated by the USEPA on February 27, 2001. The procedures for implementing these standards have been established by USEPA. However, the states are still in the process of determining how to implement them. There are no non-attainment areas for ozone or for $PM_{2.5}$ within the modeling domain. The existing PM_{10} standard remains applicable throughout the United States (U.S.), including the states within the modeling domain, and will be used for comparison and to maintain consistency with the original PRBO&G EIS. The NAAQS addressed in this study are listed in **Table 5-2**. A comprehensive list of the AAQS for each state in the modeling domain, and how they compare to the NAAQS, is presented in **Appendix B**.

Table 5-2 Applicable Ambient Air Quality Standards

	Annual[2]		**24-Hour**[3]		**8-Hour**[3]		**3-Hour**[3]		**1-Hour**[3]	
Pollutant	**($\mu g/m^3$)**	**(ppmv)**	**($\mu g/m^3$)**	**(ppmv)**	**($\mu g/m^3$)**	**(ppmv)**	**($\mu g/m^3$)**	**(ppmv)**	**($\mu g/m^3$)**	**(ppmv)**
NO_2	100	0.05							565	0.30[4]
SO_2	60	0.02[4,5]	260	0.10[4,5]			1,300	0.50	1,300	0.50[4]
PM_{10}	50[6]		150[7]		---					
$PM_{2.5}$	15[6]		35[8]		---					
CO					10,000	9			26,000 40,000	23[4] 35

ppmv=parts per million, by volume

[1] **NAAQS unless otherwise noted.**
[2] **Annual arithmetic mean not to be exceeded, unless otherwise noted.**
[3] **Not to be exceeded more than once per year, unless otherwise noted.**
[4] **Montana SAAQS (more stringent than NAAQS).**
[5] **Wyoming SAAQS (more stringent than NAAQS).**
[6] **Expected annual arithmetic mean averaged over a 3-year period.**
[7] **Annual 99th percentile concentration averaged over a 3-year period**
[8] **Annual 98th percentile concentration averaged over a 3-year period.**

5.2.2 Hazardous Air Pollutants

The study will assess emissions of critical hazardous air pollutants that were modeled in the earlier Argonne and ENSR Studies. These include benzene, ethyl benzene, formaldehyde, n-hexane, toluene and xylene. Emissions of these HAPs from oil and gas operations will be made based on the emission rate of nitrogen oxides and a comparative emission rate using AP-42 factors.

The study will model both 1-hour and annual impacts of hazardous air pollutants in the project area. Since the greatest modeled HAPs impacts are expected to occur at the near-field receptors, only those receptors and the Northern Cheyenne and Crow Indian Reservations will be analyzed in this study. Results of the 1-hour modeled impacts for benzene, ethyl benzene, formaldehyde, n-hexane, toluene and xylene will be compared to the Reference Exposure Levels (RELs) (EPA 2005). Impacts for chronic and carcinogenic risks will be analyzed on the same grid for the same HAPs. Results will also be compared to the non-carcinogenic Reference Concentrations for Chronic Inhalation Exposure (RfCs) and the carcinogenic risk assessment will be provided for those HAPs with a carcinogenic risk factor (benzene and formaldehyde).

Since neither the EPA nor the states in the project area have established ambient HAP standards, the above assessments will be provided for information purposes only.

5.3 Air Quality Related Values

5.3.1 Visibility

Estimated maximum visibility degradation at the Class I areas and specified Class II areas of concern due to the contributions from the modeled sources will be processed to obtain visibility impairment in terms of a change in percent extinction or dv. The predicted visibility impairment will be compared with the threshold (10 percent of the reference background visibility, or 1.0 dv, for the impairment attributable to the cumulative sources). A comparison to 5 percent impact (0.5 dv) will also be included in the project report.

Two separate post-processing visibility analyses will be used to depict the baseline impact and the projected impact at the Class I areas and specified Class II areas of concern. The first method is the standard “FLAG method” (Method 2), as proposed by FLAG (2000). The “FLAG” method will use two slight refinements: (1) RHMAX will be set equal to 95 in CALPOST as opposed to 98 and (2) the EPA f(RH) values will be used as opposed to the FLAG f(RH) values. In recent Method 2 applications the FLM has accepted these two modifications. The second method (Method 6) is more widely implemented for visibility analyses under EPA’s BART guideline and is consistent with the same approach that is applied to visibility analyses under the final regional haze rule.

Method 2 will use FLAG recommended speciated monthly hygroscopic and non-hygroscopic concentrations that are used to describe the background air quality for each Class I area. Method 2 uses hourly relative humidity from the CALMET files to determine the hourly f(RH) value. These hourly f(RH) values are used to increase the scattering efficiency of the hygroscopic component (i.e. ammonium sulfate and/or nitrate) of the background speciated monthly concentrations and thus generate monthly background extinction values for each Class I area. The same procedure is used to calculate the hourly modeled extinction values that correspond to the hourly modeled CALPUFF concentrations and the same hourly f(RH) values. CALPOST then calculates each day's 24-hour average maximum percent change in extinction and change in deciviews over all the receptors for each Class I area.

Method 2 has established a recommended procedure for identifying and evaluating potential visibility impairment primarily in mandatory federal Class I Areas. According to the FLAG procedure, predicted changes in visibility in terms of percent change in extinction (or change in deciviews [dv]; a 10 percent change in extinction corresponds to 1.0 dv) due to emissions from proposed sources would be computed, and compared to FLAG specified seasonal natural background reference visibility levels, and the resulting percent change in extinction (or change in dv) would be compared with FLAG-prescribed threshold levels for impact assessment. Estimated natural background visibility reference levels and associated parameter values will be taken from the FLAG document.

Method 6 will also use FLAG recommended speciated monthly hygroscopic and non-hygroscopic concentrations that are used to describe the background air quality for each Class I area. Unlike Method 2 however, Method 6 takes monthly site specific monthly f(RH) values. These monthly f(RH) values are used to in the same manner as the hourly f(RH) values used for Method 2. Site-specific, monthly relative humidity adjustment factors will be taken from Table A-3 in Appendix A in the "Guidance for Tracking Progress Under the Regional Haze Rule" document. This method is consistent with EPA's methodology in modeling of BART-eligible sources. For the BART Method 6 approach, the top 2% (7 days each year) are discarded as being outlier days and the 98th percentile predicted visibility extinction impact is used as indicative of a source's effects on visibility in Class I areas.

This study will provide an analysis of both Methods 2 and 6 as described above. For Method 2, results will be presented in terms of number of days when modeled percent change in extinction is greater than both 5 and 10 percent, along with the maximum modeled change in extinction for each year and Class I and Class II area of concern. For Method 6, results will be presented in terms of number of days when modeled change in deciviews is greater than both 0.5 and 1.0 deciviews, along with the maximum modeled and 8th highest change in deciviews for each year and Class I and Class II area of concern.

5.3.2 Acidic Deposition and Lake Chemistry

Estimated annual wet, dry, and total (wet plus dry) deposition fluxes of total sulfur and nitrogen compounds due to the contributions from the modeled sources, will be used to estimate the total sulfur and nitrogen deposition fluxes at the following lakes:

- Black Joe Lake, Class I Bridger Wilderness Area;
- Deep Lake, Class I Bridger Wilderness Area;
- Hobbs Lake, Class I Bridger Wilderness Area;
- Upper Frozen Lake, Class I Bridger Wilderness Area;
- Florence Lake, Class II Cloud Peak Wilderness Area;
- Emerald Lake, Class II Cloud Peak Wilderness Area;
- Ross Lake, Class I Fitzpatrick Wilderness Area; and
- Lower Saddlebag Lake, Class II Popo Agie Wilderness Area.

The study will perform an additional analysis in terms of the acid neutralizing capacity (ANC) for each of these lakes. An estimation of potential changes in ANC at several specified sensitive lake receptors will be made by following the procedure developed by the USFS Rocky Mountain Region (2000). The POSTUTIL program will be used to sum all wet and dry fluxes of SO_2, SO_4, NO_3, HNO_3, and dry NO_x. The total nitrogen and sulfur deposition will then be computed from the summed fluxes. Predicted changes in ANC will be compared with the threshold (10 percent change in ANC for lakes with background ANC values greater than 25 micro equivalents per liter (μeq/l), and no more than a 1 μeq/l change in ANC for lakes with background ANC values equal to or less than 25 μeq/l).

All modeled acidic deposition results will be presented in tabular form or some other appropriate format in the project report.

6.0 REFERENCES

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APPENDIX A

STATE BY STATE COMPARISON OF AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Period	National	ND	SD	NE	WY	UT	ID	MT
PM_{10}	Annual	50 μg/m_3	same as NAAQS	same as NAAQS	same as NAAQS	same as NAAQS	same as NAAQS	same as NAAQS	50 μg/m_3, state and federal violation when more than one expected exceedance per calendar year, averaged over 3 years.
	24-hour	150 μg/m_3, maximum average concentration, no more than one exceedance per year	same as NAAQS	same as NAAQS	same as NAAQS	same as NAAQS	same as NAAQS	same as NAAQS	150 μg/m_3, state and federal violation when the 3-year average of the arithmetic means over a calendar year exceeds the standard
$PM_{2.5}$	Annual	15 μg/m_3, 3-year average of annual arithmetic mean				15 ug/m**3, annual arithmetic mean		same as NAAQS	same as NAAQS
	24-Hour	35 μg/m_3, 98th percentile of the 24-hour values determined for each year. 3-year average of the 98th percentile values.				35 ug/m**3, 98th percentile 24-hour average		same as NAAQS	same as NAAQS
SO_2	Annual	0.03 ppm (80 μg/m_3), annual arithmetic mean not to be exceeded in any calendar year.	0.023 ppm (60 μg/m_3), arithmetic mean	same as NAAQS	same as NAAQS	60 ug/m**3, arithmetic mean	same as NAAQS	same as NAAQS	0.02 ppm, state violation when the arithmetic average over any four consecutive quarters exceeds the standard.
	24-hour	0.14 ppm (365 μg/m_3), not to be exceeded more than once in any calendar year	0.099 ppm (260 μg/m_3), maximum average concentration	same as NAAQS	same as NAAQS	260 ug/m**3, maximum concentration not to be eceeded more than once per year	same as NAAQS	same as NAAQS	10 ppm, rolling average, not to be exceeded more than once every 12 consecutive months
	3-hour	0.5 ppm (1300 μg/m_3), not to be exceeded more than once in any calendar year (Secondary Standard)	0.273 ppm (715 μg/m_3), maximum average concentration	same as NAAQS	same as NAAQS	1300 ug/m**3 (0.50 ppm), maximum concentration not to be exceeded more than once per year.	same as NAAQS	same as NAAQS	same as National AAQS

Pollutant	Averaging Period	National	ND	SD	NE	WY	UT	ID	MT
SO_2 (cont.)	1-hour								0.5 ppm, not to be exceeded more than 18 times in any 12 consecutive months
H_2S*	3-month		0.02 ppm (28 mg/m_3), maximum arithmetic mean concentration	same as NAAQS	same as NAAQS		same as NAAQS		
	24-hour		0.10 ppm	same as NAAQS	same as NAAQS		same as NAAQS		
	1-hour	0.05 ppm	0.20 ppm	same as NAAQS	same as NAAQS		same as NAAQS		0.05 ppm, not to be exceeded more than once over any 12 consecutive months.
	1/2 hour					70 ug/m**3, not to be exceeded more than twice per year			
	1/2 hour					40 ug/m**3, not to be exceeded more than twice in any five consecutive days			
	instantaneous		10 ppm (14 mg/m_3),	same as NAAQS	same as NAAQS		same as NAAQS		
CO	8-hour	10 mg/m**3 (9 ppm), maximum concentration not to be exceeded more than once per year	8 ppm (10 mg/m_3), maximum concentration not to be exceeded more than once per year	same as NAAQS	same as NAAQS	same as NAAQS	same as NAAQS		9 ppm, not to be exceeded more than once over any 12 consecutive months
	1-hour	35 ppm (40 mg/m_3), maximum concentration not to be exceeded more than once per year	same as National AAQS	same as NAAQS	same as NAAQS	same as NAAQS	same as NAAQS		23 ppm, not to be exceeded more than once over any 12 consecutive months.

Pollutant	Averaging Period	National	ND	SD	NE	WY	UT	ID	MT
Ozone (O_3)*	8-hour	0.08 ppm (157 μg/m^3), average of 4th highest maximum daily 8-hour average, over 3 consecutive years.				4th highest daily maximum 8-hour average must be less than or equal to 0.08 ppm, in accordance with national standard		same as NAAQS	
Ozone (O_3)*	1-hour	0.12 ppm (235 μg/m^3), not to be exceeded more than once per year	0.12 ppm (235 μg/m^3), maximum concentration not to be exceeded more than once per year	same as NAAQS	same as NAAQS	0.12 ppm (235 ug/m**3), not to be exceeded more than once per year	same as NAAQS	same as NAAQS	0.10 ppm, not to be exceeded more than once over any 12 consecutive months.
NO_2	Annual	0.053 ppm (100 ug/m**3) Annual arithmetic mean	same as NAAQS	same as NAAQS	same as NAAQS	same as NAAQS	same as NAAQS	same as NAAQS	0.05 ppm, not to be exceeded more than once over any 12 consecutive months.
	1-hour								0.30 ppm, not to be exceeded more than once over any 12 consecutive months.
Lead*	calendar quarter	1.5 μg/m^3, not to be exceeded in any quarter of any calendar year	1.5 μg/m^3 , maximum arithmetic mean	same as NAAQS	same as NAAQS	same as NAAQS	same as NAAQS	same as NAAQS	
	90-day average								1.5 μg/m^3, not to be exceeded (ever) for the averaging time period as described in the state regulation.

* H2S, Ozone, and Lead are not being modeled for this study, and are included in this table for completeness.

APPENDIX B

ADDITIONAL EMISSIONS SOURCES FOR CUMULATIVE ANALYSES

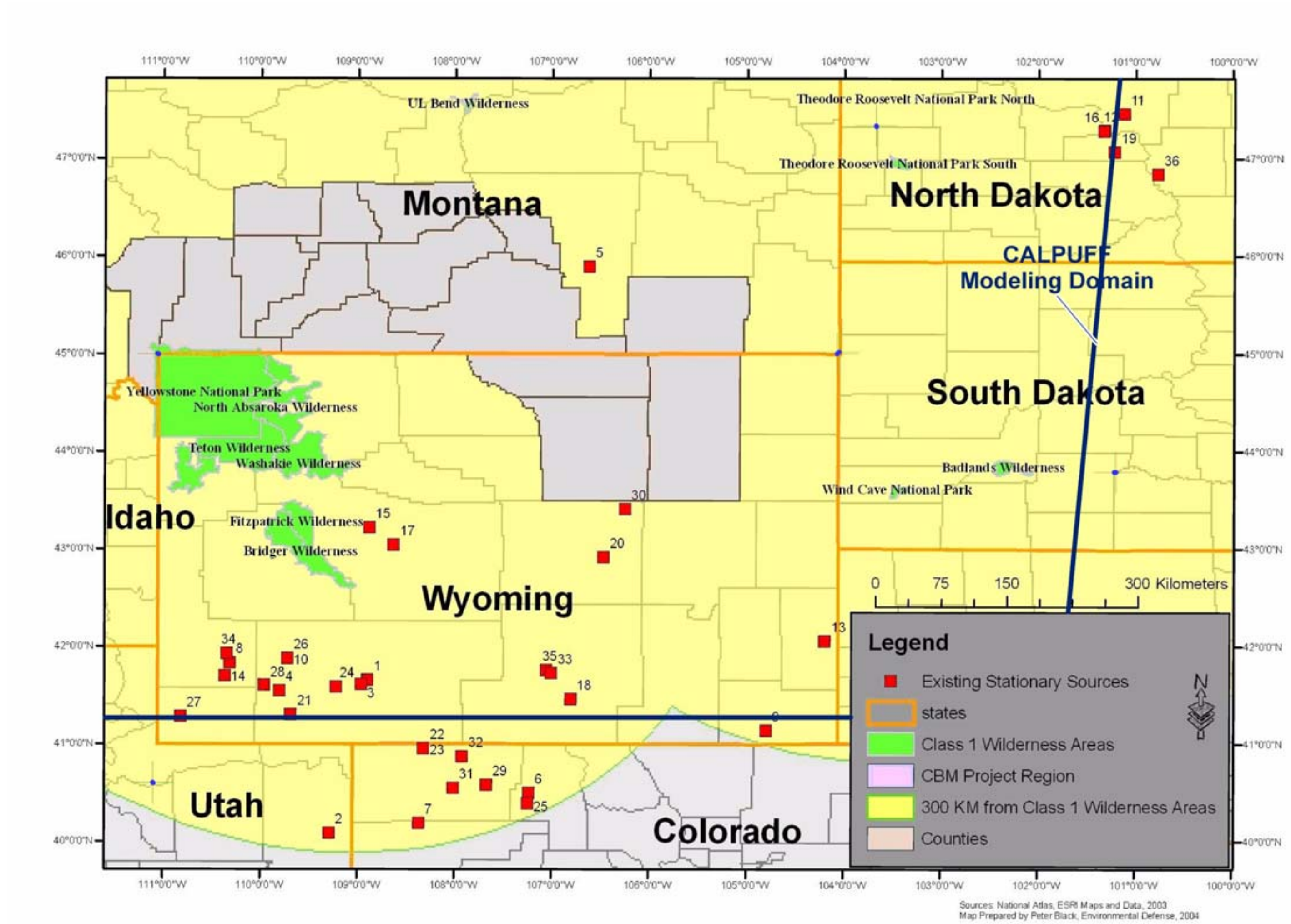

Figure B-1 (After Environmental Defense Fund letter containing scoping comments on the Supplemental EIS)

Number In Figure B-1	Facility Name	NOX (TPY)	PM10 (TPY)	SO2 (TPY)	Source Of Information For Emissions
1	Aldila Corp	81.73	14.49	3.71	Desolation Flats EIS[1]
2	Black Butte Coal Co_ Black Butte Mine	U[2]	2,627	U[2]	AIRS[4]
3	Blue Mountain Energy - Deserado Mine	NA[3]	NA[3]	NA[3]	Desolation Flats EIS[1]
4	Bridger Coal Company - Jim Bridger Mine	208	664	12	AIRS[4]
5	Bonanza Power Plant	5,700	138	1,135	AIRS[4]
6	Church & Dwight Company Incorporated	5.1	99.3	U[2]	AIRS[4]
7	Coal Creek Station	12,862	1,992	49,743	AIRS[4]
8	Colstrip Power Plant	827	32.4	1,262	AIRS[4]
9	Clear Creek Storage	43	U[2]	[2]	Desolation Flats EIS[1]
10	Colorado Interstate Co Laramie Comp Stn	31	U[2]	[2]	Desolation Flats EIS[1]
11	Colorado Interstate Gas Rawlins Comp	817	U[2]	[2]	AIRS[4]
12	Connell Resources Inc Camilletti Pit	U[2]	[2]	1.8	AIRS[4]
13	DOE BLM	1.7	U[2]	24	AIRS[4]
14	D.G. Huskins Construction Co. CT-1229	9	12.9	0.2	Desolation Flats EIS[1]
15	D.G. Huskins Construction Co. CT-1230	32.4	23.7	59.6	Desolation Flats EIS[1]
16	Elam Const Incorporated Davenport Pit	U[2]	[2]	1.72	AIRS[4]
17	Exxon - Shute Creek I	109	U[2]	1,447	AIRS[4]
18	FMC Wyoming Corp _ Soda Ash Plant	1,095	168	265	AIRS[4]
19	Frontier Refining Incorporated	390	220	1,409	AIRS[4]
20	General Chemical Soda Ash Plant	3,608	1,035	4,761	AIRS[4]
21	Great River Energy Stanton Station	3,172	137	9,784	AIRS[4]
22	Holly Sugar Corporation	98.2	224	213	AIRS[4]
23	Jonah Gas Gathering CT-1422	40.6	U[2]	[2]	Desolation Flats EIS[1]
24	Jonah Gas Gathering CT-1423	60.4	U[2]	[2]	Desolation Flats EIS[1]

Number In Figure B-1	Facility Name	NOX (TPY)	PM10 (TPY)	SO2 (TPY)	Source Of Information For Emissions
25	Kern River Gas Trans. _ Muddy Creek	62.6	U[2]	[2]	AIRS[4]
26	Kn Energy Inc - Sand Draw Station	36.5	U[2]	[2]	AIRS[4]
27	Leland Olds Power Plant	12,955	491	50,107	AIRS[4]
28	Louisiana Land & Explor._lost Cabin	7.8	U[2]	1,383	AIRS[4]
29	Louisiana Pacific Carbon CT-1122 BLM	28.7	U[2]	[2]	AIRS[4]
30	Milton R Young Station	22,098	550	41,344	AIRS[4]
31	Mountain Cement Co, CT-1137	636.4	30.7	72.3	AIRS[4]
32	Northwest Pipeline	790	3.17	1.86	AIRS[4]
33	Presidio Oil CT-1128 BLM	33.9	U[2]	[2]	Desolation Flats EIS[1]
34	Questar Gas Mgmt Company Pwfc Northside 1	4.14	U[2]	[2]	AIRS[4]
35	Questar Gas Mgmt Co Pwfc Southside 2	38.5	0.1	U[2]	AIRS[4]
36	Questar Gas Mangement- CT-1295 BLM	99.85	U[2]	[2]	Desolation Flats EIS[1]
37	R.M. Heskett Station	Omitted[6]	Omitted[6]	Omitted[6]	AIRS[4]
38	S F Phosphates, Inc.	68.4	28.2	1,460	AIRS[4]
39	Solvay Minerals, Inc	1,376	194	89.7	AIRS[4]
40	South And Jones BLM	1.6	94	U[2]	AIRS[4]
41	SRTV BLM	2.48	2.79	U[2]	Desolation Flats EIS[1]
42	Tri State Generation Craig Power Plant	16,761	378	10,662	AIRS[4]
43	Twentymile Coal Co	U[2]	364	U[2]	Desolation Flats EIS[1]
44	TotalFinaELF's TG Soda Ash BLM	173	26.2	U[2]	Desolation Flats EIS[1]
45	Umetco Minerals Corporation	U[2]	22.4	U[2]	AIRS[4]
46	Western Gas Resources Inc Sand Wash Station	U[2]	[2]	[2]	AIRS[4]
47	Western Mobile Northern Steamboat S Pit	U[2]	23.05	U[2]	Desolation Flats EIS[1]
48	Williams Field Service - Permit CT-1306	31.89	U[2]	[2]	Desolation Flats EIS[1]

Number In Figure B-1	Facility Name	NOX (TPY)	PM10 (TPY)	SO2 (TPY)	Source of Information For Emmisions and Coordinates
49	Williams Field Services (CT 1177)	32.86	U[2]	[2]	Desolation Flats EIS[1]
50	Williams Field Svcs_Opal Plant	882	U[2]	[2]	AIRS[4]
51	Williams Field Services _ Echo Springs	195	U[2]	[2]	AIRS[4]
52	Wyoming Lime Producers	249	77.2	3.7	AIRS[4]
53	Atlantic Rim CBM Project	NA[3]	NA[3]	NA[3]	Fed. Reg.[5]
54	Bitter Creek Pipeline's Symons Central Compressor	NA[3]	NA[3]	NA[3]	Badger Hills EA[7]
55	Bitter Creek Pipeline's Consul 27 Compressor	NA[3]	NA[3]	NA[3]	Badger Hills EA[7]
56	Basin Creek 100 MW power plant	NA[3]	NA[3]	NA[3]	??
57	Glacier International's 160 MW power plant	NA[3]	NA[3]	NA[3]	??
58	Great Northern/Kiewit's 500 MW Eastern Montana coal-fired power plant	NA[3]	NA[3]	NA[3]	??
59	Natrona County International Airport	0.7	22.8	0.2	Desolation Flats EIS[1]
60	Nelson Refining System's	73.6	4.4	60.2	Desolation Flats EIS[1]
61	Two new coal mines planned for Otter Creek	NA[3]	NA[3]	NA[3]	MT PRB EIS [9]
62	Puron Corporation's Coal Conversion Plant	NA[3]	NA[3]	NA[3]	WY DEQ Report[8]
63	Seneca Coal Company's Seneca II mine	NA[3]	50	NA[3]	AIRS[4]
64	Texaco USA's Stagecoach Draw Oil and Gas	16.13	U[2]	[2]	Desolation Flats EIS[1]
65	Tongue River Railroad	NA[3]	NA[3]	NA[3]	MT PRB EIS [9]
66	Union Pacific Resource's Champlin Gas Plant	200.73	U[2]	[2]	Desolation Flats EIS[1]
67	Wold Trona Company's Soda Ash plant	155	111	33.3	Desolation Flats EIS[1]

?? Question Marks as shown on this table are from the original EDF scoping comment letter.

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Note

1. Facilities identified by BLM in the emission inventory of the “Desolation Flats Natural Gas Exploration and Development Project, Technical Support Documents for Ambient Air Quality Impacts Analysis,” Rawlings and Rock Springs Field Offices, at Appendix B (April 2003), and also within 300 km of one or more of the 15 Class I areas listed by BLM as affected by emissions from the PRB Oil and Gas Project. See Plaintiffs' Exhibits V-1 (Desolation Flats DEIS, Chp 4) and V-2 ("Technical Support Document," Appendix B, Permitted Sources).

2. U means unreported on EPA's AIRS website.

3. NA means not available.

4. Facilities and emissions reported by EPA in the US EPA's AIRS Data website at <http://www.epa.gov/air/data/>. On the AIRS website, click on "Reports and Maps," then "Select geographic area," then in the "Select a state" section, click on "Montana," or other apprpriate state. Click "Go." Then click on "Facility Emissions." Select "NOx", "PM10" or "SO2" under "Pollutant Emitted".

5. Reasonably Foreseeable Future Sources as idenitified by BLM in proposed RMP. 66 Fed. Reg. 33975 (June 26, 2001). <u>See</u> Plaintiffs' Exhibit W.

6. Emissions for the Heskett Station are omitted because source is more than 300 KM from a Class I Area.

7. Facilities identified by Montana BLM in the emission inventory of the "Air Quality Technical Report, Badger Hills POD Environmental Assessment," Miles City District Office, at 31 (February 2004) as within the 300 km zone of impact of the air pollution emission on one or more of the Class I areas listed in the Plaintiffs' Amended Complaint. See id., at 5. BLM evaluated these sources for increment consumption. See id., at 24. See Plaintiffs' Exhibit X.

8. Facilities identified by WY DEQ as permitted after the baseline dates for PM10, SO2, and NOx, as noted in the May 5, 2003, “Custom Report, 37 NSR Report,” Air Quality Division, Wyoming Department of Environmental Quality (Attached to May 19,2003 Letter from Dan Olson, Wyoming DEQ, to Dan Heilig, Executive Director, Wyoming Outdoor Council). See Plaintiffs' Exhibit T.

9. Facilities identified as reasonably foreseeable future sources in BLM’s Montana “Statewide Draft Oil and Gas Environmental Impact Statement and Amendment of the Powder River and Billings Resource Management Plans,” at MIN-33 (January 2002). MT AR § VI, File A, Doc. 1.