APPENDIX H: METHOD FOR AIR QUALITY MODELING AND ANALYSIS OF AIR QUALITY IMPACTS

Modeling Protocol for Air Quality Impact Assessment
October 28, 2009

Air Quality Modeling Impact Analysis for the Jackson Hole Airport Agreement Extension Environmental Impact Statement
September 8, 2010

Basis for Estimates of Greenhouse Gas Emissions as Carbon Dioxide Equivalents

MODELING PROTOCOL FOR AIR QUALITY IMPACT ASSESSMENT
Revised October 28, 2009

Prepared for the
U.S. Department of the Interior - National Park Service
Grand Teton National Park - Wyoming
Jackson Hole Airport Agreement Extension
Environmental Impact Statement

Prepared by
Parsons

BACKGROUND AND OBJECTIVES

The Jackson Hole Airport is located entirely within the bounds of Grand Teton National Park. The airport operates under a use agreement with the U.S. Department of the Interior that is administered by the National Park Service (NPS).

In March 2009, a draft environmental impact statement (DEIS) was submitted for a proposed action to extend the term of the current use agreement, which expires in 2033, for 20 years to 2053. The action to extend the agreement would not involve any new construction or alteration of operations at the airport.

In the March 2009 DEIS, air quality was one of several impact topics that were "dismissed" from detailed consideration and analysis based preliminary evaluations that concluded that the proposed action would have no measureable effect on these resources. Part of the basis for dismissing air quality was that the proposed action (use agreement extension) involved no construction of new or modified emission sources and no significant increases in existing emission levels.

In its review of the DEIS, the U.S. Environmental Protection Agency (USEPA) cited the Jackson Hole Airport's uniqueness as the only commercial airport located within a federal Class I protection area, along with references to provisions in the Clean Air Act prescribing special considerations and programs to protect air quality and air quality related values (AQRVs), including visibility, within Class I areas.

Accordingly, the USEPA requested that a series of dispersion modeling analyses be conducted and the results incorporated into the final EIS. The goal is to assess and document impacts of airport operations and emissions in both the Class I and nearby Class II areas. Modeling should include analyses of:

- Impacts of criteria pollutant emissions, including lead, relative to the National Ambient Air Quality Standards (NAAQS);
- Impacts of criteria pollutant emissions relative to Class I and Class II Significant Impact Levels (SILs) in the respective area types;
- Impacts relative to Class I and Class II Prevention of Significant Deterioration (PSD) increments for those criteria pollutants for which such increments are established; and

- Impacts on AQRVs in the Grand Teton National Park Class I area, including impacts on visibility and on deposition rates at sensitive lakes within the park.

In addition to the above, the NPS indicated that the analyses should assess deposition rates for sulfur and nitrogen at defined “sensitive” lake bodies within Grand Teton National Park.

With its comments, the USEPA suggested models and methods for executing the analyses. USEPA and NPS air quality modeling staff subsequently discussed additional details of the methods, and the NPS provided this guidance to its EIS contractor, Parsons.

This modeling protocol summarizes key elements of the analytical methods and model inputs that will be used in conducting the required analyses. In addition to the direct guidance from the USEPA and NPS, because of the airport’s location this protocol also incorporates modeling guidance from the Wyoming Department of Environmental Quality (WYDEQ) – Air Quality Division.

MODELING AND ASSESSMENT APPROACH

Modeling will focus on assessing impacts of emissions related to the Jackson Hole Airport and associated aircraft operations. No other external emission sources inside or outside Grand Teton National Park will be explicitly included in the modeling. Impacts of all other non-airport sources will be assumed to be included in the background air quality levels established for the area.

Parsons will employ USEPA-approved and -recommended models with representative meteorological data to:

- Calculate ambient concentrations of airport emissions in Class I and Class II receptor areas for comparison with applicable ambient air quality standards, increments, and significant impact levels;
- Estimate impacts on visibility-related parameters, including atmospheric color change and contrast; and
- Calculate deposition rates at receptors representing the designated sensitive lakes in the park.

The specific models to be used in the analysis include:

- The Federal Aviation Administration (FAA) *Emissions and Dispersion Modeling System* (EDMS) model (version EDMS 5.1 – September 2008);
- USEPA’s AERMOD dispersion model, Version 07026, which is also incorporated in the impact component of EDMS; and
- USEPA’s VISCREEN visibility screening model.

Impacts of airport emissions will be calculated for the following timeframes:

- A 2005 baseline year assumed to represent “existing conditions;” and
- Future years 2015 and 2025.

These are the years for which detailed information on current and projected future airport operating levels and aircraft types were included in Tables 8 and 33 of the final environmental impact statement. They also are the years for which noise modeling was performed.

MODEL INPUT DATA

The following sections briefly describe the components of the model set-up and input data.

Source and Emissions Data

The initial reference listing for airport emission sources is the *"2000 Air Emissions Inventory – Grand Teton National Park, Wyoming"* that was prepared for the National Park Service by EA Engineering, Science, and Technology, Inc. in February 2003. In addition to discussing aircraft and associated ground operations, this inventory identifies other sources at the airport that will be included in the list of modeled sources, such as heating units and emergency generators.

This reference list will provide the basis for compiling the source and emissions data to be input to the modeling analyses. The EDMS model will be used to develop the actual dispersion model input files, including source identification, source type, source dimensions, operating profiles, and calculation of emission rates. In particular, the EDMS model will be used to calculate updated emission rates for aircraft operations and associated ground and gate operations, including taxiing and landing and takeoff (LTO) sequences, auxiliary power units (APUs), and ground-support equipment, and also for vehicular traffic in and out of the airport and parking.

The analyses will focus exclusively on impacts attributable to Jackson Hole Airport emission sources for which emission calculations have been or will be performed as noted above. No new emission inventories or calculations for sources external to the airport will be performed for this modeling study. (A separate component of the NPS response to the USEPA's comments on the DEIS will show that other components of the Grand Teton National Park emission inventory did not change substantially from 2000 to 2009.)

Sources and Source Characterization

Airport Point Sources

The *2000 Air Emissions Inventory* lists the following airport emission sources that will be included in the modeling analyses:

- One propane-fueled 30-kilowatt (kW) generator;
- One diesel-fueled 600-kW generator;
- One diesel-fueled 50-kW generator;
- One diesel-fueled 25-kW generator;
- Two No. 2 oil-fired 800,000 Btu/hr heating units; and
- Aircraft operations, including general and commercial aviation operations and associated ground support equipment and airport traffic operations.

The generators and heating unit are considered as **point sources**, and will be modeled as such in the AERMOD sequential modeling analyses. Emission rates will be derived from the "potential" pounds or tons per year emission levels provided in the *2000 Air Emissions Inventory*.

Source parameters for the point sources (for example, stack diameters, flow rates, and exhaust temperatures) were not provided in the report. These data will be requested from airport operations staff. If the information is not readily available, the source parameter data will be estimated based on parameters for similar types and sizes of units.

Airport Area and Volume Sources

Emissions for aircraft, ground support operations, and other airport operations will be newly calculated for this analysis using the EDMS model. Although EDMS calculations were included in the *2000 Air Emissions Inventory* for the park, the new calculations will use the actual aircraft operations data for October 2004 through September 2005 that were presented in Table 8 of the final EIS. Calculations will also be made for the years 2015 and 2025 based on the forecast average daily operations data presented in Table 33 of the EIS.

EDMS provides for calculation of the emission rates, as well as the sizes and configurations of sources that are needed as key inputs to the AERMOD dispersion model. These inputs are based on data and information describing the physical layout of the facility and associated sources (for example, roads, parking lots, and ramp and gate alignments) as well as on the types of sources and quantified levels of activity.

Lead has been absent from automobile fuel since the mid-1990s, but continues to be used as an octane booster in fuel for piston-engine aircraft. Because a large component of airport traffic involves general aviation and piston engine aircraft, emissions from use of leaded fuel will be important in the NAAQS and deposition analyses for lead. If these are not calculated directly by EDMS, the emission estimates for lead will be derived based on the lead content in the fuel and ratios of lead to emissions of other pollutants as provided in reference materials.

Aircraft, associated ground support, and other airport operations, including mobile source activity on airport roads and parking areas, collectively constitute a series of **area and volume sources.** These will be modeled as such in the EDMS/AERMOD sequential analysis.

Source Emission Operating Scenarios

Two (2) sets of source operating scenarios will be modeled to obtain representative model predictions of impacts relative to (a) maximum short-term airport operations and emission levels, and (b) annual average operations and emissions levels.

For the first, or "short-term," source scenario, airport traffic and aircraft operations and ground activity data representative of the July through September peak-season period (as identified in the DEIS) for the park will be used to establish the model input emission rates. A set of AERMOD model runs using these maximum short-term emission rates will be executed to assess impacts for all pollutants that have short-term standards, increments, and significant impact levels (i.e., standards for 1-, 3-, 8-, and 24-hour averaging periods, plus the 3-month average lead standard). These short-term rates will also be used in the VISCREEN modeling.

In the second, or long-term" source scenario, airport traffic and aircraft operations and ground activity data representative of overall annual average conditions will be used to establish the model input emission rates. A second set of AERMOD model runs will be executed to assess impacts for all pollutants that have annual standards, increments, and significant impact levels. The model results based on these long-term rates will also be used to predict the deposition levels as described later.

Model Input Emission Rates

In the February 2003 Emission Inventory Report, the tons per year emissions from generators and heating units were calculated based on the following assumptions.

- The potential annual emissions for each of the generators are based on 500 operating hours per year.
- Potential emission rates for the heating units are based on full-load, full-time operation of 8,760 hours per year (365 days x 24 hours per day).

For each of the time-based source scenarios to be analyzed in the sequential modeling (peak seasonal and annual average) the emission rates input to the models (pounds per hour or grams per second) will assume the emission levels are evenly apportioned over the presumed operating hours for each source type, as follows:

- Aircraft operations and associated airport ground support and traffic emissions will be spread over the approximate 7:00 A.M. to 10:00 P.M. operating hours for the airport.
- Generator emissions also will be spread over the airport operating hours.
- Heater emissions will be spread over the full 8,760 hours available per year in each case because they were conservatively calculated based on potential maximum hourly operating levels.

For sources with restricted operating periods, emission rates for the non-operating hours will be set to "zero" in the model input file.

An exception to the above emission rate distribution will be made for the VISCREEN analysis. VISCREEN is essentially a "1-hour" model. To provide a worst-case estimate of airport emissions on the calculated visibility parameters, all emission sources will be set to their maximum short-term (hourly) emission rates.

Meteorological Database

The EDMS and AERMOD models will be run in an hourly sequential mode. The WYDEQ – Air Quality Division has already supplied files with a current 5-year database of hourly data that has been pre-processed for use in the AERMOD model. This database, which was recently processed and submitted to WYDEQ by Trinity Consultants based on Jackson Hole Airport hourly surface weather observation data for the 5-year period 2004-2008, coupled with corresponding upper air data from Riverton, Wyoming.

The data were processed for use in AERMOD using the AERMET and AERSURFACE preprocessor programs. The outputs include the calculated planetary boundary layer parameters required by AERMOD based on the land use patterns and seasonal and direction-specific surface characteristics (that is, roughness length, Bowen ratio, and surface albedo) defined for the area surrounding the data source.

The availability of a suitable record from the Jackson Hole Airport observation site provides the most representative data possible for these analyses. The sequential modeling analyses for the significant impact area (SIA) determination based on the SILs, and for the NAAQS, increment, and deposition analyses, will make use of the full 5-year data record.

For the visibility analysis, a Level I VISCREEN analysis uses a presumed worst-case meteorological dispersion of "F" stability and a 1-meter per second wind speed (non-directional). If the Level I analysis produces results that exceed certain visibility parameter thresholds, the meteorological database can be used to provide a more realistic worst-case condition in a Level II analysis. The Level II meteorological input data include the worst-case combination of wind speed and stability category that occurs during fully 1% of all hours in the period. For this analysis, the Level II meteorological condition would be based on meteorological records for the hours corresponding to airport operating hours.

Receptor Grids

Four receptor grids, or defined sub-grids, will be used in the analyses, as follows:

- An overall base receptor grid for the NAAQS, increment, and SIL analyses;
- Base grid sub-divisions to segregate Class I and Class II areas;
- A set of discrete receptors for the lake deposition analysis; and
- Defined receptor points (that is, source-observer distances) for the VISCREEN analysis.

The **base grid** is intended to cover the entire area surrounding the airport within which predicted impacts would exceed the most stringent SIL. The final base grid will be determined based on the maximum radius of significant impact for any pollutant and averaging period.

Maximum modeled ground-level concentrations of airport emissions probably will occur at receptors closest to the airport. However, it is unknown how far the maximum significant impact area and, hence, the final grid, may extend from the airport. This will be established using preliminary model runs, and the resulting final grid will be used for the production runs.

The base receptor grid will consist of a series of nested Cartesian Coordinate grid systems defined by Universal Transverse Mercator (UTM) coordinates, starting at the airport property boundary and having the following spatial densities as recommended by WYDEQ:

- 50-meter (m) spacing along the airport boundary fence;
- 100-m spacing in all directions from the boundary to a distance of 1.0 kilometer (km) from the approximate center-point of the airport sources;
- 250-m spacing from 1.0 to 3.0 km;
- 500-m spacing from 3.0 to 10.0 km; and
- 1000-m spacing from 10.0 km to the outer edge of the grid.

As shown in the environmental impact statement Figure 1, the airport is located in the extreme southern portion of Grand Teton National Park, all of which is a Class I area for air quality. The area south and south-southwest of the airport, which includes the Town of Jackson and other portions of Jackson County, is designated as a Class II area.

The base grid may be sub-divided into separate portions for Class I and Class II receptors. This will facilitate calculation and reporting of model output concentrations relative to the different increment and SIL thresholds for the respective areas. The full grid will be used for the assessment of model predicted impacts relative to the NAAQS.

The discrete receptors will be similarly defined by the UTM coordinates, with one receptor point designated for each lake for which deposition rates will be calculated. There are 37 lakes of concern, and they range in distance (approximate) from 10 to 52 km from the airport. The distance to the farthest lake may be set to 50 km to be consistent with guidelines for suitability of using the AERMOD model.

For the VISCREEN analysis, NPS defined the two source-observer distances to be used in the analysis. They include a minimum of 1 km (approximate distance to the central emissions point on the airport from the airport fence line) and a maximum of 18 km (such as the distance to the Grand Teton Peak from U.S. Highway 26/89/191 viewing points close to the airport). The NPS also provided an annual average background visual range value of 248 km for use in the VISCREEN analysis.

The base grid and discrete receptor grid points will be pre-processed for input to AERMOD using the companion AERMAP pre-processor program (version 09040 or greater). The AERMAP pre-processing will be accomplished with the acquisition of 7.5-minute digital elevation model (DEM) files of topographic maps from the U.S. Geological Survey (USGS) covering the projected grid area, and slightly beyond to ensure proper data processing at the outer grid boundaries. The DEM file data provide the receptor terrain heights and are used in conjunction with the receptor UTM coordinates to calculate the "height scale" and "critical dividing streamline height" (h_{crit}) parameters for each receptor for input to AERMOD.

Building Dimensions

The source inventory includes point sources at the airport with low release heights. As a result, these likely are subject to building-induced aerodynamic downwash influences. To account for this, the AERMOD model will be run with the Plume Rise Model Enhancement (PRIME) algorithms to properly calculate impacts under downwash conditions.

This will employ input of dimensions (length, height, width) for the airport terminal and other buildings into the model. Facility plot plans and building layout engineering drawings will be used as input to the USEPA's Building Profile Input Program (BPIP) PRIME program to develop the appropriate model input files of building dimension data for calculating building wake and cavity effects.

MODEL EXECUTION FOR IMPACT ASSESSMENT

Once all of the source data, emission rates, and model inputs defined above are established, the models will be set-up and executed to calculate the impacts for comparison with the various assessment criteria.

AERMOD Modeling

The AERMOD model execution is based on the following:

- AERMOD with PRIME will be run for all 5 years of historical meteorological data to assess impacts for all point, area, and volume sources; for all pollutants and averaging periods; and in all terrain regimes.

- Two sets of AERMOD runs (and results) will be used to assess impacts for both the seasonal short-term peak activity period (Jul-Sep) and for the overall average operating, activity level, and emissions scenarios. Note that, for both scenarios, emissions will be run using each full year of hourly data to ensure that impacts associated with the worst-case possible meteorological dispersion conditions are predicted.
- The modeling domain is situated in a complex terrain setting with receptors at and above the elevation of emission sources. AERMOD appropriately implements USEPA guidance for modeling of impacts at receptors in simple, intermediate, and elevated terrain.
- The latest version of BeeLine's BEEST software (Ver. 9.78) incorporating Version 07026 of AERMOD PRIME will be used.
- AERMOD will be run with Regulatory Default Options and Rural dispersion coefficients.
- AERMOD will be used to calculate ambient concentrations of sulfur dioxide, particulate matter with diameters of less than 10 and less than 2.5 microns, nitrogen oxides, carbon monoxide, and lead (SO_2, PM_{10}, $PM_{2.5}$, NO_x, CO, and Pb).
- Modeled concentrations for lead will be further processed using the "LeadPost" program to appropriately calculate rolling 3-month-average concentrations for direct comparison with the 3-month-average lead standard.

The AERMOD model runs will yield output concentrations that can be compared to the concentration threshold representing the SILs, NAAQS, and Class I and II increments. Comparison with the SILs and setting the final size of the receptor grids will be based on the maximum model-predicted concentrations for each pollutant and averaging period. Comparison of impacts relative to standards and increments will be based on the highest-second-highest (HSH), or fourth high (for particulate matter), concentrations for comparison with these criteria.

The final reported impact assessment values will be the maximum relevant values (for example, HSH short-term, or maximum annual concentrations) predicted for any year in the 5-year meteorological database.

Deposition levels at the sensitive lake receptors will be calculated using the Level I analysis approach as described in the April 1993 Interagency Work Group on Air Quality Modeling (IWAQM) Phase I report. This approach uses the model-predicted concentrations of sulfur dioxide and nitrogen oxides to estimate total sulfur and nitrogen deposition rates based on the predicted concentration levels and a series of conversion factors and defined deposition velocities to calculate deposition rates in units of kilograms per hectare for various averaging periods. The estimated deposition rates are then compared to established deposition analysis threshold values representing this AQRV.

VISCREEN Modeling

For the VISCREEN modeling, the screening approach does not allow the input of multiple sources or multiple source types. Therefore, the VISCREEN modeling will employ a "virtual point source" approach to the source characterization. The sum total of all maximum hourly emission rates will be modeled as coming from that single point source. The location of the virtual point source will be established at an additional "upwind" distance (that is, distance upwind of the actual airport location) such that the horizontal plume width parameter (sigma Y) of this point source plume at the time it reaches the airport would cover the one-half of width of the composite area encompassing the actual airport source complex.

More specifically, **Figure H-1** depicts the establishment of the virtual point source location upwind along the long axis of the Jackson Hole Airport area source complex. The target area source width will be the minimum projected width (W) of the complex, which in this case is the width represented by a line nearly normal to the long axis and running through the center of the complex. A preliminary SCREEN model run will be made for the case of F stability and 1 meter per second wind speed with downwind receptor points placed at 50-100 meter intervals from the source out to a total distance of several kilometers. The model output will be reviewed to determine the distance at which the output Sigma Y value equals one half of the projected area source width. This distance in turn represents the distance between the area source and its corresponding virtual point source.

In the actual execution of the VISCREEN model, the virtual point source distance will be added to the previously specified distances from the airport to the VISCREEN receptor points.

(Note: If a Level II VISCREEN analysis becomes necessary, the same procedure would be followed, except that the applicable Sigma Y distances would be determined from preliminary SCREEN model runs using the 1% frequency stability and wind speed conditions determined for a Level II analysis.)

Model Results and National Default Ratio for Nitrogen Dioxide and Nitrogen Oxides

Nitrogen dioxide (NO_2) is the form of the pollutant in which the standards for nitrogen oxides are expressed. However, the model employs nitrogen oxides emission rates and provides output as nitrogen oxides. These direct results will be used to establish the significant impact area (SIA) for nitrogen oxides. Once the SIA is established, nitrogen oxides model results will be scaled based on the national default nitrogen dioxide to nitrogen oxides ratio of 0.75 to obtain estimates of nitrogen dioxide for comparison to the NAAQS and Class I and II increments.

Background Air Quality Concentrations

For the final assessment of impacts relative to the NAAQS, the maximum model predicted concentrations will be added to background levels to obtain total ambient concentrations for comparison with the standards. Only the sources on airport property will be explicitly examined in this modeling analysis. All other sources inside and outside Grand Teton National Park will be represented by the background values.

WYDEQ provided a list of monitoring sites from which actual measured air quality concentrations could be deemed representative of prevailing air quality levels in the Jackson Hole area. Multiple monitoring sites were recommended since not all pollutants are measured at every monitoring site. In general, the monitoring sites identified for each pollutant are those closest to, or in, the Jackson area.

The WYDEQ web site was consulted to review their annual monitoring reports and to extract measured concentrations values for the past three (3) years (2006-2008) for each pollutant and averaging period, except for lead, which is not measured any sites in Wyoming.

Table H-1 attached lists the maximum short-term (i.e., maximum 1-, 3-, 8-, and 24-hour averages) and annual average concentration values measured in each of the three years for each pollutant and averaging period to be examined in the modeling analysis. The table also indicates the monitoring site location at which data values for each pollutant were measured.

For this analysis, background air quality levels will conservatively be assumed as the maximum concentration values measured in any of the three years for each pollutant and averaging period.

For lead, a search was made to identify representative monitoring locations in nearby states. The nearest monitoring location considered as being situated in a comparable setting and not unduly influenced by local industrial sources is the site in the town of Kellogg in Shoshone County, Idaho. Although monitoring at this site was terminated midway through 2002, the historical data record for the last three years of site operations consistently yielded 3-month average lead concentrations in the range of 0.03 to 0.04 $\mu g/m^3$. Based on this, a value of 0.04 $\mu g/m^3$ is specified as the 3-month average background value for lead.

Background levels are intended to represent the impacts of other nearby and regional emission sources not explicitly included in the modeling analysis. However, because the Jackson Hole Airport is among the existing sources, the background values – especially those from the Jackson monitor - may be considered conservative in that impacts of airport emissions may already be reflected, or partly so, in the existing air quality levels.

PRESENTATION OF MODELING RESULTS

The results of the modeling analyses will be summarized in a comprehensive series of tables and figures, with explanatory text. Results will be provided for::

- All Jackson Hole Airport sources combined;
- Source emission rates associated with peak seasonal and annual averaging operating scenarios,
- Each year in the 5-year meteorological data input file;
- Each pollutant and averaging period; and
- Both Class I and Class II areas.

The NAAQS and increment compliance modeling results for sulfur dioxide, particulate matter with diameters of less than 10 and less than 2.5 microns, nitrogen oxides, carbon monoxide, and lead for each of the two operating scenarios will be summarized in tables containing the following specific information for each pollutant:

- The maximum and highest-second highest (HSH) predicted short-term (that is, 1-, 3-, 8- and/or 24-hour average) concentration values predicted for each year in the record for pollutants that have short-term standards;
- The maximum 3-month rolling average concentration for lead,
- The maximum annual average predicted concentrations for each year for pollutants that have standards for long-term (that is, annual) averaging periods;

- The UTM coordinates of the receptors where the listed maximum and HSH concentrations were predicted to occur;
- The relative direction and distance from the center of the airport at which maximum impacts are predicted to occur; and
- The year, month, day, and end-hour of the time period during which the maximum short-term impacts were predicted and the year for which maximum annual average concentrations were predicted.

The overall highest values for the full 5-year meteorological data record for the compliance-controlling impacts (that is, HSH impacts for short-term standards and maximum annual impacts for long-term standards) will be carried forward to a final compliance assessment.

The modeling results will also be depicted graphically in figures presenting isopleth plots of predicted concentrations for each pollutant and averaging period for the meteorological data year in which the highest overall impact for that pollutant and averaging period was predicted to occur. These plots will show the locations and areal extent of maximum predicted impacts.

The VISCREEN results will be presented in a table listing the model output results along with the threshold criteria for color and contrast.

The deposition results will be presented in a table that lists, for each identified lake for which a discrete receptor point was established, the total sulfur and nitrogen deposition levels determined for each year in the meteorological database. The numerical results will be compared to the recommended deposition analysis threshold values.

Figure 1. Depiction of Virtual Point Source

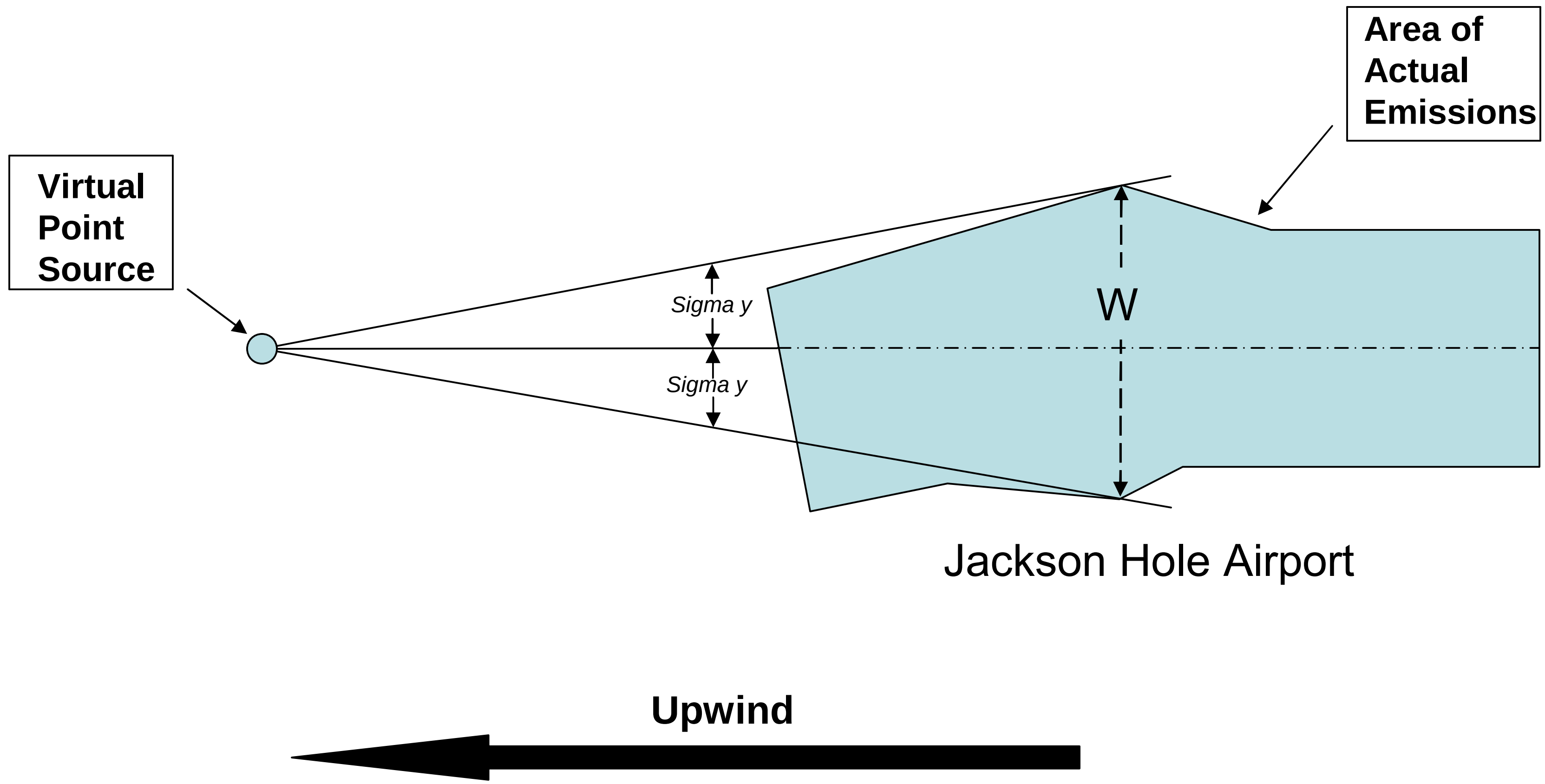

Table 1 Summary of Representative Background Air Quality Values

Pollutant	Averaging Period	Monitoring Location	Maximum Measured Concentrations In 2006 (ug/m^3)	Maximum Measured Concentrations In 2007 (ug/m^3)	Maximum Measured Concentrations In 2008 (ug/m^3)	Selected Concentrations For Background (ug/m^3)
SO_2	3-Hour	WDEQ South Pass Monitor	NA	14.9	**16.5**	16.5
	24-Hour	WDEQ South Pass Monitor	NA	5.5	**8.4**	8.4
	Annual Average	WDEQ South Pass Monitor	NA	2.6	**2.6**	2.6
PM_{10}	24-Hour	WDEQ Jackson Monitor	80	35	**93**	93
	Annual Average	WDEQ Jackson Monitor	**21**	17	19	21
$PM_{2.5}$	24-Hour	WDEQ Jackson Monitor	**23.3**	17.9	13.7	23.3
	Annual Average	WDEQ Jackson Monitor	**6.84**	5.55	5.22	6.84
NO_2	Annual Average	WDEQ Daniel South Monitor	5.64	5.64	5.64	5.64
O_3	8-Hour (4th High)	WDEQ Daniel South Monitor	0.074 ppm	0.066 ppm	0.074 ppm	0.074 ppm
CO	1-Hour	WDEQ Murphy Ridge Monitor	NA	**1832**	1031	1832
	8-Hour	WDEQ Murphy Ridge Monitor	NA	**1718**	802	1718
			In 2000	**In 2001**	**In 2002**	
Pb	Quarterly Average	Idaho-Shoshone-Kellogg	**0.04**	0.03	0.03	0.04

Notes: Monitoring locations specified by WDEQ-AQD, except for lead (Pb). No Pb monitoring has been performed in Wyoming

The lead (Pb) monitoring location was based on a search of nearby monitoring stations in other states, with the selection of the Kellogg location (in Shoshone County, Idaho) as being most representative of the study area.

No lead monitoring data was found for the 3-year period for 2006 to 2008. The most recent 3-year period of Pb data from Kellogg, Idaho is 2000 to 2002.

Bolded data values over the 3-year period from 2006 - 2008 are carried forward as the "Selected Background Values"

Data collection for the selected SO_2 and CO monitoring stations did not commence until 2007.

NA = data not available.

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September 8, 2010

Prepared for the

National Park Service
Grand Teton National Park

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Section 1: Introduction

The Jackson Hole Airport (airport) is entirely within the bounds of Grand Teton National Park. The airport operates under an agreement with the U.S. Department of the Interior that is administered by the National Park Service (NPS).

In March 2009, a draft environmental impact statement was submitted for a proposed action to extend the term of the current agreement, which expires in 2033, for 20 years to 2053. The action to extend the agreement would not involve any new construction or alteration of operations at the airport.

In the March 2009 draft environmental impact statement, air quality was one of several impact topics that were dismissed from detailed consideration. Preliminary evaluations concluded that changes in emissions from the proposed action would be too small to detect compared to emissions from stationary sources and automobiles used by the area's residents and 2.4 million visitors annually.

In its review of the draft environmental impact statement, the U.S. Environmental Protection Agency cited the Jackson Hole Airport's uniqueness as the only airport with scheduled passenger service that was located within a federal Class I protection area, along with references to provisions in the Clean Air Act prescribing special considerations and programs to protect air quality and air quality related values, including visibility, within Class I areas.

Accordingly, the U.S. Environmental Protection Agency requested that a series of air quality dispersion modeling analyses be conducted, with the results incorporated into the final environmental impact statement. The goal is to assess and document impacts of airport operations and emissions in both the Class I and nearby Class II areas.

Modeling included analyses for:

- Impacts of criteria pollutant emissions, including lead, relative to the National Ambient Air Quality Standards (NAAQS);
- Impacts of criteria pollutant emissions relative to Class I and Class II significant impact levels in the respective area types;
- Impacts relative to Class I and Class II Prevention of Significant Deterioration increments for those criteria pollutants for which such increments are established; and
- Impacts on air quality related values in the Grand Teton National Park Class I area, including impacts on visibility and on deposition rates of nitrogen and sulfur at sensitive lakes within the park.

With its comments, the U.S. Environmental Protection Agency suggested models and methods for executing the analyses. Air quality modeling staff from the U.S. Environmental Protection Agency and National Park Service subsequently discussed additional details of the methods, and the National Park Service provided this guidance to its environmental impact statement contractor, Parsons.

This modeling report was prepared by Parsons on behalf of the National Park Service to disclose the air quality effects of the alternatives for extending the Jackson Hole Airport agreement. The report summarizes the methods, input data, and results of the dispersion modeling impact analysis. The modeling approach and methods are consistent with the modeling protocol discussed with and approved by air quality specialists from the U.S. Environmental Protection Agency and National Park Service.

This air quality impact analysis explicitly accounts for emissions from all sources at the airport, including aircraft operations, traffic, and combustion sources such as boilers and generators. Emissions from other offsite sources, including nearby and regional sources, are represented in ambient background levels based on regional monitoring data. As explained in more detail later, this use of actual regional values results in an overestimate of air pollutant concentrations relative to standards, because the regional background data already include existing airport emissions.

The modeling approach consisted of performing a sequential modeling analysis employing the U.S. Environmental Protection Agency's AERMOD dispersion model with a 5-year (2004 through 2008) surface meteorological record from the Jackson Hole Airport and corresponding upper air data from Riverton, Wyoming. Source and emissions data for air pollutants associated with the airport were obtained from *Final 2000 Air Emissions Inventory, Grand Teton National Park, Wyoming* (EA Engineering, Science, and Technology, Inc. 2003), the March 2009 draft environmental impact statement, and information provided by airport operational personnel.

Details on models and input data are provided in Sections 5 and 6, respectively. The modeling results and interpretation relative to air quality standards and other indictors of concern are presented in Section 7.

The National Park Service normally uses English units for distance, weight, and volume. However, most air quality regulations from the U.S. Environmental Protection Agency, and their associated models and other analyses, use the metric system, such as significant impact area calculations based on kilometer grids and air pollutant concentrations in micrograms per cubic meter. Therefore, metric is the primary measurement system used in this report, with conversion to English units when it is judged to enhance reader comprehension.

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Section 2: Site Information

The Jackson Hole Airport is in Teton County in the northwest portion of Wyoming approximately 7 miles north of the town of Jackson. The airport complex is entirely within the bounds of Grand Teton National Park, which is a federally protected Class I area as designated under U.S. Environmental Protection Agency's Prevention of Significant Deterioration air quality regulations.

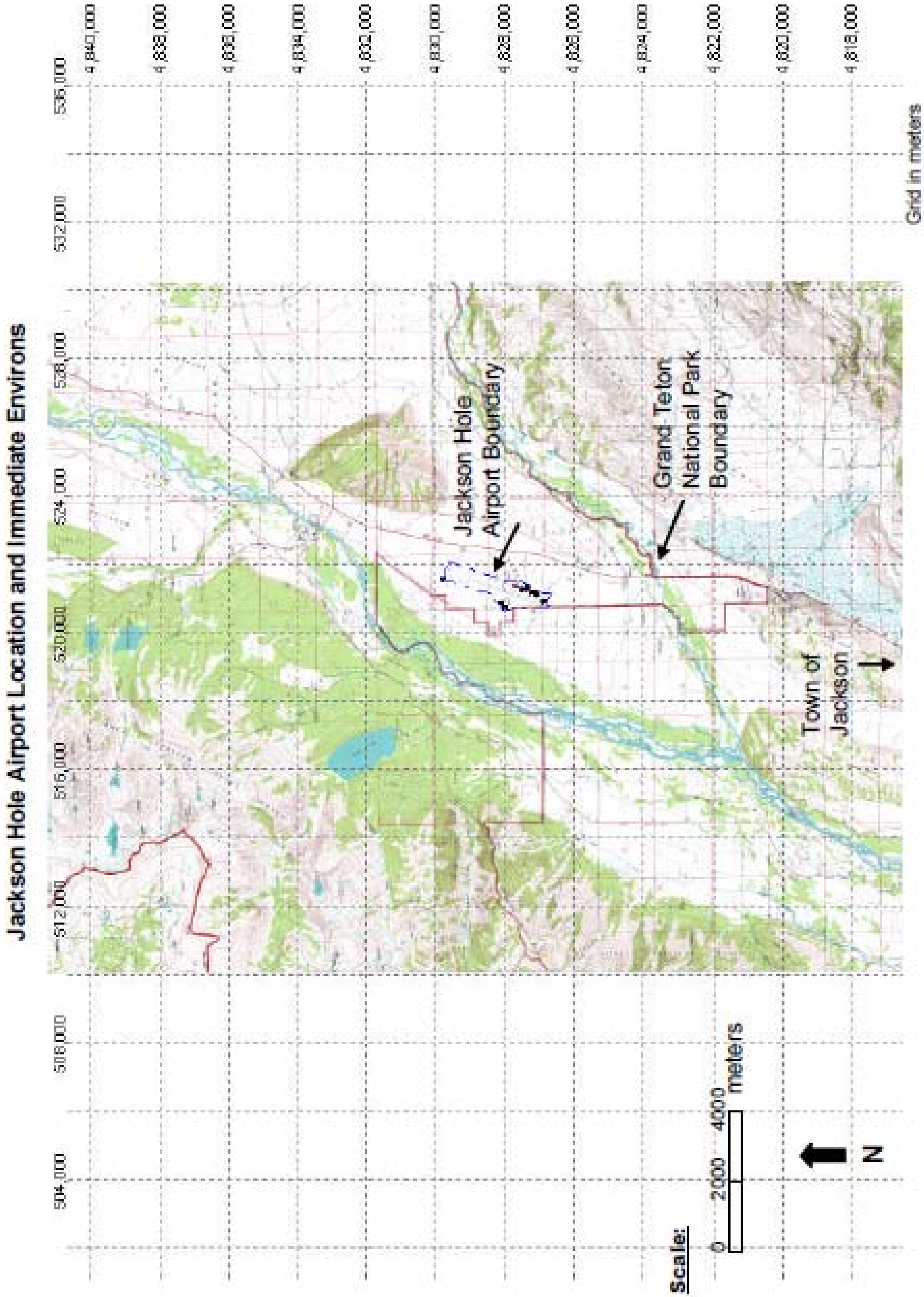
Figure 2-1 presents a topographic map section showing the location of the airport in relation to the Grand Teton National Park boundary and immediate surroundings. The boundary line for the park is also the boundary for the Class I area. Areas outside this line, including the National Elk Refuge and town of Jackson, are in the Class II area. The airport effectively borders the Class II area on its southwest side.

The base elevation of the airport is about 1,950 meters (6,400 feet) above mean sea level. The area immediately surrounding the airport is generally flat and openly exposed. However, terrain becomes steeply elevated only a few miles beyond the airport boundary where the north-south Teton Range rises to more than 3,650 meters (12,000 feet) above mean sea level. The highest peak in the range is Grand Teton, which rises to 4,197 meters (13,770 feet) about 16 kilometers (10 miles) northwest of the airport.

A residential development is immediately adjacent to and southwest of the airport boundary where the Class II area borders on the airport. Additional residential areas extend to the west and northwest of the airport within the Class II area.

Teton County is considered as in "attainment" or "non-classifiable" relative to all criteria pollutant standards.

FIGURE 2-1: JACKSON HOLE AIRPORT LOCATION



Section 3: Source and Emissions Descriptions

Jackson Hole Airport is a small commercial airport with a single terminal building and one runway. Air emission sources at the airport fall into three categories: aircraft-related, traffic-related, and combustion sources associated with heating and emergency power generation. Each of these source types is described below.

The layouts and configurations of these three emissions source types, along with the facility property line, are shown in Figure 3-1.

AIRCRAFT-RELATED SOURCES

Modeled emissions for aircraft and aircraft-related sources include:

- Aircraft: emissions from aircraft apply to the flight engines used by aircraft during approach, taxi in, startup, taxi out, takeoff, and climb cycles.
- Ground support equipment: these emissions are generated by ground support vehicles that service the aircraft, such as loading and unloading baggage, servicing the lavatory and cabin, and loading food and fuel. In preparation for departure, a ground support tug may be used to push or tow the aircraft away from the gate.
- Auxiliary power units: emissions from auxiliary power units most often come from onboard generators that provide electrical power to the aircraft while its main engines are shut down.

Aircraft and associated ground support operations are modeled as an “areapoly” source. Areapoly is a model feature that enables the user to define an area source as a specified, tailor-shaped polygon The layout and configuration of the “aircraft” source, along with the airport boundary, are shown in Figure 3-1.

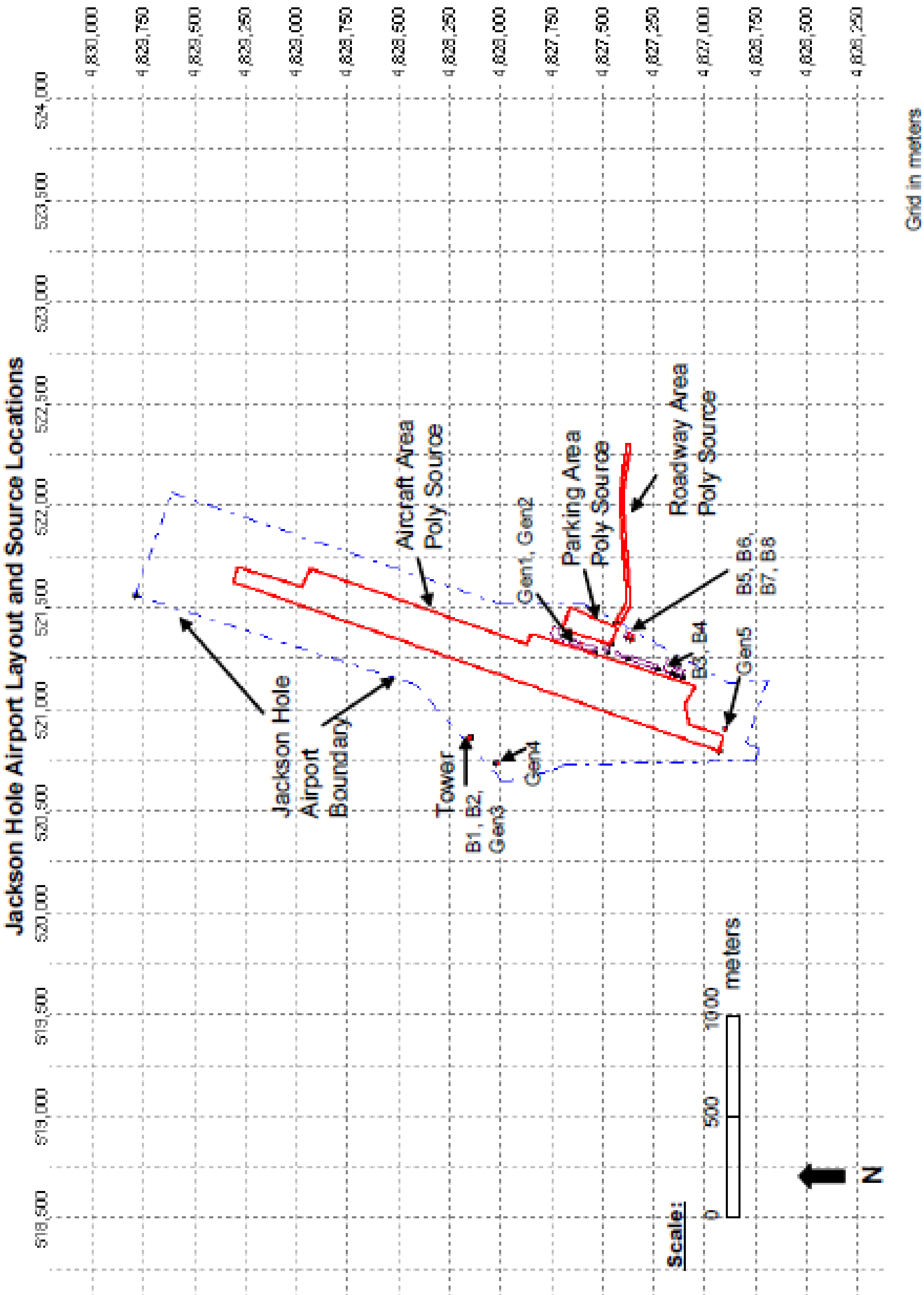
TRAFFIC-RELATED SOURCES

Modeled emissions for traffic-related sources include:

- Emissions from vehicular traffic entering and exiting the airport on the airport access road. The road is east of the airport property and runs generally east for approximately 0.9 kilometers (0.5 miles).
- Vehicular traffic in the airport parking area. This area is located on the east side of the airport property.

Emissions from vehicles using the road and parking areas are modeled as areapoly sources. The layout and configuration of the “roadway” and “parking” sources are shown in Figure 3-1.

FIGURE 3-1: AIR EMISSIONS SOURCE LOCATIONS IN THE JACKSON HOLE AIRPORT BOUNDARY AND ALONG THE ACCESS ROAD



COMBUSTION POINT SOURCES

Modeled emissions from heating and emergency power units include eight small boilers and five diesel-fired generators, as follows (with location):

- Two No. 2 oil-fired 800,000 British thermal unit per hour heating units (for the tower);
- Two No. 2 oil-fired 96,000 British thermal unit per hour heating units (for hangar 4);
- Four No. 2 oil-fired 96,000 British thermal unit per hour heating units (for the car rental buildings);
- One diesel-fueled 1,500-kilowatt generator (on the north end of the terminal);
- One diesel-fueled 1,000-kilowatt generator (on the south end of the terminal);
- One diesel-fueled 60-kilowatt generator (for the tower);
- One diesel-fueled 50-kilowatt generator (for the Federal Aviation Administration's Air Traffic Control Beacon Interrogator-6 aircraft tracking system); and
- One diesel-fueled 25-kilowatt generator (MALS 01).

Emissions from boilers and generators are modeled as point sources. The layout and locations of the point sources are shown in Figure 3-1. They are clustered in two general locations, including near the tower on the west side of the airport property and near the terminal and facility support buildings on the east side of the airport.

EMISSIONS AND SOURCE CHARACTERIZATIONS

EMISSIONS MODELED

For this National Environmental Policy Act air quality analysis, impacts of Jackson Hole Airport source emissions were predicted for the following pollutants and averaging periods:

- Sulfur dioxide (SO_2) – 3-hour, 24-hour, and annual.
- Particulate matter with diameters of 2.5 microns or less and 10 microns or less ($PM_{2.5}$ and PM_{10}, respectively) – 24-hour and annual. (Unless specified, it is assumed that particulate matter emissions refer to particles with diameters of 10 microns or less, which includes the smaller-diameter component.)
- Carbon monoxide (CO) – 1-hour and 8-hour.
- Nitrogen dioxide (NO_2) – annual.
- Lead (Pb) – rolling 3-month.

In addition, the following air quality related values were modeled:

- Visibility; and
- Total nitrogen and sulfur deposition in high-elevation, sensitive lakes

AIRPORT SOURCE EMISSION RATES

Two sets of source operating scenarios were modeled to obtain representative predictions of impacts: peak season airport operations and emission levels, and annual average operations and emissions levels.

For the peak season scenario, aircraft operations from the July through September 2005 peak season, and associated airport traffic and ground activity, were used to establish the model input emission rates. These were the same values used to evaluate other impact topics in the draft environmental impact statement. A set of AERMOD model runs using these peak season emission rates was executed to assess impacts for all pollutants with a short-term standard, plus the 3-month rolling average lead standard. These peak season rates were also used in the VISCREEN modeling.

In the annual average scenario, aircraft operations and associated airport traffic and ground activity data from October 2004 through September 2005 were used to establish the model input emission rates. A second set of AERMOD model runs was executed to assess impacts for all pollutants that have annual standards. In addition, the model results based on these year-round rates were used to predict the total nitrogen and sulfur deposition levels.

Current modeling used the same assumptions that were employed in the 2000 emissions inventory for Grand Teton National Park (EA Engineering, Science, and Technology, Inc. 2003) to determine emissions in tons per year from generators and heating units. These included the following:

- The potential annual emissions for each generator were based on 500 operating hours per year.
- Potential emission rates for the heating units were based on full-load, full-time operation of 8,760 hours per year (365 days x 24 hours per day).

For the peak season and annual average source scenarios analyzed in the sequential modeling, the emission rates used in the models assumed the emission levels were evenly apportioned over the presumed operating hours for each source type, as follows:

- Aircraft operations and associated airport ground support and traffic emissions were spread over the approximate 7:00 A.M. to 10:00 P.M. operating hours for the airport.
- Generator emissions were spread over the airport operating hours.
- Boiler emissions were spread over the full 8,760 hours available per year in each case based on a worst-case scenario of maximum hourly operating levels.

For sources with restricted operating periods, emission rates for the non-operating hours were set to “zero” in the model input file.

An exception to the above emission rate distribution was made for the VISCREEN analysis. VISCREEN is essentially a “1-hour” model. To provide a worst-case estimate of airport emissions on the calculated visibility parameters, all emission sources were set to their maximum short-term (hourly) emission rates.

OTHER OFFSITE SOURCES EMISSIONS AND IMPACTS

No other offsite sources were explicitly included in the modeling analysis. Contributions of other offsite emission sources to total impacts were represented by background air quality levels for each pollutant and averaging period based on monitoring data supplied by the Wyoming Department of Environmental Quality, as described in Section 6.

Section 4: Regulatory Criteria for Analyses

NATIONAL ENVIRONMENTAL POLICY ACT COMPLIANCE

The National Environmental Policy Act requires federal agencies to integrate environmental values into their decision-making processes by considering the environmental impacts of their proposed actions and reasonable alternatives to those actions. As part of the National Environmental Policy Act process, a draft environmental impact statement was made available in March 2009 for a proposed action to extend the term of the current agreement for the Jackson Hole Airport in Grand Teton National Park for 20 additional years, until 2053. The current agreement expires in 2033.

Section 1 describes the concerns raised by the U.S. Environmental Protection Agency regarding the dismissal of air quality from further consideration in the draft environmental impact statement. As a result of discussions between that agency and the National Park Service, it was determined that the air quality impacts of airport operations and emissions in both the Class I and nearby Class II areas should be disclosed in the final environmental impact statement. This report provides the assessment and documentation to support the disclosure of air quality impacts in accordance with the National Environmental Policy Act.

FEDERAL AND STATE AIR QUALITY CRITERIA

Table 4-1 presents the modeling impact assessment criteria used for this study. It includes the averaging periods and concentration values for the National Ambient Air Quality Standards; Prevention of Significant Deterioration increment; significant impact levels, which were used to calculate the significant impact area; thresholds for deposition of nitrogen and sulfur, and thresholds for protection of visibility in Class I areas.

NATIONAL AMBIENT AIR QUALITY STANDARDS ANALYSIS

The air quality impact analysis was conducted to determine the effects of the airport on the ability of the surrounding Class I and Class II areas to meet ambient air quality standards for sulfur dioxide, particulate matter with diameters of 10 microns or less and 2.5 microns or less, carbon monoxide, and nitrogen dioxide. The analysis also evaluated impacts on specified air quality related values in the vicinity of the Jackson Hole Airport.

The State of Wyoming has adopted the National Ambient Air Quality Standards as applicable to ambient air quality levels within the state.

The modeling analysis employs a 5-year meteorological data record. For this study, compliance with standards applicable to short-term averaging periods (that is, 1-, 3-, 8-, and/or 24-hours) were generally assessed based on the maximum (MAX) model-predicted impact determined for any year in the 5-year record. Compliance with standards applicable to long-term (that is, annual) averaging periods were assessed based on the highest model-predicted impact determined for any year in the record.

TABLE 4-1: MODELING ASSESSMENT CRITERIA USED TO DETERMINE THE IMPACTS ON AIR QUALITY FROM THE JACKSON HOLE AIRPORT [a]

Pollutant	Averaging Period	National / State Ambient Air Quality Standards	Prevention of Significant Deterioration Increment Concentration		Significant Impact Levels	
			Class I Areas	Class II Areas	Class I Areas [b]	Class II Areas
Sulfur dioxide	3-hour	1,300 $\mu g/m^3$ [c]	25 $\mu g/m^3$	512 $\mu g/m^3$	1 $\mu g/m^3$	25 $\mu g/m^3$
	24-hour	365 $\mu g/m^3$	5 $\mu g/m^3$	91 $\mu g/m^3$	0.2 $\mu g/m^3$	5 $\mu g/m^3$
	Annual average	80 $\mu g/m^3$	2 $\mu g/m^3$	20 $\mu g/m^3$	0.1 $\mu g/m^3$	1 $\mu g/m^3$
Particulate matter (10 microns or less)	24-hour	150 $\mu g/m^3$	8 $\mu g/m^3$	30 $\mu g/m^3$	0.3 $\mu g/m^3$	5 $\mu g/m^3$
	Annual average	--	4 $\mu g/m^3$	17 $\mu g/m^3$	0.2 $\mu g/m^3$	1 $\mu g/m^3$
Particulate matter (2.5 microns or less)	24-hour	35 $\mu g/m^3$	8 $\mu g/m^3$ [d]	8 $\mu g/m^3$	0.3 $\mu g/m^3$ [d]	5 $\mu g/m^3$ [d]
	Annual average	15 $\mu g/m^3$	4 $\mu g/m^3$ [d]	4 $\mu g/m^3$	0.2 $\mu g/m^3$ [d]	1 $\mu g/m^3$ [d]
Nitrogen dioxide	Annual average	100 $\mu g/m^3$	2.5 $\mu g/m^3$	25 $\mu g/m^3$	0.1 $\mu g/m^3$	1 $\mu g/m^3$
Carbon monoxide	1-hour	40,000 $\mu g/m^3$	--			2,000 $\mu g/m^3$
	8-hour	10,000 $\mu g/m^3$	--			500 $\mu g/m^3$
Lead	Quarterly average	0.15 $\mu g/m^3$	--			
Total sulfur deposition	Annual	0.005 kilograms /hectare/year [e]	--	--	--	--
Total nitrogen deposition	Annual	0.005 kilograms /hectare/year [e]	--	--	--	--
Visibility: color	1-hour	2 [f]	--	--	2 [f]	--
Visibility: contrast	1-hour	0.05 [f]	--	--	0.05 [f]	--

a/ Except as noted, criteria pollutant standards, increments, Class II significant impact levels, and visibility standards are from the U.S. Environmental Protection Agency. Some of these also have been adopted by the Wyoming Department of Environmental Quality. A double dash indicates that there is no criterion for this pollutant for this standard.

b/ Class I significant impact levels were provided by Andrea Stacy of the NPS' Air Resources Division in a September 21, 2009 email.

c/ $\mu g/m^3$ = micrograms per cubic meter.

d/ Some standards or criteria for particulate matter with diameters of 2.5 microns or less have not yet been established by the U.S. Environmental Protection Agency or Wyoming Department of Environmental Quality. Therefore, based on a suggestion from the Wyoming Department of Environmental Quality and National Park Service, this criterion for this pollutant is the same as the standard for particulate matter with diameters of 10 microns or less.

e/ Sulfur and nitrogen deposition analysis thresholds are from the Federal Land Managers' Air Quality Related Values Workgroup (2008). However, these values are not national or state ambient air quality standards.

f/ Visibility criteria do not have units. The "color" value indicates the perceptibility of emissions based on color differences and brightness. The "contrast" value is a change in a spectral criterion defined for a green wavelength of 0.55 microns.

PREVENTION OF SIGNIFICANT DETERIORATION

The proposal to extend the existing use agreement of the Jackson Hole Airport is not subject to review under regulations for Prevention of Significant Deterioration because no construction of new or modified emission sources and no significant increases in existing emission levels are planned. However, as mentioned above, the U.S. Environmental Protection Agency cited the Jackson Hole Airport's uniqueness as the only commercial airport located within a federal Class I protection area, along with references to provisions in the Clean Air Act prescribing special considerations and programs to protect air quality and air quality related values, in its draft environmental impact statement comments and request for further analysis of the airport's emissions. Accordingly, Prevention of Significant Deterioration -type increment assessments and Class I Area impact analyses were performed as part of this study.

SIGNIFICANT IMPACT AREA ANALYSIS

As part of the analysis, the modeling results were used to determine the Jackson Hole Airport's "significant impact area" for each modeled pollutant and averaging period. A source's significant impact area is defined as the maximum radial distance in any direction from the source within which predicted concentrations are above the significant impact levels established for each pollutant and averaging period.

The significant impact levels for each pollutant and averaging period examined in this analysis are also included in Table 4-1. They are included for two types of areas referred to as Class I and Class II areas. Class I areas are protected areas of special national or regional natural, scenic, recreational, or historic value for which federal air quality (Prevention of Significant Deterioration) regulations provide stringent protection. The Grand Teton National Park is designated as a Class I area and the Jackson Hole Airport lies completely within the Class I boundary. However, the town of Jackson itself is in a Class II area that is afforded a "normal" level of protection under the federal regulations. The Class II area extends from the town of Jackson up to and beyond the airport (refer to Figure 6-4).

DEPOSITION OF NITROGEN AND SULFUR

The affirmative responsibility of federal land managers to protect the air quality related values of Class I areas includes the deposition of air pollutants onto land and water. Nitrogen and sulfur move from the atmosphere to soil and water systems and can cause acidification, leaching of nutrients, unnatural fertilization and eutrophication, and changes in species composition and abundance (Federal Land Managers' Air Quality Related Values Workgroup 2008).

No data has been collected at high-elevation lakes in Grand Teton National Park to measure current nitrogen and sulfur deposition rates. Therefore, a protocol was developed for this environmental impact statement by Stacy and Blett (2010, unpublished paper) to estimate current deposition values at Grand Teton National Park. This method involved:

- Interpolating wet nitrogen concentration data from the closest National Atmospheric Deposition Program monitors at Yellowstone National Park and Pinedale, Wyoming; multiplied by precipitation over elevation gradients from the U.S. Geological Survey PRISM model to estimate annual wet deposition at high-elevation sites in Grand Teton National Park; and

- Converting wet deposition to total deposition at Grand Teton National Park using the dry-to-wet deposition ratio from the co-located National Atmospheric Deposition Program and Clean Air Status Trends Network monitors in Yellowstone National Park.

Using this method, deposition rates at high-elevation lakes in Grand Teton National Park were estimated to be as follows:

- Total nitrogen deposition at high-elevation sites is about 5.8 kilograms per hectare per year.
- Total sulfur deposition in high-elevation areas is about 3.2 kilograms per hectare per year.

Deposition analysis thresholds for nitrogen and sulfur were developed jointly by the National Park Service and U.S. Fish and Wildlife Service (2002) and reaffirmed by the Federal Land Managers' Air Quality Related Values Workgroup (2010). A deposition analysis threshold is

"the additional amount of nitrogen and sulfur deposition within a Class I area, below which estimated impacts from a proposed new or modified source are considered insignificant." The thresholds include total (both wet and dry) deposition in all inorganic forms of these elements (for example, nitrogen oxides, nitric acid, ammonium ion, and ammonia forms of nitrogen).

The calculation of a deposition analysis threshold for the eastern and western United States was based on the deposition of nitrogen and sulfur that was occurring from natural sources before human activities, the year-to-year variability described at the beginning of this deposition discussion, and concerns about the cumulative effects of deposition over multiple years. The deposition analysis threshold used by National Park Service and the U.S. Fish and Wildlife Service and also used for this environmental impact statement evaluation was 0.005 kilograms per hectare per year each for nitrogen and sulfur in the western United States, including Grand Teton National Park. The threshold in eastern states is twice the western value.

The deposition analysis threshold was used to evaluate the cumulative impacts of the alternatives; however, the deposition analysis threshold did not apply for direct and indirect impacts due to the decrease in emissions related to airport operations under both alternatives when compared to existing conditions.

PROTECTION OF VISIBILITY IN CLASS I AREAS

Visibility refers to the clarity with which scenic vistas and landscape features are perceived at long distances. Vistas, including those in national parks, can be obscured by haze, most of which is caused by air pollution particles. The Clean Air Act includes multiple provisions to protect and enhance visibility in Class I areas.

To protect visibility, proposed new sources of air pollution must be modeled to determine their effects in Class I areas. As described for Prevention of Significant Deterioration, neither of the Jackson Hole Airport alternatives involves construction of new or modified emission sources, but the U.S. Environmental Protection Agency requested visibility modeling because of its unique location within a federal Class I protection area. Therefore, emissions from the Jackson Hole Airport were evaluated with the VISCREEN model as if they were a new source to determine the visibility effects of the baseline (2005) condition and those that would occur in 2015 and 2025 with the implementation of the alternatives.

Emissions from a facility have the potential to be perceptible to untrained observers under "reasonable worst case" conditions if either of two criteria in Table 4-1 is exceeded:

- The "delta E" value, which indicates the perceptibility of emissions based on color differences and brightness, is greater than 2.0; or
- The "contrast" value, which is a spectral criterion defined for a green wavelength of 0.55 microns, is greater than 0.05.

Section 5: Modeling Approach

GENERAL MODELING APPROACH

Modeling focused on assessing impacts of emissions related to the Jackson Hole Airport and associated aircraft operations. No other external emission sources inside or outside Grand Teton National Park were included in the modeling. Impacts of all other non-airport sources were assumed to be included in the background air quality levels established for the area.

The analyses employed models approved and recommended by the U.S. Environmental Protection Agency with representative meteorological data to:

- Calculate ambient concentrations of airport emissions in Class I and Class II receptor areas for comparison with applicable ambient air quality standards, increments, and significant impact levels;
- Estimate impacts on visibility-related parameters, including atmospheric color change and contrast; and
- Calculate deposition rates at receptors representing the designated sensitive lakes in the park.

The specific models used in the analysis included:

- The Federal Aviation Administration *Emissions and Dispersion Modeling System* (EDMS) model (version EDMS 5.1 – September 2008);
- The U.S. Environmental Protection Agency's AERMOD dispersion model, Version 09292; and
- The U.S. Environmental Protection Agency's VISCREEN visibility screening model.

Impacts of airport emissions were calculated for the following timeframes:

- A 2005 baseline year assumed to represent "existing conditions;" and
- Future years 2015 and 2025.

These are the years for which detailed information on current and projected future airport operating levels and aircraft types were included in Tables 7 and 27 of the draft environmental impact statement. They are the same years for which noise modeling was performed for the draft environmental impact statement.

MODEL AND MODEL OPTIONS

EDMS MODEL

The Emissions and Dispersion Modeling System (EDMS) is an emissions model for assessing air quality at civilian airports and military air bases. The model is used to produce an inventory of emissions generated by sources on and around the airport. For this analysis, the most recent version - EDMS 5.1 – was utilized to calculate emissions from aircraft, aircraft support equipment, and vehicle traffic.

EDMS incorporates a database of aircraft commonly used around the world. This database includes aircraft type, emissions of various pollutants from these aircraft engines, and emissions of ground support equipment that are typically associated with each type of aircraft. This database allows for calculation of emissions by EDMS for any given number and type of aircraft input into EDMS.

EDMS also incorporates the U.S. Environmental Protection Agency's MOBILE (v.6.2) model. Mobile allows for calculation of emissions based on the number and types of vehicles traversing a known length of roadway or area of parking.

AERMOD MODEL

The air quality impact assessment was conducted by a sequential analysis using the U.S. Environmental Protection Agency's AERMOD dispersion model. This model was recently (November 2005) approved formally by the U.S. Environmental Protection Agency and incorporated in that agency's *"Guideline on Air Quality Models"* as the replacement for the existing ISCST3 model (See *Federal Register* Vol. 70 No. 216 Wed. Nov 9, 2005 for revisions to 40 CFR Part 51 Appendix W).

AERMOD is the current state-of-the-art steady-state plume dispersion model for assessment of pollutant concentrations from a variety of sources. AERMOD is appropriate for modeling source impacts in all terrain regimes by implementing U.S. Environmental Protection Agency guidance for assessing impacts in simple, complex, and intermediate terrain.

AERMOD is a steady-state plume model, using Gaussian distributions in the vertical and horizontal for stable conditions, and in the horizontal for convective conditions. The vertical concentration distribution for convective conditions results from an assumed bi-Gaussian probability density function of the vertical velocity.

AERMOD's advantages include the ability to model impacts in simple, complex, and "intermediate" terrain. Intermediate terrain in this context refers to receptors that are above release height but below the plume height predicted by AERMOD model algorithms. AERMOD also uses an arbitrarily large number of meteorological data levels to create profiles of wind, temperature, and turbulence that can vary with height. Surface parameters such as roughness length, albedo, and Bowen Ratio, which have a large influence on atmospheric boundary layer dispersion conditions, can be selected by direction and month to provide a more accurate characterization of the modeling domain than predecessor models such as ISC3.

AERMOD provides the most representative and realistic estimates of impacts of emissions from the Jackson Hole Airport, including determining margins of compliance with ambient air quality standards, and as a planning tool when considering potential future growth in the area.

The modeling employed the most recent Windows-based Oris Software version of AERMOD (BEEST version 9.82a, U.S. Environmental Protection Agency AERMOD version 09292). This version of AERMOD also includes the most recent generation of building downwash algorithms (PRIME). "AERMOD-PRIME (Plume Rise Model Enhancement)" was used in this analysis to account for all on-site structures on or near which all airport sources are located. The dimensions of the buildings and structures input to the model to account for any potential building-induced aerodynamic wake effects on plume dispersion from the vertically discharged point sources.

Model options corresponding to the regulatory default settings within the model that were used in this analysis included:

- The parameter DFAULT in the MODELOPT record on the Control Pathway;
- Elevated terrain algorithms requiring input of terrain height data;
- Stack tip downwash (except for building downwash cases);
- Buoyancy induced dispersion;
- An iterative approach to estimate stable boundary layer plume rise;
- Rural dispersion coefficients;
- Calm hour processing routines;
- Missing-data processing routines; and
- Sequential date checking.

AERMAP

The AERMOD Terrain Preprocessor (AERMAP) is the companion program of AERMOD that is used to pre-process the receptor grid. AERMAP pre-processing routines utilize electronic digital elevation model files corresponding to 7.5-minute U.S. Geological Survey topographic map quadrangles, along with a project-specific receptor grid, to calculate the parameters required by AERMOD to handle air flow through complex terrain. The primary parameter calculated by AERMAP is the height scale (hc), or "hill height." The height scale is used to calculate the critical dividing streamline height (Hcrit) for each receptor based on the controlling terrain feature for the receptor. In addition, AERMAP optionally computes receptor elevations from the digital elevation model file data.

For this modeling analysis, AERMAP version 09040 was used to pre-process the receptor grid. This version of AERMAP contains the U.S. Geological Survey-approved NADCON 2.1 program that converts North American Datum (NAD) of 1927 to NAD of 1983.

AERMAP was run with the "TERRHGTS/EXTRACTED" keywords selected, which allows interpolation of receptor point elevations directly from the digital elevation model data.

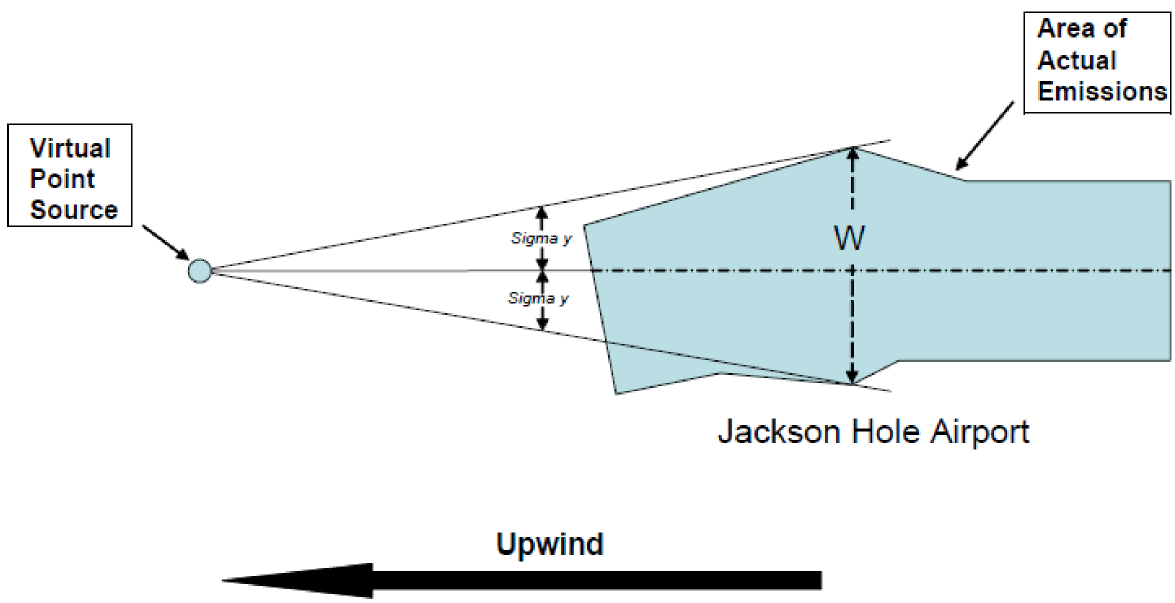
Additional details on the AERMAP pre-processing procedures used for this analysis are provided in Section 6.2 (Receptor Data).

VISCREEN

The U.S. Environmental Protection Agency's VISCREEN model was used to predict any visibility impairment that may be caused by emissions from Jackson Hole Airport. For the VISCREEN modeling, the screening approach does not allow the input of multiple sources or multiple source types. Therefore, the VISCREEN modeling employed a "virtual point source" approach to the source characterization. The sum total of all maximum hourly emission rates were modeled as coming from that single point source. The location of the virtual point source was established at an additional "upwind" distance (that is, distance upwind of the actual airport location) such that the horizontal plume width parameter (sigma Y) of this point source plume at the time it reaches the airport would cover one-half of width of the composite area encompassing the actual airport source complex.

More specifically, Figure 5-1 depicts the establishment of the virtual point source location upwind along the long axis of the Jackson Hole Airport area source complex. The target area source width was the minimum projected width (W) of the airport, which in this case was the width represented by a line nearly normal to the long axis and running through the center of the airport. A preliminary SCREEN model run was made for the case of F stability and 1 meter (3 feet) per second wind speed with downwind receptor points placed at 50-100 meter (165 – 330 feet) intervals from the source out to a total distance of several kilometers. The model output was reviewed to determine the distance at which the output Sigma Y value equals one half of the projected area source width. This distance in turn represents the distance between the area source and its corresponding virtual point source, and it was determined to be 19 kilometers (12 miles).

FIGURE 5-1: DEPICTION OF THE ESTABLISHMENT OF THE VIRTUAL POINT SOURCE FOR VISIBILITY ANALYSIS



For a Level 2 VISCREEN analysis, the same procedure was followed except that the applicable Sigma Y distances were determined from preliminary SCREEN model runs using the 1% frequency stability and wind speed conditions determined for a Level 2 analysis. In addition, the target area source width was modified to reflect the projected width of the airport for the key 45-degree viewing angle defined for the analysis.

VISCREEN required some basic study-specific inputs. For the VISCREEN analysis, the National Park Service defined a single viewing scenario to be used in the analysis with a source-observer distance of 1 kilometer (0.6 miles) (represents an observer positioned roughly on the airport property line with the Class I area). They further defined minimum and maximum Class I area distances of 1 km (0.6 miles) (approximate distance to the central emissions point on the airport from the airport fence line) and 18 kilometers (11 miles) (such as the distance to the Grand Teton Peak from U.S. Highway 26/89/191 viewing points close to the airport). The National Park Service also provided an annual average background visual range value of 248 kilometers (about 154 miles) for use in the VISCREEN analysis.

In the actual execution of the VISCREEN model, the virtual point source distance is added to the study-specific distances from the airport to the Class I area as discussed above.

IMPACT ASSESSMENT APPROACH

SOURCE CHARACTERIZATION

Area Sources

Aircraft, associated ground support, and other airport operations, including mobile source activity on airport roadways and parking areas, collectively constitute a series of area sources. These were modeled as such in the EDMS/AERMOD sequential analysis.

Emissions for aircraft, ground support operations, and other airport operations were calculated for this analysis using the EDMS model. Although EDMS calculations were included in the *2000 Air Emissions Inventory* for the park, the new calculations used the actual aircraft operations data for October 2004 through September 2005 that were presented in Table 7 of the draft environmental impact statement as the baseline condition or year. Calculations were also made for the years 2015 and 2025 for the two alternatives under consideration based on the forecast average daily operations data presented in Table 27 of the draft environmental impact statement.

While EDMS provided for calculation of aircraft- and traffic-related emission inventories and rates, the sizes and configurations of area sources were needed as key inputs to the AERMOD dispersion model. These inputs were based on data and information describing the physical layout of the facility and associated sources (for example, roadways, parking lots, runways, and taxiways), as well as on the types of sources and quantified levels of activity.

Point Sources

The boilers and generators are point sources and were modeled as such in the AERMOD sequential modeling analyses. Emission rates were derived from the "potential" pounds or tons per year emission levels provided in the *2000 Air Emissions Inventory*. Source parameters for the point sources (for example, stack diameters, flow rates, and exhaust temperatures) were requested and obtained from airport operations staff. Any source parameter data that was not readily available was estimated based on parameters for similar types and sizes of units. Two of the emergency generators have horizontal discharges and were modeled as "pseudo-point sources" with stack parameters based on U.S. Environmental Protection Agency guidance for this source type.

Lead Emissions

Lead has been absent from automobile fuel since the mid-1990s, but continues to be used as an octane booster in fuel (avgas) for piston-engine aircraft. Because a large component of Jackson Hole Airport traffic involves general aviation, and specifically piston engine aircraft, an assessment of lead emissions from use of avgas was included in the National Ambient Air Quality Standards analysis. Lead emissions were calculated indirectly by EDMS by rerunning the model for piston engine aircraft only, and then using the known amount of lead content in avgas along with the pounds of fuel burned output from EDMS to derive a lead emission rate.

COMPLIANCE ANALYSIS SOURCE GROUP

To satisfy the analysis objective of assessing the status of compliance with National Ambient Air Quality Standards and other impact criteria, all of the sources at the Jackson Hole Airport were modeled in a single source group. Compliance with short-term standards was conservatively assessed based on modeling all sources combined at their maximum allowable short-term pounds per hour emission rates for each pollutant.

Compliance with long-term standards was conservatively assessed by modeling all sources combined at their “annual average pounds per hour” emission rates derived from each source’s allowable tons per year emission levels for each pollutant.

BACKGROUND AIR QUALITY LEVELS

The final element in the assessment of compliance with ambient air quality standards was conducted by adding predicted impacts from the modeled emission sources to established background air quality concentration values and comparing the resulting total impacts to National Ambient Air Quality Standards.

Background air quality accounts for existing pollutant levels in an area that are attributable to other off-site facilities and fugitive sources that are not explicitly included in the modeling analyses. Background air quality levels are typically determined based on actual monitoring data representative of the area of concern.

The Wyoming Department of Environmental Quality provided a list of monitoring sites from which actual measured air quality concentrations could be deemed representative of prevailing air quality levels in the Jackson Hole area. Multiple monitoring sites were recommended because not all pollutants are measured at every monitoring site. In general, the monitoring sites identified for each pollutant are those closest to, or in, the Jackson area.

The Wyoming Department of Environmental Quality web site was consulted to review their annual monitoring reports and to extract measured concentrations values for the past three years (2006-2008) for each pollutant and averaging period, except for lead, which is not measured any sites in Wyoming.

Table 5-1 lists the maximum short-term (that is, maximum 1-, 3-, 8-, and 24-hour averages) and annual average concentration values measured in each of the three years for each pollutant and averaging period to be examined in the modeling analysis. The table also indicates the monitoring site location at which data values for each pollutant were measured. For this analysis, background air quality levels were conservatively assumed as the maximum concentration values measured in any of the three years for each pollutant and averaging period.

For lead, a search was made to identify representative monitoring locations in nearby states. The nearest monitoring location considered as being situated in a comparable setting and not unduly influenced by local industrial sources was the site in the town of Kellogg in Shoshone County, Idaho. Although monitoring at this site was terminated midway through 2002, the historical data record for the last three years of site operations (2000, 2001, and 2002) consistently yielded 3-month average lead concentrations in the range of 0.03 μg/m^3 to 0.04 μg/m^3. Based on this, a lead value of 0.04 μg/m^3 was specified as the 3-month average background value.

Background levels are intended to represent the impacts of other nearby and regional emission sources not explicitly included in the modeling analysis. However, because the Jackson Hole Airport was among the existing sources, the background values – especially those from the Jackson monitor - may be considered conservative in that impacts of airport emissions may already be reflected, or partly so, in the existing air quality levels.

TABLE 5-1: SUMMARY OF BACKGROUND AIR QUALITY VALUES FOR THE REGION OF GRAND TETON NATIONAL PARK, 2006 THROUGH 2008

Pollutant	Averaging Period	Monitoring Location [a/]	Maximum Measured Concentration			Concentration Selected for Background
			2006	2007	2008	
Sulfur dioxide	3-hour	South Pass	No data [b/]	14.9 μg/m^3 [c/]	**16.5 μg/m^3**	16.5 μg/m^3 [d/]
	24-hour	South Pass	No data	5.5 μg/m^3	**8.4 μg/m^3**	8.4 μg/m^3
	Annual average	South Pass	No data	**2.6 μg/m^3**	**2.6 μg/m^3**	2.6 μg/m^3
Particulate matter (10 microns or less)	24-hour	Jackson	80 μg/m^3 [c/]	35 μg/m^3	**93 μg/m^3**	93 μg/m^3
	Annual average	Jackson	**21 μg/m^3**	17 μg/m^3	19 μg/m^3	21 μg/m^3
Particulate matter (2 microns or less)	24-hour	Jackson	**23.3 μg/m^3**	17.9 μg/m^3	13.7 μg/m^3	23.3 μg/m^3
	Annual average	Jackson	**6.84 μg/m^3**	5.55 μg/m^3	5.22 μg/m^3	6.84 μg/m^3
Nitrogen dioxide	Annual average	Daniel South	**5.64 μg/m^3**	**5.64 μg/m^3**	**5.64 μg/m^3**	5.64 μg/m^3
Ozone	8-hour (4th high)	Daniel South	**0.074 ppm**	0.066 ppm	**0.074 ppm**	0.074 ppm
Carbon monoxide	1-hour	Murphy Ridge	No data	**1,832 μg/m^3**	1,031 μg/m^3	1,832 μg/m^3
	8-hour	Murphy Ridge	No data	**1,718 μg/m^3**	802 μg/m^3	1,718 μg/m^3
Lead [e/]	Quarterly average	Shoshone County, Idaho	No data	No data	No data	0.04 μg/m^3

a/ Except for lead, monitoring locations were specified by the Wyoming Department of Environmental Quality, Air Quality Division and are operated by this agency.
b/ Monitoring for this pollutant at this site did not begin until 2007.
c/ μg/m^3 = micrograms per cubic meter. ppm = parts per million.
d/ Highest values are denoted with bold and were used as the background concentration in air quality modeling.
e/ Background concentrations of lead are based on the best available data, which consist of quarterly averages from 2000 through 2002 from the Kellogg monitor in Shoshone County, Idaho.

COMPLIANCE WITH STANDARDS

The National Ambient Air Quality Standards compliance analysis results are summarized in a table listing the controlling maximum predicted Jackson Hole Airport source impacts for each pollutant and averaging period, the corresponding background concentration, and the total concentration, along with the standard to which the total impacts are compared. National Ambient Air Quality Standards compliance was assessed for the baseline year as well as the two future years (2015 and 2025) for the two alternatives.

National Ambient Air Quality Standards compliance is assessed over the entire receptor grid developed for the study area (that is, over the entire modeling domain).

ASSESSMENT OF INCREMENT

For this study, the analysis of increment was limited to assessing future impacts for the airport alternatives versus the baseline results. This was accomplished by subtracting baseline model-predicted results for a given pollutant and averaging period from the alternative future year result on a space-only (receptor by receptor) basis. The increment assessment results are summarized in a table listing the differential results for the three pollutants with increment standards (sulfur dioxide, particulate matter with diameters of 10 microns or less, and nitrogen dioxide) for the four future year cases (Alternatives 1 and 2 for 2015 and 2025) and showing whether the results are increment-consuming (positive values) or increment-expanding (negative values). Because there are different sets of increment standards for Class I and Class II areas, two sets of summary results are presented, each with the corresponding standard to which the differential impacts are compared. For the same reason, increment is assessed separately over the Class I and Class II portions of the receptor grid developed for this study.

ASSESSMENT OF AIR QUALITY RELATED VALUES

Visibility

For the visibility analysis, a Level 1 VISCREEN analysis used a presumed worst-case meteorological dispersion of “F” stability and a 1-meter per second wind speed (non-directional). If the Level 1 analysis produces results that exceed certain visibility parameter thresholds, the meteorological database can be used to provide a more realistic worst-case condition in a Level 2 analysis. The Level 2 meteorological input data include the worst-case combination of wind speed and stability category that occurs during fully 1% of all hours in the period for a key viewing path or corresponding wind direction sector. For this analysis, the Level 2 meteorological condition was based on meteorological records for the hours corresponding to airport operating hours.

Level 1 and 2 VISCREEN results are presented in tables listing the model output results along with the threshold criteria for color and contrast. Results are presented for the baseline year as well as the two future alternative years.

Total Nitrogen and Sulfur Deposition in High Elevation Sensitive Lakes

Modeled deposition levels at the sensitive lake receptors were calculated using the Level I analysis approach as described in the April 1993 Interagency Work Group on Air Quality Modeling (IWAQM) Phase I report. This approach uses the model-predicted concentrations of sulfur dioxide and nitrogen oxides to estimate total sulfur and nitrogen deposition rates based on the predicted concentration levels and a series of conversion factors and defined deposition velocities to calculate deposition rates in units of kilograms per hectare for various averaging periods.

The modeled deposition results are presented in a table that lists, for each identified lake for which a discrete receptor point was established, the total sulfur and nitrogen deposition levels determined for each year in the meteorological database.

Section 6: Model Input Data

SOURCE AND EMISSIONS DATA

Tables 6-1 through 6-3 list the source and emissions data input to the model for all of the existing Jackson Hole Airport emission sources for baseline (October 2004 through September 2005), 2015, and 2025, respectively. Information listed in Table 6-1 for each source, and presented in both English and model-input metric units where appropriate, includes:

- Emission unit ID, building location, source type/description, heat input rate, and fuel type;
- UTM coordinates of the source location;
- Physical stack parameters including stack height and diameter;
- Stack exhaust parameters including volumetric flow rate, stack gas exit velocity, and exhaust temperature;
- Maximum short-term emission rates for sulfur dioxide, particulate matter with diameters of 10 microns or less, and carbon monoxide; and
- Annual average emission rates for sulfur dioxide, particulate matter with diameters of 10 microns or less, and nitrogen dioxide.

Source and emissions data for stationary sources (that is, boilers and generators) were derived from information provided by airport personnel. An adjustment was made to the existing Generators 3 and 4 stacks' actual source configuration data to provide appropriate information for model input. These two generators exhaust through a horizontal vent. Consistent with U.S. Environmental Protection Agency guidance for modeling "pseudo-point sources," the exit velocity was for this source set to 0.001 meters per second and a corresponding equivalent diameter calculated to preserve the associated volume flow rate.

Emissions for aircraft, ground support operations, and other airport operations were calculated for this analysis using the EDMS model. Calculations were based on the actual aircraft operations data for October 2004 through September 2005 that were presented in Table 7 of the March 2009 draft environmental impact statement. Calculations were also made for the years 2015 and 2025 based on the forecast average daily operations data presented in Table 27 of the draft environmental impact statement.

Emissions for the visibility analysis were derived by adding and totaling all short-term emissions for nitrogen oxides and particulate matter with diameters of 10 microns or less from all modeled sources.

TABLE 6-1: SOURCE AND EMISSIONS DATA INPUT TO THE MODEL FOR BASELINE CONDITIONS (OCTOBER 2004 THROUGH SEPTEMBER 2005)

Baseline (2005)

JACKSON HOLE AIRPORT - Jackson Hole, WY - Stationary Combustion Emission Sources, Stack Parameters, and Emission Rates

POINT SOURCES

Emission Unit	Bldg.	Source Description	Fuel	UTM Coordinates (m) Easting	UTM Coordinates (m) Northing	Heat Input (Btu/hr)	Stack Parameters Height	Stack Parameters Diameter	Exhaust Parameters Flow Rate	Exhaust Parameters Velocity	Exhaust Parameters Temp	Emission Rates SO_2 Short-Term	PM Short-Term	CO Short-Term	Pb Short-Term	SO_2 Long-Term	PM Long-Term	NO_x Long-Term	
BOILERS:																			
B-01	Tower Garage	Buderus G305/8	No 2 Oil	520865	4828145	800000	12 ft	0.67 ft	347 acfm	16.40 ft/s	375 °F	0.4057	0.0115	0.0286	7.2000E-06	0.4057	0.0115	0.1143	lb/hr
							3.66 m	0.20 m	10 m^3/min	5.00 m/s	464 K	0.0511	0.0014	0.0036	9.0720E-07	0.0511	0.0014	0.0144	g/s
B-02	Tower Garage	Buderus G305/8	No. 2 Oil	520865	4828145	800000	12 ft	0.67 ft	347 acfm	16.40 ft/s	375 °F	0.4057	0.0115	0.0286	7.2000E-06	0.4057	0.0115	0.1143	lb/hr
							3.66 m	0.20 m	10 m^3/min	5.00 m/s	464 K	0.0511	0.0014	0.0036	9.0720E-07	0.0511	0.0014	0.0144	g/s
B-03	FB02	Buderus G215	No 2 Oil	521205	4827187	96000	28 ft	0.50 ft	255 acfm	21.65 ft/s	350 °F	0.0781	0.0004	0.0055	8.6400E-07	0.0781	0.0004	0.0198	lb/hr
							8.53 m	0.15 m	7 m^3/min	6.60 m/s	450 K	0.0098	0.0001	0.0007	1.0886E-07	0.0098	0.0001	0.0025	g/s
B-04	FB02	Buderus G215	No 2 Oil	521205	4827187	96000	28 ft	0.50 ft	255 acfm	21.65 ft/s	350 °F	0.0781	0.0004	0.0055	8.6400E-07	0.0781	0.0004	0.0198	lb/hr
							8.53 m	0.15 m	7 m^3/min	6.60 m/s	450 K	0.0098	0.0001	0.0007	1.0886E-07	0.0098	0.0001	0.0025	g/s
B-05	Car Rental 1	Buderus G215	No 2 Oil	521352	4827349	96000	26 ft	0.67 ft	479 acfm	22.65 ft/s	350 °F	0.0781	0.0004	0.0055	8.6400E-07	0.0781	0.0004	0.0198	lb/hr
							7.92 m	0.20 m	14 m^3/min	6.90 m/s	450 K	0.0098	0.0001	0.0007	1.0886E-07	0.0098	0.0001	0.0025	g/s
B-06	Car Rental 1	Buderus G215	No 2 Oil	521338	4827354	96000	26 ft	0.67 ft	479 acfm	22.65 ft/s	350 °F	0.0781	0.0004	0.0055	8.6400E-07	0.0781	0.0004	0.0198	lb/hr
							7.92 m	0.20 m	14 m^3/min	6.90 m/s	450 K	0.0098	0.0001	0.0007	1.0886E-07	0.0098	0.0001	0.0025	g/s
B-07	Car Rental 2	Buderus G215	No 2 Oil	521363	4827376	96000	26 ft	0.67 ft	479 acfm	22.65 ft/s	350 °F	0.0781	0.0004	0.0055	8.6400E-07	0.0781	0.0004	0.0198	lb/hr
							7.92 m	0.20 m	14 m^3/min	6.90 m/s	450 K	0.0098	0.0001	0.0007	1.0886E-07	0.0098	0.0001	0.0025	g/s
B-08	Car Rental 2	Buderus G215	No 2 Oil	521352	4827383	96000	26 ft	0.67 ft	479 acfm	22.65 ft/s	350 °F	0.0781	0.0004	0.0055	8.6400E-07	0.0781	0.0004	0.0198	lb/hr
							7.92 m	0.20 m	14 m^3/min	6.90 m/s	450 K	0.0098	0.0001	0.0007	1.0886E-07	0.0098	0.0001	0.0025	g/s
GENERATORS:						kW													
Gen-1	Terminal North	Cummins QSK60-G6 (500 hrs/yr - Standby Unit)	Diesel	521394	4827740	1500	18 ft	0.80 ft	5,459 acfm	181.00 ft/s	950 °F	8.1305	1.4070	11.0550	NA	0.7425	0.1285	4.4055	lb/hr
							5.49 m	0.24 m	155 m^3/min	55.17 m/s	783 K	1.0244	0.1773	1.3929	NA	0.0936	0.0162	0.5551	g/s
Gen-2	Terminal South	Cummins QST30-G5-NR1 (500 hrs/yr - Standby Unit)	Diesel	521327	4827575	1000	18 ft	0.80 ft	5,459 acfm	181.00 ft/s	950 °F	5.4203	0.9380	7.3700	NA	0.4950	0.0857	2.9370	lb/hr
							5.49 m	0.24 m	155 m^3/min	55.17 m/s	783 K	0.6830	0.1182	0.9286	NA	0.0624	0.0108	0.3701	g/s
Gen-3	Tower	Perkins 1757/1500 (500 hrs/yr - Standby Unit)	Diesel	520866	4828154	60	10 ft	0.002 ft	986 acfm	0.002 ft/s	-460 °F	0.0824	0.1769	0.5371	NA	0.0075	0.0162	0.2276	lb/hr
							3.05 m	0.001 m	28 m^3/min	0.001 m/s	0 K	0.0104	0.0223	0.0677	NA	0.0009	0.0020	0.0287	g/s
Gen-4	BI-6	John Deere 4045TF270E (500 hrs/yr - Standby Unit)	Diesel	520715	4828010	50	8 ft	0.002 ft	986 acfm	0.002 ft/s	-460 °F	0.0687	0.1474	0.4476	NA	0.0063	0.0135	0.1897	lb/hr
							2.44 m	0.001 m	28 m^3/min	0.001 m/s	0 K	0.0087	0.0186	0.0564	NA	0.0008	0.0017	0.0239	g/s
Gen-5	MALS01	Kohler/John (500 hrs/yr - Standby Unit)	Diesel	520912	4826900	25	9 ft	0.34 ft	986 acfm	181.00 ft/s	950 °F	0.0343	0.0737	0.2238	NA	0.0031	0.0067	0.0948	lb/hr
							2.74 m	0.10 m	28 m^3/min	55.17 m/s	783 K	0.0043	0.0093	0.0282	NA	0.0004	0.0008	0.0119	g/s

Notes:
1. All combustion sources identified and capacities provided by Jackson Hole Airport (JHA) staff
2. Stack parameters provided by JHA as available, otherwise, these were estimated based on similar types and sizes of units as per the protocol.
3. Stack Heights listed are heights Above Ground Level (AGL)
4. JHA base elevation is 6451 feet (1966 meters) Above Mean Sea Level (MSL)
5. Sources Gen-3 & Gen-4 discharge horizontally. Stack Exit Velocity and Diameter are entered per USEPA guidelines for pseudo-point sources
6. Short-Term emission rates for each source/pollutant listed are maximum lb/hr emission rates at each source's full fuel-burning capacity and potential to emit.
7. Long-Term emission rates for the boilers are "annual average lb/hr" emission rates based on potential to emit for all hours of the year (lb/yr levels divided by 8,760 hours per year)
8. Long-Term emission rates for the stand-by generators are "annual average lb/hr" emission rates based on potential to emit for 500 hours of the year spread evenly over total airport operational hours (lb/yr levels divided by 5,475 hours per year)
9. Sulfur in fuel content of 0.05% used for SO2 emission rates for out Years 2015 and 2025.
10. All emissions of PM10 are conservatively assumed to be PM2.5, such that emissions and model results for the two are equal

JACKSON HOLE AIRPORT - Jackson Hole, WY - Aircraft and Vehicular (Roadway and Parking) Emission Rates

2005 BASELINE	Emission Source	Source Description		Base Elevation	Release Height	Vertical Dimension		SO_2 $g/s\text{-}m^2$	PM $g/s\text{-}m^2$	CO $g/s\text{-}m^2$	NO_x $g/s\text{-}m^2$	Pb $g/s\text{-}m^2$
	AIRCRAFT	Aircraft Operations		6382 ft / 1945 m	39.37 ft / 12.00 m	13.45 ft / 4.10 m		1.4154E-06	2.8882E-07	5.3298E-05	1.1281E-05	-
	PARKING	Vehicular Parking Lot		6393 ft / 1949 m	3.28 ft / 1.00 m	9.84 ft / 3.00 m		1.0434E-08	1.0068E-08	5.368E-06	4.8197E-07	-
	ROADWAY	Airport Access Road		6392 ft / 1948 m	3.28 ft / 1.00 m	9.84 ft / 3.00 m		5.209E-08	4.973E-08	1.5205E-05	1.6242E-06	-
	PISTON ENGINE AIRCRAFT							-	-	-	-	5.1702E-09

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TABLE 6-2: SOURCE AND EMISSIONS DATA INPUT TO THE MODEL FOR YEAR 2015 CONDITIONS

Year: 2015

JACKSON HOLE AIRPORT - Jackson Hole, WY - Stationary Combustion Emission Sources, Stack Parameters, and Emission Rates

POINT SOURCES

Emission Unit	Bldg.	Source Description	Fuel/ APC	UTM Coordinates (m) Easting	UTM Coordinates (m) Northing	Heat Input (Btu/hr)	Stack Parameters Height	Stack Parameters Diameter	Exhaust Parameters Flow Rate	Exhaust Parameters Velocity	Exhaust Parameters Temp	Emission Rates SO2 Short-Term	PM Short-Term	CO Short-Term	Pb Short-Term	SO2 Long-Term	PM Long-Term	NOx Long-Term	
BOILERS:																			
B-01	Tower Garage	Buderus G305/8	No 2 Oil	520865	4828145	800000	12 ft	0.67 ft	347 acfm	16.40 ft/s	375 °F	0.0406	0.0115	0.0286	7.2000E-06	0.0406	0.0115	0.1143	lb/hr
							3.66 m	0.20 m	10 m³/min	5.00 m/s	464 K	0.0051	0.0014	0.0036	9.0720E-07	0.0051	0.0014	0.0144	g/s
B-02	Tower Garage	Buderus G305/8	No 2 Oil	520865	4828145	800000	12 ft	0.67 ft	347 acfm	16.40 ft/s	375 °F	0.0406	0.0115	0.0286	7.2000E-06	0.0406	0.0115	0.1143	lb/hr
							3.66 m	0.20 m	10 m³/min	5.00 m/s	464 K	0.0051	0.0014	0.0036	9.0720E-07	0.0051	0.0014	0.0144	g/s
B-03	FB02	Buderus G215	No. 2 Oil	521205	4827187	96000	28 ft	0.50 ft	255 acfm	21.65 ft/s	350 °F	0.0078	0.0004	0.0055	8.6400E-07	0.0078	0.0004	0.0198	lb/hr
							8.53 m	0.15 m	7 m³/min	6.60 m/s	450 K	0.0010	0.0001	0.0007	1.0886E-07	0.0010	0.0001	0.0025	g/s
B-04	FB02	Buderus G215	No 2 Oil	521205	4827187	96000	28 ft	0.50 ft	255 acfm	21.65 ft/s	350 °F	0.0078	0.0004	0.0055	8.6400E-07	0.0078	0.0004	0.0198	lb/hr
							8.53 m	0.15 m	7 m³/min	6.60 m/s	450 K	0.0010	0.0001	0.0007	1.0886E-07	0.0010	0.0001	0.0025	g/s
B-05	Car Rental 1	Buderus G215	No 2 Oil	521352	4827349	96000	26 ft	0.67 ft	479 acfm	22.65 ft/s	350 °F	0.0078	0.0004	0.0055	8.6400E-07	0.0078	0.0004	0.0198	lb/hr
							7.92 m	0.20 m	14 m³/min	6.90 m/s	450 K	0.0010	0.0001	0.0007	1.0886E-07	0.0010	0.0001	0.0025	g/s
B-06	Car Rental 1	Buderus G215	No 2 Oil	521338	4827354	96000	26 ft	0.67 ft	479 acfm	22.65 ft/s	350 °F	0.0078	0.0004	0.0055	8.6400E-07	0.0078	0.0004	0.0198	lb/hr
							7.92 m	0.20 m	14 m³/min	6.90 m/s	450 K	0.0010	0.0001	0.0007	1.0886E-07	0.0010	0.0001	0.0025	g/s
B-07	Car Rental 2	Buderus G215	No 2 Oil	521363	4827376	96000	26 ft	0.67 ft	479 acfm	22.65 ft/s	350 °F	0.0078	0.0004	0.0055	8.6400E-07	0.0078	0.0004	0.0198	lb/hr
							7.92 m	0.20 m	14 m³/min	6.90 m/s	450 K	0.0010	0.0001	0.0007	1.0886E-07	0.0010	0.0001	0.0025	g/s
B-08	Car Rental 2	Buderus G215	No 2 Oil	521352	4827383	96000	26 ft	0.67 ft	479 acfm	22.65 ft/s	350 °F	0.0078	0.0004	0.0055	8.6400E-07	0.0078	0.0004	0.0198	lb/hr
							7.92 m	0.20 m	14 m³/min	6.90 m/s	450 K	0.0010	0.0001	0.0007	1.0886E-07	0.0010	0.0001	0.0025	g/s
GENERATORS:						Kw													
Gen-1	Terminal North	Cummins QSK60-G6 (500 hrs/yr - Standby Unit)	Diesel	521394	4827740	1500	18 ft	0.80 ft	5,459 acfm	181.00 ft/s	950 °F	0.8130	1.4070	11.0550	NA	0.0743	0.1285	4.4055	lb/hr
							5.49 m	0.24 m	155 m³/min	55.17 m/s	783 K	0.1024	0.1773	1.3929	NA	0.0094	0.0162	0.5551	g/s
Gen-2	Terminal South	Cummins QST30-G5-NR1 (500 hrs/yr - Standby Unit)	Diesel	521327	4827575	1000	18 ft	0.80 ft	5,459 acfm	181.00 ft/s	950 °F	0.5420	0.9380	7.3700	NA	0.0495	0.0857	2.9370	lb/hr
							5.49 m	0.24 m	155 m³/min	55.17 m/s	783 K	0.0683	0.1182	0.9286	NA	0.0062	0.0108	0.3701	g/s
Gen-3	Tower	Perkins 1757/1500 (500 hrs/yr - Standby Unit)	Diesel	520866	4828154	60	10 ft	0.002 ft	986 acfm	0.002 ft/s	-460 °F	0.0082	0.1769	0.5371	NA	0.0008	0.0162	0.2276	lb/hr
							3.05 m	0.001 m	28 m³/min	0.001 m/s	0 K	0.0010	0.0223	0.0677	NA	0.0001	0.0020	0.0287	g/s
Gen-4	BI-6	John Deere 4045TF270E (500 hrs/yr - Standby Unit)	Diesel	520715	4828010	50	8 ft	0.002 ft	986 acfm	0.002 ft/s	-460 °F	0.0069	0.1474	0.4476	NA	0.0006	0.0135	0.1897	lb/hr
							2.44 m	0.001 m	28 m³/min	0.001 m/s	0 K	0.0009	0.0186	0.0564	NA	0.0001	0.0017	0.0239	g/s
Gen-5	MALS01	Kohler/John (500 hrs/yr - Standby Unit)	Diesel	520912	4826900	25	9 ft	0.34 ft	986 acfm	181.00 ft/s	950 °F	0.0034	0.0737	0.2238	NA	0.0003	0.0067	0.0948	lb/hr
							2.74 m	0.10 m	28 m³/min	55.17 m/s	783 K	0.0004	0.0093	0.0282	NA	0.0000	0.0008	0.0119	g/s

Notes

1 All combustion sources identified and capacities provided by Jackson Hole Airport (JHA) staff
2 Stack parameters provided by JHA as available; otherwise, these were estimated based on similar types and sizes of units as per the protocol
3 Stack Heights listed are heights Above Ground Level (AGL)
4 JHA base elevation is 6451 feet (1966 meters) Above Mean Sea Level (MSL)
5 Sources Gen-3 & Gen-4 discharge horizontally. Stack Exit Velocity and Diameter are entered per USEPA guidelines for pseudo-point sources.
6 Short-Term emission rates for each source/pollutant listed are maximum lb/hr emission rates at each source's full fuel-burning capacity and potential to emit
7 Long-Term emission rates for the boilers are "annual average lb/hr" emission rates based on potential to emit for all hours of the year (lb/yr levels divided by 8,760 hours per year)
8 Long-Term emission rates for the stand-by generators are "annual average lb/hr" emission rates based on potential to emit for 500 hours of the year spread evenly over total airport operational hours (lb/yr levels divided by 5,475 hours per year)
9 Sulfur in fuel content of 0.05% used for SO2 emission rates for out Years 2015 and 2025
10 All emissions of PM10 are conservatively assumed to be PM2.5, such that emissions and model results for the two are equal

TABLE 6-2: SOURCE AND EMISSIONS DATA INPUT TO THE MODEL FOR YEAR 2015 CONDITIONS (CONTINUED)

JACKSON HOLE AIRPORT - Jackson Hole, WY - Aircraft and Vehicular (Roadway and Parking) Emission Rates

2015 ALT-2	Emission Source	Source Description	Base Elevation	Release Height	Vertical Dimension	SO_2 g/s-m²	PM g/s-m²	CO g/s-m²	NO_x g/s-m²	Pb g/s-m²
	AIRCRAFT	Aircraft Operations	6382 ft 1945 m	39 37 ft 12 00 m	13 45 ft 4 10 m	1 2614E-06	3.1482E-07	4 7072E-05	9 3558E-06	-
	PARKING	Vehicular Parking Lot	6393 ft 1949 m	3 28 ft 1 00 m	9 84 ft 3 00 m	1 5229E-09	5 711E-09	3 2924E-06	1 8741E-07	-
	ROADWAY	Airport Access Road	6392 ft 1948 m	3 28 ft 1.00 m	9 84 ft 3.00 m	7 8014E-09	2.8313E-08	9 7535E-06	6 3726E-07	-
	PISTON ENGINE AIRCRAFT					-	-	-	-	3 6463E-09

2015 ALT-1	Emission Source	Source Description	Base Elevation	Release Height	Vertical Dimension	SO_2 g/s-m²	PM g/s-m²	CO g/s-m²	NO_x g/s-m²	Pb g/s-m²
	AIRCRAFT	Aircraft Operations	6382 ft 1945 m	39 37 ft 12 00 m	13 45 ft 4 10 m	5.5168E-07	1.9902E-07	3 7426E-05	2 677E-06	-
	PARKING	Vehicular Parking Lot	6393 ft 1949 m	3 28 ft 1 00 m	9 84 ft 3.00 m	8 87E-10	3 3263E-09	1 9176E-06	1 0916E-07	-
	ROADWAY	Airport Access Road	6392 ft 1948 m	3 28 ft 1.00 m	9.84 ft 3.00 m	4 5438E-09	1 649E-08	5 6808E-06	3 7116E-07	-
	PISTON ENGINE AIRCRAFT					-	-	-	-	3 6463E-09

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TABLE 6-3: SOURCE AND EMISSIONS DATA INPUT TO THE MODEL FOR YEAR 2025 CONDITIONS

Year: 2025

JACKSON HOLE AIRPORT - Jackson Hole, WY - Stationary Combustion Emission Sources, Stack Parameters, and Emission Rates

POINT SOURCES

Emission Unit	Bldg.	Source Description	Fuel/ APC	UTM Coordinates (m) Easting	UTM Coordinates (m) Northing	Heat Input (Btu/hr)	Stack Parameters Height	Stack Parameters Diameter	Exhaust Parameters Flow Rate	Exhaust Parameters Velocity	Exhaust Parameters Temp	Emission Rates SO2 Short-Term	PM Short-Term	CO Short-Term	Pb Short-Term	SO2 Long-Term	PM Long-Term	NOx Long-Term	
BOILERS:																			
B-01	Tower	Buderus G305/8	No 2	520865	4828145	800000	12 ft	0.67 ft	347 acfm	16.40 ft/s	375 °F	0.0406	0.0115	0.0286	7.2000E-06	0.0406	0.0115	0.1143	lb/hr
	Garage		Oil				3.66 m	0.20 m	10 m³/min	5.00 m/s	464 K	0.0051	0.0014	0.0036	9.0720E-07	0.0051	0.0014	0.0144	g/s
B-02	Tower	Buderus G305/8	No 2	520865	4828145	800000	12 ft	0.67 ft	347 acfm	16.40 ft/s	375 °F	0.0406	0.0115	0.0286	7.2000E-06	0.0406	0.0115	0.1143	lb/hr
	Garage		Oil				3.66 m	0.20 m	10 m³/min	5.00 m/s	464 K	0.0051	0.0014	0.0036	9.0720E-07	0.0051	0.0014	0.0144	g/s
B-03	FB02	Buderus G215	No 2	521205	4827187	96000	28 ft	0.50 ft	255 acfm	21.65 ft/s	350 °F	0.0078	0.0004	0.0055	8.6400E-07	0.0078	0.0004	0.0198	lb/hr
			Oil				8.53 m	0.15 m	7 m³/min	6.60 m/s	450 K	0.0010	0.0001	0.0007	1.0886E-07	0.0010	0.0001	0.0025	g/s
B-04	FB02	Buderus G215	No. 2	521205	4827187	96000	28 ft	0.50 ft	255 acfm	21.65 ft/s	350 °F	0.0078	0.0004	0.0055	8.6400E-07	0.0078	0.0004	0.0198	lb/hr
			Oil				8.53 m	0.15 m	7 m³/min	6.60 m/s	450 K	0.0010	0.0001	0.0007	1.0886E-07	0.0010	0.0001	0.0025	g/s
B-05	Car	Buderus G215	No 2	521352	4827349	96000	26 ft	0.67 ft	479 acfm	22.65 ft/s	350 °F	0.0078	0.0004	0.0055	8.6400E-07	0.0078	0.0004	0.0198	lb/hr
	Rental 1		Oil				7.92 m	0.20 m	14 m³/min	6.90 m/s	450 K	0.0010	0.0001	0.0007	1.0886E-07	0.0010	0.0001	0.0025	g/s
B-06	Car	Buderus G215	No 2	521338	4827354	96000	26 ft	0.67 ft	479 acfm	22.65 ft/s	350 °F	0.0078	0.0004	0.0055	8.6400E-07	0.0078	0.0004	0.0198	lb/hr
	Rental 1		Oil				7.92 m	0.20 m	14 m³/min	6.90 m/s	450 K	0.0010	0.0001	0.0007	1.0886E-07	0.0010	0.0001	0.0025	g/s
B-07	Car	Buderus G215	No 2	521363	4827376	96000	26 ft	0.67 ft	479 acfm	22.65 ft/s	350 °F	0.0078	0.0004	0.0055	8.6400E-07	0.0078	0.0004	0.0198	lb/hr
	Rental 2		Oil				7.92 m	0.20 m	14 m³/min	6.90 m/s	450 K	0.0010	0.0001	0.0007	1.0886E-07	0.0010	0.0001	0.0025	g/s
B-08	Car	Buderus G215	No. 2	521352	4827383	96000	26 ft	0.67 ft	479 acfm	22.65 ft/s	350 °F	0.0078	0.0004	0.0055	8.6400E-07	0.0078	0.0004	0.0198	lb/hr
	Rental 2		Oil				7.92 m	0.20 m	14 m³/min	6.90 m/s	450 K	0.0010	0.0001	0.0007	1.0886E-07	0.0010	0.0001	0.0025	g/s
GENERATORS:						Kw													
Gen-1	Terminal	Cummins QSK60-G6	Diesel	521394	4827740	1500	18 ft	0.80 ft	5,459 acfm	181.00 ft/s	950 °F	0.8130	1.4070	11.0550	NA	0.0743	0.1285	4.4055	lb/hr
	North	(500 hrs/yr - Standby Unit)					5.49 m	0.24 m	155 m³/min	55.17 m/s	783 K	0.1024	0.1773	1.3929	NA	0.0094	0.0162	0.5551	g/s
Gen-2	Terminal	Cummins QST30-G5-NR1	Diesel	521327	4827575	1000	18 ft	0.80 ft	5,459 acfm	181.00 ft/s	950 °F	0.5420	0.9380	7.3700	NA	0.0495	0.0857	2.9370	lb/hr
	South	(500 hrs/yr - Standby Unit)					5.49 m	0.24 m	155 m³/min	55.17 m/s	783 K	0.0683	0.1182	0.9286	NA	0.0062	0.0108	0.3701	g/s
Gen-3	Tower	Perkins 1757/1500	Diesel	520866	4828154	60	10 ft	0.002 ft	986 acfm	0.002 ft/s	-460 °F	0.0082	0.1769	0.5371	NA	0.0008	0.0162	0.2276	lb/hr
		(500 hrs/yr - Standby Unit)					3.05 m	0.001 m	28 m³/min	0.001 m/s	0 K	0.0010	0.0223	0.0677	NA	0.0001	0.0020	0.0287	g/s
Gen-4	BI-6	John Deere 4045TF270E	Diesel	520715	4828010	50	8 ft	0.002 ft	986 acfm	0.002 ft/s	-460 °F	0.0069	0.1474	0.4476	NA	0.0006	0.0135	0.1897	lb/hr
		(500 hrs/yr - Standby Unit)					2.44 m	0.001 m	28 m³/min	0.001 m/s	0 K	0.0009	0.0186	0.0564	NA	0.0001	0.0017	0.0239	g/s
Gen-5	MALS01	Kohler/John	Diesel	520912	4826900	25	9 ft	0.34 ft	986 acfm	181.00 ft/s	950 °F	0.0034	0.0737	0.2238	NA	0.0003	0.0067	0.0948	lb/hr
		(500 hrs/yr - Standby Unit)					2.74 m	0.10 m	28 m³/min	55.17 m/s	783 K	0.0004	0.0093	0.0282	NA	0.0000	0.0008	0.0119	g/s

Notes
1 All combustion sources identified and capacities provided by Jackson Hole Airport (JHA) staff
2 Stack parameters provided by JHA as available, otherwise, these were estimated based on similar types and sizes of units as per the protocol
3 Stack Heights listed are heights Above Ground Level (AGL)
4 JHA base elevation is 6451 feet (1966 meters) Above Mean Sea Level (MSL)
5 Sources Gen-3 & Gen-4 discharge horizontally. Stack Exit Velocity and Diameter are entered per USEPA guidelines for pseudo-point sources
6 Short-Term emission rates for each source/pollutant listed are maximum lb/hr emission rates at each source's full fuel-burning capacity and potential to emit
7 Long-Term emission rates for the boilers are "annual average lb/hr" emission rates based on potential to emit for all hours of the year (lb/yr levels divided by 8,760 hours per year)
8 Long-Term emission rates for the stand-by generators are "annual average lb/hr" emission rates based on potential to emit for 500 hours of the year spread evenly over total airport operational hours (lb/yr levels divided by 5,475 hours per year)
9 Sulfur in fuel content of 0.5% used for SO2 emission rates for out Years 2015 and 2025
10 All emissions of PM10 are conservatively assumed to be PM2.5, such that emissions and model results for the two are equal

TABLE 6-3: SOURCE AND EMISSIONS DATA INPUT TO THE MODEL FOR YEAR 2025 CONDITIONS (CONTINUED)

JACKSON HOLE AIRPORT - Jackson Hole, WY - Aircraft and Vehicular (Roadway and Parking) Emission Rates

2025 ALT-2	Emission Source	Source Description		Base Elevation	Release Height	Vertical Dimension		SO_2 g/s-m²	PM g/s-m²	CO g/s-m²	NO_x g/s-m²	Pb g/s-m²
	AIRCRAFT	Aircraft Operations		6382 ft 1945 m	39 37 ft 12 00 m	13.45 ft 4 10 m		1 2943E-06	3 1164E-07	4.3964E-05	9.1713E-06	-
	PARKING	Vehicular Parking Lot		6393 ft 1949 m	3.28 ft 1 00 m	9 84 ft 3.00 m		1 5344E-09	4 9868E-09	2 9056E-06	1 0252E-07	-
	ROADWAY	Airport Access Road		6392 ft 1948 m	3 28 ft 1.00 m	9.84 ft 3.00 m		7.9486E-09	2 4817E-08	8 5677E-06	3 4532E-07	-
	PISTON ENGINE AIRCRAFT							-	-	-	-	3 7280E-09

2025 ALT-1	Emission Source	Source Description		Base Elevation	Release Height	Vertical Dimension		SO_2 g/s-m²	PM g/s-m²	CO g/s-m²	NO_x g/s-m²	Pb g/s-m²
	AIRCRAFT	Aircraft Operations		6382 ft 1945 m	39 37 ft 12 00 m	13 45 ft 4 10 m		5 7931E-07	2.0233E-07	3.6738E-05	2.5403E-06	-
	PARKING	Vehicular Parking Lot		6393 ft 1949 m	3.28 ft 1 00 m	9 84 ft 3.00 m		8 87E-10	2 8828E-09	1 6796E-06	5 9263E-08	-
	ROADWAY	Airport Access Road		6392 ft 1948 m	3 28 ft 1 00 m	9.84 ft 3 00 m		4 5949E-09	1 4346E-08	4 9528E-06	1 9962E-07	-
	PISTON ENGINE AIRCRAFT							-	-	-	-	3 7280E-09

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BUILDING DIMENSION DATA

The AERMOD model includes the PRIME (Plume Rise Model Enhancement) algorithms to account for the influence of buildings and structures on plume dispersion and plume rise. AERMOD requires the specification of various building parameters and dimensions to account for building wake effects.

Given the proximity of modeled sources to adjacent or nearby buildings, building dimension data was input to the model for all of the major structures at the airport. Building information provided by airport staff were used as input to the U.S. Environmental Protection Agency's BPIP-PRIME program to develop the appropriate model input files of building dimension data for calculating building wake and cavity effects.

A list of the BPIP files developed for the airport, along with a BPIP output file showing the facility layout were developed.

RECEPTOR DATA

The modeling analysis employed an overall receptor grid consisting of a total of 4,338 receptor points covering an approximate 19 by 23-kilometer square area centered on the airport facility. This grid included both the Class I and Class II areas. For additional analyses that included only the Class I or Class II areas, the overall receptor grid was reduced to cover only those areas.

The grids include a series of (1) discrete Cartesian grid coordinate points, and (2) a series of airport property line receptors as shown in Figure 6-1 – Close-Up of Receptor Grid. Actual ground level terrain elevations were assigned to all receptors based on the values determined in the AERMAP processing step described later.

DISCRETE CARTESIAN GRID RECEPTORS

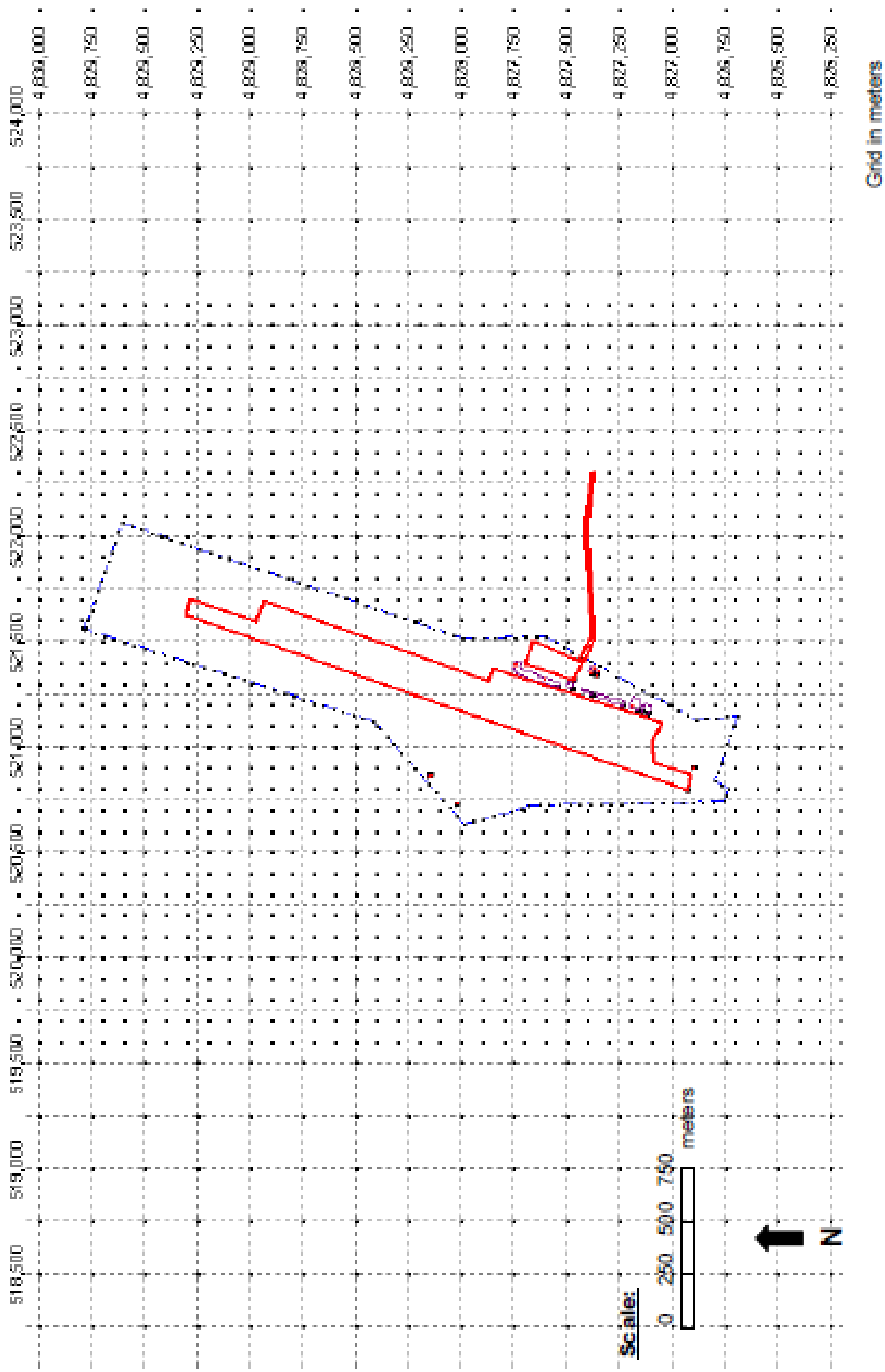
The discrete Cartesian grid receptors input to the modeling analysis are defined by a series of nested grids. The inner grid consists of receptors spaced at 100-meter intervals covering an area extending out to distances of approximately 1.0 kilometer in each cardinal direction (N-E-S-W) from a center point on the airport property. Any receptors that fell within the airport property boundary were eliminated.

Additional receptors were spaced at intervals of 250 meters from distances of 1.0 to 3 kilometers from the grid center point in each cardinal direction, at 500-meter intervals from 3.0 to 10 kilometers from the center point, and at 1000-meter intervals from 10 kilometers to the edges of the grid in each direction.

PROPERTY LINE RECEPTORS

In order to compensate for a reduction in the density of the near-field grid when on-site receptors were eliminated, several additional receptors were selected along the airport property lines. The property line receptors were placed at 50-meter intervals around the entire property boundary.

FIGURE 6-1: CLOSE-UP RECEPTOR GRID USED FOR DETERMINING AIR QUALITY IMPACTS



Figures 6-2 through 6-4 are graphical plots depicting the relative areal extent and spatial density of the overall, Class I, and Class II receptor grids, respectively, overlaid on a topographic map section of the airport environs that shows the relative densities of the grid in the areas surrounding the airport.

SENSITIVE LAKE RECEPTORS

For the total nitrogen and sulfur deposition analysis, the discrete receptors were similarly defined by the UTM coordinates with one receptor point designated for each lake for which deposition rates were calculated. There are 37 lakes of concern, and they range in distance (approximate) from 10 to 52 kilometers (6 to 32 miles) from the airport.

AERMAP RECEPTOR ELEVATIONS AND MODEL INPUT FILE

The AERMOD Terrain Preprocessor AERMAP was used to pre-process the receptor grid the receptor grid for model input. AERMAP utilizes digital elevation model files of 7.5-minute U.S. Geological Survey topographic map quadrangles, along with the project-specific receptor grid as defined above, to calculate the height scale (hc), or “hill height” values used to define the critical dividing streamline height (Hcrit) for each receptor, and to compute receptor elevations from the digital elevation model file data.

For this modeling analysis, AERMAP version 09040 was used to pre-process the receptor grid. This version of AERMAP contains the U.S. Geological Survey-approved NADCON 2.1 program that converts North American Datum (NAD) of 1927 to NAD of 1983.

The airport is in the northwest corner of the U.S. Geological Survey’s Gros Ventre Junction, Wyoming quadrangle. Using this quadrangle as the starting point an additional 23 digital elevation model data files were obtained. These are the 7.5-minute series [30-meter data] digital elevation model files.

The total extent of these 24 quadrangles contains the full modeling domain plus an extended buffer area to ensure that any significant terrain features just beyond the outermost lines of receptors were included in the analysis.

The Cartesian coordinate receptor grid systems with spacing as previously defined was created (x, y coordinates only), for input into AERMAP. An “anchor point” was defined as roughly the center of the airport facility.

AERMAP was then executed with these inputs, and was run with the option to extract both receptor elevations and "hill heights" for each receptor. The processed file was then input to AERMOD.

FIGURE 6-2: FULL RECEPTOR GRID USED FOR DETERMINING AIR QUALITY IMPACTS

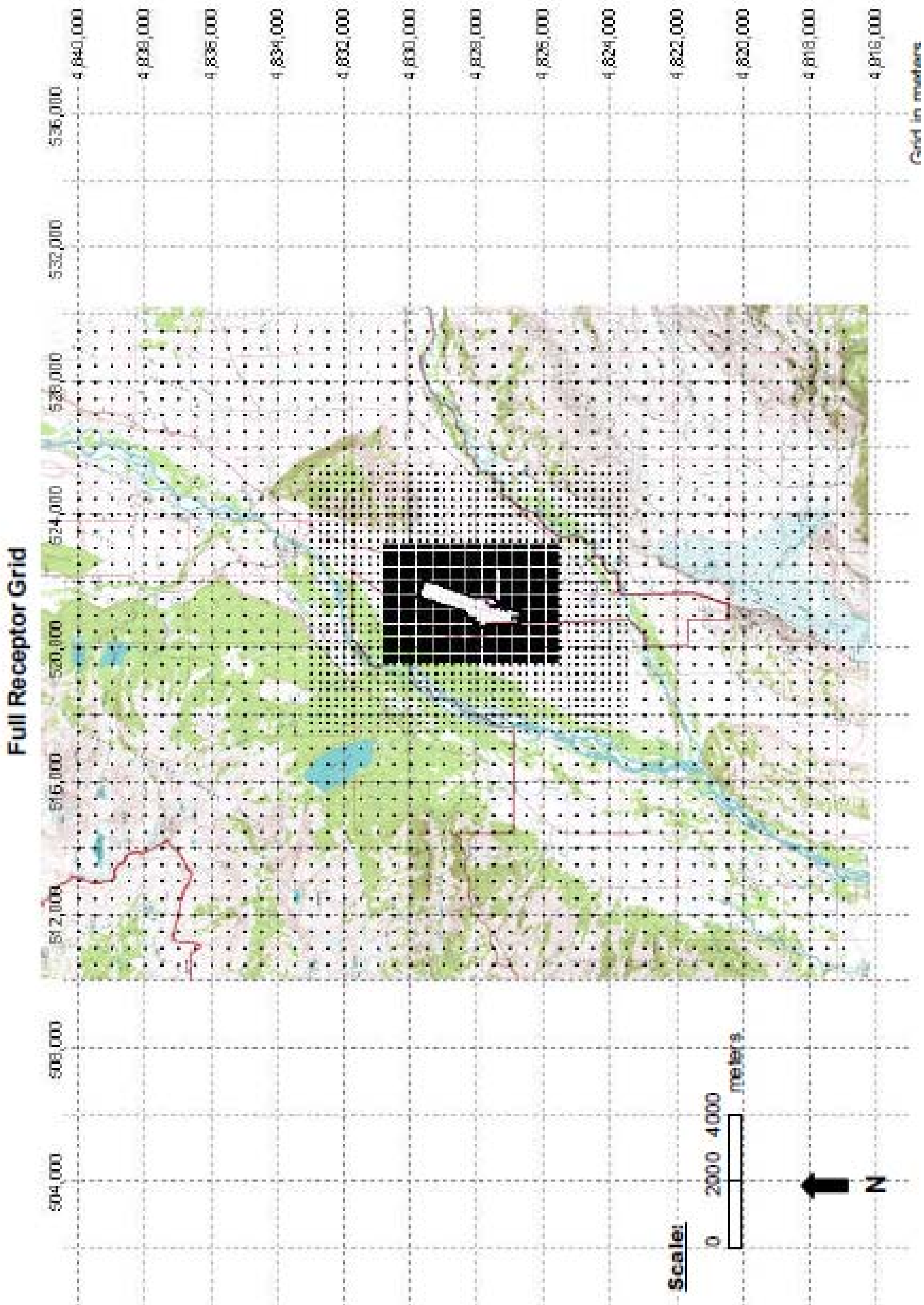


FIGURE 6-3: POINTS ON THE FULL RECEPTOR GRID THAT WERE USED FOR DETERMINING AIR QUALITY IMPACTS IN CLASS I AREAS

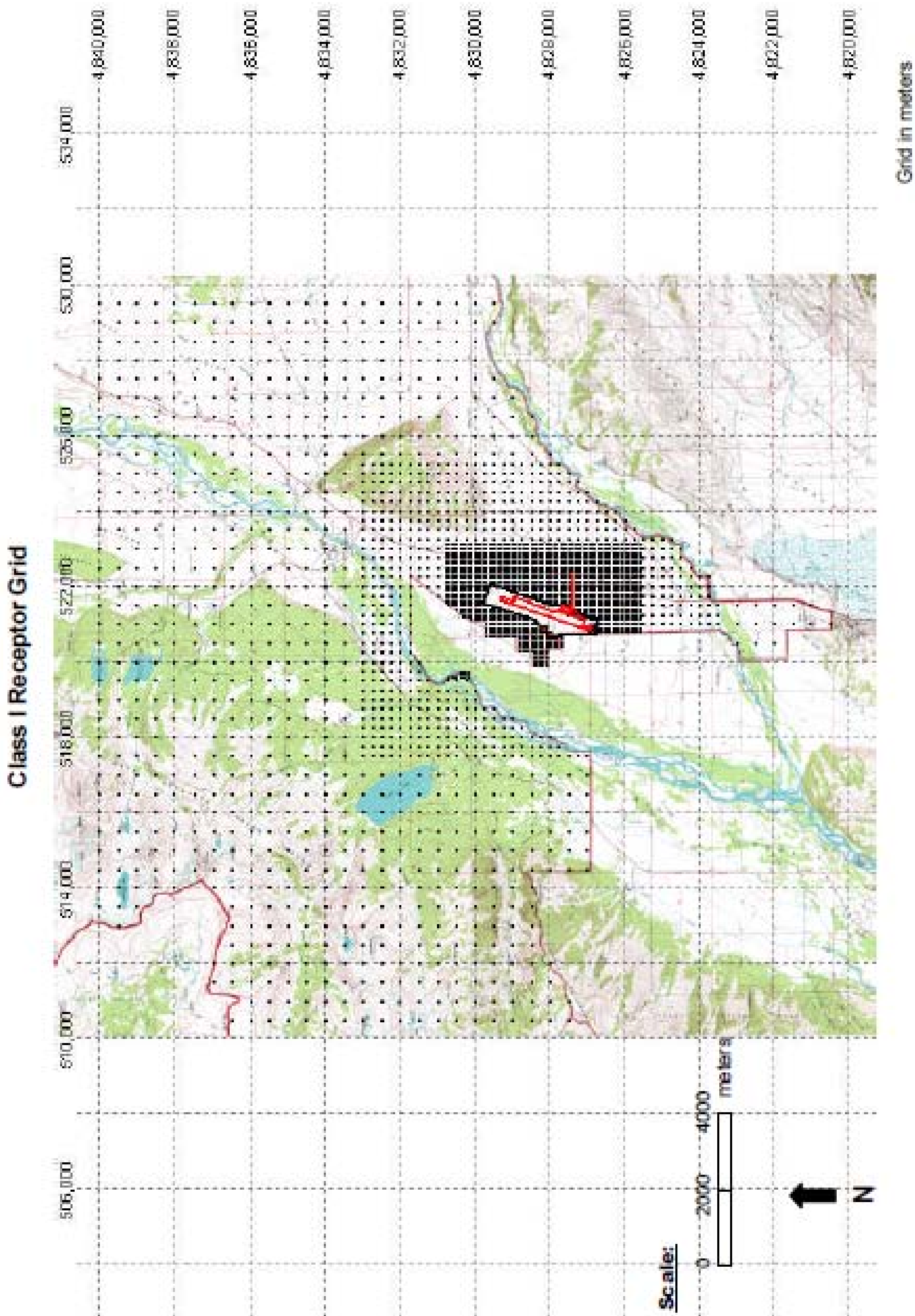
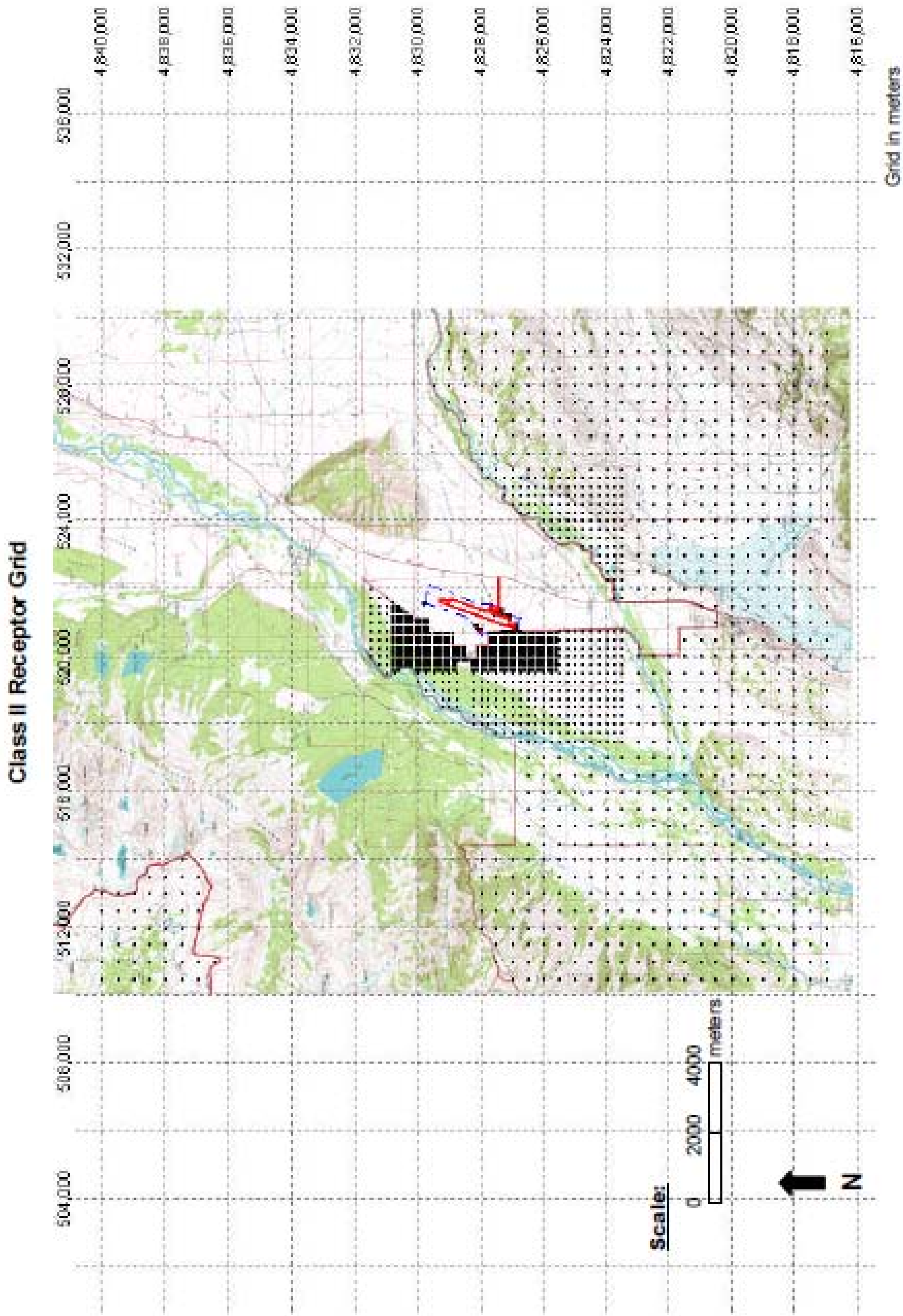


FIGURE 6-4: POINTS ON THE FULL RECEPTOR GRID THAT WERE USED FOR DETERMINING AIR QUALITY IMPACTS IN CLASS II AREAS



AERMOD METEOROLOGICAL DATA INPUT

Sequential air quality dispersion models require the input of hourly meteorological data values of wind speed, wind direction, temperature, and other defined atmospheric dispersion parameters. An “on-site” five-year model-ready meteorological database was obtained from the Wyoming Department of Environmental Quality.

METEOROLOGICAL DATA BASE

The AERMOD model was run in an hourly sequential mode. The Wyoming Department of Environmental Quality, Air Quality Division supplied files with a current 5-year database of hourly data that had been pre-processed for use in the AERMOD model. This database, which was recently processed and submitted to Wyoming Department of Environmental Quality by Trinity Consultants, was based on Jackson Hole Airport hourly surface weather observation data for the 5-year period 2004-2008 coupled with corresponding upper air data from Riverton, Wyoming.

The data were processed for use in AERMOD using the AERMET and AERSURFACE pre-processor programs. The outputs include the calculated planetary boundary layer parameters required by AERMOD based on the land use patterns and seasonal and direction-specific surface characteristics (that is, roughness length, Bowen ratio, and surface albedo) defined for the area surrounding the airport.

The availability of a suitable record from the Jackson Hole Airport observation site provided the most representative data possible for these analyses.

METEOROLOGICAL DATA COMPLETENESS

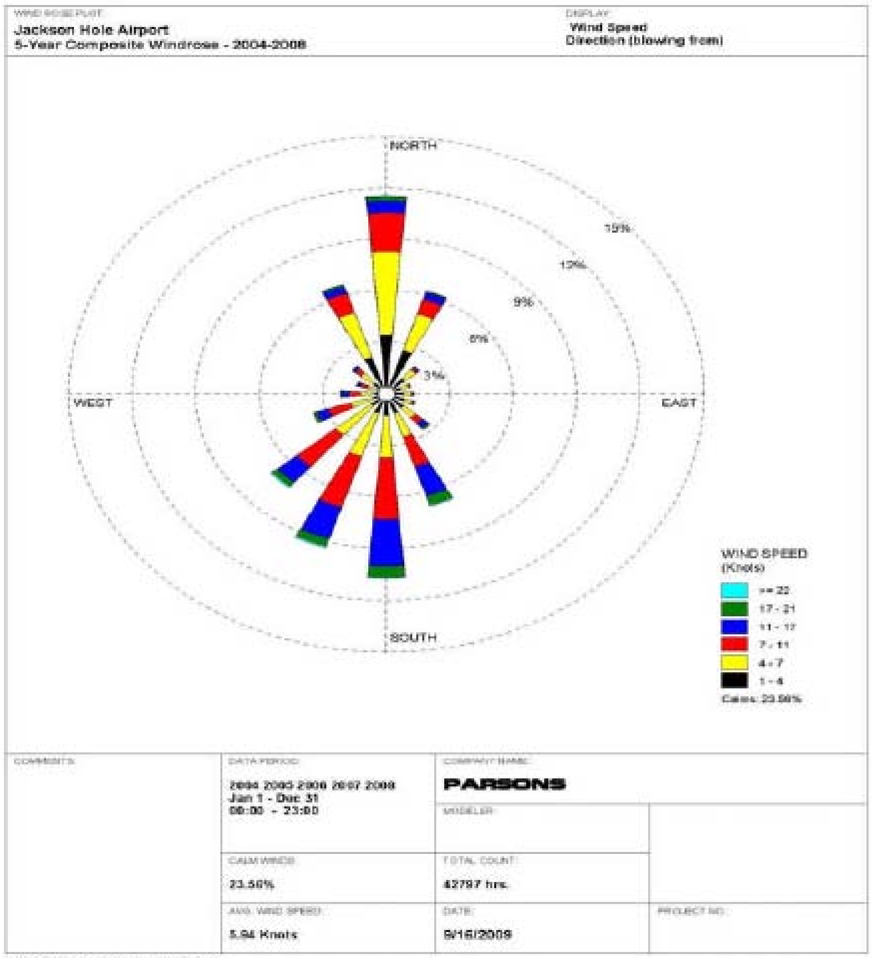
The meteorological databases for the 5-year period from 2004 to 2008 as obtained from the Wyoming Department of Environmental Quality were found to be virtually 100% populated, and therefore, no gap filling or data substitution measures were required. Accordingly, the meteorological data input file used in the model was 100% complete.

TRANSPORT WIND SPEED AND DIRECTION

The primary source of transport wind speed and direction was the 10-meter level data measured at the Jackson Hole Airport. For reference purposes, a composite 5-year wind rose depicting the combined wind speed and direction frequency distribution developed from data measured during the selected period (January 1, 2004 – December 31, 2008) at Jackson Hole Airport is shown in Figure 6-5.

The wind rose in Figure 6-5 shows a bimodal distribution with pronounced peaks from the due north and due south. Beyond the peak directions, winds in the area are generally from the south-southeast through due south to southwest, as well as from the north-northwest through north-northeast. Winds from due east and due west occur relatively infrequently on an annual basis.

FIGURE 6-5: FIVE-YEAR (2004 THROUGH 2008) COMPOSITE WIND ROSE FOR THE JACKSON HOLE AIRPORT



AERMOD INPUT FILES

The meteorological data base, including all of the parameters developed as described above for each hour in each yearly record through the AERSURFACE and AERMET processing routines, were created as one boundary layer file (*.sfc) and one atmospheric profile file (*pfl) for subsequent input to AERMOD.

VISCREEN LEVEL 2 METEOROLOGICAL SUMMARIES

Because the Level-1 analysis results exceeded screening criteria, a Level-2 analysis was performed. The objective of the Level-2 screening analysis is identical to that of Level-1 – the estimation of worst-day plume visual impacts – but in Level-2 screening, more realistic (less conservative) input, representative of the given source is provided. While the Level-1 analysis assumes only "F" stability and a 1-meter-per-second wind speed, the Level-2 analysis utilizes the actual Jackson Hole Airport meteorological database.

The *Workbook for Plume Visual Impact Screening and Analysis* recommends the meteorological database be used to prepare joint frequency and distribution tables of wind speed, wind direction, and stability class. Also recommended is that these tables be stratified by time of day in order to discern any diurnal variation in winds and stability. The preprocessed meteorological database for the Jackson Hole Airport did not contain an actual stability class category. However, a relationship between roughness length and Monin-Obukhov Length (L) – both of which are contained in the meteorological database - were used to determine a Pasquill-Gifford (PG) stability class.

All five years of meteorological data were used for the Level-2 analysis. Examination of the hourly data revealed calculated roughness lengths of generally 0.1 meters extending up to a maximum of 0.3 meters. The data were then grouped by time of day: 0700-1200; 1300-1800; and 1900-2200. These time period groupings reflect both the recommendations of guidance and the operating hours of the airport. Once grouped, the data were further sorted by length (L) along with the corresponding wind speed and direction for that hour. Table 6-4 indicates the Pasquill-Gifford stability class associated with length.

TABLE 6-4: PASQUILL-GIFFORD STABILITY CLASSES ASSOCIATED WITH MONIN-OBUKHOV LENGTHS

Monin-Obukhov Length (meters)	Pasquill-Gifford Stability Class
-12.5	A
-25	B
-65	C
--	D
+65	E
+30	F

Once grouped by time of day and stability class, joint wind speed and direction tables were generated for the "F," "E," and "D" stability classes to determine the frequency of occurrence of winds in each direction sector and the associated wind speed.

For this analysis, the key viewing angle for viewing the Grand Teton peaks was defined as the 45 degree sector from 303.75 to 348.75 degrees. This viewing angle corresponds to southeasterly component winds (123.75 – 168.75 degrees from true north) that would transport a plume emanating from the airport towards the Grand Teton range and are critical in determining worst-case visibility conditions for the Jackson Hole airport. Therefore, the reported hourly southeast and south-southeast wind directions were counted in each of the stability classes and within each time grouping in order to determine a cumulative frequency of occurrence greater than or equal to 1% (equivalent to 1 day or 24 hours) with the most restrictive (stable) stability class. This was done with the complete 5-year data base.

Results of this meteorological analysis are presented in Tables 6-5 through 6-7. In the tables, the values presented are summarized as "counts" representing a single hourly observation within the 5-year period rather than percent frequency. A frequency of occurrence equivalent to 1% will equal 120 "counts" (24 hours times 5 years). When the cumulative frequency in counts exceeds a value of 120, the associated dispersion condition (combination of P-G stability class and wind speed) becomes the controlling dispersion condition for the Level 2 analysis.

TABLE 6-5: HOURS 7-12 JACKSON HOLE AIRPORT WIND FREQUENCY DISTRIBUTION (COUNT), 2004 THROUGH 2008, FOR F, E, AND D STABILITY (1 OF 3)

L: 0-30 meters
(F stability)

Wind Direction (Blowing From) / Wind Speed (m/s)

	0.1 - 1.0	1.0 - 2.0	2.0 - 3.0	3.0 - 4.0	4.0 - 5.0	>= 5.0	Total
348.75-11.25	6	117	0	0	0	0	123
11.25-33.75	3	107	0	0	0	0	110
33.75-56.25	3	20	0	0	0	0	23
56.25-78.75	3	10	0	0	0	0	13
78.75-101.25	2	9	0	0	0	0	11
101.25-123.75	2	9	0	0	0	0	11
123.75-146.25	1	17	0	0	0	0	18
146.25-168.75	6	12	0	0	0	0	18
168.75-191.25	0	10	0	0	0	0	10
191.25-213.75	0	19	0	0	0	0	19
213.75-236.25	1	10	0	0	0	0	11
236.25-258.75	1	4	0	0	0	0	5
258.75-281.25	1	4	0	0	0	0	5
281.25-303.75	1	4	0	0	0	0	5
303.75-326.25	1	25	0	0	0	0	26
326.25-348.75	2	107	0	0	0	0	109
Total	33	484	0	0	0	0	517

TABLE 6-5: HOURS 7-12 JACKSON HOLE AIRPORT WIND FREQUENCY DISTRIBUTION (COUNT), 2004 THROUGH 2008, FOR F, E, AND D STABILITY (2 OF 3)

L: 30-65 meters
(E stability)

Wind Direction (Blowing From) / Wind Speed (m/s)

	0.1 - 1.0	1.0 - 2.0	2.0 - 3.0	3.0 - 4.0	4.0 - 5.0	>= 5.0	Total
348.75-11.25	0	61	3	0	0	0	64
11.25-33.75	0	37	9	0	0	0	46
33.75-56.25	0	13	0	0	0	0	13
56.25-78.75	0	1	0	0	0	0	1
78.75-101.25	0	3	0	0	0	0	3
101.25-123.75	0	3	0	0	0	0	3
123.75-146.25	0	4	0	0	0	0	4
146.25-168.75	0	6	0	0	0	0	6
168.75-191.25	0	12	0	0	0	0	12
191.25-213.75	0	16	1	0	0	0	17
213.75-236.25	0	7	2	0	0	0	9
236.25-258.75	0	1	0	0	0	0	1
258.75-281.25	0	2	0	0	0	0	2
281.25-303.75	0	2	0	0	0	0	2
303.75-326.25	0	14	0	0	0	0	14
326.25-348.75	0	54	5	0	0	0	59
Total	0	236	20	0	0	0	256

TABLE 6-5: HOURS 7-12 JACKSON HOLE AIRPORT WIND FREQUENCY DISTRIBUTION (COUNT), 2004 THROUGH 2008, FOR F, E, AND D STABILITY (3 OF 3)

L: >65 meters (D stability)

Wind Direction (Blowing From) / Wind Speed (m/s)

	0.1 - 1.0	1.0 - 2.0	2.0 - 3.0	3.0 - 4.0	4.0 - 5.0	>= 5.0	Total
348.75-11.25	0	68	68	17	5	4	162
11.25-33.75	0	36	38	7	5	3	89
33.75-56.25	0	15	10	0	1	0	26
56.25-78.75	0	10	2	0	0	0	12
78.75-101.25	0	8	1	0	0	0	9
101.25-123.75	0	11	1	0	1	0	13
123.75-146.25	0	6	7	11	10	5	39
146.25-168.75	0	16	43	43	35	12	149
168.75-191.25	0	30	81	74	38	12	235
191.25-213.75	0	42	88	49	13	7	199
213.75-236.25	0	16	41	29	11	8	105
236.25-258.75	0	11	19	8	2	2	42
258.75-281.25	0	6	2	4	4	0	16
281.25-303.75	0	5	5	3	1	2	16
303.75-326.25	0	17	18	1	0	3	39
326.25-348.75	0	56	50	12	8	7	133
Total	0	353	474	258	134	65	1284

TABLE 6-6: HOURS 13-18 JACKSON HOLE AIRPORT WIND FREQUENCY DISTRIBUTION (COUNT), 2004 THROUGH 2008, FOR F, E, AND D STABILITY (1 OF 3)

L: 0-30 meters (F stability)

Wind Direction (Blowing From) / Wind Speed (m/s)

	0.1 - 1.0	1.0 - 2.0	2.0 - 3.0	3.0 - 4.0	4.0 - 5.0	>= 5.0	Total
348.75-11.25	0	21	0	0	0	0	21
11.25-33.75	2	15	0	0	0	0	17
33.75-56.25	2	6	0	0	0	0	8
56.25-78.75	3	17	0	0	0	0	20
78.75-101.25	1	10	0	0	0	0	11
101.25-123.75	0	10	0	0	0	0	10
123.75-146.25	0	14	0	0	0	0	14
146.25-168.75	0	13	0	0	0	0	13
168.75-191.25	1	16	0	0	0	0	17
191.25-213.75	0	18	0	0	0	0	18
213.75-236.25	0	20	0	0	0	0	20
236.25-258.75	0	13	0	0	0	0	13
258.75-281.25	0	7	0	0	0	0	7
281.25-303.75	1	3	0	0	0	0	4
303.75-326.25	1	5	0	0	0	0	6
326.25-348.75	4	12	0	0	0	0	16
Total	15	200	0	0	0	0	215

TABLE 6-6: HOURS 13-18 JACKSON HOLE AIRPORT WIND FREQUENCY DISTRIBUTION (COUNT), 2004 THROUGH 2008, FOR F, E, AND D STABILITY (2 OF 3)

L: 30-65 meters (E stability)

Wind Direction (Blowing From) / Wind Speed (m/s)

	0.1 - 1.0	1.0 - 2.0	2.0 - 3.0	3.0 - 4.0	4.0 - 5.0	>= 5.0	Total
348.75-11.25	0	12	1	0	0	0	13
11.25-33.75	0	5	0	0	0	0	5
33.75-56.25	0	2	0	0	0	0	2
56.25-78.75	0	2	0	0	0	0	2
78.75-101.25	0	1	1	0	0	0	2
101.25-123.75	0	3	0	0	0	0	3
123.75-146.25	0	5	0	0	0	0	5
146.25-168.75	0	4	0	0	0	0	4
168.75-191.25	0	9	2	0	0	0	11
191.25-213.75	0	15	1	0	0	0	16
213.75-236.25	0	16	0	0	0	0	16
236.25-258.75	0	9	0	0	0	0	9
258.75-281.25	0	7	0	0	0	0	7
281.25-303.75	0	2	1	0	0	0	3
303.75-326.25	0	0	0	0	0	0	0
326.25-348.75	0	3	2	0	0	0	5
Total	0	95	8	0	0	0	103

TABLE 6-6: HOURS 13-18 JACKSON HOLE AIRPORT WIND FREQUENCY DISTRIBUTION (COUNT), 2004 THROUGH 2008, FOR F, E, AND D STABILITY (3 OF 3)

L: >65 meters (D stability)

Wind Direction (Blowing From) / Wind Speed (m/s)

	0.1 - 1.0	1.0 - 2.0	2.0 - 3.0	3.0 - 4.0	4.0 - 5.0	>= 5.0	Total
348.75-11.25	0	9	15	7	4	0	35
11.25-33.75	0	7	1	5	6	0	19
33.75-56.25	0	4	0	1	1	0	6
56.25-78.75	0	5	1	1	0	0	7
78.75-101.25	0	3	3	1	0	0	7
101.25-123.75	0	11	3	1	0	0	15
123.75-146.25	0	5	13	12	7	2	39
146.25-168.75	0	22	51	83	28	6	190
168.75-191.25	0	43	129	71	26	6	275
191.25-213.75	0	29	78	49	15	13	184
213.75-236.25	0	13	46	25	6	1	91
236.25-258.75	0	21	23	3	1	2	50
258.75-281.25	0	6	9	3	3	1	22
281.25-303.75	0	7	5	0	1	0	13
303.75-326.25	0	7	5	1	4	0	17
326.25-348.75	0	12	17	7	6	0	42
Total	0	204	399	270	108	31	1012

TABLE 6-7: HOURS 19-22 JACKSON HOLE AIRPORT WIND FREQUENCY DISTRIBUTION (COUNT), 2004 THROUGH 2008, FOR F, E, AND D STABILITY (1 OF 3)

L: 0-30 meters
(F stability)

Wind Direction (Blowing From) / Wind Speed (m/s)

	0.1 - 1.0	1.0 - 2.0	2.0 - 3.0	3.0 - 4.0	4.0 - 5.0	>= 5.0	Total
348.75-11.25	1	199	0	0	0	0	200
11.25-33.75	6	178	0	0	0	0	184
33.75-56.25	0	96	0	0	0	0	96
56.25-78.75	0	80	0	0	0	0	80
78.75-101.25	1	63	0	0	0	0	64
101.25-123.75	0	70	0	0	0	0	70
123.75-146.25	0	77	0	0	0	0	77
146.25-168.75	1	73	0	0	0	0	74
168.75-191.25	0	72	0	0	0	0	72
191.25-213.75	1	68	0	0	0	0	69
213.75-236.25	2	81	0	0	0	0	83
236.25-258.75	0	35	0	0	0	0	35
258.75-281.25	0	44	0	0	0	0	44
281.25-303.75	1	36	0	0	0	0	37
303.75-326.25	1	68	0	0	0	0	69
326.25-348.75	2	133	0	0	0	0	135
Total	16	1373	0	0	0	0	1389

TABLE 6-7: HOURS 19-22 JACKSON HOLE AIRPORT WIND FREQUENCY DISTRIBUTION (COUNT), 2004 THROUGH 2008, FOR F, E, AND D STABILITY (2 OF 3)

L: 30-65 meters
(E stability)

Wind Direction (Blowing From) / Wind Speed (m/s)

	0.1 - 1.0	1.0 - 2.0	2.0 - 3.0	3.0 - 4.0	4.0 - 5.0	>= 5.0	Total
348.75-11.25	0	150	24	0	0	0	174
11.25-33.75	0	88	13	0	0	0	101
33.75-56.25	0	18	1	0	0	0	19
56.25-78.75	0	33	1	0	0	0	34
78.75-101.25	0	38	1	0	0	0	39
101.25-123.75	0	22	0	0	0	0	22
123.75-146.25	0	28	2	0	0	0	30
146.25-168.75	0	38	1	0	0	0	39
168.75-191.25	0	53	1	0	0	0	54
191.25-213.75	0	62	2	0	0	0	64
213.75-236.25	0	43	4	0	0	0	47
236.25-258.75	0	29	0	0	0	0	29
258.75-281.25	0	19	0	0	0	0	19
281.25-303.75	0	21	0	0	0	0	21
303.75-326.25	0	33	2	0	0	0	35
326.25-348.75	0	94	7	0	0	0	101
Total	0	769	59	0	0	0	828

TABLE 6-7: HOURS 19-22 JACKSON HOLE AIRPORT WIND FREQUENCY DISTRIBUTION (COUNT), 2004 THROUGH 2008, FOR F, E, AND D STABILITY (3 OF 3)

L: >65 meters (D stability)

Wind Direction (Blowing From) / Wind Speed (m/s)

	0.1 - 1.0	1.0 - 2.0	2.0 - 3.0	3.0 - 4.0	4.0 - 5.0	>= 5.0	Total
348.75-11.25	0	91	256	82	23	12	464
11.25-33.75	0	18	94	38	6	5	161
33.75-56.25	0	9	16	11	2	0	38
56.25-78.75	0	13	23	2	1	0	39
78.75-101.25	0	14	19	4	0	0	37
101.25-123.75	0	12	17	0	0	0	29
123.75-146.25	0	19	46	27	5	1	98
146.25-168.75	0	26	139	88	35	9	297
168.75-191.25	0	73	265	157	44	15	554
191.25-213.75	0	70	219	87	31	11	418
213.75-236.25	0	48	138	48	13	10	257
236.25-258.75	0	26	69	30	7	3	135
258.75-281.25	0	25	33	7	2	1	68
281.25-303.75	0	16	30	3	6	1	56
303.75-326.25	0	31	40	5	1	1	78
326.25-348.75	0	73	149	30	12	4	268
Total	0	564	1553	619	188	73	2997

Section 7: Modeling Results

Based on the modeling approach described in Section 5.0, and the model input data presented in Section 6.0, a series of model runs were set up and executed as discrete runs for each appropriate combination of sources, pollutant, meteorological data year, and Baseline-Alternative/Year combination (five cases) examined in this assessment.

This section presents and discusses the modeling analysis results and, based on combining peak modeled impacts with established background air quality levels, presents an assessment of compliance with applicable National Ambient Air Quality Standards for sulfur dioxide, particulate matter with diameters of 10 microns or less and 2.5 microns or less, carbon monoxide, nitrogen dioxide, and lead.

The results of the modeling analyses are summarized in a comprehensive series of tables and figures that present results for the above AERMOD runs as follows:

- For all Jackson Hole Airport sources combined,
- For each pollutant and averaging period,
- For each year in the 5-year meteorological data input file, and
- For five cases (baseline, Alt-1-2015, Alt-1-2025, Alt-2-2015, and Alt-2-2025)

In addition, results for the air quality related values of visibility and deposition are provided.

The following sections summarize and discuss the modeling results comprising the different components of the analyses and compliance assessments.

NATIONAL AMBIENT AIR QUALITY STANDARDS COMPLIANCE MODELING RESULTS

The National Ambient Air Quality Standards compliance modeling results for sulfur dioxide, particulate matter with diameters of 10 microns or less and 2.5 microns or less, carbon monoxide, nitrogen dioxide, and lead are summarized in Tables 7-1A through 7-4E and 7-5, respectively, with the alpha identifier indicating the results for each analyzed case as follows:

Table 7-#A - Baseline Condition (Year 2005)

Table 7-#B - Alternative 1 – 2015

Table 7-#C - Alternative 1 – 2025

Table 7-#D - Alternative 2 – 2015

Table 7-#E - Alternative 2 – 2025

To avoid interrupting the text, these tables are provided at the end of Section 7.

In each of these tables the specific information presented for each pollutant includes:

- The maximum and highest-second highest predicted short-term (that is, 1-, 3-, 8-, 24-hour average and/or 3-month rolling average) concentration values predicted for each year in the record for pollutants that have short-term standards,
- The Maximum Annual Average predicted concentrations for each year for pollutants that have standards for long-term (that is, annual) averaging periods,
- The UTM coordinates of the receptors where the listed maximum and highest-second highest concentrations were predicted to occur,
- The relative direction and distance from the center of the Jackson Hole Airport at which maximum impacts are predicted to occur, and
- The year, month, day, and end hour of the time period during which the maximum short-term impacts were predicted and the year for which maximum annual average concentrations were predicted.

Note that the highest values for the full 5-year meteorological data record for the compliance-controlling impacts (that is, maximum impacts for both short-term standards and maximum annual impacts for long-term standards) are noted in **boldface typ**e in the tables. These maximum impact values will be carried forward to the final compliance assessment.

The modeling results are also depicted graphically in Figures 7-1 through 7-8. These figures present isoplethed plots of predicted concentrations for the baseline year (worst among the 5 cases modeled) for each pollutant and averaging period for the meteorological data year in which the highest impact for that pollutant and averaging period was predicted to occur.

To avoid interrupting the text, these figures are provided at the end of Section 7. The modeling results for each pollutant are discussed briefly in the following sections.

SULFUR DIOXIDE MODELING RESULTS

The sulfur dioxide modeling results in Tables 7-1A through 7-1E and depicted in Figures 7-1 through 7-3 show the following:

- All model-predicted sulfur dioxide concentrations are below applicable National Ambient Air Quality Standards for all three averaging periods.
- The baseline condition produced the highest model-predicted results among the five cases examined. This is true for all three averaging periods.
- Model-predicted sulfur dioxide impacts among the future year alternatives are generally at about the same concentration levels, although Alternative 2 results are slightly higher.
- The maximum 3-hour sulfur dioxide impact for the airport sources is 178.8 $\mu g/m^3$ in model year 2006. As shown in Figure 7-1, it occurs on the eastern boundary of the airport just off the northeast corner of the parking lot.
- Figure 7-1 also shows that an area of peak 3-hour sulfur dioxide impacts is predicted to occur in the same general area off the northeast corner of the airport parking lot. This peak impact area appears to be attributable to two facts. First, total airport-wide sulfur dioxide emission levels are dominated primarily by emissions from the boilers, and secondarily by emissions from the generators. Secondly, several of these sources (that is, boilers and generators) are clustered on the eastern side of the airport property near the support and terminal buildings such that they line up

for the south-southwesterly wind conditions that would cause emissions to result in maximum cumulative impacts when transported toward this area. Concentrations otherwise decrease rapidly with both lateral and downwind distance from this peak area. Predicted concentrations decrease to less than 25% of the peak value (that is, to 45 $\mu g/m^3$ or less) within 250 meters of the maximum receptor point.

- The maximum 24-hour sulfur dioxide impact for the airport sources is 43.4 $\mu g/m^3$ in model year 2006. As shown in Figure 7-2, it occurs just east of the parking lot on the airport property line.
- Figure 7-2 also shows that an area of peak 24-hour sulfur dioxide impacts is predicted to occur slightly south of the location of the highest 3-hour impact; namely, at a property line receptor near the middle of the parking lot. As with the 3-hour impact, the 24-hour peak impact area occurs with a source-receptor geometry in which the cluster of boilers and generators in this portion of the airport are aligned with the wind direction associated with this impact, resulting in maximum cumulative impacts of combined source emissions. The 24-hour sulfur dioxide impacts also decrease rapidly with distance from the point of maximum concentration. Modeled concentrations decrease from 43.4 $\mu g/m^3$ to less than 10 $\mu g/m^3$ generally within 250 meters of the eastern airport boundary line. Off-site impacts to the south, west, and north are even lower, barely exceeding 5 $\mu g/m^3$.
- The maximum annual average sulfur dioxide impact for the airport sources is 9.0 $\mu g/m^3$, predicted for model year 2006. As shown in Figure 7-3, it occurs on the western side of the airport property line just north of the tower. This location is different from the short-term sulfur dioxide impacts and is most likely due to the close proximity of the receptor to the two boilers located at the tower.
- Figure 7-3 also shows an area of peak annual average sulfur dioxide concentrations that occur on the eastern property line just south of the parking lot, which is the same general location as the peak short-term sulfur dioxide impacts. The location of the maximum receptor and peak impact locations on different sides of the airport is most likely a result of highly controlling source-receptor geometry and how it lines up with key wind directions from the annual wind direction distribution. For instance, the close due north location of the maximum receptor location to the tower boilers lines up perfectly with the major peak for due southerly winds as shown in the wind rose in Figure 6-5. Similar to the short-term impacts, predicted annual average concentrations decrease rapidly with distance. Predicted annual average sulfur dioxide concentrations at other receptors along the airport boundary and off-site are generally only 1.0 $\mu g/m^3$ or less.

PARTICULATE MATTER MODELING RESULTS

Particulate matter was modeled with a single set of emission rates meant to represent both 10 microns or less and particulate with diameters of 2.5 microns or less for comparison to relevant standards.

The particulate matter modeling results in Table 7-2A through 7-2E and depicted in Figures 7-4 and 7-5 show the following:

- All model-predicted particulate matter concentrations are well below applicable National Ambient Air Quality Standards for both the 24-hour and annual averaging periods.
- Model-predicted particulate matter impacts among the baseline year and future year alternatives are generally at nearly identical concentration levels. This is true for both averaging periods.

- The maximum 24-hour particulate matter impact for the airport sources is 11.1 $\mu g/m^3$ in model year 2006 for all five cases examined. As shown in Figure 7-4, it occurs on the western side of the airport property line just north of the BI-6 generator location, and in fact, appears to be a direct result of the horizontally discharging generator emissions at that location.
- Similar to Figure 7-3 for the annual average sulfur dioxide impacts, Figure 7-4 also shows an area of peak 24-hour average particulate matter concentrations that occur on the eastern property line roughly centered over the parking lot, which is the same general location as the peak short- and long-term sulfur dioxide impacts. This peak impact area appears to be similarly attributable to both the alignment and close proximity of the cluster of boilers and generators in this portion of the airport, which when aligned with the wind direction associated with this impact produces maximum cumulative impacts when transported toward this area. Concentrations otherwise decrease rapidly with both lateral and downwind distance from the peak impact area, and are generally below 2.0 $\mu g/m^3$ or less within 500 meters of the eastern airport property line.
- The maximum annual average particulate matter impact for the airport sources is 0.5 $\mu g/m^3$, predicted for model years 2006 and 2007 for the baseline and Alternative 2 years. As shown in Figure 7-5, it occurs on the western side of the airport property line just north of the tower. This location is slightly different from the maximum 24-hour particulate matter concentration due north of the generator. The annual average maximum is most likely due to the close proximity of the receptor to the two boilers located at the tower.
- Figure 7-5 also reveals a pattern of elongated isopleths of annual average particulate matter impacts that are roughly aligned with and centered on the airport's runway, but with concentrations levels at the airport boundary and beyond only reaching approximately two to three orders of magnitude below the annual standard of 15 $\mu g/m^3$ for particulate matter with diameters of 2.5 microns or less (the is no annual standard for particulate matter with diameters of 10 microns or less).

CARBON MONOXIDE MODELING RESULTS

The carbon monoxide modeling results in Table 7-3A through 7-3E and depicted in Figures 7-6 and 7-7 show the following:

- All model-predicted carbon monoxide concentrations are below applicable National Ambient Air Quality Standards by an order of magnitude for both the 1- and 8-hour averaging periods.
- The baseline condition produced the highest model-predicted results among the five cases examined. This is true for both averaging periods.
- Model-predicted carbon monoxide results among the future year alternatives are generally higher for Alternative 2 impacts than for Alternative 1 impacts, although as stated above, both sets of results are well below applicable National Ambient Air Quality Standards for carbon monoxide.
- The maximum 1-hour carbon monoxide impact for the airport sources is 3,136.4 $\mu g/m^3$ in model year 2006. As shown in Figure 7-6, it occurs at the southern airport property line right at the boundary between the Class I and Class II area (near the southeast corner of the residential development).
- Figure 7-6 also shows that the areas of peak impacts occur both at the far southern end of the airport property (on the property line and beyond) and in an area to the northeast of the far northern end of the airport runway mostly beyond the airport property line. The carbon monoxide isopleths show an irregular but somewhat elongated pattern that is roughly aligned with the

orientation of the airport runway, as well as the predominant north-south wind distribution pattern, suggesting that the carbon monoxide impacts are primarily attributable to the emissions associated with aircraft landing and takeoff-cycles. The level of carbon monoxide impacts drops off rapidly from these two peak impact areas such that in the middle portion of the airport including the terminal and parking area the carbon monoxide concentrations represent only 50% or less of the peak area concentrations.

- The maximum 8-hour average carbon monoxide impact for the airport sources is 1,241.0 $\mu g/m^3$, predicted for model year 2005. As shown in Figure 7-7, it occurs at the southern airport property line right just to the east of the boundary between the Class I and Class II area (near but slightly east of the southeast corner of the residential development).
- Figure 7-7 for 8-hour carbon monoxide impacts shows a more pronounced elongated isopleth pattern aligned both to the runway and the predominant north-south wind distribution, but with a single area of peak impact located at the southern end of the airport property. These longer period impacts may reflect the contribution over 8-hour periods from the boiler and generator emissions to the aircraft landing and takeoff-cycle impacts under northerly wind conditions as these sources are clustered at the southern end of the airport fairly close to the peak impact area and produce their worst-case impacts for northerly winds. As with sulfur dioxide and particulate matter impacts, the 8-hour carbon monoxide impacts decrease fairly rapidly with distance from the southern end of the airport.

NITROGEN OXIDES (AS NITROGEN DIOXIDE) MODELING RESULTS

The nitrogen dioxide modeling results in Table 7-4A through 7-4E and depicted in Figure 7-8 show the following:

- All model-predicted nitrogen dioxide concentrations are an order of magnitude below the applicable National Ambient Air Quality Standards of 100 $\mu g/m^3$ for the annual averaging period.
- The baseline condition produced the highest model-predicted results among the five cases examined.
- Model-predicted nitrogen dioxide results among the future year alternatives are generally higher for Alternative 2 impacts than for Alternative 1 impacts, although as stated above, both sets of results are well below applicable National Ambient Air Quality Standards for nitrogen dioxide.
- The maximum annual average nitrogen dioxide impact for the airport sources is 11.5 $\mu g/m^3$ in model year 2005. As shown in Figure 7-8, it occurs on the eastern side of the airport property line just north of the terminal building and parking area.
- Figure 7-8 also shows that the area of peak impact occurs in the same location on the eastern property line just north of the terminal and parking area. Again, the elongated isopleths pattern aligned with the runway and peak winds suggests that nitrogen dioxide impacts are mostly attributable to the aircraft landing and takeoff-cycle emissions, but given the location of the maximum concentration, most likely with a significant contribution from the Terminal North generator emissions. This generator is located about 200 meters south-southwest from the peak impact area so lines up perfectly with the south-southwesterly secondary peak wind condition. As with all other airport source impacts, maximum predicted annual average nitrogen dioxide concentrations decrease fairly rapidly with distance from the sources. Maximum annual average concentrations decrease to levels below 2 $\mu g/m^3$ within approximately 1 kilometer (about 0.6 miles) to the south of the airport and within 500 meters (about 0.3 miles) or less of the airport in all other directions.

LEAD MODELING RESULTS

The lead modeling results in Table 7-5 and depicted in Figure 7-9 show the following:

- All model-predicted lead concentrations are below applicable National Ambient Air Quality Standards of 0.15 $\mu g/m^3$ for the rolling 3-month averaging period.
- The baseline condition produced a model-predicted rolling-3-month result of 0.008 $\mu g/m^3$.
- Maximum model-predicted lead impacts among the future year alternatives are at the same concentration of 0.005 $\mu g/m^3$. This is a result of the lead emissions mainly coming from piston-engine aircraft that are part of the general aviation operations at the airport. Because all other aircraft related activities have minimal or no lead emissions, the emission input to the model for Alternative 1 (limited to General Aviation) were identical to Alternative 2 for this pollutant.
- The maximum rolling 3-month average lead impact for the airport sources is 0.007 $\mu g/m^3$ for the rolling 3-month period ending in February 2005. As shown in Figure 7-9, it occurs at the far southern end of the airport property line.
- Figure 7-9 also shows that the area of peak impact occurs in the same location at the south end of the airport property. Again, the elongated isopleths pattern aligned with the runway and peak winds suggests that lead impacts are mostly attributable to the aircraft emissions during the landing and takeoff cycle. As with all other airport source impacts, maximum predicted monthly average lead concentrations decrease fairly rapidly with distance from the area of peak impact.

SIGNIFICANT IMPACT AREA MODELING RESULTS

For reference purposes, the modeling results for the baseline condition (worst-case among the alternatives) were used to define the "Significant Impact Areas" (SIAs) for the Jackson Hole Airport. The significant impact areas represent the maximum radial downwind distances from the airport wherein predicted concentrations are at or above the significant impact levels for each modeled pollutant.

As with the National Ambient Air Quality Standards compliance analysis, the significant impact area results are considered to be conservative in that all sources are assumed to be operating simultaneously. The significant impact areas for pollutants having significant impact levels for short-term averaging periods (that is, 1-, 3-, 8, and/or 24-hours) are based on modeled impacts associated with maximum hourly emission rates. For the annual significant impact area determinations, model outputs from runs using the long-term annual average pounds per hour emission rates were the basis for assessing these impact levels.

Significant impact areas for the Jackson Hole Airport were determined for each averaging period for each of the five years in the meteorological data record, as well as for the Class I and Class II receptor grid areas. The results representing the 5-year maximum (that is, worst-case) significant impact area radii for each pollutant and averaging period, as well as the controlling Class I or II area type (the greater radius distance between the two is controlling), are summarized in Table 7-6 below:

These baseline significant impact area results show that the Class I area impacts generally control and that impacts for all of the pollutant averaging period combinations examined exceed the significant impact level concentrations on significant portions of the receptor grid. This makes sense as the airport is in the Class I area and the Class I significant impact levels are roughly an order of magnitude lower than the Class II significant impact levels. However, for carbon monoxide there are only Class II significant impact levels.

TABLE 7-6: SIGNIFICANT IMPACT AREA SUMMARY

Pollutant and Averaging Period	Significant Impact Level (micrograms per cubic meter)	Area Type	Significant Impact Area Radius (kilometers)	Year Occurring
Sulfur dioxide 3-hour	1	Class I	>14	2006
Sulfur dioxide 24-hour	0.2	Class I	>14	2006
Sulfur dioxide annual	0.1	Class I	4.6	2006
Particulate matter with diameters of 10 microns or less, 24-hour	0.3	Class I	8.1	2006
Particulate matter with diameters of 10 microns or less, annual	0.2	Class I	0.9	2006
Carbon monoxide 1-hour	2,000	Class II	7.7	2006
Carbon monoxide 8-hour	500	Class II	9.5	2005
Nitrogen dioxide annual	0.1	Class I	10.7	2005

Figures 7-10 through 7-17 present plots showing the significant impact area radii for each pollutant and averaging period (the red line extending out from the airport), along with the spatial extent of pollutant concentrations above the significant impact levels (blue areas within the circle). The figures show that maximum modeled short-term sulfur dioxide concentrations above the significant impact level extend to the northern limit of the receptor grid at a distance of greater than 14 kilometers (about 8.7 miles) from the airport, while peak modeled annual concentrations of particulate matter with diameters of 10 microns or less exceed the significant impact level only to a maximum distance of 0.9 kilometer (a little over a half-mile) from the airport. Figure 7-15 shows that the significant impact area for 1-hour carbon monoxide impacts is controlled by a lone receptor 7.7 kilometers (about 5 miles) south-southwest of the airport

INCREMENT ASSESSMENT RESULTS

The analysis of increment was limited to assessing future impacts for the airport alternatives versus the baseline results. This is accomplished by subtracting baseline model-predicted results for a given pollutant and averaging period from the alternative future year result on a space-only (receptor by receptor) basis. The increment assessment results are summarized in tables listing the differential results for the three pollutants with increment standards (sulfur dioxide, particulate matter with diameters of 10 microns or less, and nitrogen dioxide) for the four future year cases (Alternatives 1 and 2 for 2015 and 2025) and showing whether the results are increment-consuming (positive values) or increment-expanding (negative values). Because there are different sets of increment standards for Class I and Class II areas, two sets of summary results are presented, each with the corresponding standard to which the differential impacts are compared.

Table 7-7 shows the Class I area increment assessment summary results along with the corresponding standard. The values in the table are the maximum differential results. They show that for all combinations of alternative, future years, pollutants, and averaging period, the results are well under the standard. In fact, in most cases the results are slightly negative, indicating an increment expanding situation for impacts from future emissions relative to baseline emissions. The exception to this is for particulate matter with diameters of 10 microns or less and particulate matter with diameters of 2.5 microns or less under the Alternative 2 future years, which shows that marginal increment consumption is possible for future particulate emissions relative to baseline emissions. Also, 24-hour particulate matter with diameters of 10 microns or less and particulate matter with diameters of 2.5 microns or less impacts under Alternative 1 indicate no discernable change.

TABLE 7-7: CLASS I INCREMENT ASSESSMENT SUMMARY OF FUTURE YEAR MINUS BASELINE YEAR – MAXIMUM (μG/M3)

Pollutant and Averaging Period	Standard	Alternative 1 2015	Alternative 1 2025	Alternative 2 2015	Alternative 2 2025
Sulfur dioxide, 3-hour	25.0	-0.00283	-0.00283	-0.00283	-0.00283
Sulfur dioxide, 24-hour	5.0	-0.01871	-0.01847	-0.01195	-0.01161
Sulfur dioxide, annual	2.0	-0.00027	-0.00026	-0.00020	-0.00020
Particulate matter with diameters of 10 microns or less, 24-hour	8.0	0.0	0.0	0.12759	0.11183
Particulate matter with diameters of 10 microns or less, annual	4.0	-0.00003	-0.00003	0.01613	0.01426
Nitrogen dioxide, annual	2.5	-0.00294	-0.00299	-0.00074	-0.00082

Table 7-8 shows the Class II area increment assessment summary results along with the corresponding standard. The values in the table are the maximum differential results. Similar to the Class I results they show that for all combinations of alternative, future years, pollutants, and averaging period, the results are well under the standard. Again, in most cases the results are slightly negative, indicating an increment expanding situation for impacts from future emissions relative to baseline emissions. In the Class II area the exceptions to this are for particulate matter with diameters of 10 microns or less and nitrogen dioxide under the Alternative 2 future years which shows that marginal increment consumption impacts are possible for future emissions of these pollutants relative to baseline emissions.

TABLE 7-8: CLASS II INCREMENT ASSESSMENT SUMMARY OF FUTURE YEAR MINUS BASELINE YEAR – MAXIMUM (μG/M3)

Pollutant and Averaging Period	Standard	Alternative 1 2015	Alternative 1 2025	Alternative 2 2015	Alternative 2 2025
Sulfur dioxide 3-hour	512	-0.08806	-0.08745	-0.07238	-0.07165
Sulfur dioxide 24-hour	91	-0.01607	-0.01593	-0.01235	-0.01217
Sulfur dioxide annual	20	-0.00023	-0.00023	-0.00013	-0.00012
Particulate matter with diameters of 10 microns or less, 24-hour	30/8	-0.00037	-0.00035	0.12513	0.10983
Particulate matter with diameters of 10 microns or less, annual	17/4	-0.00002	-0.00002	0.00760	0.00674
Nitrogen dioxide annual	25	-0.00237	-0.00241	0.65559	0.59943

VISIBILITY RESULTS

The presence of pollutant particulates in a plume mainly from particulate matter and nitrogen oxide emissions causes light scattering, which in turn affects the true contrast an observer sees when viewing objects against the sky and terrain backgrounds. The amount of scattering is highly dependent on particle size, approaching its maximum at a particle size in the range of 0.1 to 1.0 microns in diameter. Light scattering is also dependent on pollutant particle density and on the size and density of background particulate matter in the atmosphere. The VISCREEN model utilizes default values for both plume and background particle size and density.

The VISCREEN results include the color difference parameter Delta E and the green contrast value. The Delta E value was developed to assess the perceived magnitude of color and brightness changes and is used as the primary basis for determining the perceptibility of plume visual impacts in a screening analysis such as this one. The green contrast value is the contrast at a given wavelength of two colored objects such as the plume/sky or plume terrain.

Table 7-9 presents the results for the Level 1 and 2 VISCREEN analyses. Table 7-9 presents a listing of the model output results along with the threshold criteria for Delta E and green contrast. Results are presented for the baseline year as well as the two future alternative years.

As shown in the table, the Level 1 analysis utilizing worst-case meteorological conditions (F stability and 1.0 meter per second wind speed), along with the particle size and density default inputs, produced results that exceeded the Delta E threshold value of 2.0 for all cases and exceeded the green contrast threshold value of 0.05 against the sky for the baseline and Alternative 2 future years. In general, this is an indication that the plume emanating from the airport could be impairing visibility in the Class I area. Overall, this Level 1 finding is consistent for the baseline year as well as for both the alternatives in future years. As a result of this Level 1 finding, a more realistic (less conservative) Level 2 analysis was performed.

The Level 2 analysis employed the use of the 5-year meteorological data record from the airport that was used in the AERMOD modeling. A 45 degree viewing angle was defined to the northwest through north-northwest and data corresponding to the airport's operational hours were analyzed to find the meteorological condition with a cumulative frequency of occurrence greater than or equal to 1% for this viewing angle. This condition was found to be F stability with a 2 meter per second wind speed. In addition, a modified virtual point source distance of 50 kilometers (about 31 miles) corresponding to the airport's projected width for the key viewing angle was used in the Level 2 analysis.

As shown in Table 7-9, the Level 2 analysis utilizing more realistic meteorological conditions and a modified virtual point source distance of 50 kilometers (about 31 miles) produced results that for all cases did not exceed the Delta E or green contrast threshold values of 2.0 and 0.05, respectively. This Level 2 finding indicates no impairment to visibility in the Class I area from the airport's emissions. Overall, the Level 2 findings are consistent for the baseline year as well as for both the Alternatives/future years.

DEPOSITION RESULTS

The modeled deposition results are presented in a series of tables that lists, for each identified lake for which a discrete receptor point was established, the total sulfur and nitrogen deposition levels determined for each year in the meteorological database. The numerical results were used in the impact analysis for the environmental impact statement.

Table 7-10A through Table 7-10E present the modeled results for total nitrogen deposition in the sensitive lakes.

Table 7-11A through Table 7-11E present the modeled results for total sulfur deposition in the sensitive lakes.

The data show that deposition rates under each alternative decreased from the modeled existing conditions. However, baseline existing conditions showed that the overall deposition rates of nitrogen and sulfur estimated by Stacy and Blett (2010, unpublished paper) exceed the estimated critical load value estimated for Grand Teton National Park. In addition, as a percent of existing condition values, the peak season baseline results represent 8.9% of the 5.8 kg/hectare/year level for total nitrogen and 2.2% of the 3.2 kg/hectare/year level for total sulfur and exceed the deposition analysis level of 0.005 kilograms per hectare per year. The deposition analysis threshold was used to evaluate the cumulative impacts of the alternatives; however, the deposition analysis threshold did not apply for direct and indirect impacts due to the decrease in emissions related to airport operations under both alternatives when compared to existing conditions.

Baseline deposition results represent the worst impacts for all years examined. Alternative 2 results revealed total deposition levels for both nitrogen and sulfur to be worse than Alternative 1 results. But both alternatives would reduce deposition rates when compared with existing conditions.

Based on these modeled results showing exceedences of the deposition analysis threshold significance levels under existing conditions, current emissions associated with the Jackson Hole Airport contribute to the current estimated nitrogen deposition rate of 5.8 kilograms per hectare per year and the current estimated sulfur deposition rate of 3.2 kilograms per hectare per year. Modeled results show that the worst-case scenario for the airport's current contribution to the deposition rate may range from 6% to 8% for nitrogen and 2.2% for sulfur (Delta and Noname 55 lakes). The other 36 lakes showed lower modeled values.

In addition to the worst-case total nitrogen and total sulfur deposition quantities, Tables 7-10A through 7-10E (for nitrogen) and Tables 7-11A through 7-11E (for sulfur) show 5-year maximum and average annual deposition at each lake in 2005 and for each alternative in 2015 and 2025. This information is presented as the last two columns of each of these tables. The deposition amounts were determined by modeling the aircraft types and number of operations for each year and for each alternative using the meteorological conditions for each of the 5-years in the meteorological database (2004 through 2008). The "5-yr max" column shows the highest amount deposited during any of the five years that were modeled at each lake. The "5-yr avg" column shows the average annual amount deposited at each lake based on the 5-year modeling period (2004 through 2008).

The model used in this analysis was a conservative model that may have over-estimated this contribution (Notar, personal communication 2010). The NPS Air Resources Division has proposed additional modeling in order to refine these results. A more refined model is expected to predict lower rates of nitrogen and sulfur deposition in the park due to the airport, although results from this model would likely still show a contribution from the airport that may warrant mitigation.

NATIONAL AMBIENT AIR QUALITY STANDARDS COMPLIANCE DEMONSTRATION

The modeling results summarized in the previous sections are used to assess the status of compliance of modeled air quality impacts from airport emissions with applicable ambient air quality standards for sulfur dioxide, particulate matter with diameters of 10 microns or less, carbon monoxide, nitrogen dioxide, and lead. A comprehensive compliance summary appears in Tables 7-12A through **7-12E**, representing the baseline set of results plus the four alternatives in future years. Table 7-12A shows the worst-case among the alternatives, which as shown and discussed in Section 7.1 is the baseline year (2005). These results are discussed below.

Compliance with national ambient air quality standards is assessed by adding, as applicable, the maximum predicted impacts from all modeled sources for each pollutant to the established background air quality levels. The resulting total predicted concentrations are then compared to the applicable standards for each pollutant and averaging period.

Table 7-12A summarizes the maximum modeled impacts and established background air quality concentrations used to assess compliance for each pollutant and averaging period. The table lists the maximum short-term sulfur dioxide, particulate matter with diameters of 10 microns or less, carbon monoxide and lead concentrations and the highest annual average sulfur dioxide, particulate matter with diameters of 10 microns or less, and nitrogen dioxide concentrations predicted by the AERMOD model in any of the five years, along with the corresponding background concentrations. The combined total impacts (including background levels) are compared to the National Ambient Air Quality Standards taken from Section 4.0 and listed in the second from last column of the table. The last column of the table shows the combined total impact converted for the appropriate averaging periods only to Air Quality Index values.

A comparison of the total predicted impacts, including background levels, with the applicable National Ambient Air Quality Standards listed in Table 7-12A shows that total predicted impact levels for all pollutants and averaging periods are below the corresponding standards. Only the total 24-hour value for particulate matter with diameters of 2.5 microns or less of 34.4 $\mu g/m^3$ approaches its corresponding standard of 35 $\mu g/m^3$ by any appreciable amount. The total 24-hour emissions level for particulate matter with diameters of 2.5 microns or less represents 98% of the standard. However, fully two-thirds of the total concentration of particulate matter with diameters of 2.5 microns or less consists of the background concentration of 23.3 $\mu g/m^3$ which is added to the model-predicted concentration. The results further show that total impacts of remaining pollutants comprise anywhere from 12.4% to 69.4% of the applicable standards. But similar to the 24-hour concentration of particulate matter with diameters of 2.5 microns or less, many of the total impacts are comprised mainly of the background concentration component for each pollutant. This is particularly true for annual particulate matter with diameters of 2.5 microns or less, 24-hour and annual concentrations of particulate matter with diameters of 10 microns or less, and 8-hour carbon monoxide total impacts where the background component actually exceeds the modeled component. As a percentage of the National Ambient Air Quality Standards, airport source impacts alone represent only 3% (for annual concentration of particulate matter with diameters 2.5 microns or less) to 31.7% (for 24-hour concentration of particulate matter with diameters 2.5 microns or) of the applicable standards.

EMISSIONS OF CRITERIA POLLUTANTS

The effects of operations at the Jackson Hole Airport on emissions of criteria pollutants relative to the National Ambient Air Quality Standards were modeled using the data from actual aircraft operations from October 2004 through September 2005, and for operations in 2015 and 2025 for each alternative. The results, in tons per year, are shown in Table 7-13. As shown in the table, emissions in both periods would decrease relative to the emissions occurring during the modeled period of existing baseline operations from October 2004 through September 2005.

TABLE 7-13: EMISSIONS OF CRITERIA POLLUTANTS IN TONS PER YEAR RESULTING FROM MODELED BASELINE OPERATIONS AND EACH ALTERNATIVE

Criteria Pollutant	Modeled Existing Baseline	Alternative 1: No Action / Continue Current Agreement		Alternative 2: Preferred Alternative	
		2015	2025	2015	2025
Sulfur dioxide	23.3	6.5 (-16.8) [a/]	6.7 (-16.6)	13.6 (-9.7)	13.9 (-9.4)
Particulate matter (10 microns or less in diameter)	3.7	2.8 (-0.9)	2.8 (-0.9)	4.0 (-0.3)	3.9 (-0.2)
Nitrogen oxides	137.3	50.1 (-87.2)	48.7 (-88.6)	117.5 (-19.8)	115.5 (-21.8)
Carbon monoxide	549.8	384.9 (-164.9)	377.6 (-172.2)	484.1 (-65.7)	452.2 (-97.6)
Lead	0.05	0.04 (-0.01)	0.04 (-0.01)	0.04 (-0.01)	0.04 (-0.01)

a/ All values are in tons per year. Values in parentheses are differences from emissions of criteria pollutants from the modeled existing conditions baseline, which reflects actual airport operations from October 2004 through September 2005.

CONCLUSIONS

Based on the results presented and discussed above, the modeling analysis for the Jackson Hole Airport shows the following:

NATIONAL AMBIENT AIR QUALITY STANDARDS ANALYSIS

- The baseline set of results represent the maximum impacts for all pollutants and all averaging-periods across all five cases (baseline and Alternative 1 and 2 for both future years) examined.
- As a percent of the standard based on baseline results, impacts range from a low of 12.4% for the total 1-hour carbon monoxide impact to a high of 98.3% for the total 24-hour particulate matter with diameters of 2.5 microns or less impact.
- Total impacts resulting from the National Ambient Air Quality Standards analysis are dominated by the background concentration values added to the model-predicted concentrations.
- National Ambient Air Quality Standards analysis result differences among alternatives are minor to non-existent. The biggest difference is for model-predicted annual average nitrogen dioxide where Alternative 2 maximum concentrations are approximately 40% higher than Alternative 1 maximum concentrations. However, for both alternatives the maximum model-predicted concentration impacts represent no greater than 15.6% of the National Ambient Air Quality Standards nitrogen dioxide.

CLASS I INCREMENT

- Differential results (alternative by year minus baseline) are well under the Class I increment standards for all pollutants and averaging periods and for all four cases (Alternatives 1 and 2 for both future years).
- Except for Alternative 2 particulate matter with diameters of 10 microns or less and particulate matter with diameters of 2.5 microns or less increment impacts for both future years, most Class I increment results reflect negative values indicating an increment expanding situation relative to the airport alone. This is due to reductions in overall emissions in the future years,
- Alternative-2 particulate matter with diameters of 10 microns or less and particulate matter with diameters of 2.5 microns or less Class I increment results for both future years indicate that marginal increment consumption is possible as a result of impacts from future particulate emissions relative to baseline emissions.
- Alternative-1 24-hour particulate matter with diameters of 10 microns or less and particulate matter with diameters of 2.5 microns or less Class I increment results show no discernable change.
- Except for the particulate matter with diameters of 10 microns or less and particulate matter with diameters of 2.5 microns or less results noted above, Class I increment assessment result differences among alternatives are minor to non-existent.

CLASS II INCREMENT

- Differential results (alternative by year minus baseline) are well under the Class II increment standards for all pollutants and averaging periods and for all four cases (Alternatives 1 and 2 for both future years).
- Except for Alternative 2 particulate matter with diameters of 10 microns or less and particulate matter with diameters of 2.5 microns or less and nitrogen dioxide increment impacts for both future years, all remaining Class II increment results reflect negative values indicating an increment expanding situation relative to the airport alone. This is due to reductions in overall emissions in the future years.
- Alternative-2 particulate matter with diameters of 10 microns or less and particulate matter with diameters of 2.5 microns or less Class II increment results for both future years indicate that marginal increment consumption is possible as a result of impacts from future particulate emissions relative to baseline emissions.
- Alternative-2 annual nitrogen dioxide Class II increment results for both future years indicate that marginal increment consumption is possible as a result of impacts from future nitrogen oxide emissions relative to baseline emissions.
- Except for the particulate matter with diameters of 10 microns or less and particulate matter with diameters of 2.5 microns or less and nitrogen dioxide results noted above, Class II increment assessment result differences among alternatives are minor to non-existent.

CLASS I VISIBILITY

- The Level 1 analysis using the most conservative worst-case inputs revealed results that exceeded the screening criterion for Delta E for all five cases (baseline plus Alternatives 1 and 2 for both future years).
- Furthermore, the Level 1 analysis revealed results that exceeded the screening criterion for green contrast for three cases (baseline plus Alternative 2 for both future years). As a result, a Level 2 screening analysis was necessary.
- The Level 2 analysis using site-specific meteorological data revealed results that did not exceed the screening criteria for all five cases (baseline plus Alternatives 1 and 2 for both future years).
- These results indicate that the airport currently does not and in the future will not contribute to visibility impairment in the Class I area.

DEPOSITION OF NITROGEN AND SULFUR IN HIGH ALTITUDE SENSITIVE LAKES

- The summary results in the table represent the maximum impact to any of the lakes included in the analysis across all baseline and Alternative 1 and 2 future years assessed.
- Modeled baseline existing conditions exceed the critical load values estimated for Grand Teton National Park. Baseline deposition results represent the worst-case impacts for all alternatives for both future years.
- As a percent of existing condition values, the worst-case baseline results represent 8.9% of the 5.8 kg/hectare/year level for total nitrogen and 2.2% of the 3.2 kg/hectare/year level for total sul-

fur. Both alternatives and future years results represent percentages less than the baseline condition.

- Alternative 2 results revealed total deposition levels for both total nitrogen and total sulfur to be worse than Alternative 1 results.

Jackson Hole Airport - Jackson Hole, WY
Air Quality Modeling Impact Analysis

TABLE 7-1A

MODEL PREDICTED IMPACTS FOR AQ STANDARDS ANALYSIS - BASELINE

Pollutant: SO2

Averaging Period	Rank		ALL JAC SOURCES						
			Predicted Impact	Receptor				Meteorology	
				UTM Coordinates		Relative Location			
				Easting	Northing	Distance	Direction	Day	Period
			(µg/m³)	(km)	(km)	(km)	(°)		
2004									
3-hour	MAX		136.1	521.38334	4827.3473	0.5	162	5-Nov	21
	HSH		129.4	521.36044	4827.3056	0.6	166	25-Dec	21
24-hour	MAX		39.3	520.86054	4828.1861	0.5	312	24-Nov	24
	HSH		37.7	520.86054	4828.1861	0.5	312	4-Sep	24
Annual	MAX		5.6	520.86054	4828.1861	0.5	312		2004
2005									
3-hour	MAX		142.9	521.33744	4827.2639	0.6	169	6-Oct	21
	HSH		*133.3*	521.31444	4827.2222	0.6	172	17-Dec	18
24-hour	MAX		39.9	521.36044	4827.3056	0.6	166	9-Nov	24
	HSH		35.4	521.36044	4827.3056	0.6	166	6-Oct	24
Annual	MAX		6.9	520.86054	4828.1861	0.5	312		2005
2006									
3-hour	MAX		**178.8**	521.52064	4827.64661	0.4	126	6-Apr	21
	HSH		121.1	521.45224	4827.47231	0.5	149	20-Dec	21
24-hour	MAX		**43.4**	521.47524	4827.51401	0.4	144	29-Dec	24
	HSH		*38.0*	520.86054	4828.1861	0.5	312	28-Nov	24
Annual	MAX		**9.0**	520.86054	4828.1861	0.5	312		2006
2007									
3-hour	MAX		166.7	521.45224	4827.47231	0.5	149	14-Nov	21
	HSH		117.0	521.38334	4827.3473	0.5	162	14-Dec	21
24-hour	MAX		40.2	521.38334	4827.3473	0.5	162	2-Jan	24
	HSH		36.3	521.45224	4827.47231	0.5	149	14-Nov	24
Annual	MAX		8.9	520.86054	4828.1861	0.5	312		2007
2008									
3-hour	MAX		156.5	521.47524	4827.51401	0.4	144	16-Jan	21
	HSH		114.7	521.40634	4827.389	0.5	159	2-Jan	21
24-hour	MAX		42.0	521.36044	4827.3056	0.6	166	10-Dec	24
	HSH		36.2	521.36044	4827.3056	0.6	166	5-Dec	24
Annual	MAX		7.8	520.86054	4828.1861	0.5	312		2008

Notes:
1. Receptor relative distance and direction are calculated based on an average center locus of the airport with the coordinates:
521.22 km Easting
4827.864 km Northing

TABLE 7-1B

MODEL PREDICTED IMPACTS FOR AQ STANDARDS ANALYSIS - ALT-1/2015

Pollutant:	SO2

Averaging Period	Rank	ALL JAC SOURCES - FUTURE ALT-1 2015 Predicted Impact ($\mu g/m^3$)	Receptor UTM Coordinates Easting (km)	Receptor UTM Coordinates Northing (km)	Receptor Relative Location Distance (km)	Receptor Relative Location Direction (°)	Meteorology Day	Meteorology Period
2004								
3-hour	MAX	95.0	520.935	4828.252	0.5	324	3-Sep	21
	HSH	82.8	520.861	4828.186	0.5	312	4-Sep	18
24-hour	MAX	**36.5**	520.861	4828.186	0.5	312	24-Nov	24
	HSH	36.1	520.861	4828.186	0.5	312	4-Sep	24
Annual	MAX	0.7	520.861	4828.186	0.5	312		2004
2005								
3-hour	MAX	108.2	520.861	4828.186	0.5	312	7-May	21
	HSH	79.8	520.861	4828.186	0.5	312	24-Sep	9
24-hour	MAX	31.7	520.861	4828.186	0.5	312	9-Jun	24
	HSH	25.9	520.861	4828.186	0.5	312	7-May	24
Annual	MAX	0.8	520.861	4828.186	0.5	312		2005
2006								
3-hour	MAX	**121.5**	520.823	4828.153	0.5	306	27-Nov	3
	HSH	86.3	520.861	4828.186	0.5	312	10-Dec	15
24-hour	MAX	36.1	520.861	4828.186	0.5	312	28-Nov	24
	HSH	34.6	520.861	4828.186	0.5	312	15-Mar	24
Annual	MAX	1.0	520.861	4828.186	0.5	312		2006
2007								
3-hour	MAX	98.3	520.861	4828.186	0.5	312	19-Aug	21
	HSH	91.4	520.861	4828.186	0.5	312	26-Mar	9
24-hour	MAX	31.8	520.861	4828.186	0.5	312	25-Sep	24
	HSH	31.4	520.861	4828.186	0.5	312	6-Dec	24
Annual	MAX	**1.0**	520.861	4828.186	0.5	312		2007
2008								
3-hour	MAX	91.0	520.823	4828.153	0.5	306	3-Feb	15
	HSH	84.1	520.823	4828.153	0.5	306	25-Oct	21
24-hour	MAX	31.0	520.861	4828.186	0.5	312	14-Mar	24
	HSH	30.2	520.861	4828.186	0.5	312	1-Sep	24
Annual	MAX	0.9	520.861	4828.186	0.5	312		2008

Notes:
1. Receptor relative distance and direction are calculated based on an average center locus of the airport with the coordinates:
521.22 km Easting
4827.864 km Northing

TABLE 7-1C

MODEL PREDICTED IMPACTS FOR AQ STANDARDS ANALYSIS - ALT-1/2025

Pollutant: SO2

Averaging Period	Rank	ALL JAC SOURCES - FUTURE ALT-1 2025: Predicted Impact	Receptor: UTM Coordinates: Easting	Northing	Relative Location: Distance	Direction	Meteorology: Day	Period
		(μg/m³)	(km)	(km)	(km)	(°)		
2004								
3-hour	MAX	95.0	520.935	4828.252	0.5	324	3-Sep	21
	HSH	82.9	520.861	4828.186	0.5	312	4-Sep	18
24-hour	MAX	**36.6**	520.861	4828.186	0.5	312	24-Nov	24
	HSH	36.2	520.861	4828.186	0.5	312	4-Sep	24
Annual	MAX	0.7	520.861	4828.186	0.5	312		2004
2005								
3-hour	MAX	108.4	520.861	4828.186	0.5	312	7-May	21
	HSH	79.8	520.861	4828.186	0.5	312	24-Sep	9
24-hour	MAX	31.8	520.861	4828.186	0.5	312	9-Jun	24
	HSH	25.9	520.861	4828.186	0.5	312	7-May	24
Annual	MAX	0.8	520.861	4828.186	0.5	312		2005
2006								
3-hour	MAX	**121.5**	520.823	4828.153	0.5	306	27-Nov	3
	HSH	86.3	520.861	4828.186	0.5	312	10-Dec	15
24-hour	MAX	36.1	520.861	4828.186	0.5	312	28-Nov	24
	HSH	34.6	520.861	4828.186	0.5	312	15-Mar	24
Annual	MAX	1.0	520.861	4828.186	0.5	312		2006
2007								
3-hour	MAX	98.4	520.861	4828.186	0.5	312	19-Aug	21
	HSH	91.4	520.861	4828.186	0.5	312	26-Mar	9
24-hour	MAX	31.8	520.861	4828.186	0.5	312	25-Sep	24
	HSH	31.4	520.861	4828.186	0.5	312	6-Dec	24
Annual	MAX	**1.0**	520.861	4828.186	0.5	312		2007
2008								
3-hour	MAX	91.0	520.823	4828.153	0.5	306	3-Feb	15
	HSH	84.1	520.823	4828.153	0.5	306	25-Oct	21
24-hour	MAX	31.0	520.861	4828.186	0.5	312	14-Mar	24
	HSH	30.2	520.861	4828.186	0.5	312	1-Sep	24
Annual	MAX	0.9	520.861	4828.186	0.5	312		2008

Notes:
1. Receptor relative distance and direction are calculated based on an average center locus of the airport with the coordinates:
521.22 km Easting
4827.864 km Northing

TABLE 7-1D

MODEL PREDICTED IMPACTS FOR AQ STANDARDS ANALYSIS - ALT-2/2015

Pollutant: SO2

Averaging Period	Rank	ALL JAC SOURCES - FUTURE ALT-2 2015: Predicted Impact ($\mu g/m^3$)	Receptor: UTM Coordinates: Easting (km)	Receptor: UTM Coordinates: Northing (km)	Receptor: Relative Location: Distance (km)	Receptor: Relative Location: Direction (°)	Meteorology: Day	Meteorology: Period
2004								
3-hour	MAX	95.0	520.935	4828.252	0.5	324	3-Sep	21
	HSH	83.3	520.861	4828.186	0.5	312	4-Sep	18
24-hour	MAX	36.8	520.861	4828.186	0.5	312	24-Nov	24
	HSH	36.6	520.861	4828.186	0.5	312	4-Sep	24
Annual	MAX	1.1	521.360	4827.306	0.6	166		2004
2005								
3-hour	MAX	112.2	520.861	4828.186	0.5	312	7-May	21
	HSH	80.1	520.861	4828.186	0.5	312	24-Sep	9
24-hour	MAX	31.9	520.861	4828.186	0.5	312	9-Jun	24
	HSH	26.6	520.861	4828.186	0.5	312	7-May	24
Annual	MAX	1.2	521.360	4827.306	0.6	166		2005
2006								
3-hour	MAX	121.5	520.823	4828.153	0.5	306	27-Nov	3
	HSH	86.8	520.861	4828.186	0.5	312	10-Dec	15
24-hour	MAX	36.5	520.861	4828.186	0.5	312	28-Nov	24
	HSH	35.0	520.861	4828.186	0.5	312	15-Mar	24
Annual	MAX	1.2	520.861	4828.186	0.5	312		2006
2007								
3-hour	MAX	103.1	520.861	4828.186	0.5	312	19-Aug	21
	HSH	91.8	520.861	4828.186	0.5	312	26-Mar	9
24-hour	MAX	32.3	520.861	4828.186	0.5	312	2-Feb	24
	HSH	32.2	520.861	4828.186	0.5	312	25-Sep	24
Annual	MAX	1.3	520.861	4828.186	0.5	312		2007
2008								
3-hour	MAX	92.0	520.823	4828.153	0.5	306	3-Feb	15
	HSH	85.6	520.823	4828.153	0.5	306	25-Oct	21
24-hour	MAX	31.4	520.861	4828.186	0.5	312	14-Mar	24
	HSH	30.4	520.861	4828.186	0.5	312	1-Sep	24
Annual	MAX	1.1	520.861	4828.186	0.5	312		2008

Notes:
1. Receptor relative distance and direction are calculated based on an average center locus of the airport with the coordinates:
521.22 km Easting
4827.864 km Northing

TABLE 7-1E

MODEL PREDICTED IMPACTS FOR AQ STANDARDS ANALYSIS - ALT-2/2025

Pollutant: SO2

Averaging Period	Rank	Predicted Impact (μg/m³)	Receptor UTM Coordinates Easting (km)	Receptor UTM Coordinates Northing (km)	Relative Location Distance (km)	Relative Location Direction (°)	Meteorology Day	Meteorology Period
		ALL JAC SOURCES - FUTURE ALT-2 2025						
2004								
3-hour	MAX	95.0	520.935	4828.252	0.5	324	3-Sep	21
	HSH	83.4	520.861	4828.186	0.5	312	4-Sep	18
24-hour	MAX	**36.8**	520.861	4828.186	0.5	312	24-Nov	24
	HSH	36.6	520.861	4828.186	0.5	312	4-Sep	24
Annual	MAX	1.1	521.360	4827.306	0.6	166		2004
2005								
3-hour	MAX	112.4	520.861	4828.186	0.5	312	7-May	21
	HSH	80.1	520.861	4828.186	0.5	312	24-Sep	9
24-hour	MAX	31.9	520.861	4828.186	0.5	312	9-Jun	24
	HSH	26.7	520.861	4828.186	0.5	312	7-May	24
Annual	MAX	1.2	521.360	4827.306	0.6	166		2005
2006								
3-hour	MAX	**121.5**	520.823	4828.153	0.5	306	27-Nov	3
	HSH	86.8	520.861	4828.186	0.5	312	10-Dec	15
24-hour	MAX	36.5	520.861	4828.186	0.5	312	28-Nov	24
	HSH	35.0	520.861	4828.186	0.5	312	15-Mar	24
Annual	MAX	1.3	520.861	4828.186	0.5	312		2006
2007								
3-hour	MAX	103.3	520.861	4828.186	0.5	312	19-Aug	21
	HSH	91.8	520.861	4828.186	0.5	312	26-Mar	9
24-hour	MAX	32.3	520.861	4828.186	0.5	312	2-Feb	24
	HSH	32.2	520.861	4828.186	0.5	312	25-Sep	24
Annual	MAX	**1.3**	520.861	4828.186	0.5	312		2007
2008								
3-hour	MAX	92.0	520.823	4828.153	0.5	306	3-Feb	15
	HSH	85.6	520.823	4828.153	0.5	306	25-Oct	21
24-hour	MAX	31.4	520.861	4828.186	0.5	312	14-Mar	24
	HSH	30.4	520.861	4828.186	0.5	312	1-Sep	24
Annual	MAX	1.1	520.861	4828.186	0.5	312		2008

Notes:
1. Receptor relative distance and direction are calculated based on an average center locus of the airport with the coordinates:
521.22 km Easting
4827.864 km Northing

TABLE 7-2A

MODEL PREDICTED IMPACTS FOR AQ STANDARDS ANALYSIS - BASELINE

Pollutant: PM10

Averaging Period	Rank	ALL JAC SOURCES: Predicted Impact	Receptor: UTM Coordinates: Easting	Northing	Relative Location: Distance	Direction	Meteorology: Day	Period
		($\mu g/m^3$)	(km)	(km)	(km)	(°)		
2004								
24-hour	MAX	6.9	520.86054	4828.1861	0.5	312	11-Dec	24
	HSH	6.4	520.86054	4828.1861	0.5	312	24-Nov	24
Annual	MAX	0.3	520.86054	4828.1861	0.5	312		2004
2005								
24-hour	MAX	7.9	520.86054	4828.1861	0.5	312	5-Nov	24
	HSH	7.1	520.86054	4828.1861	0.5	312	31-Oct	24
Annual	MAX	0.4	520.86054	4828.1861	0.5	312		2005
2006								
24-hour	MAX	**11.1**	520.71114	4828.0536	0.5	290	8-Nov	24
	HSH	*8.4*	520.71114	4828.0536	0.5	290	12-Dec	24
Annual	MAX	**0.5**	520.86054	4828.1861	0.5	312		2006
2007								
24-hour	MAX	8.8	520.71114	4828.0536	0.5	290	8-Jan	24
	HSH	8.3	520.71114	4828.0536	0.5	290	31-Dec	24
Annual	MAX	0.5	520.86054	4828.1861	0.5	312		2007
2008								
24-hour	MAX	8.1	520.71114	4828.0536	0.5	290	11-Jan	24
	HSH	7.8	520.71114	4828.0536	0.5	290	29-Nov	24
Annual	MAX	0.4	520.86054	4828.1861	0.5	312		2008

Notes:
1. Receptor relative distance and direction are calculated based on an average center locus of the airport with the coordinates:
521.22 km Easting
4827.864 km Northing

Jackson Hole Airport - Jackson Hole, WY
Air Quality Modeling Impact Analysis

TABLE 7-2B

MODEL PREDICTED IMPACTS FOR AQ STANDARDS ANALYSIS - ALT-1/2015

Pollutant: PM10

Averaging Period	Rank	ALL JAC SOURCES FUTURE ALT-1 2015						
		Predicted Impact	Receptor				Meteorology	
			UTM Coordinates		Relative Location			
			Easting	Northing	Distance	Direction	Day	Period
		(μg/m³)	(km)	(km)	(km)	(°)		
2004								
24-hour	MAX	6.9	520.861	4828.186	0.5	312	11-Dec	24
	HSH	6.4	520.861	4828.186	0.5	312	24-Nov	24
Annual	MAX	0.3	520.861	4828.186	0.5	312		2004
2005								
24-hour	MAX	7.9	520.861	4828.186	0.5	312	5-Nov	24
	HSH	7.1	520.861	4828.186	0.5	312	31-Oct	24
Annual	MAX	0.4	520.861	4828.186	0.5	312		2005
2006								
24-hour	MAX	11.1	520.711	4828.054	0.5	290	8-Nov	24
	HSH	8.4	520.711	4828.054	0.5	290	12-Dec	24
Annual	MAX	0.4	520.861	4828.186	0.5	312		2006
2007								
24-hour	MAX	8.8	520.711	4828.054	0.5	290	8-Jan	24
	HSH	8.2	520.711	4828.054	0.5	290	31-Dec	24
Annual	MAX	0.4	520.861	4828.186	0.5	312		2007
2008								
24-hour	MAX	8.1	520.711	4828.054	0.5	290	11-Jan	24
	HSH	7.8	520.711	4828.054	0.5	290	29-Jan	24
Annual	MAX	0.4	520.861	4828.186	0.5	312		2008

Notes:
1. Receptor relative distance and direction are calculated based on an average center locus of the airport with the coordinates:
521.22 km Easting
4827.864 km Northing

TABLE 7-2C

MODEL PREDICTED IMPACTS FOR AQ STANDARDS ANALYSIS - ALT-1/2025

Pollutant: PM10

Averaging Period	Rank	ALL JAC SOURCES FUTURE ALT-1 2025						
		Predicted Impact	Receptor				Meteorology	
			UTM Coordinates		Relative Location			
			Easting	Northing	Distance	Direction	Day	Period
		(μg/m³)	(km)	(km)	(km)	(°)		
2004								
24-hour	MAX	6.9	520.861	4828.186	0.5	312	11-Dec	24
	HSH	6.4	520.861	4828.186	0.5	312	24-Nov	24
Annual	MAX	0.3	520.861	4828.186	0.5	312		2004
2005								
24-hour	MAX	7.9	520.861	4828.186	0.5	312	5-Nov	24
	HSH	7.1	520.861	4828.186	0.5	312	31-Oct	24
Annual	MAX	0.4	520.861	4828.186	0.5	312		2005
2006								
24-hour	MAX	11.1	520.711	4828.054	0.5	290	8-Nov	24
	HSH	8.4	520.711	4828.054	0.5	290	12-Dec	24
Annual	MAX	0.4	520.861	4828.186	0.5	312		2006
2007								
24-hour	MAX	8.8	520.711	4828.054	0.5	290	8-Jan	24
	HSH	8.2	520.711	4828.054	0.5	290	31-Dec	24
Annual	MAX	0.4	520.861	4828.186	0.5	312		2007
2008								
24-hour	MAX	8.1	520.711	4828.054	0.5	290	11-Jan	24
	HSH	7.8	520.711	4828.054	0.5	290	29-Jan	24
Annual	MAX	0.4	520.861	4828.186	0.5	312		2008

Notes:
1. Receptor relative distance and direction are calculated based on an average center locus of the airport with the coordinates:
521.22 km Easting
4827.864 km Northing

TABLE 7-2D

MODEL PREDICTED IMPACTS FOR AQ STANDARDS ANALYSIS - ALT-2/2015

Pollutant: PM10

Averaging Period	Rank	Predicted Impact (µg/m³)	Receptor UTM Coordinates Easting (km)	Receptor UTM Coordinates Northing (km)	Receptor Relative Location Distance (km)	Receptor Relative Location Direction (°)	Meteorology Day	Meteorology Period
		ALL JAC SOURCES FUTURE ALT-2 2015						
2004								
24-hour	MAX	6.9	520.861	4828.186	0.5	312	11-Dec	24
	HSH	6.4	520.861	4828.186	0.5	312	24-Nov	24
Annual	MAX	0.3	520.861	4828.186	0.5	312		2004
2005								
24-hour	MAX	7.9	520.861	4828.186	0.5	312	5-Nov	24
	HSH	7.1	520.861	4828.186	0.5	312	31-Oct	24
Annual	MAX	0.4	520.861	4828.186	0.5	312		2005
2006								
24-hour	MAX	**11.1**	520.711	4828.054	0.5	290	8-Nov	24
	HSH	8.4	520.711	4828.054	0.5	290	12-Dec	24
Annual	MAX	**0.5**	520.861	4828.186	0.5	312		2006
2007								
24-hour	MAX	8.8	520.711	4828.054	0.5	290	8-Jan	24
	HSH	8.3	520.711	4828.054	0.5	290	31-Dec	24
Annual	MAX	0.5	520.861	4828.186	0.5	312		2007
2008								
24-hour	MAX	8.1	520.711	4828.054	0.5	290	11-Jan	24
	HSH	7.8	520.711	4828.054	0.5	290	29-Jan	24
Annual	MAX	0.4	520.861	4828.186	0.5	312		2008

Notes:
1. Receptor relative distance and direction are calculated based on an average center locus of the airport with the coordinates:
521.22 km Easting
4827.864 km Northing

TABLE 7-2E

MODEL PREDICTED IMPACTS FOR AQ STANDARDS ANALYSIS - ALT-2/2025

Pollutant: PM10

Averaging Period	Rank	ALL JAC SOURCES FUTURE ALT-2 2025						
		Predicted Impact	Receptor				Meteorology	
			UTM Coordinates		Relative Location			
			Easting	Northing	Distance	Direction	Day	Period
		($\mu g/m^3$)	(km)	(km)	(km)	(°)		
2004								
24-hour	MAX	6.9	520.861	4828.186	0.5	312	11-Dec	24
	HSH	6.4	520.861	4828.186	0.5	312	24-Nov	24
Annual	MAX	0.3	520.861	4828.186	0.5	312		2004
2005								
24-hour	MAX	7.9	520.861	4828.186	0.5	312	5-Nov	24
	HSH	7.1	520.861	4828.186	0.5	312	31-Oct	24
Annual	MAX	0.4	520.861	4828.186	0.5	312		2005
2006								
24-hour	MAX	**11.1**	520.711	4828.054	0.5	290	8-Nov	24
	HSH	8.4	520.711	4828.054	0.5	290	12-Dec	24
Annual	MAX	**0.5**	520.861	4828.186	0.5	312		2006
2007								
24-hour	MAX	8.8	520.711	4828.054	0.5	290	8-Jan	24
	HSH	8.3	520.711	4828.054	0.5	290	31-Dec	24
Annual	MAX	0.5	520.861	4828.186	0.5	312		2007
2008								
24-hour	MAX	8.1	520.711	4828.054	0.5	290	11-Jan	24
	HSH	7.8	520.711	4828.054	0.5	290	29-Jan	24
Annual	MAX	0.4	520.861	4828.186	0.5	312		2008

Notes:
1. Receptor relative distance and direction are calculated based on an average center locus of the airport with the coordinates:
521.22 km Easting
4827.864 km Northing

TABLE 7-3A

MODEL PREDICTED IMPACTS FOR AQ STANDARDS ANALYSIS - BASELINE

Pollutant: CO

Averaging Period	Rank	ALL JAC SOURCES						
		Predicted Impact	Receptor				Meteorology	
			UTM Coordinates		Relative Location			
			Easting	Northing	Distance	Direction	Day	Period
		($\mu g/m^3$)	(km)	(km)	(km)	(°)		
2004								
1-hour	MAX	3095.9	520.700	4826.400	1.6	200	3-Jan	8
	HSH	*2519.1*	520.800	4826.700	1.2	200	4-Feb	8
8-hour	MAX	836.3	521.797	4828.823	1.1	31	3-Sep	24
	HSH	674.0	520.900	4826.700	1.2	195	17-Jan	24
2005								
1-hour	MAX	2519.2	520.800	4826.700	1.2	200	5-Jan	17
	HSH	2500.4	520.800	4826.700	1.2	200	3-Jan	22
8-hour	MAX	**1241.0**	520.879	4826.786	1.1	198	10-Dec	24
	HSH	795.7	521.000	4826.700	1.2	191	17-Jan	24
2006								
1-hour	MAX	**3136.4**	520.740	4826.757	1.2	203	12-Oct	8
	HSH	2414.9	520.700	4826.600	1.4	202	8-Jan	19
8-hour	MAX	613.7	521.154	4826.931	0.9	184	24-Sep	24
	HSH	544.4	521.154	4826.931	0.9	184	8-Oct	24
2007								
1-hour	MAX	2521.8	520.800	4826.700	1.2	200	25-Jan	22
	HSH	2498.1	520.800	4826.700	1.2	200	29-Jan	21
8-hour	MAX	868.4	520.900	4826.700	1.2	195	25-Jan	24
	HSH	643.0	520.923	4826.770	1.1	195	30-Dec	24
2008								
1-hour	MAX	2928.1	520.700	4826.700	1.3	204	24-Nov	20
	HSH	2416.0	520.900	4826.700	1.2	195	17-Nov	19
8-hour	MAX	1093.4	520.835	4826.801	1.1	200	17-Nov	24
	HSH	*883.8*	520.700	4826.700	1.3	204	17-Nov	24

Notes:
1. Receptor relative distance and direction are calculated based on an average center locus of the airport with the coordinates:
521.22 km Easting
4827.864 km Northing

Jackson Hole Airport - Jackson Hole, WY
Air Quality Modeling Impact Analysis

TABLE 7-3B

MODEL PREDICTED IMPACTS FOR AQ STANDARDS ANALYSIS - ALT-1/2015

Pollutant: CO

Averaging Period	Rank	ALL JAC SOURCES FUTURE ALT-1 2015						
		Predicted Impact	Receptor				Meteorology	
			UTM Coordinates		Relative Location			
			Easting	Northing	Distance	Direction	Day	Period
		($\mu g/m^3$)	(km)	(km)	(km)	(°)		
2004								
1-hour	MAX	2173.9	520.700	4826.400	1.6	200	3-Jan	8
	HSH	1768.9	520.800	4826.700	1.2	200	4-Feb	8
8-hour	MAX	587.3	521.797	4828.823	1.1	31	3-Sep	24
	HSH	472.4	520.900	4826.700	1.2	195	17-Jan	24
2005								
1-hour	MAX	1769.0	520.800	4826.700	1.2	200	5-Jan	17
	HSH	1755.8	520.800	4826.700	1.2	200	3-Jan	22
8-hour	MAX	**871.5**	520.879	4826.786	1.1	198	10-Dec	24
	HSH	557.3	521.000	4826.700	1.2	191	17-Jan	24
2006								
1-hour	MAX	**2202.4**	520.740	4826.757	1.2	203	12-Oct	8
	HSH	1695.8	520.700	4826.600	1.4	202	8-Jan	19
8-hour	MAX	431.8	521.154	4826.931	0.9	184	24-Sep	24
	HSH	382.7	521.154	4826.931	0.9	184	8-Oct	24
2007								
1-hour	MAX	1770.8	520.800	4826.700	1.2	200	25-Jan	22
	HSH	1754.2	520.800	4826.700	1.2	200	29-Jan	21
8-hour	MAX	610.2	520.900	4826.700	1.2	195	25-Jan	24
	HSH	452.0	520.923	4826.770	1.1	195	30-Dec	24
2008								
1-hour	MAX	2056.0	520.700	4826.700	1.3	204	24-Nov	20
	HSH	1696.6	520.900	4826.700	1.2	195	17-Nov	19
8-hour	MAX	768.5	520.835	4826.801	1.1	200	17-Nov	24
	HSH	620.8	520.700	4826.700	1.3	204	17-Nov	24

Notes:
1. Receptor relative distance and direction are calculated based on an average center locus of the airport with the coordinates:
521.22 km Easting
4827.864 km Northing

Jackson Hole Airport - Jackson Hole, WY
Air Quality Modeling Impact Analysis

TABLE 7-3C

MODEL PREDICTED IMPACTS FOR AQ STANDARDS ANALYSIS - ALT-1/2025

Pollutant: CO

Averaging Period	Rank	ALL JAC SOURCES FUTURE ALT-1 2015 Predicted Impact ($\mu g/m^3$)	Receptor UTM Coordinates Easting (km)	Receptor UTM Coordinates Northing (km)	Receptor Relative Location Distance (km)	Receptor Relative Location Direction (°)	Meteorology Day	Meteorology Period
2004								
1-hour	MAX	2133.9	520.700	4826.400	1.6	200	3-Jan	8
	HSH	1736.4	520.800	4826.700	1.2	200	4-Feb	8
8-hour	MAX	576.5	521.797	4828.823	1.1	31	3-Sep	24
	HSH	463.5	520.900	4826.700	1.2	195	17-Jan	24
2005								
1-hour	MAX	1736.5	520.800	4826.700	1.2	200	5-Jan	17
	HSH	1723.5	520.800	4826.700	1.2	200	3-Jan	22
8-hour	MAX	**855.5**	520.879	4826.786	1.1	198	10-Dec	24
	HSH	546.8	521.000	4826.700	1.2	191	17-Jan	24
2006								
1-hour	MAX	**2161.9**	520.740	4826.757	1.2	203	12-Oct	8
	HSH	1664.6	520.700	4826.600	1.4	202	8-Jan	19
8-hour	MAX	423.9	521.154	4826.931	0.9	184	24-Sep	24
	HSH	375.6	521.154	4826.931	0.9	184	8-Oct	24
2007								
1-hour	MAX	1738.2	520.800	4826.700	1.2	200	25-Jan	22
	HSH	1721.9	520.800	4826.700	1.2	200	29-Jan	21
8-hour	MAX	599.0	520.900	4826.700	1.2	195	25-Jan	24
	HSH	443.7	520.923	4826.770	1.1	195	30-Dec	24
2008								
1-hour	MAX	2018.2	520.700	4826.700	1.3	204	24-Nov	20
	HSH	1665.4	520.900	4826.700	1.2	195	17-Nov	19
8-hour	MAX	754.4	520.835	4826.801	1.1	200	17-Nov	24
	HSH	609.4	520.700	4826.700	1.3	204	17-Nov	24

Notes:
1. Receptor relative distance and direction are calculated based on an average center locus of the airport with the coordinates:
521.22 km Easting
4827.864 km Northing

TABLE 7-3D

MODEL PREDICTED IMPACTS FOR AQ STANDARDS ANALYSIS - ALT-2/2015

Pollutant: CO

Averaging Period	Rank	Predicted Impact ($\mu g/m^3$)	Receptor UTM Coordinates Easting (km)	Receptor UTM Coordinates Northing (km)	Receptor Relative Location Distance (km)	Receptor Relative Location Direction (°)	Meteorology Day	Meteorology Period
		ALL JAC SOURCES FUTURE ALT-2 2015						
2004								
1-hour	MAX	2734.2	520.700	4826.400	1.6	200	3-Jan	8
	HSH	2224.9	520.800	4826.700	1.2	200	4-Feb	8
8-hour	MAX	738.7	521.797	4828.823	1.1	31	3-Sep	24
	HSH	594.1	520.900	4826.700	1.2	195	17-Jan	24
2005								
1-hour	MAX	2224.9	520.800	4826.700	1.2	200	5-Jan	17
	HSH	2208.4	520.800	4826.700	1.2	200	3-Jan	22
8-hour	MAX	**1096.1**	520.879	4826.786	1.1	198	10-Dec	24
	HSH	701.4	521.000	4826.700	1.2	191	17-Jan	24
2006								
1-hour	MAX	**2770.0**	520.740	4826.757	1.2	203	12-Oct	8
	HSH	2132.8	520.700	4826.600	1.4	202	8-Jan	19
8-hour	MAX	542.3	521.154	4826.931	0.9	184	24-Sep	24
	HSH	481.0	521.154	4826.931	0.9	184	8-Oct	24
2007								
1-hour	MAX	2227.2	520.800	4826.700	1.2	200	25-Jan	22
	HSH	2206.3	520.800	4826.700	1.2	200	29-Jan	21
8-hour	MAX	767.1	520.900	4826.700	1.2	195	25-Jan	24
	HSH	568.1	520.923	4826.770	1.1	195	30-Dec	24
2008								
1-hour	MAX	2586.0	520.700	4826.700	1.3	204	24-Nov	20
	HSH	2133.8	520.900	4826.700	1.2	195	17-Nov	19
8-hour	MAX	965.9	520.835	4826.801	1.1	200	17-Nov	24
	HSH	780.6	520.700	4826.700	1.3	204	17-Nov	24

Notes:
1. Receptor relative distance and direction are calculated based on an average center locus of the airport with the coordinates:
521.22 km Easting
4827.864 km Northing

TABLE 7-3E

MODEL PREDICTED IMPACTS FOR AQ STANDARDS ANALYSIS - ALT-2/2025

Pollutant: CO

ALL JAC SOURCES FUTURE ALT-2 2025

Averaging Period	Rank	Predicted Impact ($\mu g/m^3$)	Receptor UTM Coordinates Easting (km)	Receptor UTM Coordinates Northing (km)	Receptor Relative Location Distance (km)	Receptor Relative Location Direction (°)	Meteorology Day	Meteorology Period
2004								
1-hour	MAX	2553.7	520.700	4826.400	1.6	200	3-Jan	8
	HSH	2078.0	520.800	4826.700	1.2	200	4-Feb	8
8-hour	MAX	689.9	521.797	4828.823	1.1	31	3-Sep	24
	HSH	554.9	520.900	4826.700	1.2	195	17-Jan	24
2005								
1-hour	MAX	2078.0	520.800	4826.700	1.2	200	5-Jan	17
	HSH	2062.6	520.800	4826.700	1.2	200	3-Jan	22
8-hour	MAX	**1023.7**	520.879	4826.786	1.1	198	10-Dec	24
	HSH	655.0	521.000	4826.700	1.2	191	17-Jan	24
2006								
1-hour	MAX	**2587.1**	520.740	4826.757	1.2	203	12-Oct	8
	HSH	1992.0	520.700	4826.600	1.4	202	8-Jan	19
8-hour	MAX	506.7	521.154	4826.931	0.9	184	24-Sep	24
	HSH	449.3	521.154	4826.931	0.9	184	8-Oct	24
2007								
1-hour	MAX	2080.2	520.800	4826.700	1.2	200	25-Jan	22
	HSH	2060.6	520.800	4826.700	1.2	200	29-Jan	21
8-hour	MAX	716.6	520.900	4826.700	1.2	195	25-Jan	24
	HSH	530.7	520.923	4826.770	1.1	195	30-Dec	24
2008								
1-hour	MAX	2415.2	520.700	4826.700	1.3	204	24-Nov	20
	HSH	1993.0	520.900	4826.700	1.2	195	17-Nov	19
8-hour	MAX	902.3	520.835	4826.801	1.1	200	17-Nov	24
	HSH	729.2	520.700	4826.700	1.3	204	17-Nov	24

Notes:
1. Receptor relative distance and direction are calculated based on an average center locus of the airport with the coordinates:
521.22 km Easting
4827.864 km Northing

TABLE 7-4A

MODEL PREDICTED IMPACTS FOR AQ STANDARDS ANALYSIS - BASELINE

Pollutant: **NOx**

Averaging Period	Rank	ALL JAC SOURCES: Predicted Impact	Receptor: UTM Coordinates: Easting	Receptor: UTM Coordinates: Northing	Receptor: Relative Location: Distance	Receptor: Relative Location: Direction	Meteorology: Day	Meteorology: Period
		(μg/m³)	(km)	(km)	(km)	(°)		
2004								
Annual	MAX	11.4	521.518	4827.893	0.3	84		2004
2005								
Annual	MAX	11.5	521.518	4827.893	0.3	84		2005
2006								
Annual	MAX	9.9	521.406	4827.389	0.5	159		2006
2007								
Annual	MAX	9.9	521.452	4827.472	0.5	149		2007
2008								
Annual	MAX	9.2	521.518	4827.893	0.3	84		2008

Notes:
1. Receptor relative distance and direction are calculated based on an average center locus of the airport with the coordinates:
521.22 km Easting
4827.864 km Northing

TABLE 7-4B

MODEL PREDICTED IMPACTS FOR AQ STANDARDS ANALYSIS - ALT-1/2015

Pollutant: **NOx**

Averaging Period	Rank	ALL JAC SOURCES FUTURE ALT-1 2015: Predicted Impact ($\mu g/m^3$)	Receptor: UTM Coordinates: Easting (km)	Receptor: UTM Coordinates: Northing (km)	Receptor: Relative Location: Distance (km)	Receptor: Relative Location: Direction (°)	Meteorology: Day	Meteorology: Period
2004								
Annual	MAX	5.3	521.518	4827.844	0.3	94		2004
2005								
Annual	MAX	5.2	521.518	4827.893	0.3	84		2005
2006								
Annual	MAX	5.5	520.861	4828.186	0.5	312		2006
2007								
Annual	MAX	5.4	520.861	4828.186	0.5	312		2007
2008								
Annual	MAX	5.0	520.861	4828.186	0.5	312		2008

Notes:
1. Receptor relative distance and direction are calculated based on an average center locus of the airport with the coordinates:
521.22 km Easting
4827.864 km Northing

Jackson Hole Airport - Jackson Hole, WY
Air Quality Modeling Impact Analysis

TABLE 7-4C

MODEL PREDICTED IMPACTS FOR AQ STANDARDS ANALYSIS - ALT-1/2025

Pollutant:	NOx

Averaging Period	Rank	ALL JAC SOURCES FUTURE ALT-1 2025						
		Predicted Impact	Receptor				Meteorology	
			UTM Coordinates		Relative Location			
			Easting	Northing	Distance	Direction	Day	Period
		(μg/m^3)	(km)	(km)	(km)	(°)		
2004								
Annual	MAX	5.2	521.518	4827.844	0.3	94		2004
2005								
Annual	MAX	5.1	521.518	4827.893	0.3	84		2005
2006								
Annual	MAX	5.5	520.861	4828.186	0.5	312		2006
2007								
Annual	MAX	5.3	520.861	4828.186	0.5	312		2007
2008								
Annual	MAX	5.0	520.861	4828.186	0.5	312		2008

Notes:
1. Receptor relative distance and direction are calculated based on an average center locus of the airport with the coordinates:
521.22 km Easting
4827.864 km Northing

TABLE 7-4D

MODEL PREDICTED IMPACTS FOR AQ STANDARDS ANALYSIS - ALT-2/2015

Pollutant: NOx

		ALL JAC SOURCES FUTURE ALT-2 2015						
Averaging Period	Rank	Predicted Impact	Receptor				Meteorology	
			UTM Coordinates		Relative Location			
			Easting	Northing	Distance	Direction	Day	Period
		($\mu g/m^3$)	(km)	(km)	(km)	(°)		
2004								
Annual	MAX	10.0	521.518	4827.893	0.3	84		2004
2005								
Annual	MAX	10.0	521.518	4827.893	0.3	84		2005
2006								
Annual	MAX	8.5	521.406	4827.389	0.5	159		2006
2007								
Annual	MAX	8.3	521.406	4827.389	0.5	159		2007
2008								
Annual	MAX	8.0	521.518	4827.893	0.3	84		2008

Notes:
1. Receptor relative distance and direction are calculated based on an average center locus of the airport with the coordinates:
521.22 km Easting
4827.864 km Northing

Jackson Hole Airport - Jackson Hole, WY
Air Quality Modeling Impact Analysis

TABLE 7-4E

MODEL PREDICTED IMPACTS FOR AQ STANDARDS ANALYSIS - ALT-2/2025

Pollutant:	NOx

Averaging Period	Rank	Predicted Impact	Receptor				Meteorology	
			ALL JAC SOURCES FUTURE ALT-2 2025					
			UTM Coordinates		Relative Location			
			Easting	Northing	Distance	Direction	Day	Period
		($\mu g/m^3$)	(km)	(km)	(km)	(°)		
2004								
Annual	MAX	9.8	521.518	4827.893	0.3	84		2004
2005								
Annual	MAX	9.9	521.518	4827.893	0.3	84		2005
2006								
Annual	MAX	8.3	521.406	4827.389	0.5	159		2006
2007								
Annual	MAX	8.1	521.518	4827.893	0.3	84		2007
2008								
Annual	MAX	7.9	521.518	4827.893	0.3	84		2008

Notes:
1. Receptor relative distance and direction are calculated based on an average center locus of the airport with the coordinates:
521.22 km Easting
4827.864 km Northing

TABLE 7-5

MODEL PREDICTED IMPACTS FOR AQ STANDARDS ANALYSIS - All Cases

Pollutant: Lead

Averaging Period	Rank	Predicted Impact ($\mu g/m^3$)	ALL JAC SOURCES: Receptor – UTM Coordinates – Easting (km)	Northing (km)	Relative Location – Distance (km)	Direction (°)	Meteorology – Month	Year
Baseline								
Rolling 3-Month	MAX	0.008	521.154	4826.931	0.9	184	February	2005
Alt-1/2015								
Rolling 3-Month	MAX	0.008	521.154	4826.931	0.9	184	February	2005
Alt-1/2025								
Rolling 3-Month	MAX	0.008	521.154	4826.931	0.9	184	February	2005
Alt-2/2015								
Rolling 3-Month	MAX	0.008	521.154	4826.931	0.9	184	February	2005
Alt-2/2025								
Rolling 3-Month	MAX	0.008	521.154	4826.931	0.9	184	February	2005

Notes:
1. Receptor relative distance and direction are calculated based on an average center locus of the airport with the coordinates:
521.22 km Easting
4827.864 km Northing

TABLE 7-9

VISCREEN MODELING RESULTS USING WORST-CASE SHORT-TERM EMISSION RATE

Level 1: F Class Stability 1m/s	Criteria	Scenario: Baseline (PM: 0.58 ; NOx: 19.59)	Alt-1 2015 (PM: 0.50 ; NOx: 12.93)	Alt-1 2025 (PM: 0.50 ; NOx: 12.82)	Alt-2 2015 (PM: 0.59 ; NOx: 18.04)	Alt-2 2025 (PM: 0.59 ; NOx: 17.89)
Delta E Sky	2.0	8.201	5.669	5.626	7.634	7.579
Delta E Terrain	2.0	2.994	2.584	2.584	3.032	3.031
Contrast Sky	0.05	-0.059	-0.042 (DNE)	-0.041 (DNE)	-0.056	-0.055
Contrast Terrain	0.05	0.016 (DNE)	0.014 (DNE)	0.014 (DNE)	0.016 (DNE)	0.016 (DNE)

Level 2: F Class Stability 2m/s	Criteria	Scenario: Baseline (PM: 0.58 ; NOx: 19.59)	Alt-1 2015 (PM: 0.50 ; NOx: 12.93)	Alt-1 2025 (PM: 0.50 ; NOx: 12.82)	Alt-2 2015 (PM: 0.59 ; NOx: 18.04)	Alt-2 2025 (PM: 0.59 ; NOx: 17.89)
Delta E Sky	2.0	1.618 (DNE)	1.083 (DNE)	1.074 (DNE)	1.495 (DNE)	1.483 (DNE)
Delta E Terrain	2.0	0.574 (DNE)	0.477 (DNE)	0.476 (DNE)	0.573 (DNE)	0.572 (DNE)
Contrast Sky	0.05	-0.011 (DNE)	-0.008 (DNE)	-0.008 (DNE)	-0.011 (DNE)	-0.011 (DNE)
Contrast Terrain	0.05	0.005 (DNE)	0.004 (DNE)	0.004 (DNE)	0.005 (DNE)	0.005 (DNE)

1. Emissions shown above emission scenario are totals in tons per year (tpy)
2. Values above criteria are maximum values
3. DNE = did not exceed

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Jackson Hole Airport - Jackson Hole, WY
Air Quality Modeling Impact Analysis

TABLE 7-10A

Deposition Analysis - Baseline - Total Nitrogen

Lake Number	Name	Base (2005)	2004		2005		2006		2007		2008		Base (2005)	
			NO2 (ug/m3)	N Dep (kg/hectare/yr)	NO2 (ug/m3)	N Dep (kg/hectare/yr)	NO2 (ug/m3)	N Dep (kg/hectare/yr)	NO2 (ug/m3)	N Dep (kg/hectare/yr)	NO2 (ug/m3)	N Dep (kg/hectare/yr)	5-Yr Max	5-Yr Avg
1	Amphitheater Lake		0.0134	0.289468944	0.01162	0.251017099	0.01513	0.326840681	0.01533	0.331161113	0.01482	0.320144011	0.331161	0.303726
8	Coyote Lake		0.00596	0.128748874	0.00553	0.119459945	0.00732	0.158127811	0.00317	0.068478847	0.00754	0.162880286	0.16288	0.127539
10	Delta Lake		0.01408	0.304158413	0.01401	0.302646262	0.01668	0.360324029	0.01773	0.383006297	0.0149	0.321872184	0.383006	0.334401
13	Forget Me Not Lakes		0.00657	0.141926191	0.00626	0.135229522	0.00609	0.131557154	0.00428	0.092457245	0.0076	0.164176416	0.164176	0.133069
14	Forget Me Not Lakes		0.00627	0.135445543	0.00591	0.127668766	0.00607	0.131125111	0.00408	0.088136813	0.00742	0.160288027	0.160288	0.128533
22	Holly Lake		0.00895	0.193339332	0.0081	0.174977496	0.01002	0.216453643	0.01025	0.22142214	0.00985	0.212781276	0.221422	0.203795
23	Iceflow Lake		0.00867	0.187290727	0.01288	0.278235821	0.00867	0.187290727	0.01088	0.235031501	0.00788	0.170225021	0.278236	0.211615
24	Indian Lake		0.00502	0.108442843	0.00466	0.100666066	0.0072	0.155535552	0.00219	0.04730873	0.00677	0.146246623	0.155536	0.11164
27	Kit Lake		0.00979	0.211485146	0.01079	0.233087306	0.00742	0.160288027	0.01598	0.345202517	0.00739	0.159639962	0.345203	0.221941
28	Lake of the Crags		0.00907	0.195931591	0.01046	0.225958594	0.01059	0.228766874	0.0122	0.263546352	0.009	0.19441944	0.263546	0.221725
32	Marion Lake		0.00353	0.076255625	0.00301	0.065022502	0.00527	0.113843383	0.00211	0.045580558	0.00405	0.087488748	0.113843	0.077638
33	Mica Lake		0.00644	0.13911791	0.00941	0.203276326	0.00839	0.181242122	0.00884	0.190963094	0.00773	0.166984697	0.203276	0.176317
41	Noname-6		0.00876	0.189234922	0.01079	0.233087306	0.00994	0.21472547	0.00964	0.208244822	0.00654	0.141278126	0.233087	0.197314
42	Noname-7		0.00885	0.191179116	0.0111	0.239783976	0.01039	0.224446442	0.01024	0.221206118	0.0067	0.144734472	0.239784	0.20427
43	Noname-8		0.00464	0.100234022	0.00416	0.089864986	0.00512	0.110603059	0.00539	0.116435642	0.0048	0.103690368	0.116436	0.104166
44	Noname-9		0.00465	0.100450044	0.00439	0.094833482	0.00518	0.111899189	0.00541	0.116867686	0.00464	0.100234022	0.116868	0.104857
47	Noname-12		0.00429	0.092673266	0.00605	0.130693068	0.00608	0.131341133	0.00579	0.125076506	0.00423	0.091377137	0.131341	0.114232
49	Noname-14		0.0047	0.101530152	0.0066	0.142574256	0.00658	0.142142213	0.00654	0.141278126	0.00492	0.106282627	0.142574	0.126761
53	Noname-18		0.0045	0.09720972	0.00539	0.116435642	0.00504	0.108874886	0.00612	0.132205219	0.00463	0.100018001	0.132205	0.110949
61	Noname-26		0.00532	0.114923491	0.00597	0.128964895	0.0062	0.133933392	0.00741	0.160072006	0.00522	0.112763275	0.160072	0.130131
62	Noname-27		0.01143	0.246912689	0.0116	0.250585056	0.00644	0.13911791	0.00555	0.119891988	0.00582	0.125724571	0.250585	0.176446
63	Noname-28		0.00522	0.112763275	0.00546	0.117947794	0.00585	0.126372636	0.00686	0.148190818	0.00473	0.102178217	0.148191	0.121491
67	Noname-32		0.00604	0.130477046	0.0047	0.101530152	0.00649	0.140198018	0.00651	0.140630062	0.00648	0.139981997	0.14063	0.130563
70	Noname-35		0.00596	0.128748874	0.00555	0.119891988	0.0063	0.136093608	0.00653	0.141062105	0.00588	0.127020701	0.141062	0.130563
72	Noname-37		0.00487	0.105202519	0.00627	0.135445543	0.00652	0.140846083	0.00619	0.13371737	0.00586	0.126588658	0.140846	0.12836
74	Noname-39		0.00712	0.153807379	0.0057	0.123132312	0.00807	0.174329431	0.00815	0.176057604	0.00785	0.169576956	0.176058	0.159381
76	Noname-41		0.00704	0.152079206	0.00556	0.12010801	0.00754	0.162880286	0.00751	0.162232222	0.0074	0.159855984	0.16288	0.151431
83	Noname-48		0.00936	0.202196218	0.0087	0.187938792	0.01072	0.231575155	0.0111	0.239783976	0.01011	0.218397838	0.239784	0.215978
84	Noname-49		0.00928	0.200468045	0.00802	0.173249323	0.01043	0.225310529	0.01055	0.227902788	0.01051	0.227038702	0.227903	0.210794
86	Noname-51		0.00657	0.141926191	0.00996	0.215157514	0.00789	0.170441042	0.00847	0.182970295	0.00727	0.157047703	0.215158	0.173509
87	Noname-52		0.00691	0.149270926	0.01099	0.237407738	0.00802	0.173249323	0.00952	0.205652563	0.00711	0.153591358	0.237408	0.183834
90	Noname-55		0.01235	0.266786676	0.01135	0.245184516	0.00699	0.150999098	0.02391	0.516507646	0.00582	0.125724571	0.516508	0.261041
92	Noname-57		0.00617	0.133285327	0.00568	0.122700269	0.00816	0.176273626	0.00286	0.061782178	0.0081	0.174977496	0.176274	0.133804
94	Ramshead Lake		0.00883	0.190747073	0.01154	0.249288926	0.01085	0.234383436	0.01236	0.267002698	0.00975	0.21062106	0.267003	0.230409
97	Snowdrift Lake		0.0105	0.22682268	0.01143	0.246912689	0.00818	0.176705669	0.01778	0.384086405	0.008	0.17281728	0.384086	0.241469
100	Surprise Lake		0.01382	0.298541851	0.01249	0.269810978	0.01577	0.340666063	0.01621	0.350171014	0.01516	0.327488746	0.350171	0.317336
103	Talus Lake		0.00506	0.10930693	0.00523	0.112979297	0.00567	0.122484247	0.00662	0.143006299	0.00454	0.098073806	0.143006	0.11717
104	Timberline Lake		0.01326	0.286444642	0.01318	0.284716469	0.00937	0.202412239	0.02328	0.502898285	0.00899	0.194203418	0.502898	0.294135
		Max:	0.01408	0.304158413	0.01401	0.302646262	0.01668	0.360324029	0.02391	0.516507646	0.01516	0.327488746	0.516508	0.334401
		Min:	0.00353	0.076255625	0.00301	0.065022502	0.00504	0.108874886	0.00211	0.045580558	0.00405	0.087488748		

Jackson Hole Airport - Jackson Hole, WY
Air Quality Modeling Impact Analysis

TABLE 7-10B

Deposition Analysis - Alt-1 2015 - Total Nitrogen

Lake Number	Name	Alt-1 2015	2004		2005		2006		2007		2008		Alt-1 2015	
			NO2 (ug/m3)	N Dep (kg/hectare/yr)	NO2 (ug/m3)	N Dep (kg/hectare/yr)	NO2 (ug/m3)	N Dep (kg/hectare/yr)	NO2 (ug/m3)	N Dep (kg/hectare/yr)	NO2 (ug/m3)	N Dep (kg/hectare/yr)	5-Yr Max	5-Yr Avg
1	Amphitheater Lake		0.00462	0.099801979	0.00404	0.087272726	0.00526	0.113627362	0.00535	0.115571556	0.00506	0.10930693	0.115572	0.105116
8	Coyote Lake		0.00204	0.044068406	0.00188	0.040612061	0.00241	0.052061206	0.00116	0.025058506	0.00259	0.055949594	0.05595	0.04355
10	Delta Lake		0.00488	0.105418541	0.00491	0.106066606	0.00582	0.125724571	0.00618	0.133501349	0.00515	0.111251124	0.133501	0.116392
13	Forget Me Not Lakes		0.00223	0.048172817	0.00218	0.047092709	0.00208	0.044932493	0.00157	0.033915391	0.00266	0.057461746	0.057462	0.046315
14	Forget Me Not Lakes		0.00212	0.045796579	0.00204	0.044068406	0.00206	0.04450045	0.00151	0.032619262	0.00258	0.055733573	0.055734	0.044544
22	Holly Lake		0.00311	0.067182718	0.00285	0.061566156	0.00352	0.076039603	0.0036	0.077767776	0.00338	0.073015301	0.077768	0.071114
23	Iceflow Lake		0.00289	0.062430242	0.00416	0.089864986	0.00304	0.065670566	0.00375	0.0810081	0.00274	0.059189918	0.089865	0.071633
24	Indian Lake		0.00177	0.038235823	0.00167	0.036075607	0.00236	0.050981098	0.00081	0.01749775	0.00238	0.051413141	0.051413	0.038841
27	Kit Lake		0.00332	0.071719171	0.00362	0.078199819	0.00264	0.057029702	0.00516	0.111467146	0.00263	0.056813681	0.111467	0.075046
28	Lake of the Crags		0.00316	0.068262826	0.00362	0.078199819	0.00368	0.079495949	0.00424	0.091593158	0.00315	0.068046804	0.091593	0.07712
32	Marion Lake		0.00126	0.027218722	0.00106	0.02289829	0.00176	0.038019802	0.00077	0.016633663	0.00141	0.030459046	0.03802	0.027046
33	Mica Lake		0.00222	0.047956795	0.00306	0.06610261	0.00297	0.064158415	0.00311	0.067182718	0.00273	0.058973897	0.067183	0.060875
41	Noname-6		0.00306	0.06610261	0.00372	0.080360035	0.00349	0.075391538	0.0034	0.073447344	0.00232	0.050117011	0.08036	0.069084
42	Noname-7		0.00309	0.066750674	0.00383	0.082736273	0.00365	0.078847884	0.0036	0.077767776	0.00238	0.051413141	0.082736	0.071503
43	Noname-8		0.0016	0.034563456	0.00146	0.031539154	0.0018	0.038883888	0.00189	0.040828082	0.00165	0.035643564	0.040828	0.036292
44	Noname-9		0.00161	0.034779478	0.00154	0.033267326	0.00182	0.039315931	0.00189	0.040828082	0.00161	0.034779478	0.040828	0.036594
47	Noname-12		0.0015	0.03240324	0.00211	0.045580558	0.00212	0.045796579	0.00204	0.044068406	0.00148	0.031971197	0.045797	0.039964
49	Noname-14		0.00165	0.035643564	0.00231	0.04990099	0.00229	0.049468946	0.0023	0.049684968	0.00172	0.037155715	0.049901	0.044371
53	Noname-18		0.00158	0.034131413	0.00187	0.040396039	0.00176	0.038019802	0.00212	0.045796579	0.00162	0.034995499	0.045797	0.038668
61	Noname-26		0.00186	0.040180018	0.00208	0.044932493	0.00216	0.046660666	0.00258	0.055733573	0.00183	0.039531953	0.055734	0.045408
62	Noname-27		0.004	0.08640864	0.00409	0.088352834	0.00231	0.04990099	0.00202	0.043636363	0.00212	0.045796579	0.088353	0.062819
63	Noname-28		0.00182	0.039315931	0.00191	0.041260126	0.00205	0.044284428	0.00239	0.051629162	0.00166	0.035859586	0.051629	0.04247
67	Noname-32		0.00209	0.045148514	0.00164	0.035427542	0.00227	0.049036903	0.0023	0.049684968	0.00222	0.047956795	0.049685	0.045451
70	Noname-35		0.00207	0.044716471	0.00195	0.042124212	0.00221	0.047740774	0.00228	0.049252925	0.00203	0.043852385	0.049253	0.045537
72	Noname-37		0.00167	0.036075607	0.00207	0.044716471	0.0023	0.049684968	0.00217	0.046876687	0.00204	0.044068406	0.049685	0.044284
74	Noname-39		0.00247	0.053357335	0.00199	0.042988298	0.00282	0.060918091	0.00288	0.062214221	0.0027	0.058325832	0.062214	0.055561
76	Noname-41		0.00243	0.052493249	0.00193	0.041692169	0.00264	0.057029702	0.00265	0.057245724	0.00254	0.054869486	0.057246	0.052666
83	Noname-48		0.00325	0.07020702	0.00306	0.06610261	0.00376	0.081224122	0.00389	0.084032402	0.00349	0.075391538	0.084032	0.075392
84	Noname-49		0.00322	0.069558955	0.00282	0.060918091	0.00366	0.079063906	0.00371	0.080144014	0.0036	0.077767776	0.080144	0.073491
86	Noname-51		0.00225	0.04860486	0.00321	0.069342934	0.00278	0.060054005	0.00297	0.064158415	0.00256	0.05530153	0.069343	0.059492
87	Noname-52		0.00234	0.050549054	0.00354	0.076471646	0.00282	0.060918091	0.00334	0.072151214	0.00249	0.053789378	0.076472	0.062776
90	Noname-55		0.00418	0.090297029	0.00379	0.081872186	0.00245	0.052925292	0.00726	0.156831682	0.00206	0.04450045	0.156832	0.085285
92	Noname-57		0.00218	0.047092709	0.00196	0.042340234	0.00268	0.057893789	0.00105	0.022682268	0.00279	0.060270026	0.06027	0.046056
94	Ramshead Lake		0.00309	0.066750674	0.00399	0.086192618	0.00377	0.081440143	0.00429	0.092673266	0.0034	0.073447344	0.092673	0.080101
97	Snowdrift Lake		0.00355	0.076687668	0.00383	0.082736273	0.0029	0.062646264	0.00574	0.123996398	0.00286	0.061782178	0.123996	0.08157
100	Surprise Lake		0.00477	0.103042303	0.00437	0.094401439	0.00549	0.118595858	0.00565	0.122052204	0.00519	0.11211521	0.122052	0.110041
103	Talus Lake		0.00176	0.038019802	0.00183	0.039531953	0.00198	0.042772277	0.00231	0.04990099	0.0016	0.034563456	0.049901	0.040958
104	Timberline Lake		0.00445	0.096129612	0.00437	0.094401439	0.0033	0.071287128	0.00738	0.159423941	0.0032	0.069126912	0.159424	0.098074
		Max:	0.00488	0.105418541	0.00491	0.106066606	0.00582	0.125724571	0.00738	0.159423941	0.00519	0.11211521	0.159424	0.116392
		Min:	0.00126	0.027218722	0.00106	0.02289829	0.00176	0.038019802	0.00077	0.016633663	0.00141	0.030459046		

7/28/2010

Jackson Hole Airport - Jackson Hole, WY
Air Quality Modeling Impact Analysis

TABLE 7-10C

Deposition Analysis - Alt-1 2025 - Total Nitrogen

Lake Number	Name	Alt-1 2025	2004 NO2 (ug/m3)	2004 N Dep (kg/hectare/yr)	2005 NO2 (ug/m3)	2005 N Dep (kg/hectare/yr)	2006 NO2 (ug/m3)	2006 N Dep (kg/hectare/yr)	2007 NO2 (ug/m3)	2007 N Dep (kg/hectare/yr)	2008 NO2 (ug/m3)	2008 N Dep (kg/hectare/yr)	Alt-1 2025 5-Yr Max	Alt-1 2025 5-Yr Avg
1	Amphitheater Lake		0.00447	0.096561655	0.00392	0.084680467	0.00509	0.109954994	0.00519	0.11211521	0.0049	0.105850584	0.112115	0.101833
8	Coyote Lake		0.00198	0.042772277	0.00182	0.039315931	0.00233	0.050333033	0.00113	0.024410441	0.00251	0.054221422	0.054221	0.042211
10	Delta Lake		0.00472	0.101962195	0.00476	0.102826282	0.00564	0.121836182	0.00599	0.129396938	0.00499	0.107794778	0.129397	0.112763
13	Forget Me Not Lakes		0.00216	0.046660666	0.00211	0.045580558	0.00201	0.043420342	0.00152	0.032835283	0.00258	0.055733573	0.055734	0.044846
14	Forget Me Not Lakes		0.00205	0.044284428	0.00197	0.042556255	0.00199	0.042988298	0.00146	0.031539154	0.0025	0.0540054	0.054005	0.043075
22	Holly Lake		0.00301	0.065022502	0.00276	0.059621962	0.00341	0.073663366	0.00349	0.075391538	0.00327	0.070639063	0.075392	0.068868
23	Iceflow Lake		0.0028	0.060486048	0.00402	0.086840683	0.00295	0.063726372	0.00364	0.078631862	0.00265	0.057245724	0.086841	0.069386
24	Indian Lake		0.00171	0.036939694	0.00162	0.034995499	0.00228	0.049252925	0.00079	0.017065706	0.00231	0.04990099	0.049901	0.037631
27	Kit Lake		0.00321	0.069342934	0.0035	0.07560756	0.00256	0.05530153	0.00498	0.107578757	0.00255	0.055085508	0.107579	0.072583
28	Lake of the Crags		0.00306	0.06610261	0.00351	0.075823582	0.00357	0.077119711	0.00411	0.088784878	0.00305	0.065886588	0.088785	0.074743
32	Marion Lake		0.00122	0.026354635	0.00103	0.022250225	0.0017	0.036723672	0.00075	0.01620162	0.00136	0.029378938	0.036724	0.026182
33	Mica Lake		0.00215	0.046444644	0.00295	0.063726372	0.00288	0.062214221	0.00301	0.065022502	0.00264	0.057029702	0.065023	0.058887
41	Noname-6		0.00296	0.063942394	0.00361	0.077983798	0.00338	0.073015301	0.0033	0.071287128	0.00225	0.04860486	0.077984	0.066967
42	Noname-7		0.003	0.06480648	0.00371	0.080144014	0.00354	0.076471646	0.00349	0.075391538	0.00231	0.04990099	0.080144	0.069343
43	Noname-8		0.00155	0.033483348	0.00142	0.030675067	0.00175	0.03780378	0.00183	0.039531953	0.0016	0.034563456	0.039532	0.035212
44	Noname-9		0.00156	0.03369937	0.0015	0.03240324	0.00176	0.038019802	0.00183	0.039531953	0.00156	0.03369937	0.039532	0.035471
47	Noname-12		0.00145	0.031323132	0.00205	0.044284428	0.00205	0.044284428	0.00197	0.042556255	0.00144	0.03110711	0.044284	0.038711
49	Noname-14		0.0016	0.034563456	0.00224	0.048388838	0.00222	0.047956795	0.00222	0.047956795	0.00167	0.036075607	0.048389	0.042988
53	Noname-18		0.00153	0.033051305	0.00181	0.03909991	0.0017	0.036723672	0.00206	0.04450045	0.00157	0.033915391	0.0445	0.037458
61	Noname-26		0.00181	0.03909991	0.00202	0.043636363	0.0021	0.045364536	0.0025	0.0540054	0.00178	0.038451845	0.054005	0.044112
62	Noname-27		0.00387	0.083600359	0.00396	0.085544554	0.00224	0.048388838	0.00196	0.042340234	0.00206	0.04450045	0.085545	0.060875
63	Noname-28		0.00177	0.038235823	0.00185	0.039963996	0.00198	0.042772277	0.00232	0.050117011	0.00161	0.034779478	0.050117	0.041174
67	Noname-32		0.00202	0.043636363	0.00159	0.034347434	0.0022	0.047524752	0.00223	0.048172817	0.00215	0.046444644	0.048173	0.044025
70	Noname-35		0.002	0.04320432	0.00189	0.040828082	0.00214	0.046228622	0.00221	0.047740774	0.00196	0.042340234	0.047741	0.044068
72	Noname-37		0.00162	0.034995499	0.002	0.04320432	0.00223	0.048172817	0.0021	0.045364536	0.00198	0.042772277	0.048173	0.042902
74	Noname-39		0.00239	0.051629162	0.00193	0.041692169	0.00274	0.059189918	0.00279	0.060270026	0.00261	0.056381638	0.06027	0.053833
76	Noname-41		0.00236	0.050981098	0.00187	0.040396039	0.00256	0.05530153	0.00257	0.055517551	0.00246	0.053141314	0.055518	0.051068
83	Noname-48		0.00315	0.068046804	0.00297	0.064158415	0.00365	0.078847884	0.00377	0.081440143	0.00337	0.072799279	0.08144	0.073059
84	Noname-49		0.00312	0.067398739	0.00273	0.058973897	0.00354	0.076471646	0.0036	0.077767776	0.00348	0.075175517	0.077768	0.071158
86	Noname-51		0.00218	0.047092709	0.00309	0.066750674	0.00269	0.05810981	0.00288	0.062214221	0.00249	0.053789378	0.066751	0.057591
87	Noname-52		0.00226	0.048820882	0.00342	0.073879387	0.00273	0.058973897	0.00323	0.069774977	0.00241	0.052061206	0.073879	0.060702
90	Noname-55		0.00404	0.087272726	0.00367	0.079279927	0.00237	0.051197119	0.00698	0.150783077	0.002	0.04320432	0.150783	0.082347
92	Noname-57		0.00211	0.045580558	0.0019	0.041044104	0.00259	0.055949594	0.00102	0.022034203	0.0027	0.058325832	0.058326	0.044587
94	Ramshead Lake		0.00299	0.064590458	0.00386	0.083384338	0.00366	0.079063906	0.00416	0.089864986	0.00329	0.071071106	0.089865	0.077595
97	Snowdrift Lake		0.00344	0.07431143	0.00371	0.080144014	0.00282	0.060918091	0.00554	0.119675966	0.00277	0.059837983	0.119676	0.078977
100	Surprise Lake		0.00462	0.099801979	0.00423	0.091377137	0.00531	0.11470747	0.00548	0.118379837	0.00502	0.108442843	0.11838	0.106542
103	Talus Lake		0.00171	0.036939694	0.00177	0.038235823	0.00192	0.041476147	0.00223	0.048172817	0.00155	0.033483348	0.048173	0.039662
104	Timberline Lake		0.0043	0.092889288	0.00422	0.091161115	0.0032	0.069126912	0.00711	0.153591358	0.0031	0.066966696	0.153591	0.094747
		Max:	0.00472	0.101962195	0.00476	0.102826282	0.00564	0.121836182	0.00711	0.153591358	0.00502	0.108442843	0.153591	0.112763
		Min:	0.00122	0.026354635	0.00103	0.022250225	0.0017	0.036723672	0.00075	0.01620162	0.00136	0.029378938		

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Jackson Hole Airport - Jackson Hole, WY
Air Quality Modeling Impact Analysis

TABLE 7-10D

Deposition Analysis - Alt-2 2015 - Total Nitrogen

Lake Number	Name	Alt-2 2015	2004		2005		2006		2007		2008		Alt-2 2015	
			NO2 (ug/m3)	N Dep (kg/hectare/yr)	NO2 (ug/m3)	N Dep (kg/hectare/yr)	NO2 (ug/m3)	N Dep (kg/hectare/yr)	NO2 (ug/m3)	N Dep (kg/hectare/yr)	NO2 (ug/m3)	N Dep (kg/hectare/yr)	5-Yr Max	5-Yr Avg
1	Amphitheater Lake		0.0114	0.246264624	0.0099	0.213861384	0.01288	0.278235821	0.01305	0.281908188	0.01259	0.271971194	0.281908	0.258448
8	Coyote Lake		0.00507	0.109522951	0.0047	0.101530152	0.0062	0.133933392	0.00271	0.058541854	0.00641	0.138469846	0.13847	0.1084
10	Delta Lake		0.01199	0.259009898	0.01194	0.25792979	0.0142	0.306750672	0.01511	0.326408638	0.01267	0.273699367	0.326409	0.28476
13	Forget Me Not Lakes		0.00558	0.120540053	0.00533	0.115139513	0.00518	0.111899189	0.00366	0.079063906	0.00647	0.139765975	0.139766	0.113282
14	Forget Me Not Lakes		0.00532	0.114923491	0.00503	0.108658865	0.00516	0.111467146	0.00349	0.075391538	0.00631	0.13630963	0.13631	0.10935
22	Holly Lake		0.00762	0.164608459	0.0069	0.149054904	0.00854	0.184482446	0.00874	0.188802878	0.00837	0.180810079	0.188803	0.173552
23	Iceflow Lake		0.00736	0.158991898	0.01089	0.235247522	0.00739	0.159639962	0.00926	0.200036002	0.00671	0.144950494	0.235248	0.179773
24	Indian Lake		0.00427	0.092241223	0.00398	0.085976597	0.00609	0.131557154	0.00188	0.040612061	0.00578	0.124860485	0.131557	0.09505
27	Kit Lake		0.00832	0.179729971	0.00916	0.197875786	0.00633	0.136741673	0.01352	0.292061203	0.0063	0.136093608	0.292061	0.1885
28	Lake of the Crags		0.00773	0.166984697	0.00891	0.192475246	0.00902	0.194851483	0.01038	0.224230421	0.00767	0.165688567	0.22423	0.188846
32	Marion Lake		0.00302	0.065238523	0.00257	0.055517551	0.00447	0.096561655	0.0018	0.038883888	0.00345	0.074527452	0.096562	0.066146
33	Mica Lake		0.00548	0.118379837	0.00795	0.171737172	0.00716	0.154671466	0.00753	0.162664265	0.00659	0.142358234	0.171737	0.149962
41	Noname-6		0.00746	0.161152114	0.00918	0.198307829	0.00847	0.182970295	0.00822	0.177569755	0.00558	0.120540053	0.198308	0.168108
42	Noname-7		0.00754	0.162880286	0.00944	0.20392439	0.00885	0.191179116	0.00872	0.188370835	0.00572	0.123564355	0.203924	0.173984
43	Noname-8		0.00394	0.08511251	0.00355	0.076687668	0.00436	0.094185418	0.00459	0.099153914	0.00408	0.088136813	0.099154	0.088655
44	Noname-9		0.00396	0.085544554	0.00374	0.080792078	0.00442	0.095481547	0.00461	0.099585958	0.00395	0.085328532	0.099586	0.089347
47	Noname-12		0.00365	0.078847884	0.00515	0.111251124	0.00517	0.111683167	0.00494	0.10671467	0.00361	0.077983798	0.111683	0.097296
49	Noname-14		0.00401	0.086624662	0.00562	0.121404139	0.0056	0.120972096	0.00557	0.120324031	0.00419	0.09051305	0.121404	0.107968
53	Noname-18		0.00383	0.082736273	0.00459	0.099153914	0.00429	0.092673266	0.00521	0.112547254	0.00395	0.085328532	0.112547	0.094488
61	Noname-26		0.00453	0.097857785	0.00509	0.109954994	0.00528	0.114059405	0.00631	0.13630963	0.00445	0.096129612	0.13631	0.110862
62	Noname-27		0.00973	0.210189017	0.00989	0.213645362	0.0055	0.11881188	0.00475	0.10261026	0.00497	0.107362735	0.213645	0.150524
63	Noname-28		0.00445	0.096129612	0.00465	0.100450044	0.00499	0.107794778	0.00584	0.126156614	0.00403	0.087056705	0.126157	0.103518
67	Noname-32		0.00514	0.111035102	0.00401	0.086624662	0.00553	0.119459945	0.00555	0.119891988	0.00551	0.119027902	0.119892	0.111208
70	Noname-35		0.00507	0.109522951	0.00473	0.102178217	0.00536	0.115787578	0.00556	0.12010801	0.005	0.1080108	0.120108	0.111122
72	Noname-37		0.00414	0.089432942	0.00532	0.114923491	0.00556	0.12010801	0.00528	0.114059405	0.00498	0.107578757	0.120108	0.109221
74	Noname-39		0.00606	0.13090909	0.00485	0.104770476	0.00687	0.148406839	0.00695	0.150135012	0.00668	0.144302429	0.150135	0.135705
76	Noname-41		0.00598	0.129180917	0.00474	0.102394238	0.00642	0.138685867	0.0064	0.138253824	0.0063	0.136093608	0.138686	0.128922
83	Noname-48		0.00797	0.172169215	0.00742	0.160288027	0.00914	0.197443742	0.00946	0.204356434	0.0086	0.185778576	0.204356	0.184007
84	Noname-49		0.0079	0.170657064	0.00683	0.147542753	0.00888	0.191827181	0.00899	0.194203418	0.00893	0.192907289	0.194203	0.179428
86	Noname-51		0.00559	0.120756074	0.00841	0.181674166	0.00673	0.145382537	0.00722	0.155967595	0.0062	0.133933392	0.181674	0.147543
87	Noname-52		0.00587	0.126804679	0.00929	0.200684066	0.00684	0.147758774	0.00811	0.175193518	0.00606	0.13090909	0.200684	0.15627
90	Noname-55		0.01049	0.226606658	0.00963	0.208028801	0.00596	0.128748874	0.02014	0.435067502	0.00497	0.107362735	0.435068	0.221163
92	Noname-57		0.00526	0.113627362	0.00483	0.104338433	0.00691	0.149270926	0.00245	0.052925292	0.00689	0.148838882	0.149271	0.1138
94	Ramshead Lake		0.00752	0.162448243	0.00982	0.212133211	0.00924	0.199603958	0.01052	0.227254723	0.0083	0.179297928	0.227255	0.196148
97	Snowdrift Lake		0.00891	0.192475246	0.0097	0.209540952	0.00698	0.150783077	0.01504	0.324896486	0.00683	0.147542753	0.324896	0.205048
100	Surprise Lake		0.01175	0.25382538	0.01064	0.229846982	0.01343	0.290117009	0.0138	0.298109808	0.01288	0.278235821	0.29811	0.270027
103	Talus Lake		0.00431	0.09310531	0.00446	0.096345634	0.00483	0.104338433	0.00564	0.121836182	0.00387	0.083600359	0.121836	0.099845
104	Timberline Lake		0.01125	0.2430243	0.01118	0.241512149	0.00799	0.172601258	0.01965	0.424482444	0.00767	0.165688567	0.424482	0.249462
		Max:	0.01199	0.259009898	0.01194	0.25792979	0.0142	0.306750672	0.02014	0.435067502	0.01288	0.278235821	0.435068	0.28476
		Min:	0.00302	0.065238523	0.00257	0.055517551	0.00429	0.092673266	0.0018	0.038883888	0.00345	0.074527452		

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Jackson Hole Airport - Jackson Hole, WY
Air Quality Modeling Impact Analysis

TABLE 7-10E

Deposition Analysis - Alt-2 2025 - Total Nitrogen

Lake Number	Name	Alt-2 2025	2004		2005		2006		2007		2008		Alt-2 2025	
			NO2 (ug/m3)	N Dep (kg/hectare/yr)	NO2 (ug/m3)	N Dep (kg/hectare/yr)	NO2 (ug/m3)	N Dep (kg/hectare/yr)	NO2 (ug/m3)	N Dep (kg/hectare/yr)	NO2 (ug/m3)	N Dep (kg/hectare/yr)	5-Yr Max	5-Yr Avg
1	Amphitheater Lake		0.0112	0.241944192	0.00972	0.209972995	0.01266	0.273483346	0.01283	0.277155713	0.01236	0.267002698	0.277156	0.253912
8	Coyote Lake		0.00498	0.107578757	0.00461	0.099585958	0.00609	0.131557154	0.00267	0.057677767	0.0063	0.136093608	0.136094	0.106499
10	Delta Lake		0.01177	0.254257423	0.01173	0.253393337	0.01396	0.301566154	0.01484	0.320576054	0.01245	0.268946892	0.320576	0.279748
13	Forget Me Not Lakes		0.00548	0.118379837	0.00523	0.112979297	0.00509	0.109954994	0.0036	0.077767776	0.00635	0.137173716	0.137174	0.111251
14	Forget Me Not Lakes		0.00522	0.112763275	0.00494	0.10671467	0.00507	0.109522951	0.00343	0.074095409	0.0062	0.133933392	0.133933	0.107406
22	Holly Lake		0.00748	0.161584157	0.00678	0.146462645	0.00839	0.181242122	0.00858	0.185346533	0.00822	0.177569755	0.185347	0.170441
23	Iceflow Lake		0.00722	0.155967595	0.01069	0.23092709	0.00726	0.156831682	0.0091	0.196579656	0.0066	0.142574256	0.230927	0.176576
24	Indian Lake		0.0042	0.090729072	0.00391	0.084464446	0.00598	0.129180917	0.00185	0.039963996	0.00568	0.122700269	0.129181	0.093408
27	Kit Lake		0.00817	0.176489647	0.009	0.19441944	0.00622	0.134365435	0.01327	0.286660663	0.00619	0.13371737	0.286661	0.185131
28	Lake of the Crags		0.00759	0.163960394	0.00875	0.1890189	0.00886	0.191395138	0.0102	0.220342032	0.00753	0.162664265	0.220342	0.185476
32	Marion Lake		0.00297	0.064158415	0.00252	0.054437443	0.00439	0.094833482	0.00177	0.038235823	0.00339	0.073231322	0.094833	0.064979
33	Mica Lake		0.00538	0.116219621	0.00781	0.16871287	0.00703	0.151863185	0.0074	0.159855984	0.00647	0.139765975	0.168713	0.147284
41	Noname-6		0.00733	0.158343833	0.00901	0.194635462	0.00832	0.179729971	0.00807	0.174329431	0.00548	0.118379837	0.194635	0.165084
42	Noname-7		0.00741	0.160072006	0.00927	0.200252023	0.0087	0.187938792	0.00857	0.185130511	0.00562	0.121404139	0.200252	0.170959
43	Noname-8		0.00387	0.083600359	0.00348	0.075175517	0.00429	0.092673266	0.00451	0.097425742	0.00401	0.086624662	0.097426	0.0871
44	Noname-9		0.00389	0.084032402	0.00367	0.079279927	0.00434	0.093753374	0.00452	0.097641763	0.00388	0.083816381	0.097642	0.087705
47	Noname-12		0.00359	0.077551754	0.00506	0.10930693	0.00508	0.109738973	0.00485	0.104770476	0.00354	0.076471646	0.109739	0.095568
49	Noname-14		0.00394	0.08511251	0.00552	0.119243923	0.0055	0.11881188	0.00548	0.118379837	0.00412	0.089000899	0.119244	0.10611
53	Noname-18		0.00377	0.081440143	0.00451	0.097425742	0.00422	0.091161115	0.00512	0.110603059	0.00388	0.083816381	0.110603	0.092889
61	Noname-26		0.00446	0.096345634	0.005	0.1080108	0.00518	0.111899189	0.0062	0.133933392	0.00437	0.094401439	0.133933	0.108918
62	Noname-27		0.00956	0.20651665	0.00971	0.209756974	0.0054	0.116651664	0.00466	0.100666066	0.00489	0.105634562	0.209757	0.147845
63	Noname-28		0.00437	0.094401439	0.00457	0.098721871	0.0049	0.105850584	0.00574	0.123996398	0.00396	0.085544554	0.123996	0.101703
67	Noname-32		0.00505	0.109090908	0.00394	0.08511251	0.00544	0.11751575	0.00545	0.117731772	0.00542	0.117083707	0.117732	0.109307
70	Noname-35		0.00498	0.107578757	0.00465	0.100450044	0.00527	0.113843383	0.00546	0.117947794	0.00491	0.106066606	0.117948	0.109177
72	Noname-37		0.00407	0.087920791	0.00522	0.112763275	0.00546	0.117947794	0.00519	0.11211521	0.0049	0.105850584	0.117948	0.10732
74	Noname-39		0.00595	0.128532852	0.00477	0.103042303	0.00675	0.14581458	0.00683	0.147542753	0.00656	0.14171017	0.147543	0.133329
76	Noname-41		0.00588	0.127020701	0.00465	0.100450044	0.00631	0.13630963	0.00629	0.135877586	0.00619	0.13371737	0.13631	0.126675
83	Noname-48		0.00782	0.168928891	0.00729	0.157479746	0.00898	0.193987397	0.00929	0.200684066	0.00844	0.18232223	0.200684	0.18068
84	Noname-49		0.00776	0.167632762	0.00671	0.144950494	0.00873	0.188586857	0.00883	0.190747073	0.00877	0.189450943	0.190747	0.176274
86	Noname-51		0.00549	0.118595858	0.00825	0.17821782	0.00661	0.142790278	0.00709	0.153159314	0.00609	0.131557154	0.178218	0.144864
87	Noname-52		0.00576	0.124428442	0.00912	0.197011699	0.00672	0.145166515	0.00797	0.172169215	0.00596	0.128748874	0.197012	0.153505
90	Noname-55		0.0103	0.222502248	0.00946	0.204356434	0.00585	0.126372636	0.01977	0.427074703	0.00488	0.105418541	0.427075	0.217145
92	Noname-57		0.00517	0.111683167	0.00474	0.102394238	0.00679	0.146678666	0.00241	0.052061206	0.00676	0.146030602	0.146679	0.11177
94	Ramshead Lake		0.00739	0.159639962	0.00965	0.208460844	0.00908	0.196147613	0.01033	0.223150313	0.00816	0.176273626	0.22315	0.192734
97	Snowdrift Lake		0.00875	0.1890189	0.00953	0.205868585	0.00686	0.148190818	0.01476	0.318847882	0.00671	0.144950494	0.318848	0.201375
100	Surprise Lake		0.01155	0.249504948	0.01045	0.225742572	0.01319	0.28493249	0.01356	0.29292529	0.01265	0.273267324	0.292925	0.265275
103	Talus Lake		0.00423	0.091377137	0.00438	0.094617461	0.00475	0.10261026	0.00554	0.119675966	0.00381	0.08230423	0.119676	0.098117
104	Timberline Lake		0.01105	0.238703868	0.01098	0.237191717	0.00786	0.169792978	0.01927	0.416273623	0.00753	0.162664265	0.416274	0.244925
		Max:	0.01177	0.254257423	0.01173	0.253393337	0.01396	0.301566154	0.01977	0.427074703	0.01265	0.273267324	0.427075	0.279748
		Min:	0.00297	0.064158415	0.00252	0.054437443	0.00422	0.091161115	0.00177	0.038235823	0.00339	0.073231322		

7/28/2010

Jackson Hole Airport - Jackson Hole, WY
Air Quality Modeling Impact Analysis

TABLE 7-11A

Deposition Analysis - Baseline - Total Sulfur

Lake Number	Name	Base (2005)	2004		2005		2006		2007		2008		Base (2005)	
			SO2 (ug/m3)	S Dep (kg/hectare/yr)	SO2 (ug/m3)	S Dep (kg/hectare/yr)	SO2 (ug/m3)	S Dep (kg/hectare/yr)	SO2 (ug/m3)	S Dep (kg/hectare/yr)	SO2 (ug/m3)	S Dep (kg/hectare/yr)	5-Yr Max	5-Yr Avg
1	Amphitheater Lake		0.00196	0.003090528	0.00171	0.002696328	0.00223	0.003516264	0.00225	0.0035478	0.00217	0.003421656	0.003548	0.003255
8	Coyote Lake		0.00088	0.019009901	0.0008	0.017281728	0.00104	0.022466246	0.00047	0.010153015	0.00109	0.023546354	0.023546	0.018491
10	Delta Lake		0.00205	0.044284428	0.00207	0.044716471	0.00248	0.053573357	0.00262	0.056597659	0.00219	0.04730873	0.056598	0.049296
13	Forget Me Not Lakes		0.00097	0.020954095	0.00091	0.019657966	0.00088	0.019009901	0.00064	0.013825382	0.0011	0.023762376	0.023762	0.019442
14	Forget Me Not Lakes		0.00093	0.020090009	0.00085	0.018361836	0.00087	0.018793879	0.00061	0.013177318	0.00107	0.023114311	0.023114	0.018707
22	Holly Lake		0.00131	0.02829883	0.0012	0.025922592	0.00148	0.031971197	0.00151	0.032619262	0.00144	0.03110711	0.032619	0.029984
23	Iceflow Lake		0.00124	0.026786678	0.00183	0.039531953	0.00127	0.027434743	0.00157	0.033915391	0.00115	0.024842484	0.039532	0.030502
24	Indian Lake		0.00074	0.015985598	0.00069	0.01490549	0.00103	0.022250225	0.00033	0.007128713	0.00099	0.021386138	0.02225	0.016331
27	Kit Lake		0.0014	0.030243024	0.00155	0.033483348	0.0011	0.023762376	0.00226	0.048820882	0.00109	0.023546354	0.048821	0.031971
28	Lake of the Crags		0.00132	0.028514851	0.00154	0.033267326	0.00156	0.03369937	0.00178	0.038451845	0.00133	0.028730873	0.038452	0.032533
32	Marion Lake		0.00052	0.011233123	0.00044	0.00950495	0.00075	0.01620162	0.00032	0.006912691	0.00059	0.012745274	0.016202	0.01132
33	Mica Lake		0.00093	0.020090009	0.00134	0.028946894	0.00124	0.026786678	0.00129	0.027866786	0.00114	0.024626462	0.028947	0.025663
41	Noname-6		0.00131	0.02829883	0.00161	0.034779478	0.00151	0.032619262	0.00146	0.031539154	0.001	0.02160216	0.034779	0.029768
42	Noname-7		0.00133	0.028730873	0.00165	0.035643564	0.00157	0.033915391	0.00155	0.033483348	0.00102	0.022034203	0.035644	0.030761
43	Noname-8		0.00068	0.014689469	0.00061	0.013177318	0.00076	0.016417642	0.00079	0.017065706	0.00071	0.015337534	0.017066	0.015338
44	Noname-9		0.00068	0.014689469	0.00065	0.014041404	0.00077	0.016633663	0.00079	0.017065706	0.00068	0.014689469	0.017066	0.015424
47	Noname-12		0.00063	0.013609361	0.00089	0.019225922	0.00089	0.019225922	0.00085	0.018361836	0.00063	0.013609361	0.019226	0.016806
49	Noname-14		0.00069	0.01490549	0.00097	0.020954095	0.00097	0.020954095	0.00097	0.020954095	0.00073	0.015769577	0.020954	0.018707
53	Noname-18		0.00066	0.014257426	0.00079	0.017065706	0.00074	0.015985598	0.00089	0.019225922	0.00068	0.014689469	0.019226	0.016245
61	Noname-26		0.00078	0.016849685	0.00088	0.019009901	0.00091	0.019657966	0.00108	0.023330333	0.00077	0.016633663	0.02333	0.019096
62	Noname-27		0.0017	0.036723672	0.00175	0.03780378	0.00099	0.021386138	0.00088	0.019009901	0.00094	0.02030603	0.037804	0.027046
63	Noname-28		0.00076	0.016417642	0.0008	0.017281728	0.00086	0.018577858	0.001	0.02160216	0.00069	0.01490549	0.021602	0.017757
67	Noname-32		0.00088	0.019009901	0.00069	0.01490549	0.00095	0.020522052	0.00096	0.020738074	0.00095	0.020522052	0.020738	0.01914
70	Noname-35		0.00087	0.018793879	0.00082	0.017713771	0.00093	0.020090009	0.00096	0.020738074	0.00086	0.018577858	0.020738	0.019183
72	Noname-37		0.0007	0.015121512	0.0009	0.019441944	0.00096	0.020738074	0.00091	0.019657966	0.00086	0.018577858	0.020738	0.018707
74	Noname-39		0.00104	0.022466246	0.00083	0.017929793	0.00118	0.025490549	0.0012	0.025922592	0.00115	0.024842484	0.025923	0.02333
76	Noname-41		0.00103	0.022250225	0.00081	0.01749775	0.0011	0.023762376	0.0011	0.023762376	0.00108	0.023330333	0.023762	0.022121
83	Noname-48		0.00137	0.029594959	0.00129	0.027866786	0.00159	0.034347434	0.00164	0.035427542	0.00148	0.031971197	0.035428	0.031842
84	Noname-49		0.00136	0.029378938	0.00118	0.025490549	0.00154	0.033267326	0.00155	0.033483348	0.00154	0.033267326	0.033483	0.030977
86	Noname-51		0.00095	0.020522052	0.00141	0.030459046	0.00116	0.025058506	0.00124	0.026786678	0.00107	0.023114311	0.030459	0.025188
87	Noname-52		0.00099	0.021386138	0.00156	0.03369937	0.00118	0.025490549	0.00138	0.029810981	0.00104	0.022466246	0.033699	0.026571
90	Noname-55		0.00177	0.038235823	0.00162	0.034995499	0.00102	0.022034203	0.00333	0.071935193	0.00087	0.018793879	0.071935	0.037199
92	Noname-57		0.00092	0.019873987	0.00083	0.017929793	0.00117	0.025274527	0.00042	0.009072907	0.00117	0.025274527	0.025275	0.019485
94	Ramshead Lake		0.00129	0.027866786	0.0017	0.036723672	0.0016	0.034563456	0.00181	0.03909991	0.00144	0.03110711	0.0391	0.033872
97	Snowdrift Lake		0.00151	0.032619262	0.00165	0.035643564	0.00121	0.026138614	0.00252	0.054437443	0.00118	0.025490549	0.054437	0.034866
100	Surprise Lake		0.00201	0.043420342	0.00185	0.039963996	0.00234	0.050549054	0.00239	0.051629162	0.00222	0.047956795	0.051629	0.046704
103	Talus Lake		0.00074	0.015985598	0.00076	0.016417642	0.00084	0.018145814	0.00097	0.020954095	0.00067	0.014473447	0.020954	0.017195
104	Timberline Lake		0.0019	0.041044104	0.00189	0.040828082	0.00138	0.029810981	0.00329	0.071071106	0.00134	0.028946894	0.071071	0.04234
		Max:	0.00205	0.044284428	0.00207	0.044716471	0.00248	0.053573357	0.00333	0.071935193	0.00222	0.047956795	0.071935	0.049296
		Min:	0.00052	0.003090528	0.00044	0.002696328	0.00074	0.003516264	0.00032	0.0035478	0.00059	0.003421656		

Jackson Hole Airport - Jackson Hole, WY
Air Quality Modeling Impact Analysis

TABLE 7-11B

Deposition Analysis - Alt-1 2015 - Total Sulfur

Lake Number	Name	Alt-1 2015	2004		2005		2006		2007		2008		Alt-1 2015	
			SO2 (ug/m3)	S Dep (kg/hectare/yr)	SO2 (ug/m3)	S Dep (kg/hectare/yr)	SO2 (ug/m3)	S Dep (kg/hectare/yr)	SO2 (ug/m3)	S Dep (kg/hectare/yr)	SO2 (ug/m3)	S Dep (kg/hectare/yr)	5-Yr Max	5-Yr Avg
1	Amphitheater Lake		0.00061	0.000961848	0.00053	0.000835704	0.00069	0.001087992	0.0007	0.00110376	0.00068	0.001072224	0.001104	0.001012
8	Coyote Lake		0.00027	0.005832583	0.00025	0.00540054	0.00034	0.007344734	0.00014	0.003024302	0.00034	0.007344734	0.007345	0.005789
10	Delta Lake		0.00064	0.013825382	0.00064	0.013825382	0.00076	0.016417642	0.00081	0.01749775	0.00068	0.014689469	0.017498	0.015251
13	Forget Me Not Lakes		0.0003	0.006480648	0.00028	0.006048605	0.00028	0.006048605	0.00019	0.00410441	0.00034	0.007344734	0.007345	0.006005
14	Forget Me Not Lakes		0.00029	0.006264626	0.00027	0.005832583	0.00028	0.006048605	0.00018	0.003888389	0.00034	0.007344734	0.007345	0.005876
22	Holly Lake		0.00041	0.008856886	0.00037	0.007992799	0.00046	0.009936994	0.00047	0.010153015	0.00045	0.009720972	0.010153	0.009332
23	Iceflow Lake		0.0004	0.008640864	0.0006	0.012961296	0.00039	0.008424842	0.00049	0.010585058	0.00036	0.007776778	0.012961	0.009678
24	Indian Lake		0.00023	0.004968497	0.00021	0.004536454	0.00033	0.007128713	0.0001	0.002160216	0.00031	0.00669667	0.007129	0.005098
27	Kit Lake		0.00045	0.009720972	0.0005	0.01080108	0.00034	0.007344734	0.00074	0.015985598	0.00033	0.007128713	0.015986	0.010196
28	Lake of the Crags		0.00041	0.008856886	0.00048	0.010369037	0.00048	0.010369037	0.00056	0.01209721	0.00041	0.008856886	0.012097	0.01011
32	Marion Lake		0.00016	0.003456346	0.00014	0.003024302	0.00024	0.005184518	0.00009	0.001944194	0.00018	0.003888389	0.005185	0.0035
33	Mica Lake		0.00029	0.006264626	0.00043	0.009288929	0.00038	0.008208821	0.0004	0.008640864	0.00035	0.007560756	0.009289	0.007993
41	Noname-6		0.0004	0.008640864	0.00049	0.010585058	0.00046	0.009936994	0.00044	0.00950495	0.0003	0.006480648	0.010585	0.00903
42	Noname-7		0.00041	0.008856886	0.00051	0.011017102	0.00048	0.010369037	0.00047	0.010153015	0.00031	0.00669667	0.011017	0.009419
43	Noname-8		0.00021	0.004536454	0.00019	0.00410441	0.00023	0.004968497	0.00025	0.00540054	0.00022	0.004752475	0.005401	0.004752
44	Noname-9		0.00021	0.004536454	0.0002	0.004320432	0.00024	0.005184518	0.00025	0.00540054	0.00021	0.004536454	0.005401	0.004796
47	Noname-12		0.00019	0.00410441	0.00028	0.006048605	0.00028	0.006048605	0.00026	0.005616562	0.00019	0.00410441	0.006049	0.005185
49	Noname-14		0.00021	0.004536454	0.0003	0.006480648	0.0003	0.006480648	0.0003	0.006480648	0.00022	0.004752475	0.006481	0.005746
53	Noname-18		0.0002	0.004320432	0.00025	0.00540054	0.00023	0.004968497	0.00028	0.006048605	0.00021	0.004536454	0.006049	0.005055
61	Noname-26		0.00024	0.005184518	0.00027	0.005832583	0.00028	0.006048605	0.00034	0.007344734	0.00024	0.005184518	0.007345	0.005919
62	Noname-27		0.00052	0.011233123	0.00053	0.011449145	0.00029	0.006264626	0.00026	0.005616562	0.00027	0.005832583	0.011449	0.008079
63	Noname-28		0.00024	0.005184518	0.00025	0.00540054	0.00027	0.005832583	0.00031	0.00669667	0.00021	0.004536454	0.006697	0.00553
67	Noname-32		0.00028	0.006048605	0.00021	0.004536454	0.00029	0.006264626	0.0003	0.006480648	0.0003	0.006480648	0.006481	0.005962
70	Noname-35		0.00027	0.005832583	0.00025	0.00540054	0.00029	0.006264626	0.0003	0.006480648	0.00027	0.005832583	0.006481	0.005962
72	Noname-37		0.00022	0.004752475	0.00029	0.006264626	0.0003	0.006480648	0.00028	0.006048605	0.00027	0.005832583	0.006481	0.005876
74	Noname-39		0.00032	0.006912691	0.00026	0.005616562	0.00037	0.007992799	0.00037	0.007992799	0.00036	0.007776778	0.007993	0.007258
76	Noname-41		0.00032	0.006912691	0.00025	0.00540054	0.00034	0.007344734	0.00034	0.007344734	0.00034	0.007344734	0.007345	0.006869
83	Noname-48		0.00043	0.009288929	0.0004	0.008640864	0.00049	0.010585058	0.0005	0.01080108	0.00046	0.009936994	0.010801	0.009851
84	Noname-49		0.00042	0.009072907	0.00036	0.007776778	0.00047	0.010153015	0.00048	0.010369037	0.00048	0.010369037	0.010369	0.009548
86	Noname-51		0.0003	0.006480648	0.00046	0.009936994	0.00036	0.007776778	0.00038	0.008208821	0.00033	0.007128713	0.009937	0.007906
87	Noname-52		0.00032	0.006912691	0.00051	0.011017102	0.00036	0.007776778	0.00043	0.009288929	0.00032	0.006912691	0.011017	0.008382
90	Noname-55		0.00056	0.01209721	0.00052	0.011233123	0.00032	0.006912691	0.00112	0.024194419	0.00027	0.005832583	0.024194	0.012054
92	Noname-57		0.00028	0.006048605	0.00026	0.005616562	0.00038	0.008208821	0.00013	0.002808281	0.00037	0.007992799	0.008209	0.006135
94	Ramshead Lake		0.0004	0.008640864	0.00053	0.011449145	0.0005	0.01080108	0.00056	0.01209721	0.00045	0.009720972	0.012097	0.010542
97	Snowdrift Lake		0.00048	0.010369037	0.00052	0.011233123	0.00037	0.007992799	0.00082	0.017713771	0.00036	0.007776778	0.017714	0.011017
100	Surprise Lake		0.00063	0.013609361	0.00057	0.012313231	0.00072	0.015553555	0.00074	0.015985598	0.00069	0.01490549	0.015986	0.014473
103	Talus Lake		0.00023	0.004968497	0.00024	0.005184518	0.00026	0.005616562	0.0003	0.006480648	0.00021	0.004536454	0.006481	0.005357
104	Timberline Lake		0.00061	0.013177318	0.00061	0.013177318	0.00043	0.009288929	0.00108	0.023330333	0.00041	0.008856886	0.02333	0.013566
		Max:	0.00064	0.013825382	0.00064	0.013825382	0.00076	0.016417642	0.00112	0.024194419	0.00069	0.01490549	0.024194	0.015251
		Min:	0.00016	0.000961848	0.00014	0.000835704	0.00023	0.001087992	0.00009	0.00110376	0.00018	0.001072224		

7/28/2010

Jackson Hole Airport - Jackson Hole, WY
Air Quality Modeling Impact Analysis

TABLE 7-11C

Deposition Analysis - Alt-1 2025 - Total Sulfur

Lake Number	Name	Alt-1 2025	2004		2005		2006		2007		2008		Alt-1 2025	
			SO2 (ug/m3)	S Dep (kg/hectare/yr)	SO2 (ug/m3)	S Dep (kg/hectare/yr)	SO2 (ug/m3)	S Dep (kg/hectare/yr)	SO2 (ug/m3)	S Dep (kg/hectare/yr)	SO2 (ug/m3)	S Dep (kg/hectare/yr)	5-Yr Max	5-Yr Avg
1	Amphitheater Lake		0.00064	0.001009152	0.00055	0.00086724	0.00072	0.001135296	0.00073	0.001151064	0.00071	0.001119528	0.001151	0.001056
8	Coyote Lake		0.00029	0.006264626	0.00026	0.005616562	0.00035	0.007560756	0.00015	0.003240324	0.00036	0.007776778	0.007777	0.006092
10	Delta Lake		0.00067	0.014473447	0.00067	0.014473447	0.0008	0.017281728	0.00085	0.018361836	0.00071	0.015337534	0.018362	0.015986
13	Forget Me Not Lakes		0.00032	0.006912691	0.0003	0.006480648	0.00029	0.006264626	0.0002	0.004320432	0.00036	0.007776778	0.007777	0.006351
14	Forget Me Not Lakes		0.0003	0.006480648	0.00028	0.006048605	0.00029	0.006264626	0.00019	0.00410441	0.00035	0.007560756	0.007561	0.006092
22	Holly Lake		0.00043	0.009288929	0.00038	0.008208821	0.00048	0.010369037	0.00049	0.010585058	0.00047	0.010153015	0.010585	0.009721
23	Iceflow Lake		0.00042	0.009072907	0.00062	0.013393339	0.00041	0.008856886	0.00052	0.011233123	0.00037	0.007992799	0.013393	0.01011
24	Indian Lake		0.00024	0.005184518	0.00022	0.004752475	0.00035	0.007560756	0.0001	0.002160216	0.00032	0.006912691	0.007561	0.005314
27	Kit Lake		0.00047	0.010153015	0.00052	0.011233123	0.00035	0.007560756	0.00077	0.016633663	0.00035	0.007560756	0.016634	0.010628
28	Lake of the Crags		0.00043	0.009288929	0.0005	0.01080108	0.00051	0.011017102	0.00058	0.012529253	0.00043	0.009288929	0.012529	0.010585
32	Marion Lake		0.00017	0.003672367	0.00014	0.003024302	0.00025	0.00540054	0.0001	0.002160216	0.00019	0.00410441	0.005401	0.003672
33	Mica Lake		0.00031	0.00669667	0.00045	0.009720972	0.0004	0.008640864	0.00042	0.009072907	0.00037	0.007992799	0.009721	0.008425
41	Noname-6		0.00042	0.009072907	0.00052	0.011233123	0.00048	0.010369037	0.00046	0.009936994	0.00031	0.00669667	0.011233	0.009462
42	Noname-7		0.00042	0.009072907	0.00053	0.011449145	0.0005	0.01080108	0.00049	0.010585058	0.00032	0.006912691	0.011449	0.009764
43	Noname-8		0.00022	0.004752475	0.0002	0.004320432	0.00024	0.005184518	0.00026	0.005616562	0.00023	0.004968497	0.005617	0.004968
44	Noname-9		0.00022	0.004752475	0.00021	0.004536454	0.00025	0.00540054	0.00026	0.005616562	0.00022	0.004752475	0.005617	0.005012
47	Noname-12		0.0002	0.004320432	0.00029	0.006264626	0.00029	0.006264626	0.00028	0.006048605	0.0002	0.004320432	0.006265	0.005444
49	Noname-14		0.00022	0.004752475	0.00031	0.00669667	0.00031	0.00669667	0.00031	0.00669667	0.00023	0.004968497	0.006697	0.005962
53	Noname-18		0.00021	0.004536454	0.00026	0.005616562	0.00024	0.005184518	0.00029	0.006264626	0.00022	0.004752475	0.006265	0.005271
61	Noname-26		0.00025	0.00540054	0.00028	0.006048605	0.0003	0.006480648	0.00035	0.007560756	0.00025	0.00540054	0.007561	0.006178
62	Noname-27		0.00055	0.011881188	0.00056	0.01209721	0.00031	0.00669667	0.00027	0.005832583	0.00028	0.006048605	0.012097	0.008511
63	Noname-28		0.00025	0.00540054	0.00026	0.005616562	0.00028	0.006048605	0.00033	0.007128713	0.00022	0.004752475	0.007129	0.005789
67	Noname-32		0.00029	0.006264626	0.00022	0.004752475	0.00031	0.00669667	0.00031	0.00669667	0.00031	0.00669667	0.006697	0.006221
70	Noname-35		0.00028	0.006048605	0.00026	0.005616562	0.0003	0.006480648	0.00031	0.00669667	0.00028	0.006048605	0.006697	0.006178
72	Noname-37		0.00023	0.004968497	0.0003	0.006480648	0.00031	0.00669667	0.00029	0.006264626	0.00028	0.006048605	0.006697	0.006092
74	Noname-39		0.00034	0.007344734	0.00027	0.005832583	0.00038	0.008208821	0.00039	0.008424842	0.00038	0.008208821	0.008425	0.007604
76	Noname-41		0.00034	0.007344734	0.00026	0.005616562	0.00036	0.007776778	0.00036	0.007776778	0.00035	0.007560756	0.007777	0.007215
83	Noname-48		0.00045	0.009720972	0.00041	0.008856886	0.00051	0.011017102	0.00053	0.011449145	0.00048	0.010369037	0.011449	0.010283
84	Noname-49		0.00044	0.00950495	0.00038	0.008208821	0.0005	0.01080108	0.0005	0.01080108	0.0005	0.01080108	0.010801	0.010023
86	Noname-51		0.00031	0.00669667	0.00048	0.010369037	0.00037	0.007992799	0.0004	0.008640864	0.00035	0.007560756	0.010369	0.008252
87	Noname-52		0.00033	0.007128713	0.00053	0.011449145	0.00038	0.008208821	0.00045	0.009720972	0.00034	0.007344734	0.011449	0.00877
90	Noname-55		0.00059	0.012745274	0.00054	0.011665166	0.00033	0.007128713	0.00118	0.025490549	0.00028	0.006048605	0.025491	0.012616
92	Noname-57		0.00029	0.006264626	0.00027	0.005832583	0.00039	0.008424842	0.00013	0.002808281	0.00039	0.008424842	0.008425	0.006351
94	Ramshead Lake		0.00042	0.009072907	0.00055	0.011881188	0.00052	0.011233123	0.00059	0.012745274	0.00047	0.010153015	0.012745	0.011017
97	Snowdrift Lake		0.0005	0.01080108	0.00055	0.011881188	0.00039	0.008424842	0.00086	0.018577858	0.00038	0.008208821	0.018578	0.011579
100	Surprise Lake		0.00066	0.014257426	0.0006	0.012961296	0.00075	0.01620162	0.00077	0.016633663	0.00073	0.015769577	0.016634	0.015165
103	Talus Lake		0.00024	0.005184518	0.00025	0.00540054	0.00027	0.005832583	0.00031	0.00669667	0.00022	0.004752475	0.006697	0.005573
104	Timberline Lake		0.00063	0.013609361	0.00064	0.013825382	0.00045	0.009720972	0.00113	0.024410441	0.00043	0.009288929	0.02441	0.014171
		Max:	0.00067	0.014473447	0.00067	0.014473447	0.0008	0.017281728	0.00118	0.025490549	0.00073	0.015769577	0.025491	0.015986
		Min:	0.00017	0.001009152	0.00014	0.00086724	0.00024	0.001135296	0.0001	0.001151064	0.00019	0.001119528		

7/28/2010

Jackson Hole Airport - Jackson Hole, WY
Air Quality Modeling Impact Analysis

TABLE 7-11D

Deposition Analysis - Alt-2 2015 - Total Sulfur

Lake Number	Name	Alt-2 2015	2004		2005		2006		2007		2008		Alt-2 2015	
			SO2 (ug/m3)	S Dep (kg/hectare/yr)	SO2 (ug/m3)	S Dep (kg/hectare/yr)	SO2 (ug/m3)	S Dep (kg/hectare/yr)	SO2 (ug/m3)	S Dep (kg/hectare/yr)	SO2 (ug/m3)	S Dep (kg/hectare/yr)	5-Yr Max	5-Yr Avg
1	Amphitheater Lake		0.00133	0.002097144	0.00115	0.00181332	0.0015	0.0023652	0.00151	0.002380968	0.00148	0.002333664	0.002381	0.002198
8	Coyote Lake		0.0006	0.012961296	0.00055	0.011881188	0.00074	0.015985598	0.00031	0.00669667	0.00075	0.01620162	0.016202	0.012745
10	Delta Lake		0.0014	0.030243024	0.00138	0.029810981	0.00165	0.035643564	0.00176	0.038019802	0.00148	0.031971197	0.03802	0.033138
13	Forget Me Not Lakes		0.00066	0.014257426	0.00062	0.013393339	0.00061	0.013177318	0.00041	0.008856886	0.00075	0.01620162	0.016202	0.013177
14	Forget Me Not Lakes		0.00063	0.013609361	0.00059	0.012745274	0.00061	0.013177318	0.00039	0.008424842	0.00073	0.015769577	0.01577	0.012745
22	Holly Lake		0.00089	0.019225922	0.0008	0.017281728	0.00099	0.021386138	0.00101	0.021818182	0.00098	0.021170117	0.021818	0.020176
23	Iceflow Lake		0.00087	0.018793879	0.00131	0.02829883	0.00085	0.018361836	0.00108	0.023330333	0.00078	0.016849685	0.028299	0.021127
24	Indian Lake		0.00049	0.010585058	0.00046	0.009936994	0.00073	0.015769577	0.00021	0.004536454	0.00067	0.014473447	0.01577	0.01106
27	Kit Lake		0.00098	0.021170117	0.00108	0.023330333	0.00073	0.015769577	0.00162	0.034995499	0.00072	0.015553555	0.034995	0.022164
28	Lake of the Crags		0.0009	0.019441944	0.00104	0.022466246	0.00105	0.022682268	0.00121	0.026138614	0.00089	0.019225922	0.026139	0.021991
32	Marion Lake		0.00035	0.007560756	0.0003	0.006480648	0.00053	0.011449145	0.0002	0.004320432	0.0004	0.008640864	0.011449	0.00769
33	Mica Lake		0.00064	0.013825382	0.00095	0.020522052	0.00083	0.017929793	0.00087	0.018793879	0.00076	0.016417642	0.020522	0.017498
41	Noname-6		0.00087	0.018793879	0.00107	0.023114311	0.00098	0.021170117	0.00095	0.020522052	0.00064	0.013825382	0.023114	0.019485
42	Noname-7		0.00088	0.019009901	0.0011	0.023762376	0.00103	0.022250225	0.00101	0.021818182	0.00066	0.014257426	0.023762	0.02022
43	Noname-8		0.00046	0.009936994	0.00041	0.008856886	0.00051	0.011017102	0.00053	0.011449145	0.00048	0.010369037	0.011449	0.010326
44	Noname-9		0.00046	0.009936994	0.00043	0.009288929	0.00051	0.011017102	0.00053	0.011449145	0.00046	0.009936994	0.011449	0.010326
47	Noname-12		0.00042	0.009072907	0.0006	0.012961296	0.0006	0.012961296	0.00057	0.012313231	0.00042	0.009072907	0.012961	0.011276
49	Noname-14		0.00046	0.009936994	0.00065	0.014041404	0.00065	0.014041404	0.00065	0.014041404	0.00049	0.010585058	0.014041	0.012529
53	Noname-18		0.00044	0.00950495	0.00054	0.011665166	0.0005	0.01080108	0.00061	0.013177318	0.00046	0.009936994	0.013177	0.011017
61	Noname-26		0.00052	0.011233123	0.00059	0.012745274	0.00061	0.013177318	0.00073	0.015769577	0.00051	0.011017102	0.01577	0.012788
62	Noname-27		0.00113	0.024410441	0.00115	0.024842484	0.00063	0.013609361	0.00055	0.011881188	0.00057	0.012313231	0.024842	0.017411
63	Noname-28		0.00052	0.011233123	0.00054	0.011665166	0.00058	0.012529253	0.00068	0.014689469	0.00047	0.010153015	0.014689	0.012054
67	Noname-32		0.0006	0.012961296	0.00046	0.009936994	0.00064	0.013825382	0.00064	0.013825382	0.00065	0.014041404	0.014041	0.012918
70	Noname-35		0.00059	0.012745274	0.00055	0.011881188	0.00062	0.013393339	0.00064	0.013825382	0.00058	0.012529253	0.013825	0.012875
72	Noname-37		0.00048	0.010369037	0.00063	0.013609361	0.00064	0.013825382	0.00061	0.013177318	0.00058	0.012529253	0.013825	0.012702
74	Noname-39		0.00071	0.015337534	0.00056	0.01209721	0.0008	0.017281728	0.0008	0.017281728	0.00078	0.016849685	0.017282	0.01577
76	Noname-41		0.0007	0.015121512	0.00055	0.011881188	0.00074	0.015985598	0.00074	0.015985598	0.00074	0.015985598	0.015986	0.014992
83	Noname-48		0.00093	0.020090009	0.00086	0.018577858	0.00106	0.02289829	0.0011	0.023762376	0.001	0.02160216	0.023762	0.021386
84	Noname-49		0.00092	0.019873987	0.00079	0.017065706	0.00103	0.022250225	0.00104	0.022466246	0.00105	0.022682268	0.022682	0.020868
86	Noname-51		0.00065	0.014041404	0.00101	0.021818182	0.00078	0.016849685	0.00083	0.017929793	0.00072	0.015553555	0.021818	0.017239
87	Noname-52		0.00069	0.01490549	0.00112	0.024194419	0.00079	0.017065706	0.00094	0.02030603	0.0007	0.015121512	0.024194	0.018319
90	Noname-55		0.00123	0.026570657	0.00114	0.024626462	0.00069	0.01490549	0.00249	0.053789378	0.00057	0.012313231	0.053789	0.026441
92	Noname-57		0.00061	0.013177318	0.00056	0.01209721	0.00083	0.017929793	0.00028	0.006048605	0.0008	0.017281728	0.01793	0.013307
94	Ramshead Lake		0.00087	0.018793879	0.00115	0.024842484	0.00108	0.023330333	0.00122	0.026354635	0.00097	0.020954095	0.026355	0.022855
97	Snowdrift Lake		0.00105	0.022682268	0.00115	0.024842484	0.0008	0.017281728	0.00181	0.03909991	0.00078	0.016849685	0.0391	0.024151
100	Surprise Lake		0.00137	0.029594959	0.00123	0.026570657	0.00156	0.03369937	0.0016	0.034563456	0.00151	0.032619262	0.034563	0.03141
103	Talus Lake		0.0005	0.01080108	0.00052	0.011233123	0.00056	0.01209721	0.00065	0.014041404	0.00045	0.009720972	0.014041	0.011579
104	Timberline Lake		0.00133	0.028730873	0.00133	0.028730873	0.00092	0.019873987	0.00238	0.051413141	0.00088	0.019009901	0.051413	0.029552
		Max:	0.0014	0.030243024	0.00138	0.029810981	0.00165	0.035643564	0.00249	0.053789378	0.00151	0.032619262	0.053789	0.033138
		Min:	0.00035	0.002097144	0.0003	0.00181332	0.0005	0.0023652	0.0002	0.002380968	0.0004	0.002333664		

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Jackson Hole Airport - Jackson Hole, WY
Air Quality Modeling Impact Analysis

TABLE 7-11E

Deposition Analysis - Alt-2 2025 - Total Sulfur

Lake Number	Name	Alt-2 2025	2004		2005		2006		2007		2008		Alt-2 2025	
			SO2 (ug/m3)	S Dep (kg/hectare/yr)	SO2 (ug/m3)	S Dep (kg/hectare/yr)	SO2 (ug/m3)	S Dep (kg/hectare/yr)	SO2 (ug/m3)	S Dep (kg/hectare/yr)	SO2 (ug/m3)	S Dep (kg/hectare/yr)	5-Yr Max	5-Yr Avg
1	Amphitheater Lake		0.00136	0.002144448	0.00118	0.001860624	0.00153	0.002412504	0.00155	0.00244404	0.00151	0.002380968	0.002444	0.002249
8	Coyote Lake		0.00061	0.013177318	0.00056	0.01209721	0.00076	0.016417642	0.00031	0.00669667	0.00077	0.016633663	0.016634	0.013005
10	Delta Lake		0.00143	0.030891089	0.00141	0.030459046	0.00169	0.03650765	0.00179	0.038667866	0.00151	0.032619262	0.038668	0.033829
13	Forget Me Not Lakes		0.00067	0.014473447	0.00063	0.013609361	0.00062	0.013393339	0.00042	0.009072907	0.00076	0.016417642	0.016418	0.013393
14	Forget Me Not Lakes		0.00064	0.013825382	0.0006	0.012961296	0.00062	0.013393339	0.0004	0.008640864	0.00075	0.01620162	0.016202	0.013005
22	Holly Lake		0.0009	0.019441944	0.00082	0.017713771	0.00101	0.021818182	0.00103	0.022250225	0.001	0.02160216	0.02225	0.020565
23	Iceflow Lake		0.00089	0.019225922	0.00134	0.028946894	0.00087	0.018793879	0.0011	0.023762376	0.0008	0.017281728	0.028947	0.021602
24	Indian Lake		0.0005	0.01080108	0.00046	0.009936994	0.00074	0.015985598	0.00022	0.004752475	0.00068	0.014689469	0.015986	0.011233
27	Kit Lake		0.001	0.02160216	0.00111	0.023978398	0.00074	0.015985598	0.00166	0.035859586	0.00074	0.015985598	0.03586	0.022682
28	Lake of the Crags		0.00092	0.019873987	0.00106	0.02289829	0.00107	0.023114311	0.00123	0.026570657	0.00091	0.019657966	0.026571	0.022423
32	Marion Lake		0.00035	0.007560756	0.0003	0.006480648	0.00054	0.011665166	0.00021	0.004536454	0.00041	0.008856886	0.011665	0.00782
33	Mica Lake		0.00065	0.014041404	0.00097	0.020954095	0.00084	0.018145814	0.00089	0.019225922	0.00078	0.016849685	0.020954	0.017843
41	Noname-6		0.00089	0.019225922	0.0011	0.023762376	0.001	0.02160216	0.00097	0.020954095	0.00066	0.014257426	0.023762	0.01996
42	Noname-7		0.0009	0.019441944	0.00113	0.024410441	0.00105	0.022682268	0.00103	0.022250225	0.00068	0.014689469	0.02441	0.020695
43	Noname-8		0.00047	0.010153015	0.00042	0.009072907	0.00052	0.011233123	0.00054	0.011665166	0.00049	0.010585058	0.011665	0.010542
44	Noname-9		0.00047	0.010153015	0.00044	0.00950495	0.00052	0.011233123	0.00055	0.011881188	0.00047	0.010153015	0.011881	0.010585
47	Noname-12		0.00043	0.009288929	0.00061	0.013177318	0.00061	0.013177318	0.00058	0.012529253	0.00043	0.009288929	0.013177	0.011492
49	Noname-14		0.00047	0.010153015	0.00067	0.014473447	0.00067	0.014473447	0.00066	0.014257426	0.0005	0.01080108	0.014473	0.012832
53	Noname-18		0.00045	0.009720972	0.00055	0.011881188	0.00051	0.011017102	0.00062	0.013393339	0.00047	0.010153015	0.013393	0.011233
61	Noname-26		0.00054	0.011665166	0.0006	0.012961296	0.00063	0.013609361	0.00075	0.01620162	0.00053	0.011449145	0.016202	0.013177
62	Noname-27		0.00115	0.024842484	0.00117	0.025274527	0.00065	0.014041404	0.00056	0.01209721	0.00058	0.012529253	0.025275	0.017757
63	Noname-28		0.00053	0.011449145	0.00055	0.011881188	0.00059	0.012745274	0.00069	0.01490549	0.00048	0.010369037	0.014905	0.01227
67	Noname-32		0.00061	0.013177318	0.00048	0.010369037	0.00065	0.014041404	0.00065	0.014041404	0.00066	0.014257426	0.014257	0.013177
70	Noname-35		0.0006	0.012961296	0.00056	0.01209721	0.00063	0.013609361	0.00066	0.014257426	0.0006	0.012961296	0.014257	0.013177
72	Noname-37		0.00049	0.010585058	0.00065	0.014041404	0.00066	0.014257426	0.00062	0.013393339	0.00059	0.012745274	0.014257	0.013005
74	Noname-39		0.00072	0.015553555	0.00058	0.012529253	0.00081	0.01749775	0.00082	0.017713771	0.0008	0.017281728	0.017714	0.016115
76	Noname-41		0.00071	0.015337534	0.00056	0.01209721	0.00076	0.016417642	0.00075	0.01620162	0.00075	0.01620162	0.016418	0.015251
83	Noname-48		0.00095	0.020522052	0.00088	0.019009901	0.00108	0.023330333	0.00112	0.024194419	0.00103	0.022250225	0.024194	0.021861
84	Noname-49		0.00094	0.02030603	0.00081	0.01749775	0.00105	0.022682268	0.00106	0.02289829	0.00107	0.023114311	0.023114	0.0213
86	Noname-51		0.00067	0.014473447	0.00103	0.022250225	0.00079	0.017065706	0.00085	0.018361836	0.00073	0.015769577	0.02225	0.017584
87	Noname-52		0.00071	0.015337534	0.00114	0.024626462	0.00081	0.01749775	0.00096	0.020738074	0.00072	0.015553555	0.024626	0.018751
90	Noname-55		0.00126	0.027218722	0.00116	0.025058506	0.0007	0.015121512	0.00255	0.055085508	0.00059	0.012745274	0.055086	0.027046
92	Noname-57		0.00062	0.013393339	0.00057	0.012313231	0.00084	0.018145814	0.00028	0.006048605	0.00082	0.017713771	0.018146	0.013523
94	Ramshead Lake		0.00089	0.019225922	0.00117	0.025274527	0.0011	0.023762376	0.00125	0.0270027	0.00099	0.021386138	0.027003	0.02333
97	Snowdrift Lake		0.00107	0.023114311	0.00117	0.025274527	0.00082	0.017713771	0.00185	0.039963996	0.0008	0.017281728	0.039964	0.02467
100	Surprise Lake		0.0014	0.030243024	0.00126	0.027218722	0.0016	0.034563456	0.00164	0.035427542	0.00154	0.033267326	0.035428	0.032144
103	Talus Lake		0.00051	0.011017102	0.00053	0.011449145	0.00057	0.012313231	0.00067	0.014473447	0.00046	0.009936994	0.014473	0.011838
104	Timberline Lake		0.00136	0.029378938	0.00136	0.029378938	0.00094	0.02030603	0.00243	0.052493249	0.0009	0.019441944	0.052493	0.0302
		Max:	0.00143	0.030891089	0.00141	0.030459046	0.00169	0.03650765	0.00255	0.055085508	0.00154	0.033267326	0.055086	0.033829
		Min:	0.00035	0.002144448	0.0003	0.001860624	0.00051	0.002412504	0.00021	0.00244404	0.00041	0.002380968		

7/28/2010

TABLE 7-12A

COMPLIANCE DEMONSTRATION

COMPLIANCE WITH NAAQS STANDARDS - Baseline Results

Pollutant	Averaging Period	Rank	Jackson Hole Airport - All Sources	Background	Total Impact	NAAQS	AQI
			(μg/m^3)	(μg/m^3)	(μg/m^3)	(μg/m^3)	(μg/m^3)
SO2	3-hour	MAX	178.8	16.5	195.3	1300	-
	24-hour	MAX	43.4	8.4	51.8	365	29
	Annual	MAX	9.0	2.6	11.6	80	-
PM10	24-hour	MAX	11.1	93.0	104.1	150	75
	Annual	MAX	0.5	21.0	21.5	-	-
PM2.5	24-hour	MAX	11.1	23.3	34.4	35	98
	Annual	MAX	0.5	6.8	7.3	15	-
CO	1-hour	MAX	3136.4	1,832	4968.4	40000	-
	8-hour	MAX	1241.0	1,718	2959.0	10000	30
NO_2	Annual	MAX	11.5	5.6	17.1	100	-
Lead	Rolling 3-Month	MAX	0.008	0.04	0.048	0.15	-

Notes: NAAQS = National Ambient Air Quality Standards
AQI = USEPA Air Quality Index
Values in the AQI column represent the total impact value converted to AQI for the appropriate averaging periods.

TABLE 7-12B

COMPLIANCE DEMONSTRATION

COMPLIANCE WITH NAAQS STANDARDS - Alt-1 2015 Results

Pollutant	Averaging Period	Rank	Jackson Hole Airport - All Sources	Background	Total Impact	NAAQS	AQI
			(μg/m^3)	(μg/m^3)	(μg/m^3)	(μg/m^3)	(μg/m^3)
SO2	3-hour	MAX	121.5	16.5	138.0	1300	-
	24-hour	MAX	36.5	8.4	44.9	365	29
	Annual	MAX	1.0	2.6	3.6	80	-
PM10	24-hour	MAX	11.1	93.0	104.1	150	75
	Annual	MAX	0.4	21.0	21.4	-	-
PM2.5	24-hour	MAX	11.1	23.3	34.4	35	98
	Annual	MAX	0.4	6.8	7.2	15	-
CO	1-hour	MAX	2202.4	1,832	4034.4	40000	-
	8-hour	MAX	871.5	1,718	2589.5	10000	30
NO_2	Annual	MAX	5.5	5.6	11.1	100	-
Lead	Rolling 3-Month	MAX	0.008	0.04	0.048	0.15	-

Notes: NAAQS = National Ambient Air Quality Standards
AQI = USEPA Air Quality Index
Values in the AQI column represent the total impact value converted to AQI for the appropriate averaging periods.

TABLE 7-12C

COMPLIANCE DEMONSTRATION

COMPLIANCE WITH NAAQS STANDARDS - Alt-1 2025 Results

Pollutant	Averaging Period	Rank	Jackson Hole Airport - All Sources	Background	Total Impact	NAAQS	AQI
			($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)
SO2	3-hour	MAX	121.5	16.5	138.0	1300	-
	24-hour	MAX	36.6	8.4	45.0	365	29
	Annual	MAX	1.0	2.6	3.6	80	-
PM10	24-hour	MAX	11.1	93.0	104.1	150	75
	Annual	MAX	0.4	21.0	21.4	-	-
PM2.5	24-hour	MAX	11.1	23.3	34.4	35	98
	Annual	MAX	0.4	6.8	7.2	15	-
CO	1-hour	MAX	2161.9	1,832	3993.9	40000	-
	8-hour	MAX	855.5	1,718	2573.5	10000	30
NO_2	Annual	MAX	5.5	5.6	11.1	100	-
Lead	Rolling 3-Month	MAX	0.008	0.04	0.048	0.15	-

Notes: NAAQS = National Ambient Air Quality Standards
AQI = USEPA Air Quality Index
Values in the AQI column represent the total impact value converted to AQI for the appropriate averaging periods.

TABLE 7-12D

COMPLIANCE DEMONSTRATION

COMPLIANCE WITH NAAQS STANDARDS - Alt-2 2015 Results

Pollutant	Averaging Period	Rank	Jackson Hole Airport - All Sources	Background	Total Impact	NAAQS	AQI
			($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)
SO2	3-hour	MAX	121.5	16.5	138.0	1300	-
	24-hour	MAX	36.8	8.4	45.2	365	29
	Annual	MAX	1.3	2.6	3.9	80	-
PM10	24-hour	MAX	11.1	93.0	104.1	150	75
	Annual	MAX	0.5	21.0	21.5	-	-
PM2.5	24-hour	MAX	11.1	23.3	34.4	35	98
	Annual	MAX	0.5	6.8	7.3	15	-
CO	1-hour	MAX	2770.0	1,832	4602.0	40000	-
	8-hour	MAX	1096.1	1,718	2814.1	10000	30
NO_2	Annual	MAX	10.0	5.6	15.6	100	-
Lead	Rolling 3-Month	MAX	0.008	0.04	0.048	0.15	-

Notes: NAAQS = National Ambient Air Quality Standards
AQI = USEPA Air Quality Index
Values in the AQI column represent the total impact value converted to AQI for the appropriate averaging periods.

TABLE 7-12E

COMPLIANCE DEMONSTRATION

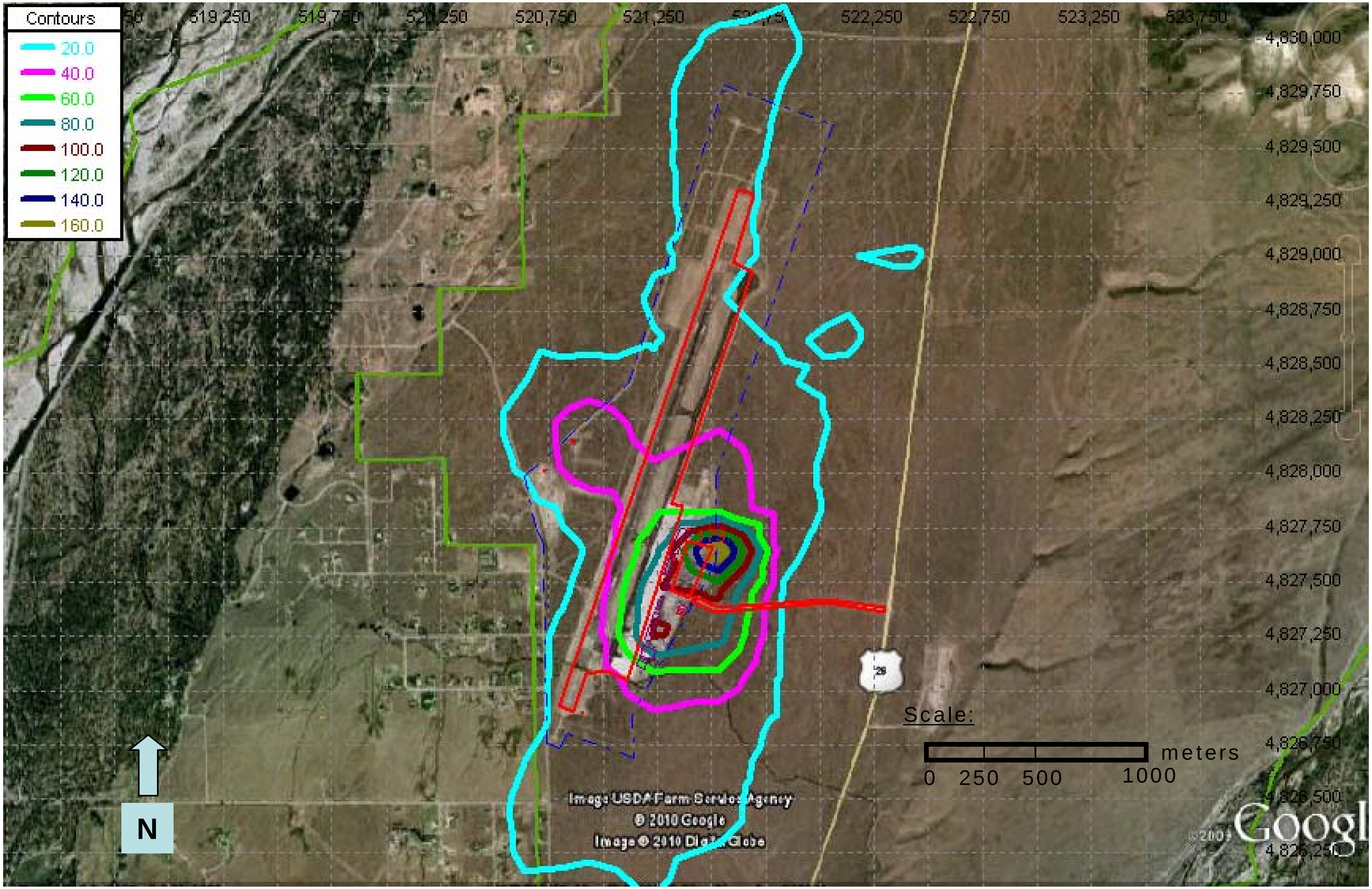
COMPLIANCE WITH NAAQS STANDARDS - Alt-2 2025 Results

Pollutant	Averaging Period	Rank	Jackson Hole Airport - All Sources	Background	Total Impact	NAAQS	AQI
			(µg/m³)	(µg/m³)	(µg/m³)	(µg/m³)	(µg/m³)
SO2	3-hour	MAX	121.5	16.5	138.0	1300	-
	24-hour	MAX	36.8	8.4	45.2	365	29
	Annual	MAX	1.3	2.6	3.9	80	-
PM10	24-hour	MAX	11.1	93.0	104.1	150	75
	Annual	MAX	0.5	21.0	21.5	-	-
PM2.5	24-hour	MAX	11.1	23.3	34.4	35	98
	Annual	MAX	0.5	6.8	7.3	15	-
CO	1-hour	MAX	2587.1	1,832	4419.1	40000	-
	8-hour	MAX	1023.7	1,718	2741.7	10000	30
NO_2	Annual	MAX	9.9	5.6	15.5	100	-
Lead	Rolling 3-Month	MAX	0.008	0.04	0.048	0.15	-

Notes: NAAQS = National Ambient Air Quality Standards
AQI = USEPA Air Quality Index
Values in the AQI column represent the total impact value converted to AQI for the appropriate averaging periods.

Figure 7-1
Jackson Hole Airport – Jackson Hole, WY
Air Quality Modeling Impact Analysis

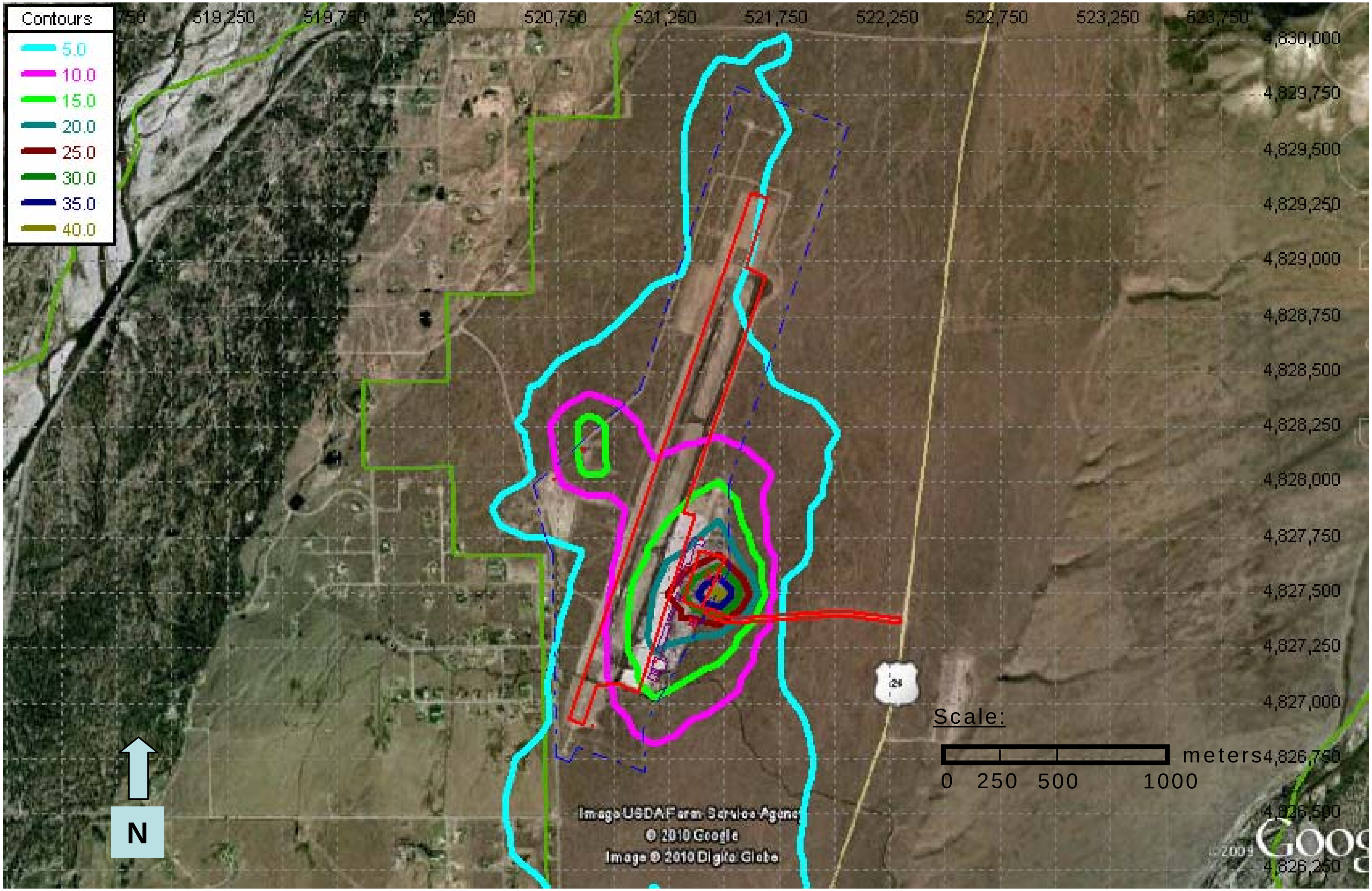
Model Predicted Maximum 3-hr SO2 Impacts – Base Case Worst Year (2006)



Grid in meters

Figure 7-2
Jackson Hole Airport – Jackson Hole, WY
Air Quality Modeling Impact Analysis

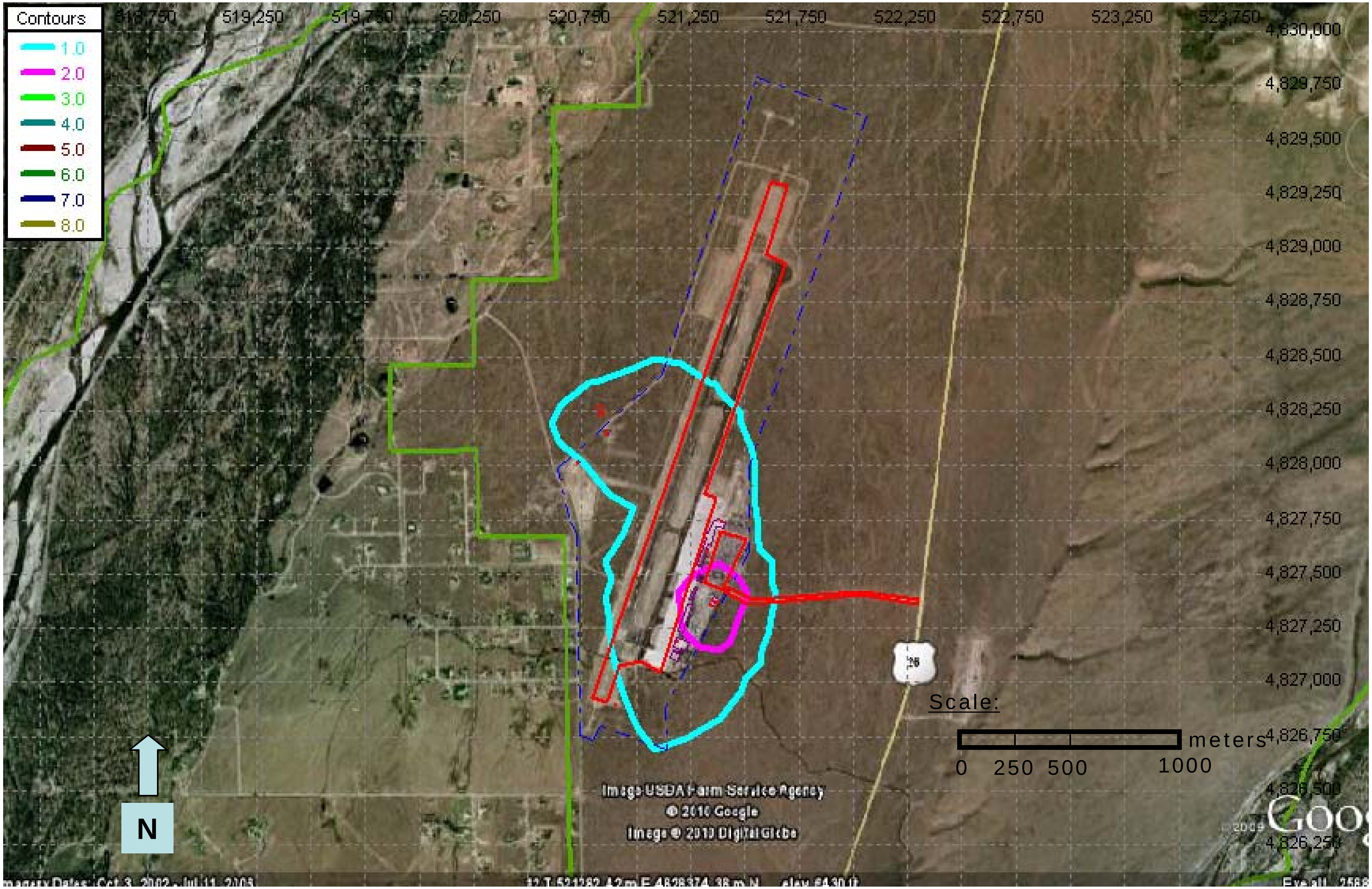
Model Predicted Maximum 24-hr SO2 Impacts – Base Case Worst Year (2006)



Grid in meters

Figure 7-3
Jackson Hole Airport – Jackson Hole, WY
Air Quality Modeling Impact Analysis

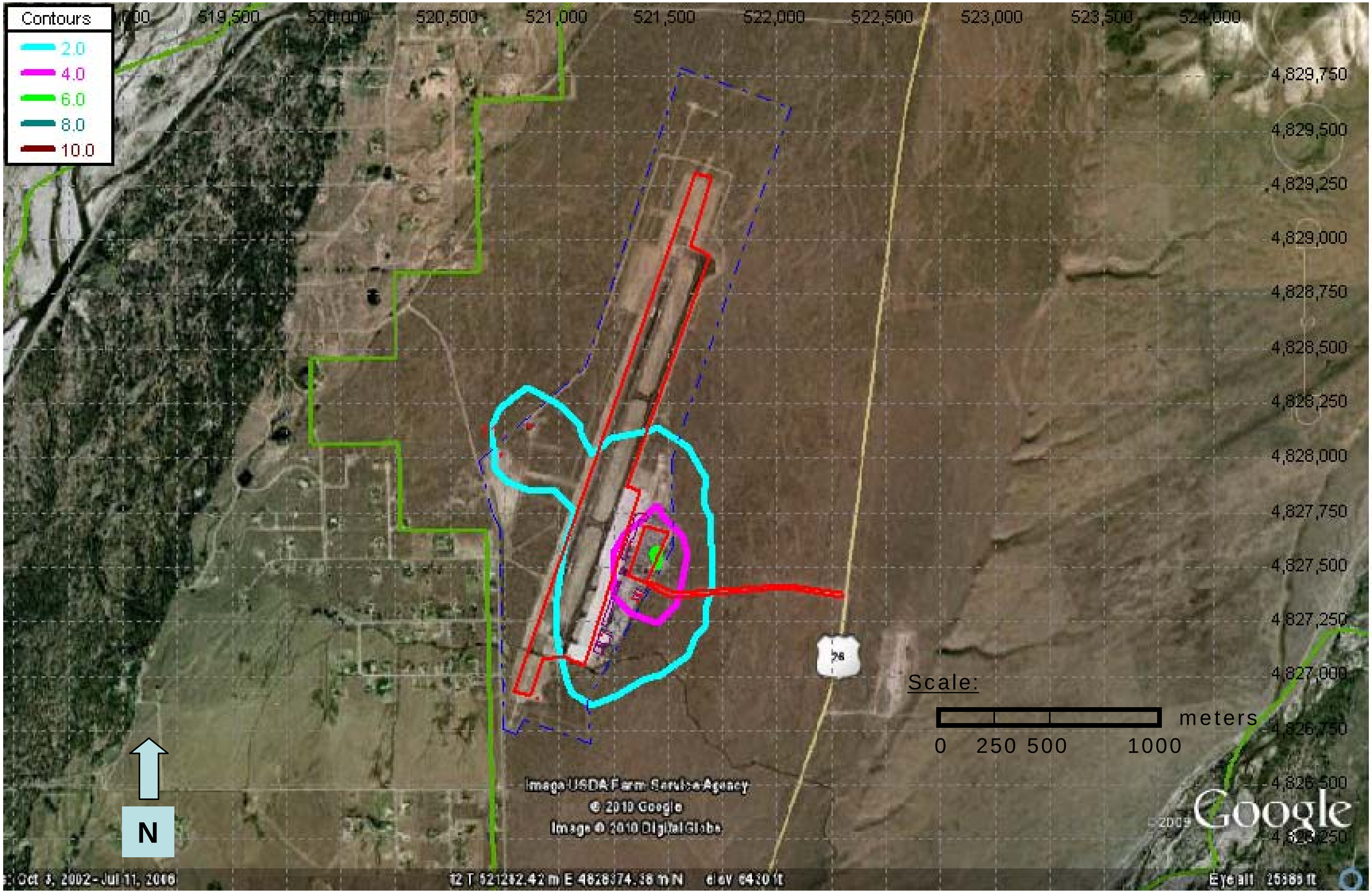
Model Predicted Maximum Annual SO2 Impacts – Base Case Worst Year (2006)



Grid in meters

Figure 7-4
Jackson Hole Airport – Jackson Hole, WY
Air Quality Modeling Impact Analysis

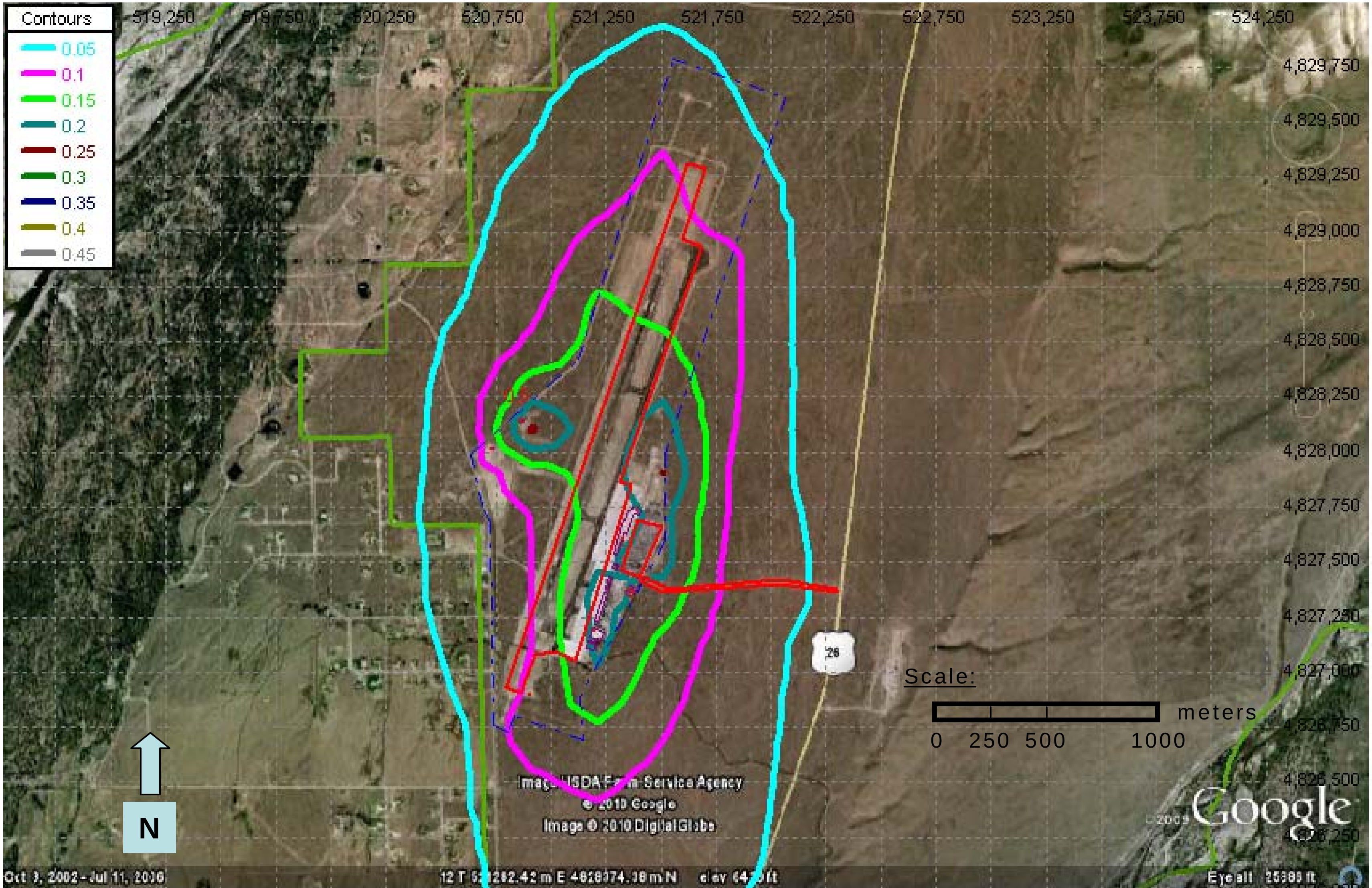
Model Predicted Maximum 24-hr PM10 Impacts – Base Case Worst Year (2006)



Grid in meters

Figure 7-5
Jackson Hole Airport – Jackson Hole, WY
Air Quality Modeling Impact Analysis

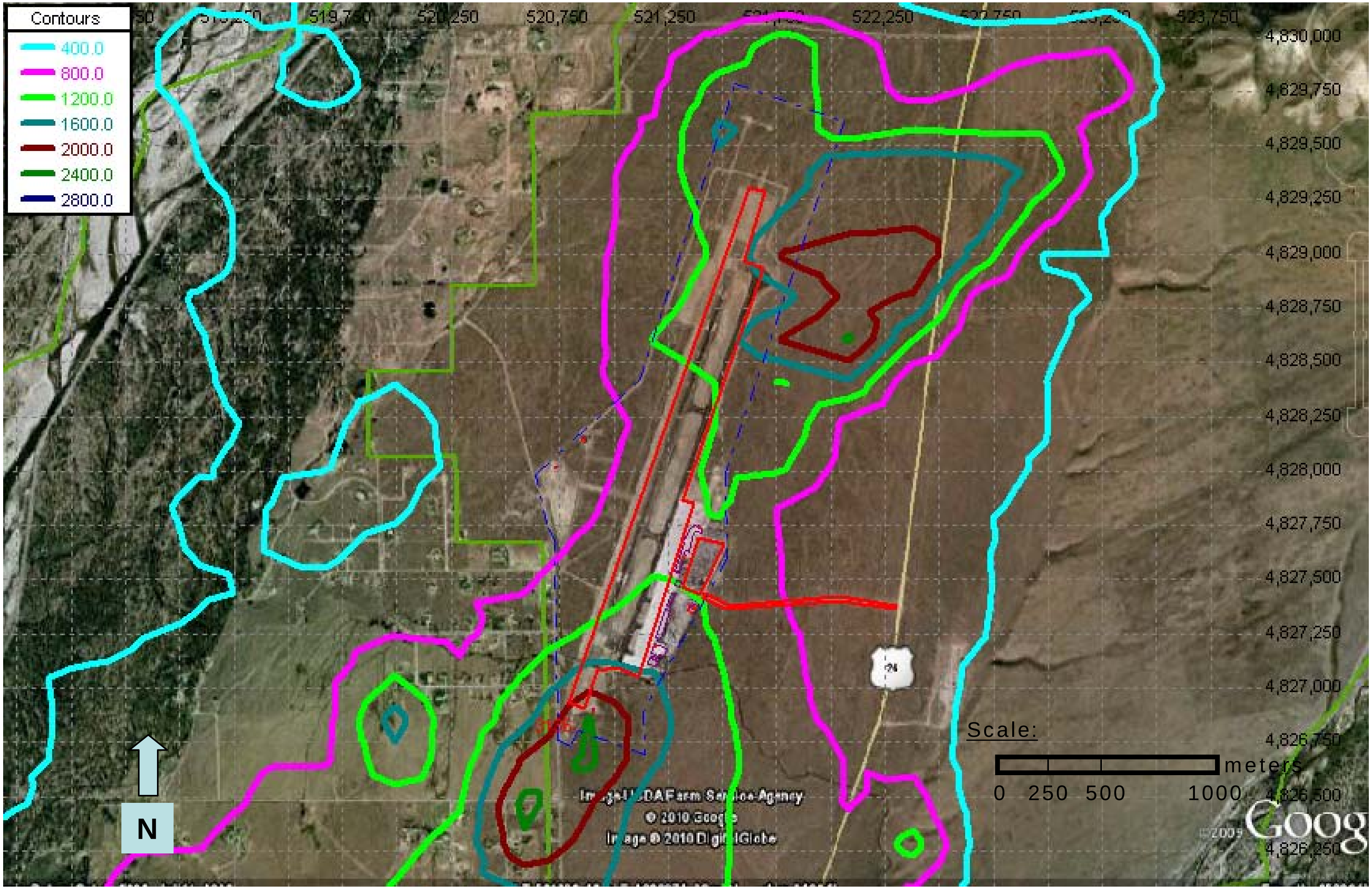
Model Predicted Maximum Annual PM10 Impacts – Base Case Worst Year (2006)



Grid in meters

Figure 7-6
Jackson Hole Airport – Jackson Hole, WY
Air Quality Modeling Impact Analysis

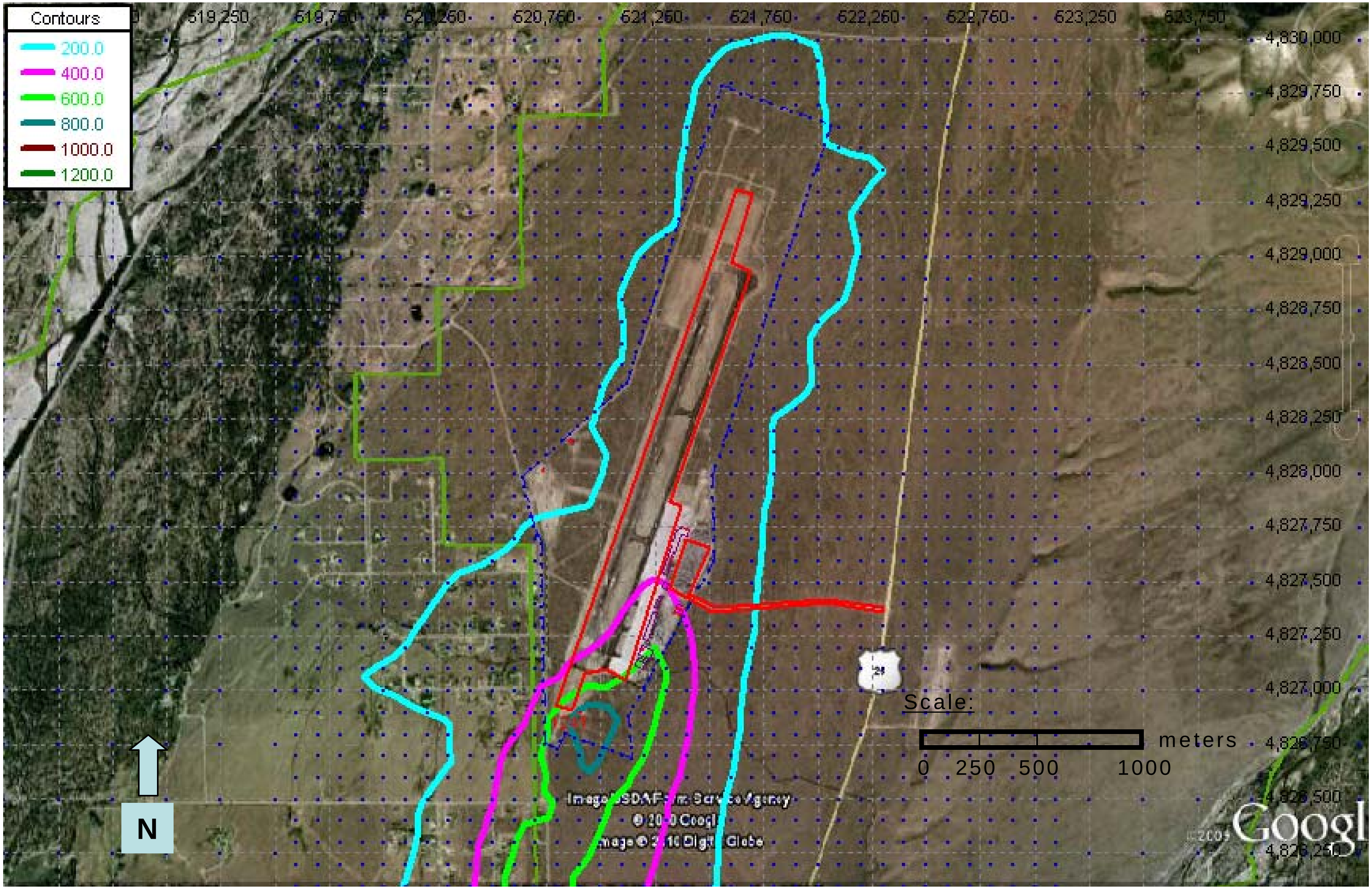
Model Predicted Maximum 1-hr CO Impacts – Base Case Worst Year (2006)



Grid in meters

Figure 7-7
Jackson Hole Airport – Jackson Hole, WY
Air Quality Modeling Impact Analysis

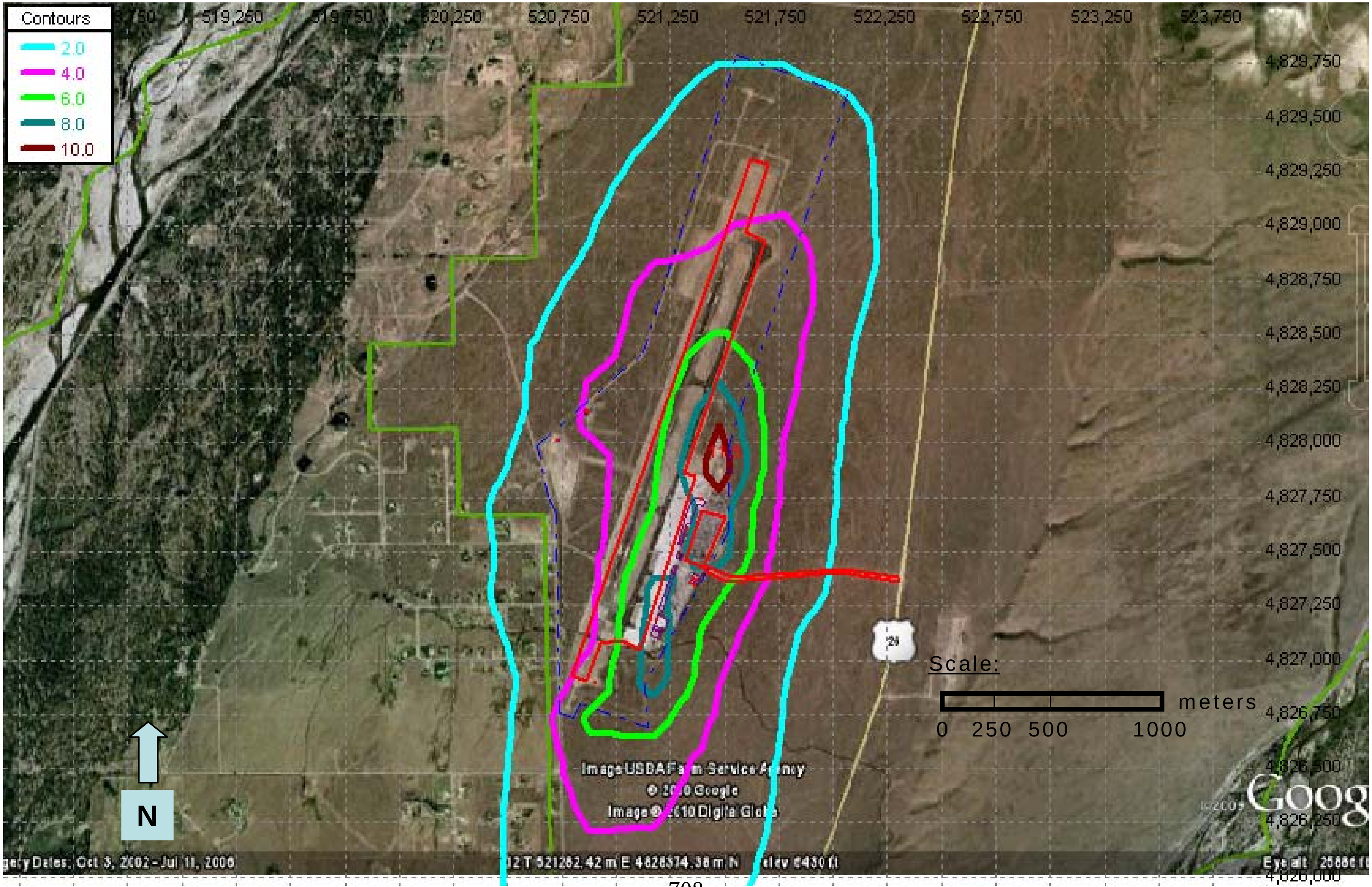
Model Predicted Maximum 8-hr CO Impacts – Base Case Worst Year (2005)



Grid in meters

Figure 7-8
Jackson Hole Airport – Jackson Hole, WY
Air Quality Modeling Impact Analysis

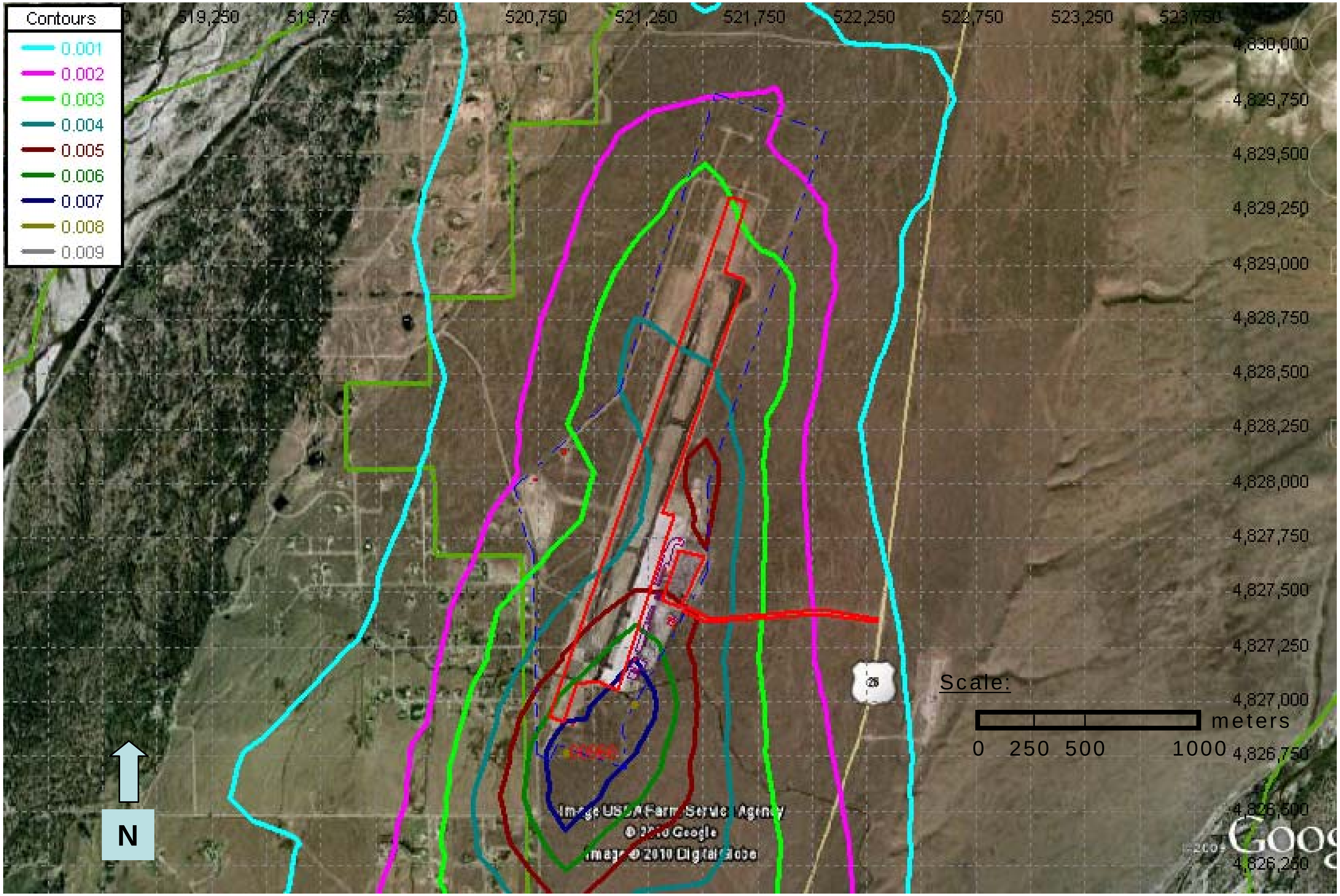
Model Predicted Maximum Annual NOx Impacts – Base Case Worst Year (2005)



Grid in meters

Figure 7-9
Jackson Hole Airport – Jackson Hole, WY
Air Quality Modeling Impact Analysis

Model Predicted Maximum Monthly Lead Impacts – Base Case



Grid in meters

Figure 7-10
Jackson Hole Airport – Jackson Hole, WY
Air Quality Modeling Impact Analysis

Significant Impact Level (SIL) Radius-of-Impact (ROI)
Class 1 Area 3-hr SO2 - Base Case Worst Year (2006)
SIL=1.0ug/m3 ; ROI >14km

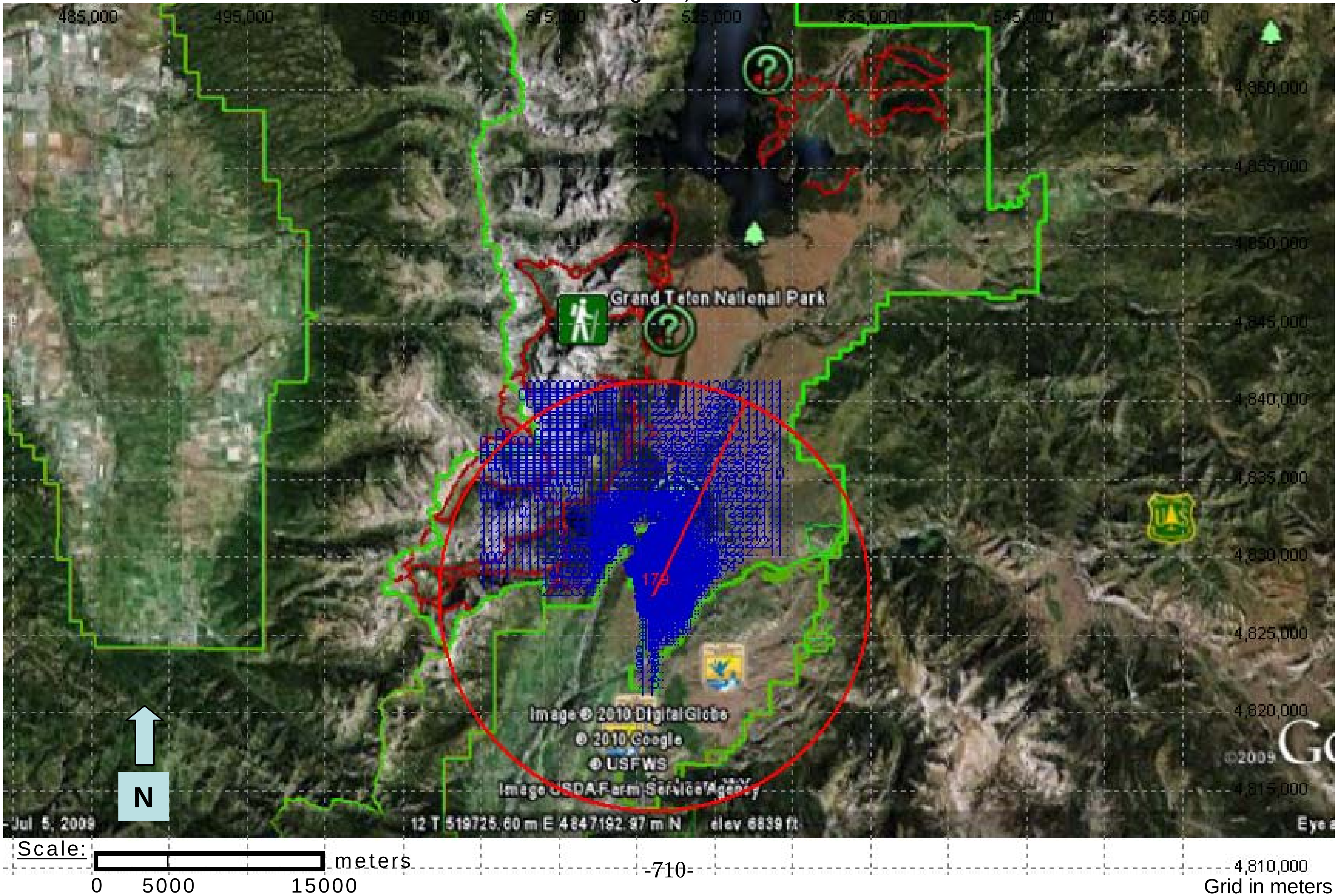


Figure 7-11
Jackson Hole Airport – Jackson Hole, WY
Air Quality Modeling Impact Analysis

Significant Impact Level (SIL) Radius-of-Impact (ROI)
Class 1 Area 24-hr SO2 - Base Case Worst Year (2006)
SIL=0.2ug/m3 ; ROI >14km

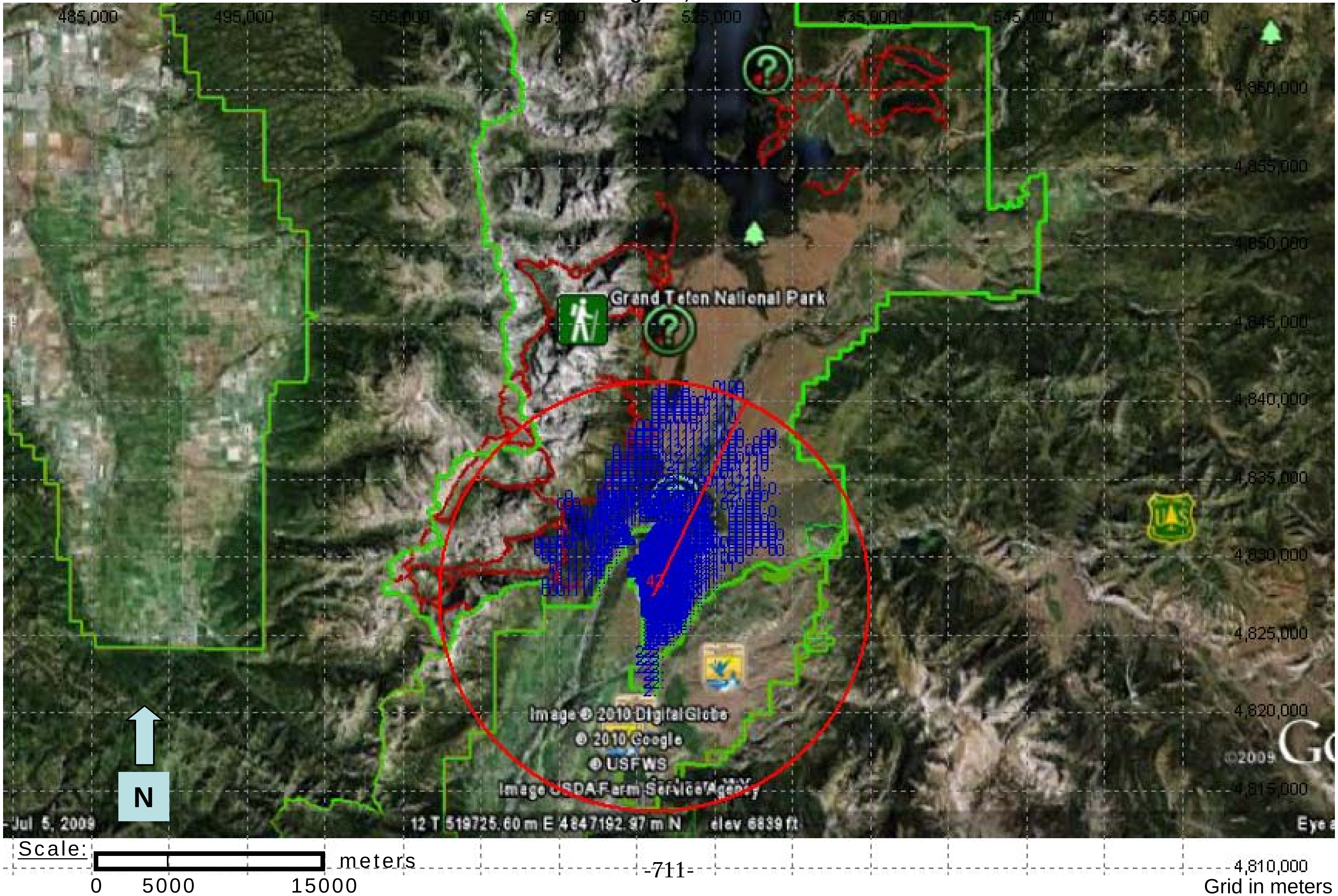
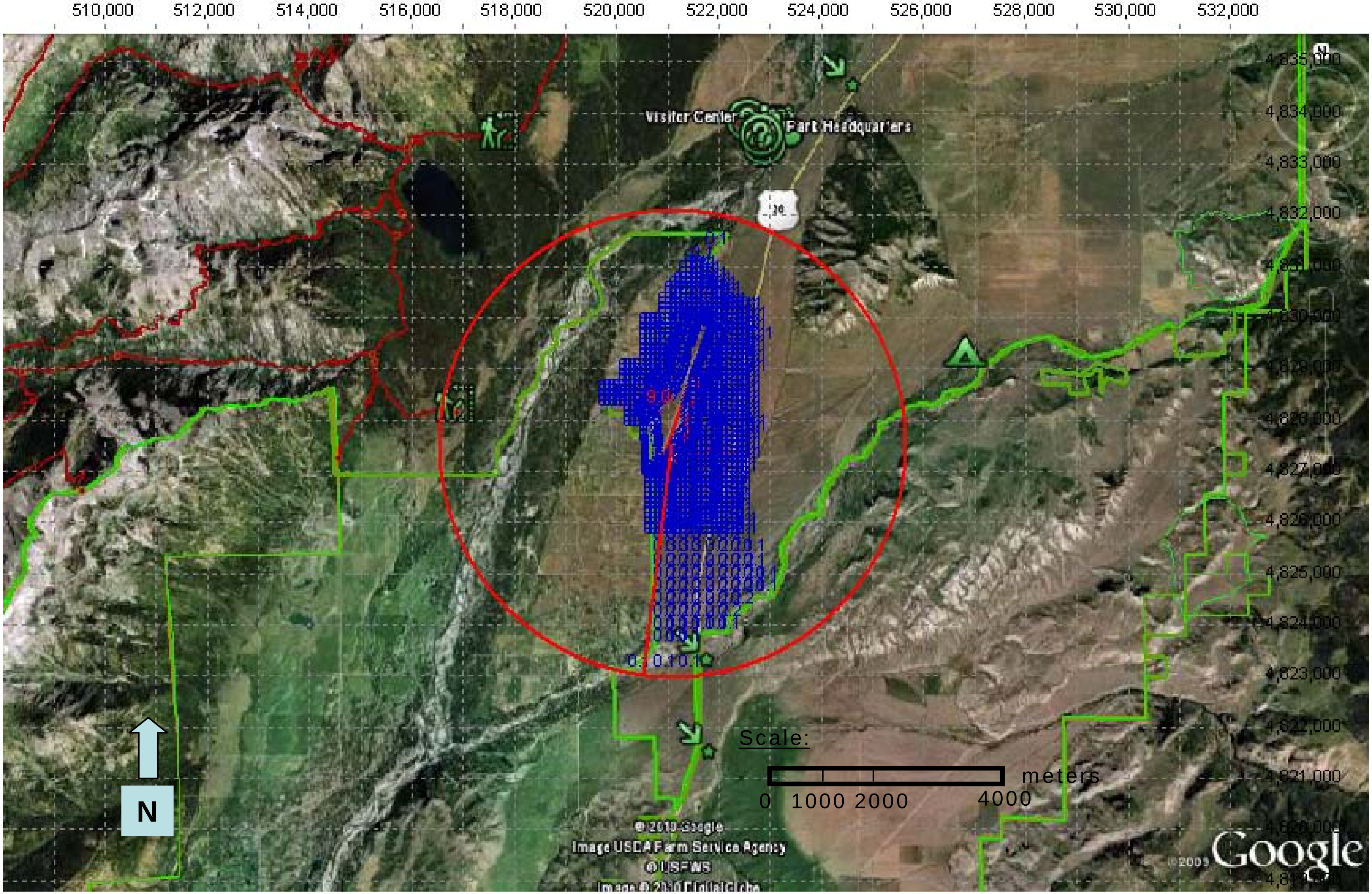


Figure 7-12
Jackson Hole Airport – Jackson Hole, WY
Air Quality Modeling Impact Analysis

Significant Impact Level (SIL) Radius-of-Impact (ROI)
Class 1 Area Annual SO2 - Base Case Worst Year (2006)
SIL=0.1ug/m3 ; ROI =4.6km



Grid in meters

Figure 7-13
Jackson Hole Airport – Jackson Hole, WY
Air Quality Modeling Impact Analysis

Significant Impact Level (SIL) Radius-of-Impact (ROI)
Class 1 Area 24-hr PM10 - Base Case Worst Year (2006)
SIL=0.3ug/m3 ; ROI = 8.1km

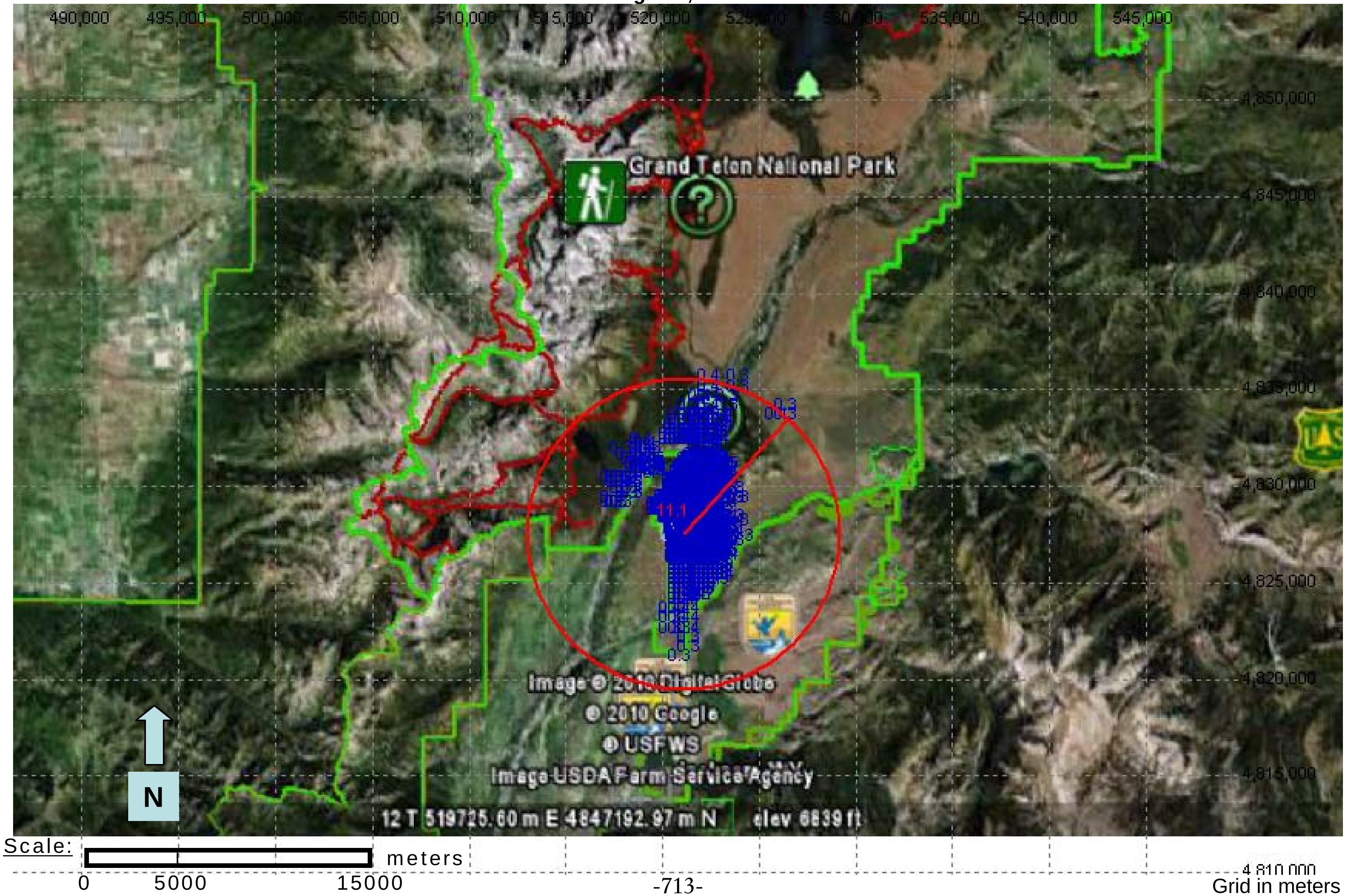
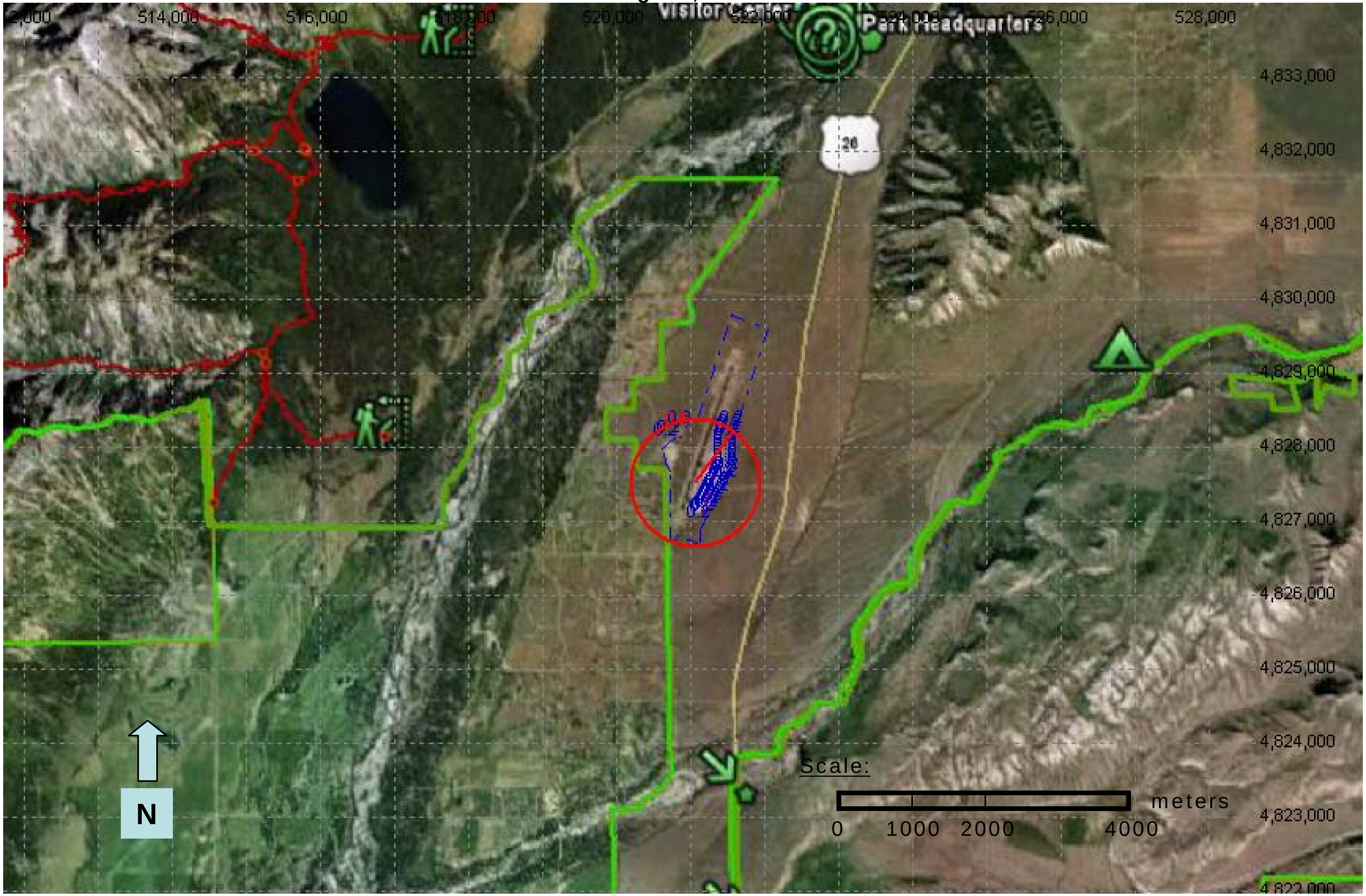


Figure 7-14
Jackson Hole Airport – Jackson Hole, WY
Air Quality Modeling Impact Analysis

Significant Impact Level (SIL) Radius-of-Impact (ROI)
Class 1 Area Annual PM10 - Base Case Worst Year (2006)
SIL=0.2ug/m3 ; ROI = 0.9km



Grid in meters

Figure 7-15
Jackson Hole Airport – Jackson Hole, WY
Air Quality Modeling Impact Analysis

Significant Impact Level (SIL) Radius-of-Impact (ROI)
Class 2 Area 1hr CO - Base Case Worst Year (2006)
SIL=2000ug/m3 ; ROI = 7.7km

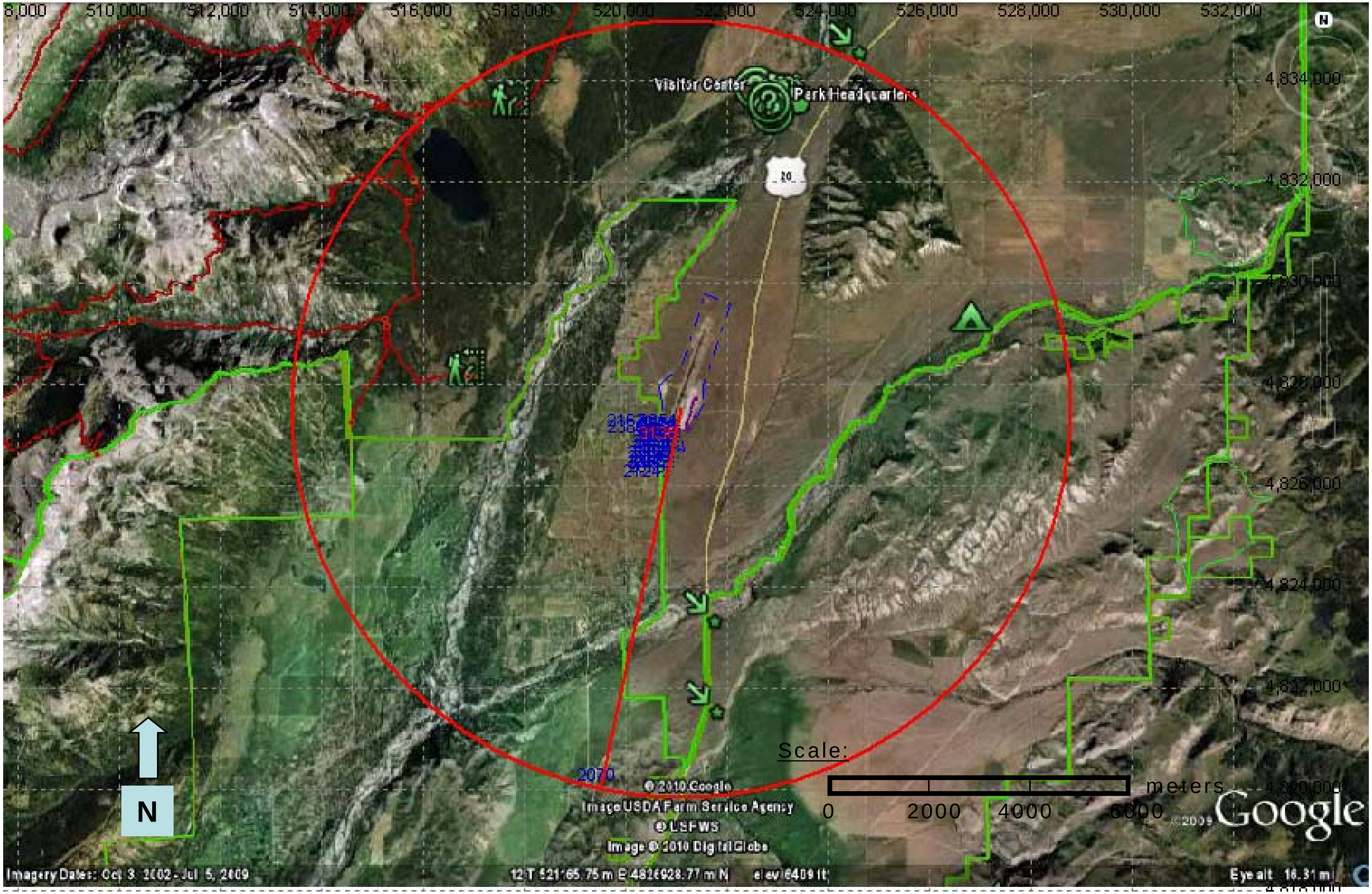


Figure 7-16
Jackson Hole Airport – Jackson Hole, WY
Air Quality Modeling Impact Analysis

Significant Impact Level (SIL) Radius-of-Impact (ROI)
Class 2 Area 8hr CO - Base Case Worst Year (2005)
SIL=500ug/m3 ; ROI = 9.5km

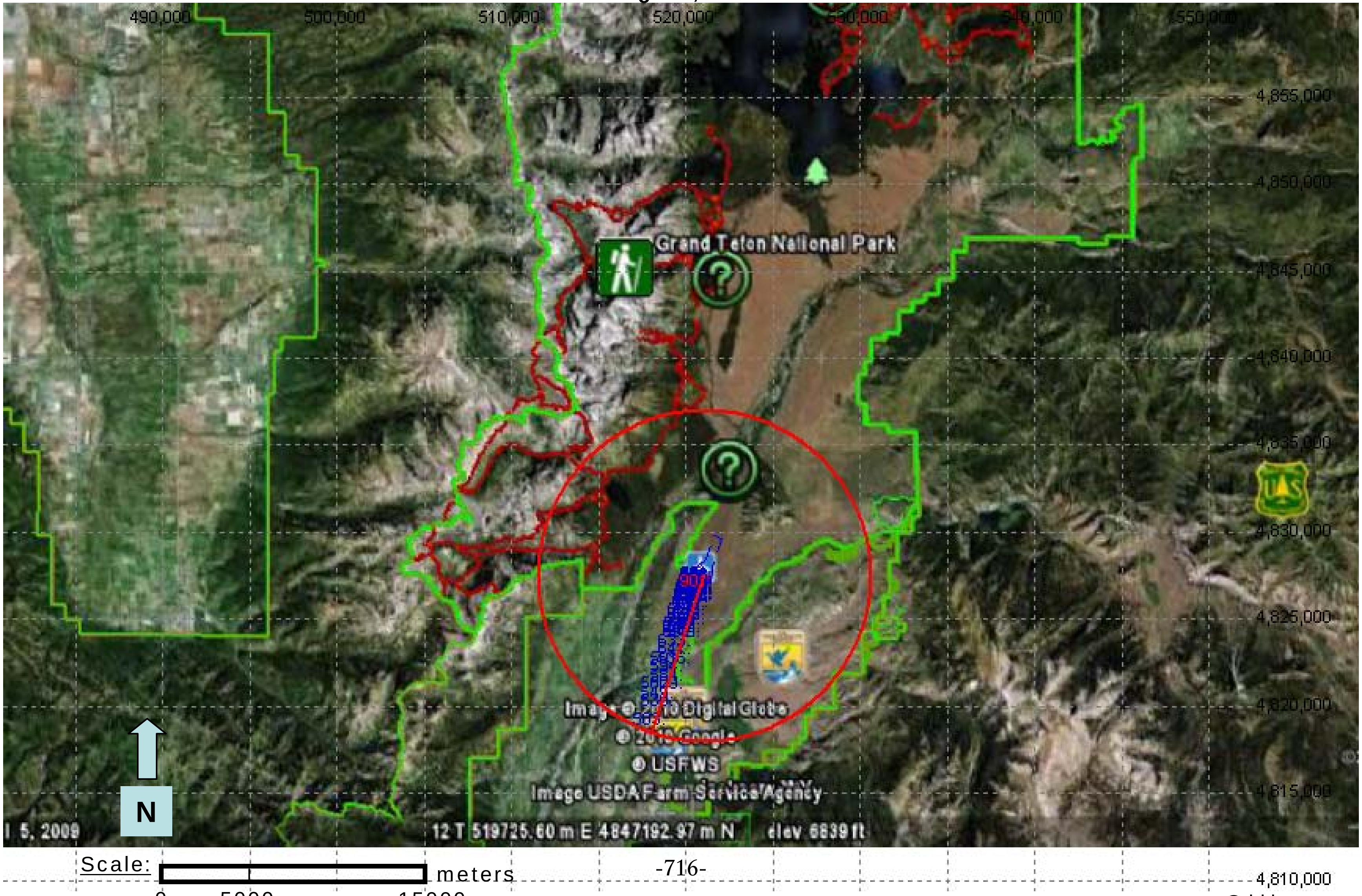
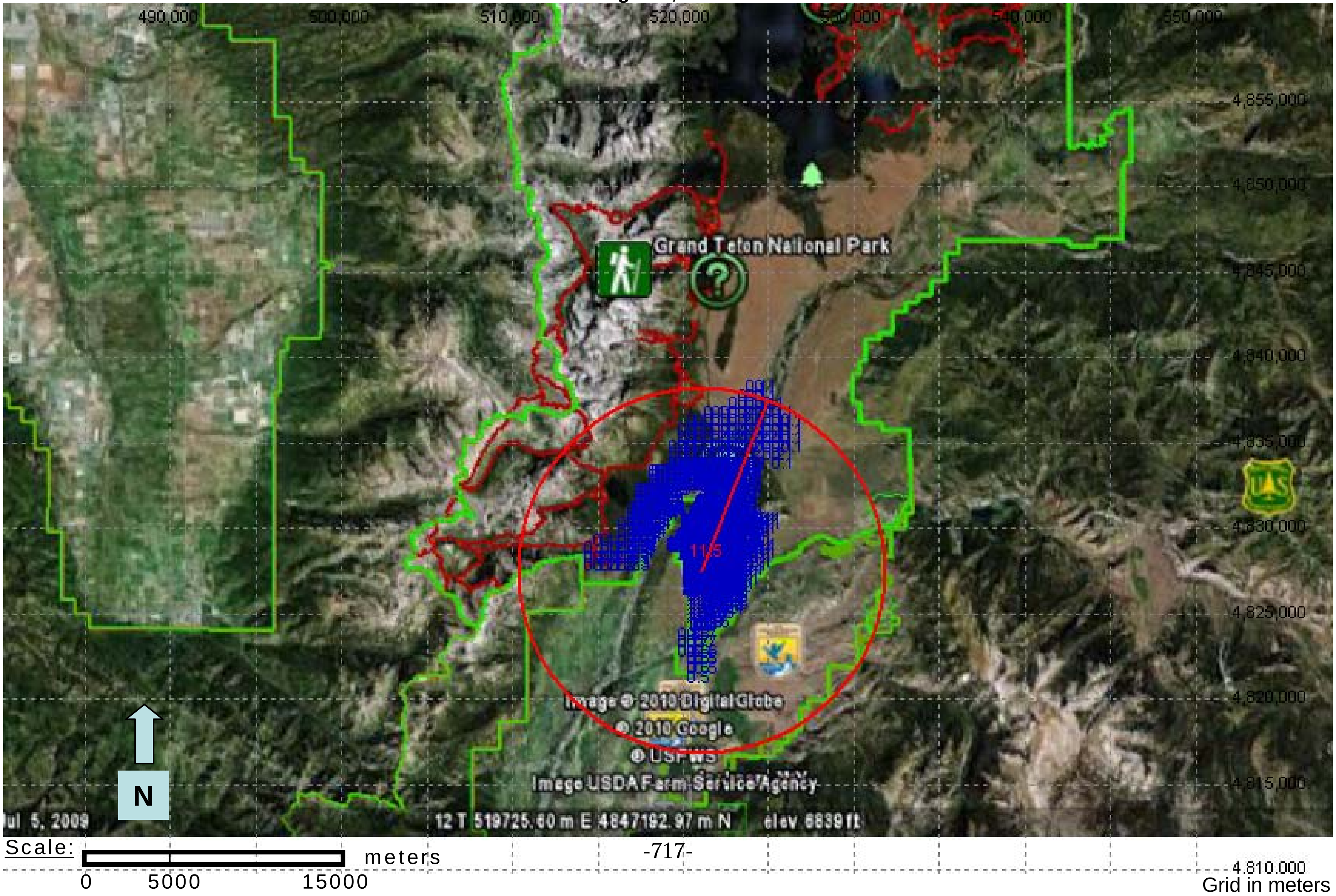


Figure 7-17
Jackson Hole Airport – Jackson Hole, WY
Air Quality Modeling Impact Analysis

Significant Impact Level (SIL) Radius-of-Impact (ROI)
Class 1 Area Annual NOx - Base Case Worst Year (2005)
SIL=0.1ug/m3 ; ROI = 10.7km



Basis for Estimates of Greenhouse Gas Emissions as Carbon Dioxide Equivalents

Case:			Baseline	2015 Alt-1	2015 Alt-2	2025 Alt-1	2025 Alt-2	Calculation Notes:
Total Fuel:		lb/yr	18,548,619	8,167,478	18,496,045	8,581,299	19,015,332	From rolled-up EDMS output
Piston Fuel (Avgas):		lb/yr	140712.3	99155.7	99155.7	101350.5	101350.5	From subset of piston-engine aircraft from EDMS output (originally used to determine lead emissions)
Avgas density	6.0	lb/gal						
Avgas volume		gal/yr	23452	16526	16526	16892	16892	Convert pounds of fuel to gallons using lb/gal density factor
Nitrous Oxide (N_2O)								
Emission factor	0.11	g/gal						
Annual emissions		kg/yr	2.6	1.8	1.8	1.9	1.9	Use published emission factor (0.11) to convert gallons fuel per year to kg pollutant per year
		lb/yr	5.7	4.0	4.0	4.1	4.1	Convert to pounds per year
Methane (CH_4)								
Emission factor	7.04	g/gal						
Annual emissions		kg/yr	165.1	116.3	116.3	118.9	118.9	Use published emission factor (7.04) to convert gallons fuel per year to kg pollutant per year
		lb/yr	363.2	256.0	256.0	261.6	261.6	Convert to pounds per year
Jet Fuel (Jet-A):		lb/yr	18,407,907	8,068,322	18,396,889	8,479,949	18,913,982	
Jet-A density	6.75	lb/gal						
Jet-A volume		gal/yr	2727097	1195307	2725465	1256289	2802071	Convert pounds of fuel to gallons using lb/gal density factor
Nitrous Oxide (N_2O)								
Emission factor	0.31	g/gal						
Annual emissions		kg/yr	845.4	370.5	844.9	389.4	868.6	Use published emission factor (0.31) to convert gallons fuel per year to kg pollutant per year
		lb/yr	1859.9	815.2	1858.8	856.8	1911.0	Convert to pounds per year
Methane (CH_4)								
Emission factor	0.27	g/gal						
Annual emissions		kg/yr	736.3	322.7	735.9	339.2	756.6	Use published emission factor (0.27) to convert gallons fuel per year to kg pollutant per year
		lb/yr	1619.9	710.0	1618.9	746.2	1664.4	Convert to pounds per year
GHG Emissions (lb/yr)								
CO2		lb	58520895	25768394	58355020	27073998	59993372	Direct from EDMS output
N2O		lb	1866	819	1863	861	1915	Add lines 13 + 27
CH4		lb	1983	966	1875	1008	1926	Add lines 18 + 32
CO2e	1	lb	58520895	25768394	58355020	27073998	59993372	Multiply actual CO2 emissions (line 36) by GWP factor of 1
N2Oe	310	lb	578322	253952	577458	266872	593681	Multiply actual N2O emissions (line 37) by GWP factor of 310
CH4e	21	lb	41646	20285	39372	21165	40447	Multiply actual CH4 emissions (line 38) by GWP factor of 21
								Change yellow column to change GWP factor
GHG Emissions in Metric Tons per Year								
CO2e		tonnes	26545	11688	26470	12281	27213	Convert CO2e in pounds per year to metric tonnes per year(divide by 2204.6)
N2Oe		tonnes	262	115	262	121	269	Convert N2Oe in pounds per year to metric tonnes per year(divide by 2204.6)
CH4e		tonnes	19	9	18	10	18	Convert CH4e in pounds per year to metric tonnes per year(divide by 2204.6)
Total CO2 Equivalent			26,826	11,813	26,749	12,411	27,500	Sum CO2e + N2Oe + CH4e
			Baseline	**2015 Alt-1**	**2015 Alt-2**	**2025 Alt-1**	**2025 Alt-2**	

Reference Notes: Pollutant emission and GWP factors obtained from the *Local Government Operations Protocol for the quantification and reporting of greenhouse gas emissions inventories, Version 1.0, September 2008* published by the California Climate Action Registry.

GWP = Global Warming Potential

As the nation's principal conservation agency, the Department of the Interior has the responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historical places; and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

NPS 136/105535 / September 2010