Office of the Governor

State of Utah

GARY R. HERBERT
Governor

SPENCER J. COX
Lieutenant Governor

November 1, 2016

Carl Daly
Air Program Director
US EPA, Region 8
1595 Wynkoop Street
Denver, Colorado 80202-1129

RE: 2010 Primary Sulfur Dioxide (SO_2) National Ambient Air Quality Standard Area Designation Recommendation

Dear Mr. Daly:

On August 5, 2013, the EPA published a notice announcing designations of 29 areas as nonattainment for the 2010 primary SO_2 standard based on certified ambient air quality monitoring data. No portions of the State of Utah were amongst those areas designated as nonattainment. EPA, under a consent decree, is required to complete the remaing area designations by December 31, 2017, and Utah is required to submit its designation recommendation by January 13, 2017. As Governor of Utah, I hereby submit my designation recommendation that all areas of the State of Utah be designated as attainment. I make this recommendation based on the lack of sources above the Data Requirements Rule (DRR) threshold in many counties in the State, monitoring data collected within Utah's EPA-approved monitoring network, and the results of the Utah Division of Air Quality's (UDAQ) work with the federal DRR to characterize air quality in areas with large sources of SO_2.

The primary standard for SO_2 is a three-year average of the 99th percentile of the annual distribution of daily maximum one-hour average concentrations at a level of 75 ppb. The secondary standard is a three-hour standard of 50 ppb and is not to be exceeded more than once per year. The following sections provide inventory information or analytical data that demonstrate the primary standard has not been exceeded statewide.

Counties Lacking Sources Above the DRR Threshold

The following counties contain no point sources with emissions above EPA's DRR threshold of 2,000 tons/year thus resulting in a low potential to exceed the 75 ppb standard. In

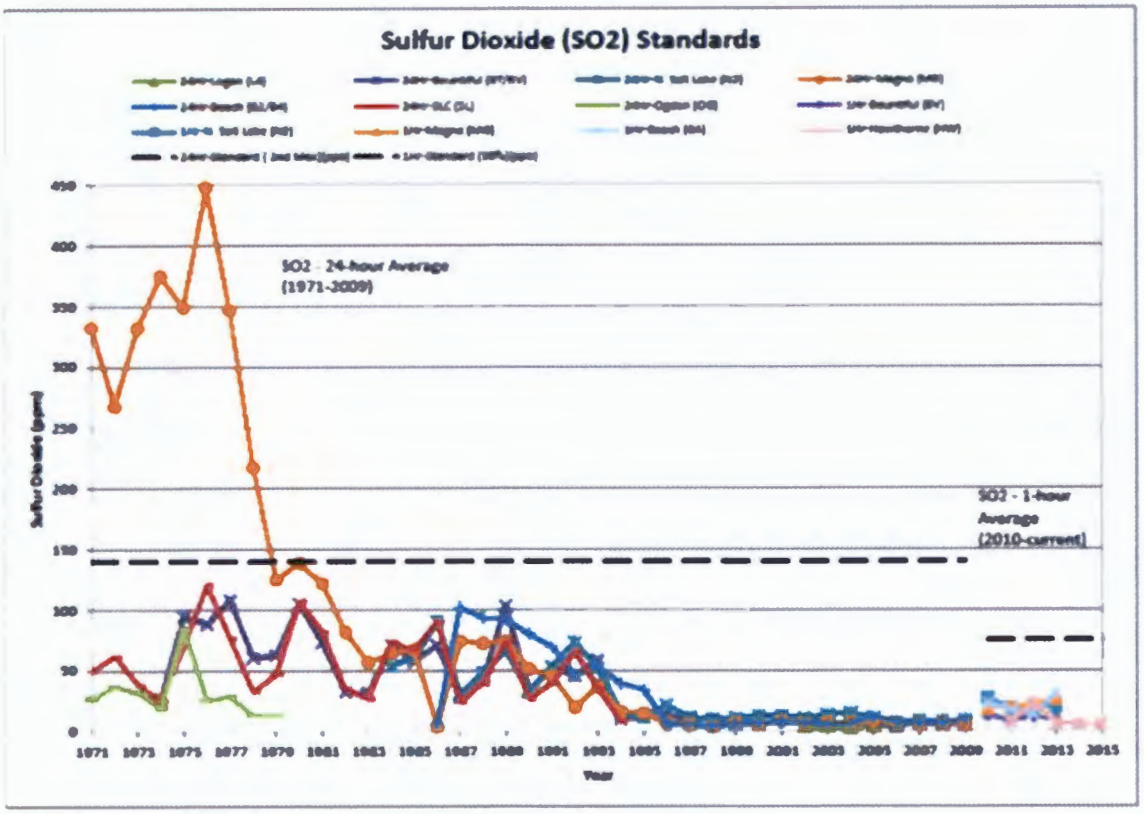
the absence of significant sources in these counties, I recommend that they be designated as attainment.

County	2014 SOx Inventory (Tons)
Beaver	14.61
Box Elder	169.25
Cache	24.93
Carbon	1,092.56
Daggett	2.04
Davis	299.77
Duchesne	146.85
Garfield	3.83
Grand	23.02
Iron	27.11
Juab	17.55
Kane	12.29
Morgan	138.11
Piute	0.89
Rich	3.07
San Juan	512.89
Sanpete	13.83
Sevier	35.68
Summit	113.35
Tooele	80.48
Uintah	122.30
Utah	226.95
Wasatch	6.62
Washington	36.14
Wayne	1.87
Weber	50.04

Monitored Values in Salt Lake County

Throughout the 1970s, the Magna monitoring station routinely measured violations of the former 24-hour standard. Consequently, all of Salt Lake County and parts of eastern Tooele County above 5,600 feet were designated as nonattainment for SO_2. Working with EPA, UDAQ established a robust network of SO_2 monitors throughout the area. Two significant technological upgrades at the Kennecott smelter resulted in continued compliance with the SO_2 standard since 1981. In the mid-1990s, Kennecott, Geneva Steel, five refineries, and several other large sources of SO_2 made dramatic reductions in emissions as part of an effort to curb concentrations of secondary particulate (sulfates) that were contributing to PM_{10} violations. As shown in the following graph, following the implementation of that plan, monitored concentrations of SO_2 throughout the network neared the detectability limits of the monitors, and, working with EPA, many of the SO_2 monitors were removed. Utah submitted an SO_2 Maintenance Plan and re-

designation request for Salt Lake and Tooele counties to EPA in April of 2005. Because measurements of SO_2 under the former standards and the new standard indicate that ambient air in Salt Lake County and the metropolitan area of Tooele County has been well within the federal health standards for decades, I recommend that Salt Lake County be designated as attainment.



Data Requirements Rule (DRR) for the 2010 1-Hour SO_2 Standard

On January 8, 2016, the State of Utah submitted to Region 8 a list of four point sources that, in 2014, had actual SO_2 emissions greater than the 2,000 ton/year threshold identified in the DRR.

Source	County	2014 SO_2 Emissions (tons)
Carbon Power Plant	Carbon	9,241.4
Hunter Power Plant	Emery	3,939.3
Huntington Power Plant	Emery	2,479.2
Intermountain Power Plant	Millard	4,371.5

Because the Carbon Power Plant, located in Carbon County, was in the process of closing down in 2014, the total SO_2 emissions from all sources in Carbon County in 2014 dropped below 2,000 tons to 1,092.56 tons. Consequently, I included Carbon County in the list of counties

lacking sources above the 2,000 ton/year DRR threshold. The Carbon Power Plant subsequently closed in April 2015.

On May 17, 2016, UDAQ submitted its modeling analysis for the remaining three sources. UDAQ concluded that there were no viable exposure points for the three sources (see attached modeling results). UDAQ will conduct verification modeling for the next three years per the DRR requirements. I recommend that Emery and Millard counties be designated as attainment based on the DRR modeling analysis.

Should you have any questions or need further information, please contact Bryce Bird, Director of the Division of Air Quality at (801) 536-4064 or bbird@utah.gov.

Sincerely,

Gary R. Herbert
Governor

Enclosure

State of Utah

1-Hour Sulfur Dioxide

Data Requirement Rule

Modeling Demonstration

May 5, 2016

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I. Introduction

In June of 2010, the Environmental Protection Agency (EPA) issued 1-Hour Primary National Ambient Air Quality Standards (NAAQS) for Sulfur Dioxide (SO_2). The new standard is 75 parts per billion (ppb), and is based on the 99th percentile of the daily maximum 1-hour concentration, averaged over a 3-year period.

As part of the new standard, on August 21, 2015, the EPA issued the "Data Requirements Rule (DRR) for the 2010 1-Hour Sulfur Dioxide Primary National Ambient Air Quality Standard" under 40 CFR Part 51. In order to meet the requirements of the rule, the DRR allows state agencies to submit plume dispersion modeling under 40 CFR § 51.1203, for major sources of SO_2 that exceed the DRR 2000 ton per year (TPY) emission threshold, as part of the State's attainment demonstration.

For the period of 2012 through 2014, the State has identified three current existing major SO_2 sources operating in excess of 2000 TPY of SO_2 emissions:

- Intermountain Power Service Corporation – IPP Power Plant, Delta, Utah
- PacifiCorp – Hunter Power Plant, Castle Dale, Utah
- PacifiCorp – Huntington Power Plant, Huntington, Utah

The Utah Division of Air Quality (UDAQ) developed a dispersion modeling protocol to address the DRR. The protocol (DAQP-011-16) was submitted to Rebecca Maticuk, Region Modeler-EPA Region 8, for approval on February 9, 2016. On March 1, 2016, the UDAQ received comments from EPA Region 8 concerning the protocol. The UDAQ prepared responses to comments, made revisions to the original protocol, and submitted them to EPA in an Addendum (DAQP-32-16) on March 22, 2016. The UDAQ received approval from EPA for the protocol on April 4, 2016.

Consistent with EPA's "Updated Guidance for Area Designations for the 2010 Primary SO_2 NAAQS" (March 20, 2015), and the "SO2 NAAQS Designations Modeling Technical Assistance Document" (February 2016), the UDAQ prepared the required dispersion modeling analyses. The analyses herein quantify the potential impact of each source on the new 1-Hour SO_2 NAAQS in the areas of concern surrounding each facility. The results of those analyses indicated that the 1-Hour SO_2 NAAQS would be attained in all areas under review in the dispersion modeling demonstration.

II. Model Selection and Technical Options

All dispersion modeling was performed using the most current version of the EPA preferred – AERMOD Modeling System (Version 15181). Modules used in the analysis include:

- AERMOD Dispersion Model – 15181
- AETMET Meteorological Processor 15181
- AERSURFACE Land Use Processor 13016
- AERMAP Terrain Processor 11103

Only ***Regulatory Default Options*** were used in model processing, including:

- Stack-tip Downwash
- Effects of Elevated Terrain
- Calm Processing
- Missing Data Processing

Hourly concentrations are calculated using the EPA 1-Hour SO_2 NAAQS processing method, which results in a multi-year average of ranked maximum daily values representing the 99th percentile, in this case, the 4th highest averaged over a three year period. The three year time period under review in the analyses is January 1, 2012, through December 31, 2014.

III. Source Characteristics

The area surrounding the three power plants identified meets the definition of "rural" for purposes of performing dispersion modeling using AERMOD. Further discussion of each power plant appears below.

Intermountain Power Service Corporation Plant – The Intermountain Power Plant (IPP) is located 10 miles north of Delta, Utah, in the west central part of the State. IPP operates two coal-fired 950MW electrical generation units at the Delta facility. The land surrounding the plant is desert shrub land, suitable for limited grazing, with some areas of farmland to the southwest. The nearest residence to the plant is 4 miles to the southwest. The surrounding terrain is flat with little change in elevations. Figure 1 is an aerial view of the plant and its surrounding environment.

PacifiCorp Hunter Power Plant – The Hunter Power Plant is located 2.5 miles south of Castle Dale, Utah, and 4.5 miles northeast of Clawson, Utah, in the central part of the State. PacifiCorp operates three coal-fired 450MW electrical generation units at the Clawson facility. The area is surrounded by farmland to the north of the plant with desert shrub land to the west and red rock desert to the south and east of the facility. The nearest residence is 1.75 miles to the north of the plant. The surrounding terrain is relatively flat close to the plant, with steep sloping terrain 4 miles to the west, and rugged desert land to the east and south. Figure 2 is an aerial view to the plant and its surrounding environment.

PacifiCorp Huntington Power Plant – The Huntington Power Plant is located in Huntington Canyon, 6.5 miles northwest of Huntington, Utah, in the central part of the State. PacifiCorp operates two coal-fired 450MW electrical generation units at the Huntington facility. Huntington Canyon is a narrow canyon with steep terrain rising 3,000 feet from the canyon floor on each side. The nearest residence is 1 mile down the canyon from the plant. Figure 3 is an aerial view to the plant and its surrounding environment.

Figure 1: Intermountain Power Service Corporation Plant and Surrounding Area

Figure 2: PacifiCorp Hunter Power Plant and Surrounding Environment

Figure 3: PacifiCorp Huntington Power Plant and Surrounding Environment

IV. Emissions of SO_2

Dispersion modeling was performed for all major sources of SO_2 in Utah with annual actual emissions in excess of 2000 TPY. Actual reported annual emissions for the period of 2012 through 2014 appears in Table 1 below.

Table 1: Annual Actual Emissions and Permit Limits

Source	Reported Actuals (TPY)			Permit Limit (lb/hr)	Average Hourly Emission Rate 2012-2014	Hours of Operation[c] 2012-2014
	2012	2013	2014			
Intermountain Power Service Corporation – Intermountain Power Plant						
Unit 1	1360	2545	2059	1273	564.7[a]	21,122
Unit 2	2191	2180	2310		541.5[a]	24,677
Total	3553	4727	4372			
PacifiCorp – Hunter Power Plant						
Unit 1	2121	2341	1193	547	475.1[b]	23,804
Unit 2	1503	1554	1559		358.8[b]	25,733
Unit 3	908	1159	1187		267.2[b]	24,353
Total	4533	5055	3939			
PacifiCorp – Huntington Power Plant						
Unit 1	1150	1186	1224	595	289.7[b]	24,580
Unit 2	1150	1223	1254		286.6[b]	25,313
Total	2301	2411	2479			

a. 24-Hour Block Average b. 30-day Rolling Average c. 26,304 total hours in 3-year period

Concentrations predicted in the analyses are based on hourly emission rates and release parameters recorded on continuous emission monitors (CEM) at the three power plants between 2012 and 2014. A three-year data profile (.emi files) of hourly-averaged emission rates, in-stack gas temperature, and in-stack flow rates for each plant's units during the period January 1, 2012, through December 31, 2014, was compiled for input to the AERMOD model. All missing data substitutions and bias adjustments to the CEM data were based on 40 CFR Part 75.33 Missing Data Substitution Procedures.

V. Stack Parameters

Emissions of SO_2 at the three plants are released from a dedicated stack for each coal-fired boiler unit. The stack locations and release parameters for the three power plant's boiler stacks are listed in Table 2 below.

Table 2: AERMOD Stack Location and Release Parameters

SO_2 Source	UTME (m)	UTMN (m)	Height (m)	Diameter (m)	Temperature (K)	Exit Velocity (m/s)
ISPC – IPP Plant					Gas Temp. Changes Hourly, Consistent with each Unit's CEM For Period 2012 through 2014	Exit Velocity Changes Hourly, Consistent with each Unit's CEM For Period 2012 through 2014
Unit 1	364213	4374464	217	8.5		
Unit 2	364213	4374464	217	8.5		
PacifiCorp – Hunter Plant						
Unit 1	497394	4336026	183	7.3		
Unit 2	497488	4336026	183	7.3		
Unit 3	497567	4335993	183	7.3		
PacifiCorp – Huntington Plant						
Unit 1	493148	4358849	183	7.3		
Unit 2	493190	4358784	183	7.3		

VI. Meteorological Data and Processing

The meteorological record for the UDAQ - DRR modeling demonstration is January 1, 2012, through December 31, 2014. Meteorological monitoring data was collected onsite at the IPSC-IPP and PacifiCorp – Huntington plants during this period. The PacifiCorp – Hunter plant did not operate a meteorological monitoring tower during this period. The Hunter analysis used site-representative meteorological data from the nearest National Weather Service (NWS) – ASOS station in Price, Utah, 30 miles northeast of the facility. Data used in the analyses is as follows:

- IPSC – IPP - 50 meter onsite Solar Radiation/Delta T (SRDT) meteorological tower with winds recorded at 10 and 50 meters, and temperature recorded at 2, 10, and 50 meters.
- PacifiCorp - Hunter Power Plant - 10 meter NWS-ASOS meteorological tower with winds recorded at 10 meters, and temperature recorded at 2 and 10 meters.
- PacifiCorp – Huntington Power Plant - 50 meter onsite SRDT meteorological tower with winds recorded at 10 and 50 meters, and temperature recorded at 2, 10, and 50 meters.

- NWS Upper Air data from Salt lake City, Utah, and Grand Junction, Colorado.

Meteorological data was processed using the AERMET 15181 meteorological processor, the AERMINUTE data pre-processor, and the AERSURFACE 13106 land-use processor. The meteorological monitoring data, AERMET and associated preprocessed meteorological files, including the AERMET surface and profile input files are provided with the Technical Support Documentation (TSD). Figures 4 through 6 are the windroses for the three data sets.

Figure 4: Intermountain Power Service Corp. Onsite Meteorology Windrose

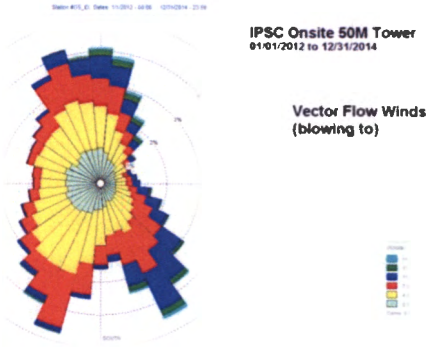


Figure 5: PacifiCorp Huntington Onsite Meteorology Windrose

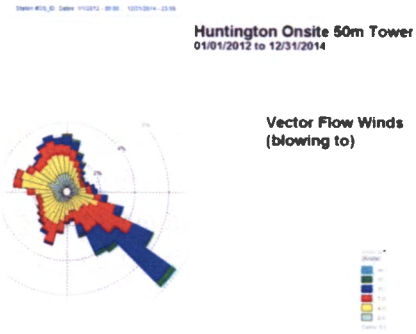
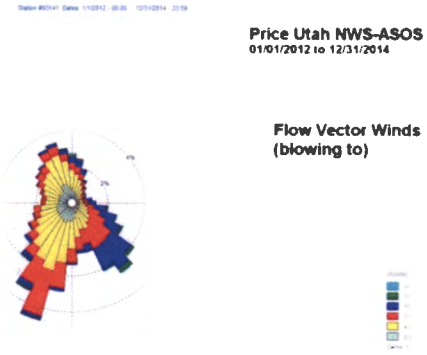


Figure 6: Price, Utah, National Weather Service ASOS Meteorology Windrose



VII. Background Concentrations

IPSC collected ambient SO_2 monitoring data at the IPP plant during the period of October 2, 2001, through October 2, 2002. This data set was used in the UDAQ - DRR modeling analyses as a representative background concentration for the three power plants. Meteorological Solutions Incorporated (MSI), the third-party air monitoring company that collected the data, conduct an in-depth evaluation of monitored values and the associated meteorological monitoring data collected during this period.

The review identified a number of recorded above averaged ambient values that were influenced by emissions from the plant during periods of strong instability in the surrounding atmosphere, which allowed for recirculation of plant exhaust gases into the area where the monitor was located. The EPA - Guidelines for Air Models allows for sources influenced monitoring values to be excluded from the process for determining a representative background concentration. Consistent with the 1-Hour SO_2 NAAQS, the fourth highest daily high monitored value for the period was 7.6 pbb or 19.8 $\mu g/m^3$. The UDAQ considers the ISPC-IPP data set representative of current SO_2 background conditions in the areas surrounding the three plants because:

- The monitoring data was collected onsite in west-central Utah under a Prevention of Significant Deterioration monitoring plan for a proposed modification to the IPP plant.
- Six major sources of SO_2 in central Utah were in existence during the monitoring period, and those sources have not added any additional new emissions to the atmosphere since the data was collected.
- A large source of SO_2 emission in central Utah, the PacifiCorp's Carbon Plant was shut down in June of 2015.
- No new sources of SO_2 emissions have been added to these areas since 2001 and the PacifiCorp plants have since installed additional controls to significantly reduce their SO_2 emissions.
- A search of the EPA-AIRDATA website identified no other SO_2 monitoring sites in rural areas of central Utah between 1995 and 2015.

The ambient monitoring data and associated processing spreadsheet and meteorological files are provided with the TSD.

VIII. Building Downwash

The Building Profile Input Program (BPIP) was used to estimate building downwash effects on plumes emitted from the three plants. All stacks meet the definition of GEP stack height, and the actual height of each stack will be used in the analyses. BPIP building overlays for each plant appear in the Figures 7 through 9. BPIP input and output files are included in the AERMOD modeling electronic support files included with this report.

Figure 7: Intermountain Power Service Corp. Power Plant BPIP Overlay

Figure 8: PacifiCorp Hunter Power Plant BPIP Overlay

Figure 9: PacifiCorp Huntington Power Plant BPIP Overlay

IX. Modeling Domain and Receptor Coverage

The modeling domain for the IPSC-IPP analysis is 83 km by 93 km. The PacifiCorp Hunter and Huntington plants were included within the same modeling domain due to the close proximity of the two plants. The PacifiCorp Hunter and Huntington modeling domain is 95 km by 27 km. Cartesian coordinate receptor grids were used to define the modeling domains. Receptor coverage extends out to the distance where the model predicted concentration gradient falls below the proposed 1-Hour SO_2 significant impact level (SIL, 4% of standard, 3 ppb / 8µg/m^3). Placement of receptors at ≤0.5 degrees of arc from the source were used to ensure that maximum concentrations within the AERMOD's predicted Gaussian distribution curves for all ranges are defined. Figure 10 depicts the receptor grid for the PacifiCorp Hunter and Huntington modeling analysis. Figure 11 depicts the receptor grid for the IPSC modeling analysis.

Receptor grid density is 250 meter spacing in the near vicinity of each plant, increasing to 500 and 1,000 meter spacing at 5 and at 10 kilometers, respectively. Property boundary receptors were included in the analyses with 100 meter spacing. Areas showing modeled concentrations in the top 10-15% range of predicted values use a 100 meter receptor spacing to identify the location and magnitude of the modeled maximums.

Section 4.2 of the EPA - SO_2 NAAQS Designations Modeling Technical Assistance Document (February 2016) states that "In areas where it is not feasible to place a monitor (water bodies, facility property, etc.), receptors can be ignored or not placed in those locations". The UDAQ has identified several locations in the PacifiCorp Hunter and Huntington analysis modeling domain where monitor placement would not be feasible due to steep and inaccessible terrain.

The area five miles west of the Hunter plant interfaces a north-south mountain range, with changes in elevation increasing 2,000 feet over a distance of less than ½ mile, and slopes in excess of 30 degrees. The base of the range is a mix of soft sand and clay soils, which have been eroded over time resulting in rugged up and down terrain with elevation changes of several hundred feet over a short distance. There are no roads or trails which access this area. The top of the range is a plateau area that is relatively flat and remote. The area is accessible by limited dirt roads and trails; however, they are not maintained and are closed to access during winter months. Figures 12 through 14 are an aerial view of this area, a map depicting the associated slopes of topographical features, and a surface photo.

The areas surrounding the Huntington plant is a deep east-west canyon with mountainous terrain on both sides. The elevation changes approximately 3,000 feet over a two mile distance from the canyon floor at the plant, to a high elevation plateau above the canyon. The slope of the canyon walls are in excess of 30 degrees for most of the area. The canyon walls and surrounding slopes are a mix of soft sand and clay soils which have been eroded over time resulting in elevation changes of several hundred feet over short distances. The plateau areas at the top of the canyon are relatively flat and remote. These areas are also accessible by limited dirt roads and trails; however, they are not maintained and are closed to access during

winter months. Figures 15 through 18 are an aerial view of the canyon, a map depicting the associated slopes of topographical features, and two surface photos of this area.

Receptor grid and terrain elevations were processed using the AERMAP (Version 11103) Terrain Processor. Elevation information for buildings and stacks was imported from AERMAP for uses in the analyses.

Figure 10: PacifiCorp Hunter and Huntington Receptor Grid and Elevations

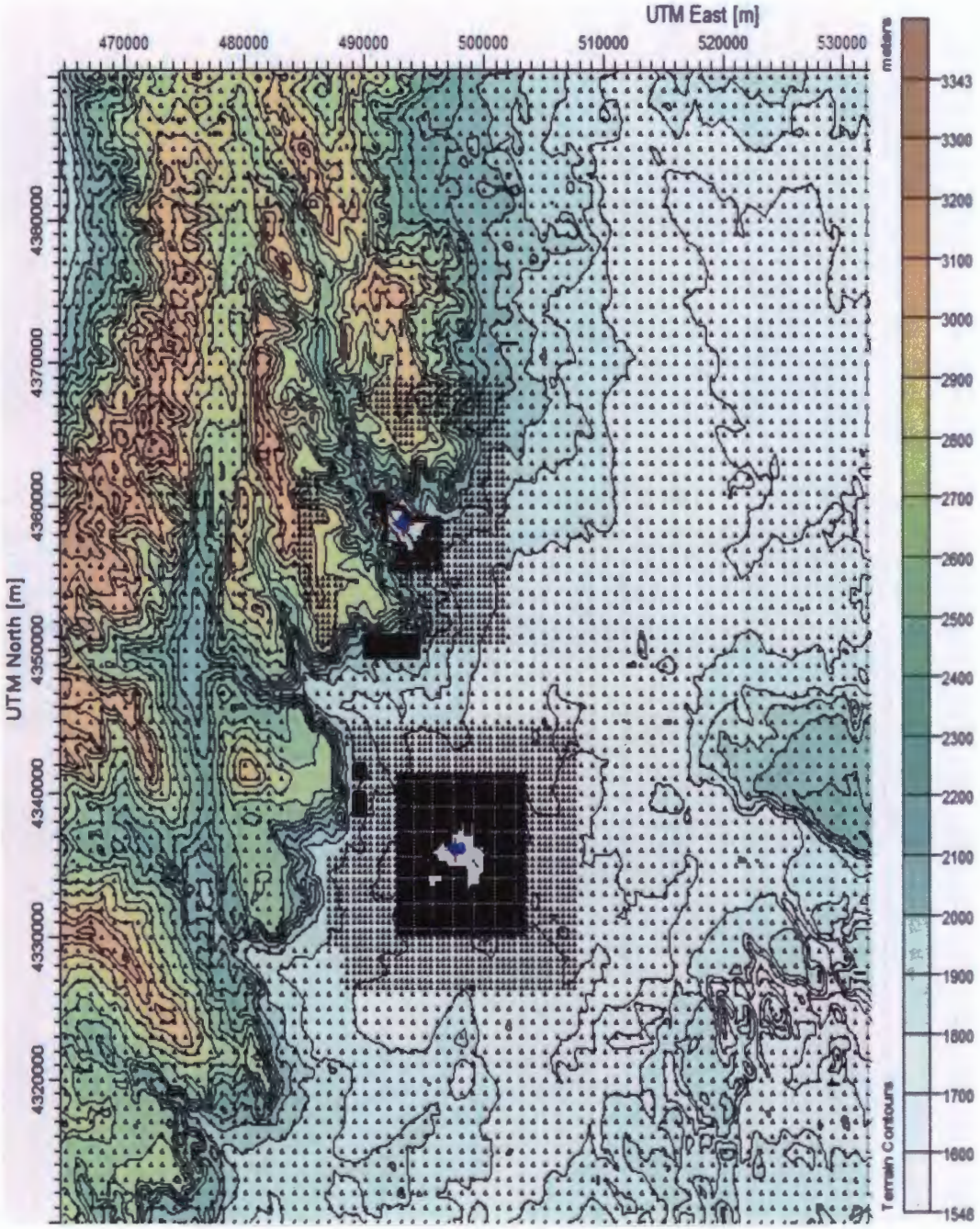


Figure 11: Intermountain Power Service Corporation Receptor Grid and Elevations

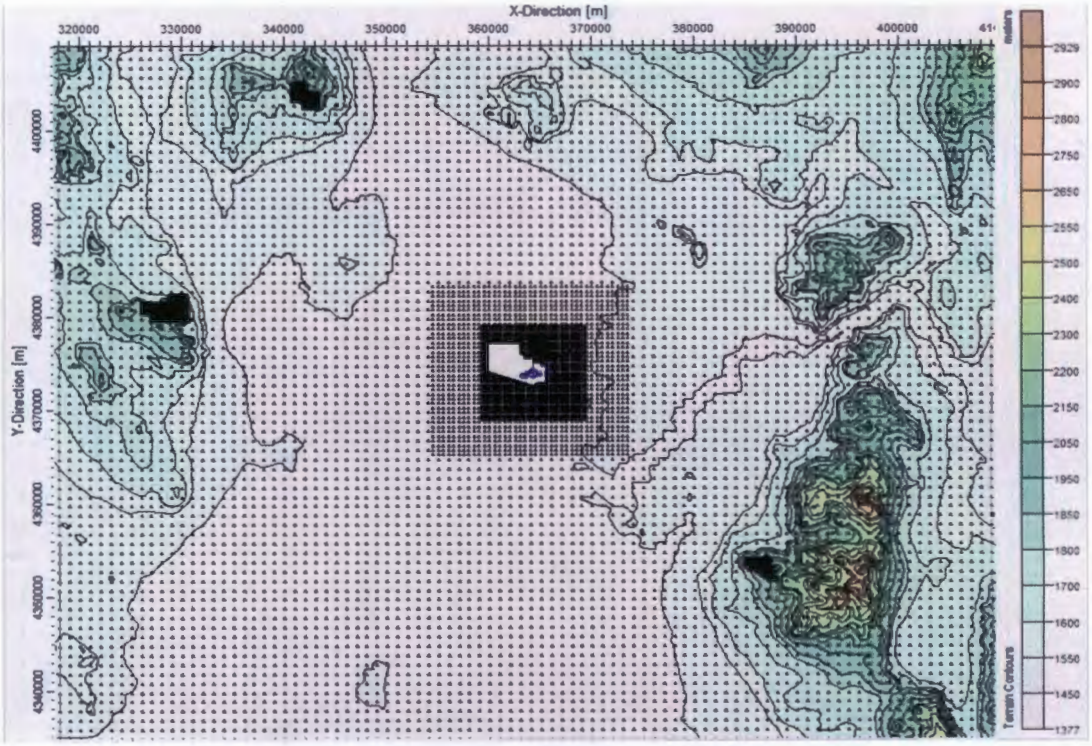


Figure 12: Aerial View of PacifiCorp Hunter Analysis Excluded Receptor Area

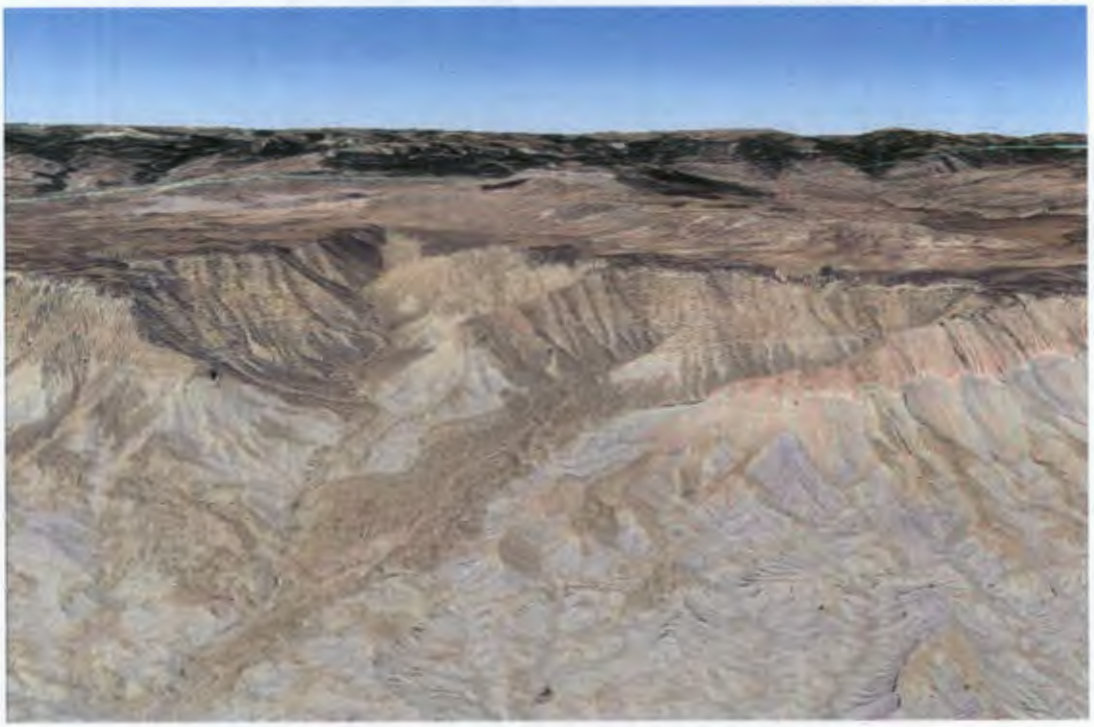


Figure 13: Slope Chart of PacifiCorp Hunter Analysis Excluded Receptor Area

Figure 14: Surface Photo of PacifiCorp Hunter Analysis Excluded Receptor Area

Figure 15: Aerial View of PacifiCorp Huntington Analysis Excluded Receptor Area

Figure 16: Slope Chart of PacifiCorp Huntington Analysis Excluded Receptor Area

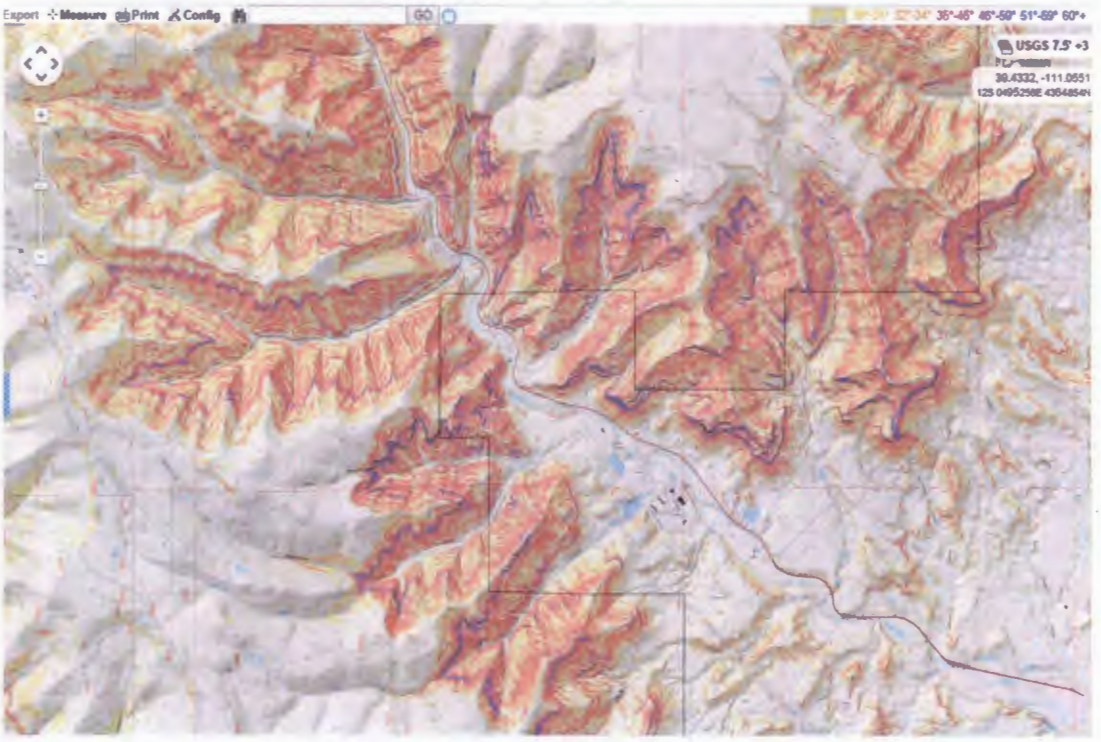


Figure 17: North Side of Huntington Canyon and Excluded Receptor Area

Figure 18: South Side of Huntington Canyon and Excluded Receptor Area

X. Modeling Results and Conclusions

Output from the AERMOD - DRR modeling analyses is consistent with the requirements of the 1-Hour SO_2 NAAQS. Model predicted concentrations reflect the 4th highest daily maximum averaged over the three year period 2012 through 2014. Table 3 shows the AERMOD predicted 4th highest daily maximum concentrations for each facility as compared with the 1-Hour SO_2 NAAQS. The results of the dispersion modeling analyses for the IPSC-IPP, and the PacifiCorp Hunter and Huntington power plants, indicate that the 1-Hour SO_2 NAAQS would be in attainment in the areas surrounding the facilities.

Table 3: 1-Hour SO_2 Data Requirements Rule Predicted Concentrations (in $\mu g/m^3$)

Modeling Domain	Model Predicted 4th Highest Daily Maximum	Background Concentration	Total Predicted Concentration	1-Hour SO_2 NAAQS
Intermountain Power Service Corporation Power Plant	70.7	19.8	90.5	195
PacifiCorp Hunter Power Plant	172.1		191.9	
PacifiCorp Huntington Power Plant	48.5		68.3	

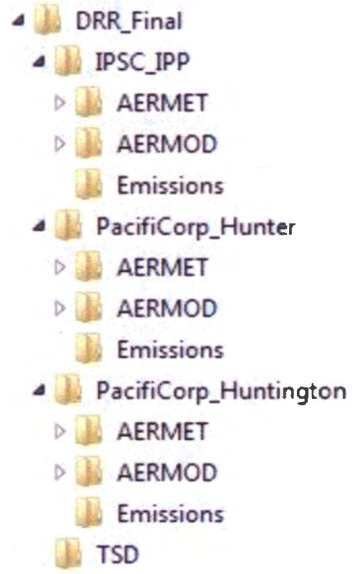
Plot plans depicting the model predicted concentrations and concentration gradient across the modeling domain for each facility can be seen in Figures 19 through 21.

XI. Technical Support Documentation

The AERMOD modeling files and other documentation supporting the conclusions of the analyses for the three power plants is provided in electronic format. A DRR_Final file directory containing individual file directories for each plant was created. Three sub-directories appear under each plant directory; AERMET, AERMOD and Emissions.

The AERMET directory contains the meteorological data processing files for each site and year for the period of 2012 through 2014.

The AERMOD directory contains all the necessary files to run the model, as well as the model and sub processing output files. Modeling files are identified by their extension.



.ADI – AERMOD Input File
.SOU – Source Input File
.ROU – Receptor Input File
.EMI – Emissions Input File
.BPI – Building Downwash Input File
.API – AERMAP Input File
.ADO – AERMOD Output File
.PRO – BPIP Output File
.OUT – AERMAP Output Files
.SFC – AERMET Surface Meteorology File
.PFL – AERMET Atmospheric Profile File
.AST – AERMAP Processing File
.SUP – BPIP Processing File

The Emissions directory contains the plant's SO_2 CEM data for each unit and spreadsheet processing for input to AERMOD.

A common TSD directory also appears under the DRR_Final directory which contains the modeling protocol, modeling report, ambient SO_2 monitoring data report and supporting spreadsheets, and other necessary documentation to support the analyses.

Figure 19: Intermountain Power Service Corporation Concentration Predictions (in $\mu g/m^3$)

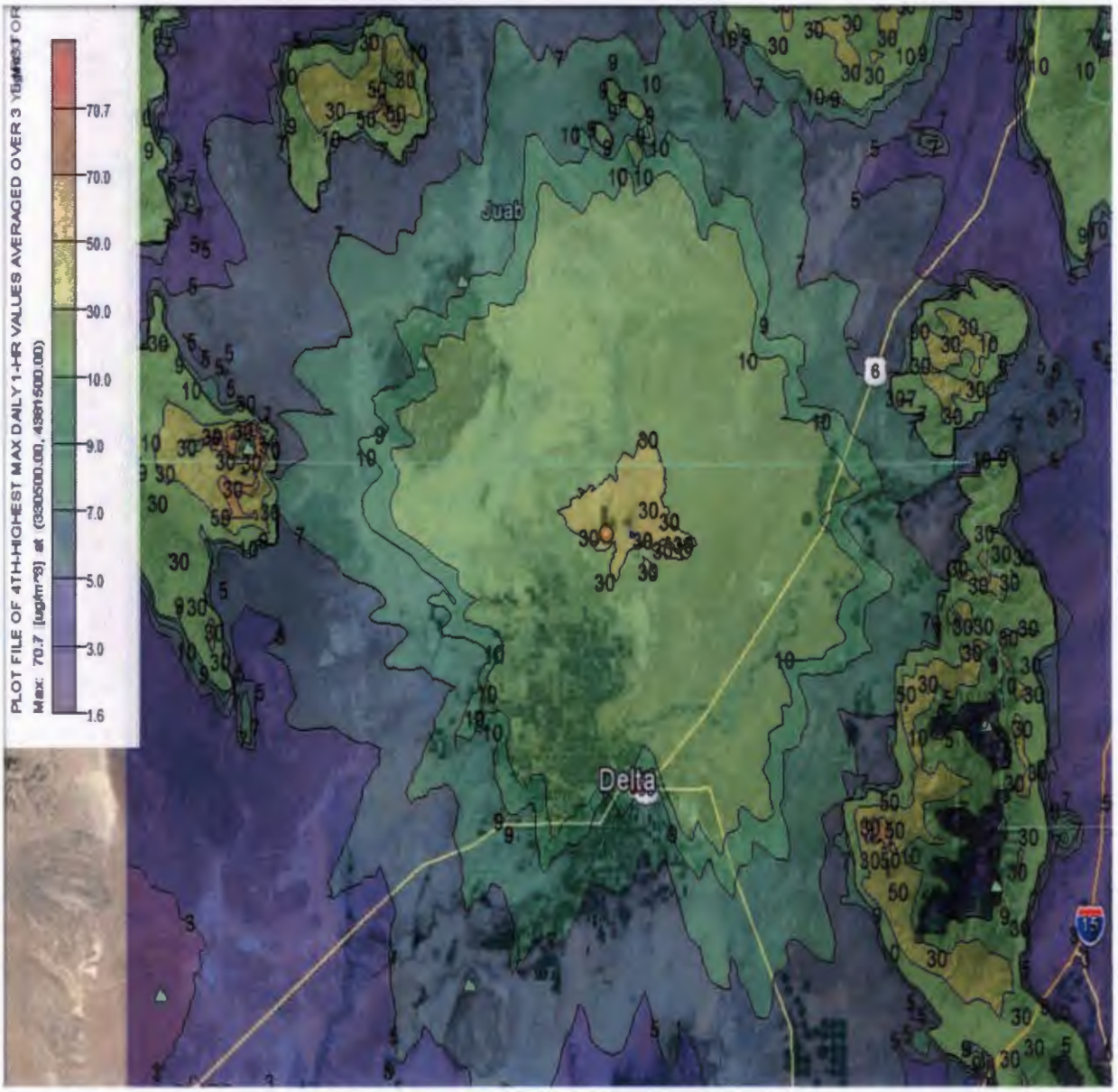


Figure 20: PacifiCorp Hunter Concentration Predictions (in $\mu g/m^3$)

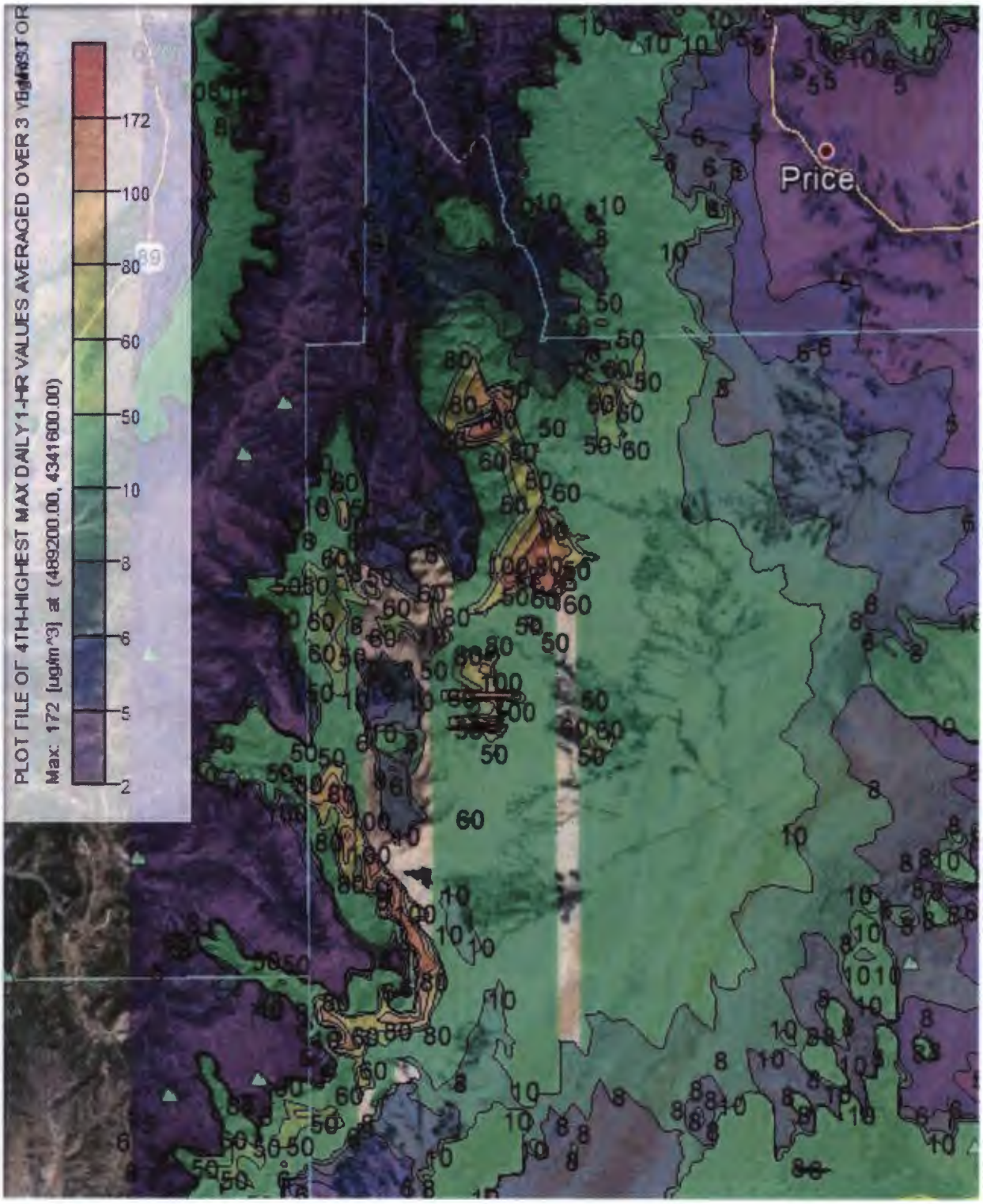


Figure 21: PacifiCorp Huntington Concentration Predictions (in $\mu g/m^3$)