Universal Application 4

Air Dispersion Modeling Report

Refer to and complete Section 16 of the Universal Application form (UA3) to assist your determination as to whether modeling is required. If, after filling out Section 16, you are still unsure if modeling is required, e-mail the completed Section 16 to the AQB Modeling Manager for assistance in making this determination. If modeling is required, a modeling protocol would be submitted and approved prior to an application submittal. The protocol should be emailed to the modeling manager. A protocol is recommended but optional for minor sources and is required for new PSD sources or PSD major modifications. Fill out and submit this portion of the Universal Application form (UA4), the "Air Dispersion Modeling Report", only if air dispersion modeling is required for this application submittal. This serves as your modeling report submittal and should contain all the information needed to describe the modeling. No other modeling report or modeling protocol should be submitted with this permit application.

16-A: Identification

1	Name of facility: **Hobbs Generating Station**
2	Name of company: **Lea Power Partners, LLC**
3	Current Permit number: **PSD 3449-M4**
4	Name of applicant's modeler: **Martin R. Schluep, Alliant Environmental, LLC**
5	Phone number of modeler: **(505) 205-4819**
6	E-mail of modeler: **mschluep@alliantenv.com**

16-B: Brief

1	Why is the modeling being done? **Other (describe below)** **This turbine upgrade project constitutes a major modification under PSD rules.**
2	Describe the permit changes relevant to the modeling. **Mitsubishi Hitachi Power System Americas (MHPSA) proposes to upgrade the two existing combustion turbines to the F4+ compressor upgrade at the Hobbs Generating Station (HGS). The upgrade consists of replacing the Inlet Guide Vanes (IGVs) and first six stages of the compressor, resulting in increased air flow. The expected impact of the upgrade on performance is an increase of 5% in output, no change in heat rate, and a 6.7% increase in turbine exhaust flow. As a result, permitted annual NO_2 and SO_2 emissions as well as hourly and annual TSP/PM_{10}/$PM_{2.5}$ emissions will increase.**
3	What geodetic datum was used in the modeling? **NAD83**
4	How long will the facility be at this location? **Indefinitely**

5	Is the facility a major source with respect to Prevention of Significant Deterioration (PSD)?	Yes **X**	No
6	Identify the Air Quality Control Region (AQCR) in which the facility is located. **155**		
7	List the PSD baseline dates for this region (minor or major, as appropriate). **Minor:** **SO_2: 7/28/1978** **PM_{10}: 2/20/1979** **$PM_{2.5}$: 11/13/2013** **Major:** **NO_2: 2/8/1988**		
8	Provide the name and distance to Class I areas within 50 km of the facility (300 km for PSD permits). **Three Class I areas within 300 km:** - **The Carlsbad Caverns National Park (CCNP) is the closest at 117 km from the HGS,** - **The Guadalupe Mountains National Park (GMNP) at 170 km, and** - **The Salt Creek Wilderness Area (SCWA) at 140 km from the HGS.**		
9	Is the facility located in a non-attainment area? If so, describe. **No**		
10	Describe any special modeling requirements, such as streamline permit requirements. **N/A**		

16-C: Modeling History of Facility

1 Describe the modeling history of the facility, including the air permit numbers, the pollutants modeled, the National Ambient Air Quality Standards (NAAQS), New Mexico AAQS (NMAAQS), and PSD increments modeled. (Do not include modeling waivers).

	Pollutant	Latest permit and modification number that modeled the pollutant facility-wide.	Date of Permit	Comments
	CO	PSD-3449-M2	2014	
	NO_2	PSD-3449-M2	2014	
	SO_2	PSD-3449-M2	2014	
	H_2S	N/A	N/A	
	PM2.5	PSD-3449-M2	2014	
	PM10	PSD-3449-M2	2014	
	TSP	PSD-3449-M2	2014	
	Lead	N/A	N/A	
	Ozone (PSD only)	N/A	N/A	
	NM Toxic Air Pollutants (20.2.72.402 NMAC)	N/A	N/A	

16-D: Modeling performed for this application

1 For each pollutant, indicate the modeling performed and submitted with this application.
Choose the most complicated modeling applicable for that pollutant, i.e., culpability analysis assumes ROI and cumulative analysis were also performed.

	Pollutant	ROI	Cumulative analysis	Culpability analysis	Waiver approved	Pollutant not emitted or not changed.
	CO				**X**	**X**
	NO_2 (1-hr)				**X**	**X**
	NO_2 (annual)			**X**		
	SO_2 (1-,3-,24-hr)					**X**
	SO_2 (annual)			**X**		
	H_2S					**X**
	PM2.5			**X**		
	PM10			**X**		
	TSP			**X**		
	Lead					**X**
	Ozone					**X**
	State air toxic(s) (20.2.72.402 NMAC)					**X (NH_3 no change)**

16-E: New Mexico toxic air pollutants modeling

1 List any New Mexico toxic air pollutants (NMTAPs) from Tables A and B in 20.2.72.502 NMAC that are modeled for this application.

N/A

List any NMTAPs that are emitted but not modeled because stack height correction factor. Add additional rows to the table below, if required.

	Pollutant	Emission Rate (pounds/hour)	Emission Rate Screening Level (pounds/hour)	Stack Height (meters)	Correction Factor	Emission Rate/ Correction Factor

16-F: Modeling options

1 What model(s) were used for the modeling? Why?
The EPA approved AERMOD model was used per the NMED Air Quality Bureau Air Dispersion Modeling Guideline (Revised August 8, 2017) and as listed in the previously submitted Modeling Protocol to NMED. The facility-wide air dispersion modeling was performed using BEE-line Software's latest version of BEEST for Windows AERMOD model (Version 11.12).

2 What model options were used and why were they considered appropriate to the application?

	The AERMOD model was executed using the regulatory default options (stack-tip downwash, buoyancy induced dispersion, final plume rise), default wind speed profile categories, default potential temperature gradients, no pollutant decay, and no flagpole option. **The selection of the appropriate dispersion coefficients used in the modeling analysis were based on the classification method defined by Auer (1978). This method considers the dispersion coefficients to be rural or urban depending on the land use within three kilometers (km) of the facility if greater than 50% meets certain land use or zoning classifications. Based on the site location (see area map), the rural dispersion was selected.** **The Elevated Terrain mode was used and receptor elevations were calculated within the model based on elevations obtained from 7.5 minute United States Geological Survey (USGS) National Elevation Data (NED) files for the applicable region.** **Source Group models were set up as suggested by NMED's modeling guidance as follows:** • **Source alone group – all sources at the facility used to compare with significant Impact Levels (SILs) for the pollutant and averaging period being modeled. This group determined if the facility is above significance levels at the location and time for total project emissions increases only.** **Affected sources: HOBBS-1 + DB-1 and HOBBS-2 + DB-2 (turbines and duct burners)** **An initial site specific and site and project-only source model for short term and long term averaging periods for each pollutant with proposed emissions increases was initially performed. All modeled impacts from project emissions increases for each pollutant were below the SILs and PSD Class I Increment SILs. Therefore, no further modeling analysis was required.** **Modeled Sources:** **The turbine and duct burner stacks were modeled as point sources using stack specific parameters (height, diameter, exhaust temperature and velocity).**

16-G: Surrounding source modeling

1	If the surrounding source inventory provided by the Air Quality Bureau was believed to be inaccurate, describe how the sources modeled differ from the inventory provided. If changes to the surrounding source inventory were made, use the unmerged list of sources to describe the changes. **N/A**	
2	Date of surrounding source retrieval. **N/A**	
	AQB Source ID	Description of Corrections

16-H: Building and structure downwash

1	How many buildings are present at the facility?	**16 buildings, including tanks**
2	How many above ground storage tanks are present at the facility?	**5 above ground storage tanks**

3	Was building downwash modeled for all buildings?	Yes **X**	No
4	If not, explain why.		
5	Building comments		

16-I: Receptors and modeled property boundary

1	"Restricted Area" is an area to which public entry is effectively precluded. Effective barriers include continuous fencing, continuous walls, or other continuous barriers approved by the Department, such as rugged physical terrain with a steep grade that would require special equipment to traverse. If a large property is completely enclosed by fencing, a restricted area within the property may be identified with signage only. Public roads cannot be part of a Restricted Area. A Restricted Area is required in order to exclude receptors from the facility property. If the facility does not have a Restricted Area, then receptors shall be placed within the property boundaries of the facility. Describe the fence or other physical barrier at the facility that defines the restricted area. **A fence surrounds the property boundary.**		
2	Receptors must be placed along publicly accessible roads in the restricted area. Are there public roads passing through the restricted area?	Yes	No **X**
3	Are restricted area boundary coordinates included in the modeling files?	Yes	No **X**
4	Describe the receptor grids and their spacing. • **Receptors along the fenceline were placed every 50 meters and 50 meters outward.** • **A rectangular fine grid receptor array was placed at 100- by 100-meter spacing from the fenceline outward to 1000 meters in all directions.** • **A medium receptor grid was placed at 250- by 250-meter spacing from the fine grid to areas beyond 2500 meters from the facility.** • **A coarse receptor was placed at 500- by 500-meter spacing from the medium grid to areas beyond 5,000 meters from the facility.** • **A coarse receptor was placed at 1000- by 1000-meter spacing from the medium grid to areas beyond 10,000 meters from the facility.**		
5	Describe receptor spacing along the fence line. **Fenceline receptors were placed along the facility boundary every 50-meters in linear fenceline distance.**		
6	Describe the PSD Class I area receptors. **One receptor each was placed at the near boundary of the Class I area (CCNP, GMNO, and SCWA).**		

16-J: Sensitive areas

1	Are there schools or hospitals or other sensitive areas near the facility? This information is optional (and purposely undefined), but may help determine issues related to public notice.	Yes	No **X**
2	If so, describe.		

3	The modeling review process may need to be accelerated if there is a public hearing. Are there likely to be public comments opposing the permit application?	Yes	No **X**

16-K: Modeling Scenarios

1	Identify, define, and describe all modeling scenarios. Examples of modeling scenarios include using different production rates, times of day, times of year, simultaneous or alternate operation of old and new equipment during transition periods, etc. Alternative operating scenarios should correspond to all parts of the Universal Application and should be fully described in Section 15 of the Universal Application (UA3). **Two scenarios were modeled for the SILs and the Class I PSD Increment SIL analyses:** **1. Short term for all 24-hour averaging periods for TSP/PM10/PM2.5** 2. **Long Term for all annual averaging periods (NO_2, SO_2 and TSP/PM_{10}/$PM_{2.5}$)**		
2	Which scenario produces the highest concentrations? Why? **All scenarios have low impacts and are below the SILs.**		
3	Were emission factor sets used to limit emission rates or hours of operation? (This question pertains to the "SEASON", "MONTH", "HROFDY" and related factor sets, not to the factors used for calculating the maximum emission rate.)	Yes	No **X**
4	If so, describe factors for each group of sources. List the sources in each group before the factor table for that group. (Modify or duplicate table as necessary. It's ok to put the table below section 16-K if it makes formatting easier.) Sources: **N/A**		

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Hour of Day	Factor	Hour of Day	Factor
1		13	
2		14	
3		15	
4		16	
5		17	
6		18	
7		19	
8		20	
9		21	
10		22	
11		23	
12		24	

If hourly, variable emission rates were used that were not described above, describe them here:

6	Were different emission rates used for short-term and annual modeling?	Yes **X**	No
7	If yes, describe. **TSP/PM_{10}/$PM_{2.5}$ hourly emission rates are based on rolling 24-hour average, calculation based on emission factor determined from compliance test data. Annual TSP/PM_{10}/$PM_{2.5}$ emissions are based on daily rolling 365-day total. The annual project increases were calculated using average actual emission rates before the 2014 modification was completed, subtracted from proposed emission rates from this project (turbine compressor upgrade).**		

16-L: NO_2 Modeling

1	Which types of NO_2 modeling were used? Check all that apply.	
		100% NO_X to NO_2 conversion
		ARM
		PVMRM
		OLM
	X	ARM2
		Other:
2	Describe the NO_2 modeling. **The Tier 2 Ambient Ratio Method 2 (ARM2) Technique was applied using default minimum and maximum ratios. The highest impact (high first high) from the three years of meteorological data was used to compare against the SILs**	
3	In-stack NO_2/NO_X ratio(s) used in modeling. **Default 0.5 minimum and 0.9 maximum values.**	
4	Equilibrium NO_2/NO_X ratio(s) used in modeling. **N/A**	
5	Describe/justify the use of the ratios chosen. **The default allowable (no justification required) ratios were chosen.**	
6	Describe the design value used for each averaging period modeled. **Annual: High first high**	

16-M: Particulate Matter Modeling

1	Select the pollutants for which plume depletion modeling was used.			
		PM2.5		
		PM10		
		TSP		
	X	None		
2	Describe the particle size distributions used. **N/A** Include the source of information.			
3	Was secondary PM modeled for PM2.5? Only required for PSD major modifications that are significant for NOx and/or SOx. Optional for minor sources, but allows use of high eighth high.		Yes	No **X**
	This application is a major PSD modification for NO_2, SO_2, TSP/PM_{10}/$PM_{2.5}$ and CO_2e			

16-N: Setback Distances and Source Classification

1	Portable sources or sources that need flexibility in their site configuration requires that setback distances be determined between the emission sources and the restricted area boundary (e.g. fence line) for both the initial location and future locations. Describe the setback distances for the initial location.

	N/A		
2	Describe the requested, modeled, setback distances for future locations, if this permit is for a portable stationary source. Include a haul road in the relocation modeling. **N/A**		
3	The unit numbers in the Tables 2-A, 2-B, 2-C, 2-E, 2-F, and 2-I should match the ones in the modeling files. Do these match?	Yes **X**	No
4	Provide a cross-reference table between unit numbers if they do not match. It's ok to place the table below section 16-N for easier formatting.		
5	The emission rates in the Tables 2-E and 2-F should match the ones in the modeling files. Do these match?	Yes **X**	No
6	If not, explain why.		
7	Have the minor NSR exempt sources or Title V Insignificant Activities" (Table 2-B) sources been modeled?	Yes	No **X**
8	Which units consume increment for which pollutants? **None, all modeled proposed emissions increases were below their specific SILs.**		
9	PSD increment description for sources. (for unusual cases, i.e., baseline unit expanded emissions after baseline date). **N/A, no unusual case for this application.**		
10	Are all the actual installation dates included in Table 2A of the application form, as required? This is necessary to verify the accuracy of PSD increment modeling.	Yes **X**	No
11	If not please explain how increment consumption status is determined for the missing installation dates.		

16-O: Flare Modeling

1	For each flare or flaring scenario, complete the following: **N/A, no flare at this site**			
	Flare ID (and scenario)	Average Molecular Weight	Gross Heat Release (cal/s)	Effective Flare Diameter (m)

16-P: Volume and Related Sources

1	Were the dimensions of volume sources different from standard dimensions in the Air Quality Bureau (AQB) Modeling Guidelines? **N/A, no volume sources included in model**	Yes	No
2	If the dimensions of volume sources are different from standard dimensions in the AQB Modeling Guidelines, describe how the dimensions were determined.		
3	Describe the determination of sigma-Y and sigma-Z for fugitive sources.		
4	Describe how the volume sources are related to unit numbers. Or say they are the same.		
5	Describe any open pits. **N/A**		
6	Describe emission units included in each open pit. **N/A**		

16-Q: Background Concentrations

1	Identify and justify the background concentrations used. **N/A, all emissions increases were modeled below their specific SILs**		
2	Were background concentrations refined to monthly or hourly values? **N/A**	Yes	No

16-R: Meteorological Data

1	Identify and justify the meteorological data set(s) used. **The three-year (2013-2015) meteorological data set, HOBBS_Artesia-NWS_Midland-ua, as provided by NMED on the modeling website, was used, as discussed in the submitted and approved modeling protocol. This data set best represents the meteorological data for the site location.**
2	Discuss how missing data were handled, how stability class was determined, and how the data were processed, if the Bureau did not provide the data. **N/A, used NMED's met data set.**

16-S: Terrain

1	Was complex terrain used in the modeling? If no, describe why. **Yes, complex terrain was used.**
2	What was the source of the terrain data? **USGS NED data file (provided on disc)**

16-T: Modeling Files

	Describe the modeling files:		
	File name (or folder and file name)	Pollutant(s)	Purpose (ROI/SIA, cumulative, culpability analysis, other)
	LPP_LT_SIL	**TSP/PM_{10}/$PM_{2.5}$, NO_2, SO_2 (Long Term, annual averaging periods)**	**Significant Impact Analysis**
	LPP_ST_SIL	**TSP/PM_{10}/$PM_{2.5}$ (Short Term, 24-hr averaging periods)**	**Significant Impact Analysis**
1			

16-U: PSD New or Major Modification Applications

1	A new PSD major source or a major modification to an existing PSD major source requires additional analysis. Was preconstruction monitoring done (see 20.2.74.306 NMAC and PSD Preapplication Guidance on the AQB website)? **A Preconstruction monitoring waiver was approved by NMED.**	Yes	No **X**
2	If not, did AQB approve an exemption from preconstruction monitoring?	Yes **X**	No
3	Describe how preconstruction monitoring has been addressed or attach the approved preconstruction monitoring or monitoring exemption. **See attached and approved preconstruction monitoring waiver.**		
4	Describe the additional impacts analysis required at 20.2.74.304 NMAC. **VISIBILITY IMPAIRMENT ANALYSIS** **Visibility impairment may occur as a result of the scattering and absorption of light by particles and gases in the atmosphere. To assess the potential impact on Class I and Class II areas, industrial facilities are required to complete a visibility impairment analysis for their proposed sources.** **Three Class I areas—the Carlsbad Caverns National Park (CCNP), Guadalupe Mountains National Park (GMNP) and Salt Creek Wilderness Area (SCWA) are located within 300 kilometers of the Hobbs Generating Station. Correspondence with the National Park Service (NPS) and with the U.S. Fish and Wildlife Service (USFWS), during initial construction permitting process (October 2006), concur that a Class I Impact Analysis was not required due to the distance to these areas.** **The nearest Class I area to the HGS is the Carlsbad Caverns National Park located in Eddy County, NM, 117 km southwest of Hobbs. Since this Class I area is located at a distance greater than 100 km from the site, it may be assumed that the HGS has negligible impact at this distance. However, to assure that there are no impacts at "nearby" Class I areas, and based on pre-application meeting discussions with NMED, it is proposed to perform a Class I impacts analysis within 300km of the site. The Q/D test for Class I areas up to 300km was performed to assure that there will not be any issues with the Federal Land Managers mandate.** **According to the "Federal Land Managers' Air Quality Related Values Work Group (FLAG) *Phase 1 Report—Revised (2010)*" (https://www.nature.nps.gov/air/Permits/flag/index.cfm) report, the initial screening criteria includes calculating a fixed Q/D factor for sources located greater than 50km from a Class I area; where "Q" is the total annual emission rate of the site's SO_2, NO_x, PM_{10}, and H_2SO_4 and "D" is the distance (in km) from the site to the Class I area. If Q/D is less than 10, the impacts on the Class I area are negligible.** **Total proposed site-wide annual emission rates in tons per year (tpy):** **SO_2: 21.5 lb/hr => 94 tpy** **NO_x: 50.5 lb/hr => 221 tpy** **PM_{10}: 36.3 lb/hr => 159 tpy** **H_2SO_4: 34.0 lb/hr => 8 tpy** **Total: 482 tpy** **Total distance from the HGS to the nearest Class I area (Carlsbad Caverns National Park): 117km** **Therefore Q/D = 482/117 = 4.1**		

Since Q/D is less than 10, the impacts of the HGS on the Carlsbad Caverns or any other Class 1 Areas (greater distance from HGS) is negligible.

SOIL AND VEGETATION ANALYSES

Sensitive soil and vegetation may be affected by the emission of certain air pollutants. The EPA developed the secondary NAAQS as a reference value for the protection from environmental damage that could be caused by certain air pollutants, including NO_x, particulate matter and sulfur dioxide (SO_2). It is considered that most soil types and vegetation will not be harmed by ground-level concentrations below the secondary NAAQS.

As detailed in Section 6, NO_x short-term emission rates will not be increased above the currently permitted levels due to the proposed turbine upgrade. However, there will be an increase in annual emission rates. Air Dispersion Modeling results discussed in Form UA4 show that projected impact concentrations are below the significant Impact Level (SIL).

WATER CONSUMPTION AND QUALITY ANALYSIS

The proposed upgrade will not require an increase in the number of regular staff that operates and maintains the facility, nor will it require any additional industrial development. Therefore, the proposed project is not expected to have any effect on the water consumption or the quality of the water.

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If required, have ozone and secondary PM2.5 ambient impacts analyses been completed? **Yes, this application is a major modification for NO_2, SO_2, TSP/PM_{10}/$PM_{2.5}$ and CO_2e.**
A facility is required to evaluate a Modeling Emission rate for Precursors (MERP) when an emissions analysis determines that emissions increases from a proposed project will exceed the PSD significance thresholds for ozone precursors (i.e., 40 tpy increases for either VOC and NO_x) and/or $PM_{2.5}$ (i.e., 10 tpy) and its precursors (i.e., 40 tpy increases for either SO_2 and NO_x). A detailed NO_x and SO_2 precursor assessment for additive secondary $PM_{2.5}$ impacts along with direct $PM_{2.5}$ has been completed and submitted to NMED. The following is a summary of the assessment report:

Table 3: Project Emission Increases from Pollutants Above the SER (Both Units)

Pollutant	Past Actuals Pre 2014 Modification (tpy)	Proposed Project Annual (tpy)	Proposed Project Increase (tpy)
NO_x	77.0	124.9	47.9
SO_2	6.7	50.7	44.0
$PM_{2.5}$	72.2	90.5	18.3

Air dispersion modeling performed based on the project increases shown above in Table 3, using AERMOD, showed the following direct $PM_{2.5}$ impacts:

Daily $PM_{2.5}$: 0.1685 ug/m^3 (modeled using AERMOD model based on annual (tpy project increase)

Annual $PM_{2.5}$: 0.0305 ug/m^3 (modeled using AERMOD model)

Daily $PM_{2.5}$ SIL: 1.2 ug/m^3

Annual $PM_{2.5}$ SIL: 0.2 ug/m^3

The primary daily $PM_{2.5}$ impact = (0.1685 ug/m^3) / (1.2 ug/m^3) * 100 = **14.0%**

The primary annual $PM_{2.5}$ impact = (0.0375 ug/m^3) / (0.2 ug/m^3) * 100 = **18.75%**

Calculation for additive secondary impacts on daily $PM_{2.5}$:

[(47.9 tpy NO_x from project increase) / (1155 tpy NO_x daily $PM_{2.5}$ MERP from Table 7.1 of the guidance document)] + [(44.0 tpy SO_2 from project increase) / (225 tpy SO_2 daily $PM_{2.5}$ MERP from Table 7.1 of the guidance document)] = 0.04147 + 0.19556 = 0.23703 * 100 = **23.7%**

TOTAL daily $PM_{2.5}$ = 14.0% + 23.7% = **37.7%**

Calculation for additive secondary impacts on annual $PM_{2.5}$:

[(47.9 tpy NO_x from project increase) / (3184 tpy NO_x annual $PM_{2.5}$ MERP from Table 7.1 of the guidance document)] + [(44.0 tpy SO_2 from project increase) / (2289 tpy SO_2 annual $PM_{2.5}$ MERP from Table 7.1 of the guidance document)] = 0.01504 + 0.01922 = 0.03427 * 100 = **3.43%**

TOTAL annual $PM_{2.5}$ = 18.75% + 3.43% = **22.18%**

The sum of the primary $PM_{2.5}$ and the NO_x and SO_2 precursor contributions is less than 100%, indicating that the SIL will not be exceeded when considering the combined impacts the direct $PM_{2.5}$ and these precursors on daily and annual $PM_{2.5}$.

Ozone analysis:

The NO_x emissions increase of 47.9 tpy is lower than the lowest (most conservative) NO_x MERP of 107 tpy as listed in Table 7.1 (EPA-454/R-16-006, December 2016) for 8-hour ozone in the eastern and other regions of the United States. Therefore, air quality impacts of ozone from this source is less than the critical air quality threshold.

16-V: Modeling Results

1 If ambient standards are exceeded because of surrounding sources, a culpability analysis is required for the source to show that the contribution from this source is less than the significance levels for the specific pollutant.
No ambient standards are exceeded. The modeling results show that the project increases are below all SILs. Therefore, impacts from sources and associated emissions increases from this project and permit modification do not contribute to any exceedance of air quality standards or PSD increments.

2 Identify the maximum concentrations from the modeling analysis.

Pollutant	Period	Facility Concentration (µg/m3)	Total Modeled Concentration (µg/m3)	Total Modeled Concentration (PPM)	Background Concentration	Cumulative Concentration	Standard (SIL)	Value of Standard	Units of Standard, Background, and Total	Percent of Standard
NO_2	**Annual**	**0.072**	**N/A**	**N/A**	**N/A**	**N/A**	**1.0**	**N/A**	**N/A**	**N/A**
SO_2	**Annual**	**0.073**	**N/A**	**N/A**	**N/A**	**N/A**	**1.0**	**N/A**	**N/A**	**N/A**
TSP/PM_{10}/$PM_{2.5}$	**Annual**	**0.031**	**N/A**	**N/A**	**N/A**	**N/A**	**0.2**	**N/A**	**N/A**	**N/A**
TSP/PM_{10}/$PM_{2.5}$	**24-hr**	**0.053**	**N/A**	**N/A**	**N/A**	**N/A**	**1.2**	**N/A**	**N/A**	**N/A**

16-W: Location of maximum concentrations

1	Identify the locations of the maximum concentrations.

Pollutant	Period	UTM East (m)	UTM North (m)	Elevation (ft)	Distance (m)	Radius of Impact (ROI) (m)
NO_2	**Annual**	**658,400**	**3,623,000**	**3,762**	**104 meters North of fenceline**	**0**
SO_2	**Annual**	**658,400**	**3,623,000**	**3,762**	**104 meters North of fenceline**	**0**
TSP/PM_{10}/$PM_{2.5}$	**Annual**	**658,400**	**3,623,000**	**3,762**	**104 meters North of fenceline**	**0**
TSP/PM_{10}/$PM_{2.5}$	**24-hr**	**658,600**	**3,623,000**	**3,760**	**104 meters North of fenceline**	**0**

16-X: Summary/conclusions

1	A statement that modeling requirements have been satisfied and that the permit can be issued. **This modeling analysis demonstrates that the proposed turbine upgrade project for the HGS as described in this report meets all N/NMAAQS and PSD increments.** **See Tables 16-X-1 through 16-X-4 for complete modeling results.**

Table 16-X-1 Project Emission Rate Increases

Units	Criteria Pollutant	Average Actual Rates Pre 2014 Modification		Proposed Rates For Turbine Compressor Upgrade		Modeled Rates for SIL Comparison		Comments
		(lb/hr)[1]	(tpy)[2]	(lb/hr)	(tpy)	(lb/hr)	(tpy)	
Hobbs-1 + DB-1 and Hobbs-2 + DB-2	NO_2	18.1	77.0	18.1	124.9	0.00	47.90	Modeled 22.95 tpy increase for each unit to compare to annual SIL. No change in permitted and proposed lb/hr; therefore 1-hr NO_2 was not modeled .
	SO_2	10.7	6.7	10.7	50.7	0.00	44.00	Modeled 22.0 tpy increase for each unit to compare to annual SIL. No change in permitted and proposed lb/hr; therefore 1-hr SO_2 was not modeled.
	TSP/PM_{10}/$PM_{2.5}$	17.1	72.2	17.8	90.5	0.70	18.30	Modeled 0.7 lb/hr and 9.15 tpy increase for each unit to compare to 24-hr and annual SILs.
	CO	11.0	10.7	11.0	76.0	0.00	65.30	No hourly inccrease and previous model showed compliance with NAAQS. There is no annual NAAQS for CO.
	NH_3	32.1	281.3	32.1	281.3	0.00	0.00	No change, no annual or hourly increases proposed.

Notes:

[1] (lb/hr) each turbine + duct burner

[2] (tpy) combined both turbines + duct burners

Table 16-X-2 Air Quality Impact Analysis (NM/NAAQS): Results

Units	Criteria Pollutant	Averaging Period	Significance Level (ug/m^3)	NM/NAAQS (ug/m^3)	GLC_{max} (ug/m^3)	GLC_{max} from Project Impact < Significance Level? (ug/m^3)
Hobbs-1 + DB-1 and Hobbs-2 + DB-2	NO_2	Annual	1.0	94	0.072	**Yes, no further analysis required**
	$PM_{2.5}$	24-hour	1.2	35	0.053	**Yes, no further analysis required**
	$PM_{2.5}$	Annual	0.2	12	0.031	**Yes, no further analysis required**
	PM_{10}	24-hour	5.0	150	0.053	**Yes, no further analysis required**
	PM_{10}	Annual	1.0	NA	0.031	**Yes, no further analysis required**
	TSP	24-hour	5.0	150	0.053	**Yes, no further analysis required**
	TSP	30-day	--	90	0.053	**Yes, no further analysis required**
	TSP	Annual	1.0	60	0.031	**Yes, no further analysis required**
	SO_2	Annual	1.0	52.4	0.073	**Yes, no further analysis required**

Note:

All modeled GLC_{max} concentrations for SIL comparison is highest met data year's high 1st high.

According to the New Mexico Air Quality Bureau Air Dispersion Modeling Guidelines (Revised August 8, 2017),
Section 2.6.8 TSP Standards, there are no SILs for the 30-day or 7-day TSP averages.

Assume that if a receptor is not significant for annual and 24-hour periods, then it's not significant for the other periods.

Table 16-X-3 Results Based on Annual Emission Rates Increases

Units	Criteria Pollutant	Averaging Period	GLC_{max} (ug/m^3)	Meteorological data year
Hobb-1 +DB-1 Hobb-2 + DB-2	NO_2	Annual	0.0658	2013
		Annual	0.0586	2014
		Annual	**0.0719**	2015
Hobb-1 +DB-1 Hobb-2 + DB-2	TSP/PM10/$PM_{2.5}$	24-hour	**0.1685**	2013
		24-hour	0.1492	2014
		24-hour	0.1642	2015
		Annual	0.0279	2013
		Annual	0.0249	2014
		Annual	**0.0305**	2015
Hobb-1 +DB-1 Hobb-2 + DB-2	SO_2	Annual	0.0672	2013
		Annual	0.0598	2014
		Annual	**0.0734**	2015

Note:
The above 24-hour TSP/PM_{10}/$PM_{2.5}$ GCL_{max} values are based on annual (tpy) project increase.

Results Based on Hourly Emission Rate Increase

Units	Criteria Pollutant	Averaging Period	GLC_{max} (ug/m^3)	Meteorological data year
Hobb-1 +DB-1 Hobb-2 + DB-2	TSP/PM_{10}/$PM_{2.5}$	24-hour	**0.0532**	2013
		24-hour	0.0471	2014
		24-hour	0.0519	2015

Note:
The above 24-hour TSP/PM_{10}/$PM_{2.5}$ GLC_{max} values are based on short term (lb/hr) project increase.

Table 16-X-4 PSD Class I Analysis

Units	Criteria Pollutant	Averaging Period	GLC_{max} (ug/m^3)	PSD Class I SIL (ug/m^3)	Below PSD Class I SIL?
Hobbs-1 + DB-1 and Hobbs-2 + DB-2	NO_2	Annual	0.07	0.10	**Yes**
	$PM_{2.5}$	24-hour	0.05	0.07	**Yes**
	$PM_{2.5}$	Annual	0.03	0.06	**Yes**
	PM_{10}	24-hour	0.05	0.30	**Yes**
	PM_{10}	Annual	0.03	0.20	**Yes**
	SO_2	Annual	0.07	0.10	**Yes**

Note:

All modeled GLC_{max} concentrations for SIL comparison is highest met data year's high 1st high.

GLC_{max} concentrations are near the plant and not the impacts at the Class I areas, which are even less.

PSD Class I Increment SIL per NMED Modeling Guidance.