

Report Date: 02/07/2011

NMED/AQB Modeler: Sufi Mustafa

Project: Rio Grande Generating Station

Company: El Paso Electric Company

Permit Application Number: 1554M1

TEMPO ID: 0122

Location: Just north of Rio Grande between Sunland Park and El Paso.

Section 8 and 9, Township 29 S, Range 4 E County: Dona Ana

UTM Coordinates: 353520 m East, 3519660 m North, zone 13

Elevation = 3720 feet

Air Quality Control Region (AQCR): 153

Brief: El Paso Electric Company (EPEC) has applied to the New Mexico State Air Quality Bureau for a minor source construction permit for its Rio Grande Generating Station (the Facility), an electric generation plant in operation since before 1957. EPEC proposed to add a natural gas-fired generating unit, a turbine. The facility has a title V air quality permit. The proposed project does not trigger PSD or non-attainment review.

The following types of emission sources are included in the project: three existing boilers (unit 6,7 and 8) and their associated cooling towers; and the proposed turbine (unit GT-9) and associated cooling tower. The emission units are described in Table 1: Table of Emissions and Stack Parameters, below. For this permit, modeling was required for the following pollutants: carbon monoxide (CO), nitrogen dioxide (NO₂), total suspended particulate (TSP), particulate matter with particle diameter equal or less than 10 microns (PM₁₀) and particulate matter with particle diameter equal or less than 2.5 microns (PM_{2.5}). Because the emissions of sulfur dioxide (SO₂) are below 1lb/hr from all sources, SO₂ modeling analyses were not required.

EPEC proposes to operate the new turbine in a variety of operating loads. To assure that the worst case operating load is analyzed, the highest emission rate (which includes the startup and shutdown emissions) were modeled with the stack parameter values (from the vendor data) associated with minimum plume rise i.e., the lowest temperature and the lowest exit velocity among different loads.

Permit conditions: EPEC will limit its peak hourly emission rate for the new turbine to 22.9 lbs/hr NO_x. Boiler 8 will be limited to a peak hourly emission rate of 460.5 lbs/hr for no more than 7 hours in any given day and the remaining 17 hours in that day to a maximum of 415.0 lbs/hr NO_x.

Conclusion: This modeling analysis demonstrates that operation of the facility described in this report neither causes nor contributes to any exceedances of applicable air quality standards. The standards relevant at this facility are NAAQS for CO, NO₂, PM_{2.5} and PM₁₀; NMAAQs for CO, NO₂ and TSP and Class I and Class II PSD increments for NO₂ and PM₁₀. The analyses also show that ammonia concentrations will be below the 1% of the Occupational Exposure Level (OEL) for ammonia.

Action: The permit can be issued based on this modeling analysis.

Modeling report submitted by Zephyr Environmental Corporation (dated 6/10/2010). Revised modeling received 8/10/2010.

The air quality analysis demonstrates compliance with applicable regulatory requirements.

Model(s) Used: AERMOD was used to run the modeling analysis.

Note: complete modeling input and output files can be made available and are located on the server *Magneto* in the directory *AQB/ModelingArchives/1554M1_El Paso Electric_Rio Grande Generating Station*.

Number of Model Runs: AERMOD – Worst case 24-hr NO₂ emission rate scenario was run by NMED. The results are listed in Table 2 below.

Table 1: Table of Emissions and Stack Parameters¹:

Stack Number	Description	Stack Height (ft)	Stack Height (m)	Diameter (ft)	Diameter (m)	Velocity (ft/s)	Velocity (m/s)	Temperature (°F)	Temperature (K)	NO ₂ Rate (g/s)	NO ₂ Rate (lbs/hr)	CO Rate (lbs/hr)	PM2.5 Rate (lbs/hr)	PM10 Rate (lbs/hr)	TSP Rate (lbs/hr)
NEWUNIT		90	27.43	13.50	4.11	50.60	15.42	738.0	665.4	2.902	23.030	30.3	5.9	5.9	5.9
6A		118	35.97	9.30	2.83	29.50	8.99	251.0	394.8	23.058	182.997	1400	5	5	5
7A		118	35.97	9.30	2.83	26.40	8.05	266.0	403.2	22.302	176.997	1400	4.9	4.9	4.9
8A		135	41.15	13.30	4.05	33.80	10.30	259.0	399.3	58.022	460.492	1000	12.6	12.6	12.6
UNIT6_1	Cooling Tower 6	38	11.58	19.70	6.00	25.25	7.70	67.50	292.87				0.0012	0.06	0.946
UNIT6_2	Cooling Tower 6	38	11.58	19.70	6.00	25.25	7.70	67.50	292.87				0.0012	0.06	0.946
UNIT6_3	Cooling Tower 6	38	11.58	19.70	6.00	25.25	7.70	67.50	292.87				0.0012	0.06	0.946
UNIT6_4	Cooling Tower 6	38	11.58	19.70	6.00	25.25	7.70	67.50	292.87				0.0012	0.06	0.946
UNIT6_5	Cooling Tower 6	38	11.58	19.70	6.00	25.25	7.70	67.50	292.87				0.0012	0.06	0.946
UNIT6_6	Cooling Tower 6	38	11.58	19.70	6.00	25.25	7.70	67.50	292.87				0.0012	0.06	0.946
UNIT6_7	Cooling Tower 6	38	11.58	19.70	6.00	25.25	7.70	67.50	292.87				0.0012	0.06	0.946
UNIT6_8	Cooling Tower 6	38	11.58	19.70	6.00	25.25	7.70	67.50	292.87				0.0012	0.06	0.946
UNIT7_1	Cooling Tower 7	36	10.97	19.70	6.00	27.00	8.23	67.50	292.87				0.0011	0.057	0.901
UNIT7_2	Cooling Tower 7	36	10.97	19.70	6.00	27.00	8.23	67.50	292.87				0.0011	0.057	0.901
UNIT7_3	Cooling Tower 7	36	10.97	19.70	6.00	27.00	8.23	67.50	292.87				0.0011	0.057	0.901
UNIT7_4	Cooling Tower 7	36	10.97	19.70	6.00	27.00	8.23	67.50	292.87				0.0011	0.057	0.901
UNIT7_5	Cooling Tower 7	36	10.97	19.70	6.00	27.00	8.23	67.50	292.87				0.0011	0.057	0.901
UNIT7_6	Cooling Tower 7	36	10.97	19.70	6.00	27.00	8.23	67.50	292.87				0.0011	0.057	0.901
UNIT8_1	Cooling Tower 8	40	12.19	19.70	6.00	62.81	19.14	67.50	292.87				0.0013	0.063	0.991
UNIT8_2	Cooling Tower 8	40	12.19	19.70	6.00	62.81	19.14	67.50	292.87				0.0013	0.063	0.991
UNIT8_3	Cooling Tower 8	40	12.19	19.70	6.00	62.81	19.14	67.50	292.87				0.0013	0.063	0.991
UNIT8_4	Cooling Tower 8	40	12.19	19.70	6.00	62.81	19.14	67.50	292.87				0.0013	0.063	0.991
UNIT8_5	Cooling Tower 8	40	12.19	19.70	6.00	62.81	19.14	67.50	292.87				0.0013	0.063	0.991
UNIT9_1	Cooling Tower 9	25	7.62	18.00	5.49	26.63	8.12	67.50	292.87				0.0002	0.01	0.155
UNIT9_2	Cooling Tower 9	25	7.62	18.00	5.49	26.63	8.12	67.50	292.87				0.0002	0.01	0.155

† All values copied or converted from Rio Grande Generating Station *Permit Application or modeling input*.
Worst case short term NOx emission rate reported in this table.

Modeling Parameters: The AERMOD regulatory default parameters were included in assumptions made by the model.

Building downwash produced by buildings at the facility was considered.

Complex Terrain Data: Both simple and complex types of terrain were used to model the facility. Elevations of receptors, facility sources, and surrounding sources were obtained from digitized USGS 7.5-minute maps and one degree maps.

Receptor Grid: The following grids were used to determine the facility's radius of impact for each pollutant.

Grid Type	Description	Shape	Spacing	Radius or Length
Cartesian	Coarse	Square	1000 meters	10.0 kilometers
Cartesian	Intermediate	Square	500 meters	5.0 kilometers
Cartesian	Fine	Square	100 meters	1.0 kilometers
Cartesian	Very fine	Square	50 meters	0.5 kilometers

Receptors along the fence were placed at 50 meter spacing.

Receptors outside of the radii of impact were discarded for the surrounding source runs.

Meteorological Data: AERMOD – One (1) year, Rio Grande Generating Station 2005
The met data was collected on site in the year 2005 and was processed with the upper air data collected by National Weather Service at the Santa Teresa station in New Mexico.

Adjacent Sources:

The Division's Modeling Guidance was used to select 27 NO₂ sources within 65 km of the facility. 136 NO₂ sources within 65 km radius of the facility were obtained from the Texas Commission on Environmental Quality's (TCEQ) Point Source Data Base (PSDB). The entire list of sources can be made available and can be found on the server *Magneto* in the directory *AQB/ModelingArchives/1554M1_El Paso Electric_Rio Grande Generating Station*.

Results Discussion: Results are detailed in Table 2.

CO, NO₂, PM_{2.5}, PM₁₀ and TSP Standards

CO Analysis:

The CO concentrations produced by the facility were demonstrated to be above significance level for 1-hour and 8-hour averaging periods but the cumulative impact of the facility and surrounding sources is below the 1-hour and 8-hour NAAQS and NMAAQS. For details please see the modeling analyses report submitted by Zephyr Environmental on 6/10/2010.

NO₂ Analysis:

Compliance with the 24-hour NO₂ NMAAQS has been demonstrated, as detailed in Table 2. Compliance with annual NO₂ NAAQS and annual NO₂ NMAAQS has also

been demonstrated, as detailed in modeling analyses report submitted by Zephyr Environmental on 6/1/2010.

The existing sources at the station began operation prior to the baseline date, therefore, they do not consume PSD increment. NO_x emission from the new source (turbine) were analyzed for increment consumption. Compliance with annual PSD Class II increment has been demonstrated, as detailed in modeling analyses report submitted by Zephyr Environmental on 6/1/2010.

NO₂ PSD Class I increment...

The nearest PSD Class I area is Guadalupe Mountain National Park, which is located 144 km from the facility. The facility has negligible impact at this distance.

PM₁₀ Analysis:

Compliance with the 24-hour PM₁₀ NAAQS has been demonstrated, as detailed in the modeling analyses report submitted by Zephyr Environmental on 6/1/2010.

The existing sources at the station began operation prior to the baseline date, therefore, they do not consume PSD increment. PM₁₀ emissions from the proposed source (turbine) and associated cooling tower, were modeled and compared with the significant impact level (SIL) for PSD. The maximum predicted concentrations from the proposed sources are less than the SIL. For details please see the modeling analyses report submitted by Zephyr Environmental on 6/10/2010.

PM_{2.5} Analysis:

Compliance with the 24-hour and annual PM_{2.5} NAAQS has been demonstrated, as detailed in the modeling analyses report submitted by Zephyr Environmental on 6/10/2010.

TSP Analysis:

Compliance with the 24-hour and annual TSP NMAAQs has been demonstrated, as detailed in the modeling analyses report submitted by Zephyr Environmental on 6/10/2010.

Ammonia Analysis:

Zephyr Environmental also conducted modeling analyses for ammonia emissions from the facility. Ammonia is listed as a toxic pollutant in NMAC 20.2.72.400. The facility ammonia emissions exceed the emission level in pounds per hour as specified in 20.2.72.502 NMAC for ammonia; however, the analyses show that ammonia concentrations will be below the 1% of the Occupational Exposure Level (OEL) for ammonia. For details please see the modeling analyses report submitted by Zephyr Environmental on 6/10/2010.

Table 2: Ambient Impact from Emissions

Pollutant	Contributing Sources	Averaging Period	Concentration ($\mu\text{g}/\text{m}^3$)	Concentration (ppm)	Receptor Elevation (ft)	UTMH (m)	UTMV (m)	Distance from Site (m)	Radius of Impact (km)	Applicable Standard	Value of Standard	Units of Standard	Percent of Standard
NO2	ALL	24-hour	152.5	0.091776	3729	353745	3519577	366.0	25	NMAAQS	0.1	ppm	91.8
NO2	EPEC	24-hour	152.1	0.091501	3729	353745	3519577	366.0	25	NMAAQS	0.1	ppm	91.5

δ NMED's 40% 24-hour conversion of NO_x to NO_2 applied to calculate concentration.

