Revised Air Quality Dispersion Modeling Review Summary for Permit No. 2195P

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Project: Los Alamos National Laboratory, TA33 Generators
Section: 17, T 19N, R 6-E, Los Alamos County
UTM Coordinates: 382480 m East, 3969150 m North, zone 13
Elevation = 7387 feet

Brief: Los Alamos National Laboratory (LANL) is requesting to operate three diesel fired generators at Technical Area 33 (TA 33). The generators will be operated intermittently to provide power. The criteria pollutants emitted by the source are nitrogen oxides (NOx), sulfur oxides (SOx), carbon monoxide (CO), and particulate matters (TSP and PM10). See Table 1 for the source emission parameters.

Conclusion: This modeling analysis demonstrates that operation of the facility described in this report neither causes nor contributes to any exceedance of applicable air quality standards outside LANL property line. The standards relevant at this facility are: NAAQS for PM_{10}, NO_2, CO and SO2, and NMAAQS for TSP, NO_2 SO2 and CO.

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

Modeling report submitted by LANL (dated: September 8, 2006).

The air quality analysis demonstrates compliance with applicable regulatory requirements.

Model(s) Used: ISCST3 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/2195P _Los Alamos_TA33 Generators*.

Number of Model Runs: ISCST3- 2 modeling runs were performed by NMED to confirm NOx concentrations.

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Table 1: Table of Emissions and Stack Parameters[1]:

Stack Number	Description	Stack Height (ft)	Stack Height (m)	Diameter (ft)	Diameter (m)	Velocity (ft/s)	Velocity (m/s)	Temperature (^{o}F)	Temperature (K)	TSP Rate (g/s)	PM_{10} Rate (g/s)	NO_x Rate (g/s)	CO Rate (g/s)	SO_x Rate (g/s)
TA33_1	20 kw Diesel Generator	2.0	0.61	3.28	1.0	$3.3x10^{-3}$	0.001	1000	810	0.015	0.015	0.105	0.045	0.014
TA33_2	20 kw Diesel Generator	2.0	0.61	3.28	1.0	$3.3x10^{-3}$	0.001	1000	810	0.015	0.015	0.105	0.045	0.014
TA33_3	225 kw Diesel Generator	8.7	2.65	0.427	0.130	210	64	981	800	0.084	0.084	1.175	0.254	0.078

[1] All values copied or converted from LANL's TA33 Diesel Generators Permit applic*ation.*

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Modeling Parameters: The following ISCST3 regulatory default parameters were included in assumptions made by the model: The plume is assumed to rise gradually. Stack-tip downwash is considered. Buoyancy-induced dispersion is taken into account. Default wind profile exponents were used. Default vertical potential temperature gradients were used. Default wind profile exponents were used. Rural terrain option was selected.
Building downwash produced by building structures at the facility was considered.

Complex Terrain Data: Simple and complex terrain was used to model the site.

Receptor Grid: A property line grid consisting of receptors spaced at 25-meter intervals placed along the LANL property line. The 25-meter spacing is used for receptors along the Pajarito road. A set of discrete Cartesian receptors were placed along the nearest public road, Diamond Derive, at 25-meter intervals.

Meteorological Data: ISCST3 -- One (1) year, Los Alamos 1995

Adjacent Sources: AQB modeled all the NOx facility sources at LANL for NOx significant impact analyses. AQB also modeled all neighboring NOx sources in 65 km radius of the TA33 for cumulative analysis.

Modeling Procedures: Only NOx emissions were reviewed by the Air Quality Bureau. For PM10, CO and SO2 emissions modeling, see LANL's modeling report, received 9/18/06.

Results Discussion: Please refer to Table 2 for NO2 modeling results. For other pollutant's modeling results see LANL's modeling report, received 9/18/06 and revised results on 4/10/07.

CO and NO_2 Standards...

1-hr and 8-hr CO standards…
The CO concentrations produced by the facility were demonstrated to be below 1-hour and 8-hour CO significance levels, as detailed in modeling report submitted by LANL.

Annual and 24-hr NO_2 NAAQS and NMAAQS…
Compliance with the annual and 24-hour NO_2 NMAAQS and with 24-hour NO_2 NAAQS has been demonstrated, as detailed in Table 2.

Annual NO_2 PSD Class II increment…
The facility is located in the AQCR 157 where minor source baseline date has not triggered yet for NO2.

NO_2 PSD Class I increment…
The facility is located in the AQCR 157 where minor source baseline date has not triggered yet for NO2.

SO_2 Standards
Annual, 3-hr, and 24-hr SO_2 NAAQS and NMAAQS…

Preliminary modeling run demonstrated that outside the 600 meter radius around the generators the SO2 concentrations produced by the generators are below the annual, 3-hour, and 24-hour SO_2 significance level. For details see the modeling report submitted by LANL.

Annual, 3-hr, and 24-hr SO_2 PSD Class II increment…
The facility is located in the AQCR 157 where minor source baseline date has not triggered yet for SO2.

SO_2 PSD Class I increment…
The facility is located in the AQCR 157 where minor source baseline date has not triggered yet for SO2.

PM10 Standard
Annual and 24-hr PM_{10} NAAQS
The PM10 concentrations produced by the facility were demonstrated to be below 24-hour and annual PM10 significance levels, as detailed in modeling report submitted by LANL.

Annual and 24-hr PM_{10} PSD Class II increment…
The facility is located in the AQCR 157 where minor source baseline date has not triggered yet for PM10.

PM_{10} PSD Class I increment…
The facility is located in the AQCR 157 where minor source baseline date has not triggered yet for PM10.

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Table 2: Ambient Impact from NO_2 and SO_2 Emissions

Pollutant	Sources	Averaging Period	Concentration ($\mu g/m^3$) w/o background	Concentration (ppm) w/o background	Receptor Elevation (ft)	UTMH (m)	UTMV (m)	Distance from Source (km)	Radius of Impact (km)	Applicable Standard	Value of Standard	Units of Standard	% Standard	Limit or background Conc.
NO2	ALL	24-hour	17.46	0.0119	7184	384966	3971227	12.64	16.3	NMAAQS	0.1	ppm	12	40%
NO2	LANL	24-hour	17.09	0.0117	7184	384966	3971227	12.64	16.3	NMAAQS	0.1	ppm	12	40%
NO2	Surround	24-hour	5.10	0.0034	6401	391600	3959400	12.64	16.3	NMAAQS	0.1	ppm	3	40%
NO2	TA33	24-hour	10.43	0.0067	5705	388400	3958200	12.64	16.3	NMAAQS	0.1	ppm	7	40%
NO2	ALL	annual	3.43	0.0023	7185	385137	3971192	12.64	16.3	NMAAQS	0.05	ppm	5	75%
NO2	LANL	annual	3.13	0.0021	7185	385137	3971192	12.64	16.3	NMAAQS	0.05	ppm	4	75%
NO2	Surround	annual	0.42	0.0003	6458	391200	3959200	12.64	16.3	NMAAQS	0.05	ppm	1	75%
NO2	TA33	annual	1.94	0.0013	6407	390600	3958800	12.64	16.3	NMAAQS	0.05	ppm	3	75%

$^{\phi}$ 75% annual conversion of NO_X to NO_2 was assumed.

$^{\delta}$ NMED's 40% 24-hour conversion of NO_X to NO_2 applied to calculate concentration.

Radius of impact (ROI) is measured from the mid point of all LANL sources.

All Source group comprise of all permitted NOx sources within and outside LANL.

LANL Source group comprise of all permitted NOx sources within LANL.

Surround Source group comprise of all permitted NOx sources within 65 km outside LANL.

TA33 Source group comprise of TA33 three generator only