STATE OF IDAHO
DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION

QUICK REFERENCE GUIDE:
DISPERSION MODELING FOR AIR QUALITY PERMITS

This quick reference guide is designed to assist experienced modelers in conducting analyses for new projects or modifications that are not subject to Prevention of Significant Deterioration (PSD) requirements. It is not intended to replace or supersede Idaho's Air Quality Modeling Guideline or the Rules for Control of Air Pollution in Idaho.

Table 1. REGULATED POLLUTANT DISPERSION MODELING

Pollutant	Averaging Period	Significant Contribution Level (SCL)[a]	NAAQS[b]	Form of the Standard for Modeling	Design Value for Full Impact NAAQS Analyses	Met Data
PM_{10}	24-hour	5.0 µg/m^3	150 µg/m^3	Not to be exceeded more than once per year on average over the number of years modeled	6th high (5 yrs) 2nd high (1 yr)	Concatenate met files
$PM_{2.5}$	24-hour	1.2 µg/m^3	35 µg/m^3	98th percentile, averaged over the number of years modeled	8th high	Concatenate met files
	Annual	0.3 µg/m^3	12 µg/m^3	Annual mean, averaged over the number of years modeled	1st high	Concatenate met files
CO	1-hour	2,000µg/m^3	40,000 µg/m^3	Not to be exceeded more than once per year	2nd high	Run for each year of met data
	8-hour	500 µg/m^3	10,000 µg/m^3			
NO_2[c]	1-hour	4 ppb[d] (7.5 µg/m^3)	100 ppb (0.1 ppm) (188 µg/m^3)	98th percentile of the yearly distribution of 1-hour daily maximum concentrations, averaged over the number of years modeled	8th high	Concatenate met files
	Annual	1.0 µg/m^3	0.053 ppm (100 µg/m^3)	Annual mean	1st high	Run for each year of met data
SO_2[e]	1-hour[f]	3 ppb[d] (7.9 µg/m^3)	75 ppb (0.075 ppm) (196 µg/m^3)	99th percentile of the yearly distribution of 1-hour daily maximum concentrations, averaged over the number of years modeled	4th high	Concatenate met files
Lead	Rolling 3-month average	---	0.15 µg/m^3	Not to be exceeded	1st high	Run for each year of met data
TAPs	24-hour & Annual	---	Idaho Air Rules Sections 585, 586[g]	Not to be exceeded	1st high	Concatenate met files

[a] SCL is the term used in the Rules for the Control of Air Pollution in Idaho. Significant Impact Level (SIL) is the term used in federal rules. SILs for gaseous pollutants are in ppm or ppb in federal rules. SCLs in the Rules for the Control of Air Pollution in Idaho are given in the equivalent concentration expressed in µg/m^3. **Compliance with SCLs alone may not be used to demonstrate compliance with the National Ambient Air Quality Standards (NAAQS) without prior DEQ approval.**

[b] NAAQS for gaseous pollutants are in ppm or ppb in federal rules. NAAQS in this table are given in the equivalent concentration expressed in µg/m^3 for comparison with dispersion model output values.

[c] Level I (NO_2 = NOx) and Level II (1-hr NO_2 = 0.8 NOx; annual NO_2 = 0.75 NOx) analyses do not require prior DEQ approval. **Prior DEQ approval must be obtained for Level III analyses.**

[d] EPA's Interim SIL concentrations should be used until further notice.

[e] Because the 1-hr NAAQS is substantially more stringent than the standards for the 3-hr, 24-hr, and annual averaging periods, modeling is required only for the 1-hr averaging period.

[f] DO NOT run 1-hr SO_2 with any other short-term averaging period selected. Doing so will cause the model to report 1-hr results based on the overall distribution of hourly values instead of the distribution of daily maximum 1-hr values.

[g] Section 210 of the Rules for the Control of Air Pollution in Idaho requires demonstration of preconstruction compliance with Section 161. Contact DEQ if a toxic substance emitted by the facility is not included in Section 585 (noncarcinogens) or 586 (carcinogens).

NSR DISPERSION MODELING CONTACTS

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IS MODELING REQUIRED FOR ALL CRITERIA POLLUTANTS?

Compare the increase in annual emissions (not the net emissions) of each criteria pollutant associated with the project to below regulatory concern (BRC) exemption criteria described in Section 221 of the Rules for the Control of Air Pollution in Idaho (Potential to Emit [PTE] < 10% of significant emission rates). Modeling for new facilities or modifications is typically required only for pollutants with emissions exceeding BRC levels.

Under Section 203, DEQ may require a compliance demonstration even if the increase in emissions is BRC. No permit to construct shall be granted for a new or modified stationary source unless the applicant shows to DEQ's satisfaction that the source or modification would comply with all applicable local, state, or federal emission standards; would not cause or significantly contribute to a violation of any air quality standard; and emissions of TAPs would not injure or unreasonably affect human or animal life or vegetation.

MODELING PROTOCOL

A modeling protocol is required for pre-permit construction authorization (Section 213, Rules for the Control of Air Pollution in Idaho) and is strongly recommended for all projects.

COMMON MISTAKES TO AVOID

1. Descriptions of the project and emission sources are inconsistent with the modeling analyses.
2. Areas accessible to the public are not treated as ambient air.
3. "Flat" terrain options are used for a project location surrounded by nearby elevated terrain.
4. Limiting assumptions such as hourly, daily, and annual production rates, hours per day, etc. are not described or are buried in tiny footnotes in the electronic copy of the emissions inventory.
5. Assumptions described in the modeling report do not match information in the modeling files or elsewhere in the application.
6. Emission sources described in the application are omitted from the modeling without explanation.
7. Modeled emissions differ from the values in emissions inventory, with no explanation provided.
8. Short-term modeled emission rates are calculated based on annual production or material use.
9. The electronic copy of the emissions inventory shows only final values and does not allow viewing the calculations.
10. Supporting documentation and calculations for stack, area source, and volume source parameters are not included or do not support the values used in modeling.
11. Stack parameters are unrealistic (e.g., exhaust velocities are in excess of 500 m/sec or stack heights are substantially increased such as from 30 ft to 120 ft) with no changes to exit temperature or velocity.
12. The receptor spacing appears too coarse to resolve the maximum impact, and reported modeled concentrations are already close to an applicable standard.
13. Applicant failed to submit all electronic modeling files.
14. Revised modeling files are submitted without an accompanying revised modeling report.
15. Modeling information is not submitted using the format or forms specified by DEQ.