



MEMO TO : Interested Parties

FROM : Terry L. O'Clair, P.E.  
Director  
Division of Air Quality *TLO*

RE : Dispersion Modeling Requirements  
Compressor Engines and Glycol Dehydration Units

DATE : January 23, 2015

The purpose of this memorandum is to clarify when dispersion modeling is required to be submitted for facilities which include compressor engine(s) and/or glycol dehydration unit(s) as the primary source(s) of emissions. This memorandum addresses dispersion modeling requirements for both criteria pollutants and hazardous air pollutants (air toxics) as defined by the Department's Air Toxics Policy (see Sections I and II). This memorandum also includes a procedure to follow when "further review" of emissions is required for emissions from facilities which include compressor engines (See Section III).

I. Criteria Pollutants

Modeling requirements for criteria pollutants are addressed in the attached October 6, 2014 Department memorandum. These requirements remain in effect for all facilities including those with compressor engine(s) and/or glycol dehydration unit(s).

II. Air Toxics

Dispersion modeling for air toxics is not required to be submitted with a permit application if all of the following conditions are met:

1. Emissions from all compressor engines at the facility are controlled with a catalytic emissions control system (or an equivalent control technology) which is designed to reduce non-methane hydrocarbon emissions by at least 50%.
2. Emissions from all compressor engines at the facility are vented from a stack height which is greater than or equal to 1.5 times the nearest building height.
3. For glycol dehydration unit(s):
  - a. Emissions from all glycol dehydration unit(s) at the facility are controlled by combustion in a flare, process heater, boiler or other combustion device; or
  - b. Emissions from all glycol dehydration unit(s) at the facility are controlled by a control technology with a VOC destruction and removal efficiency of at least 90%; or
  - c. Combined air toxics emissions from all glycol dehydration units at the facility are less than 5 tons/year and combined benzene emissions from all glycol dehydration units are less than 1 ton/year.

4. If the facility is located less than  $\frac{1}{4}$  mile from a residence: combined air toxics emissions from the entire facility are less than 10 tons/year, benzene emissions are less than 2 tons/year, and formaldehyde emissions are less than 2 tons/year. If the facility is located at least  $\frac{1}{4}$  mile from a residence: combined air toxics emissions from the entire facility are less than 10 tons/year, benzene emissions are less than 3 tons/year, and formaldehyde emissions are less than 3 tons/year.

### III. Facilities Which Include Compressor Engines

If modeling is required under Section II and the modeled impact of emissions from a facility exceeds a guideline concentration (GC) or the maximum individual carcinogenic risk level (MICR) of  $1 \times 10^{-5}$ , "further review" is triggered under the Air Toxics Policy. If the modeled impact from a facility which includes compressor engines exceeds the GC for formaldehyde or an MICR of  $1 \times 10^{-5}$ , approval for the facility may be granted if all of the following conditions are met:

1. Emissions from all compressor engines at the facility are controlled with a catalytic emissions control system (or an equivalent control technology) which is designed to reduce non-methane hydrocarbon emissions by at least 50%.
2. The MICR at any existing residence due to emissions from the facility does not exceed  $1 \times 10^{-5}$ .
3. The MICR at any location due to emissions from the facility does not exceed  $1 \times 10^{-4}$ .
4. The impact at any existing residence due to emissions from the facility does not exceed a hazard index of 1.0.
5. The formaldehyde concentration due to emissions from the facility does not exceed a health-based value approved by the Department.

### IV. Summary

In summary, the following process should be followed to determine if dispersion modeling is required to be submitted for a facility which includes compressor engine(s) and/or glycol dehydration unit(s):

1. Review the attached October 6, 2014 Department memorandum to determine if dispersion modeling is required for criteria pollutants.
2. Review the above conditions under Section II of this memorandum to determine if dispersion modeling is required for air toxics.
3. If dispersion modeling is required for air toxics under Section II for a facility which includes compressor engines, then Section III can be used to address instances where the impact of emissions exceeds the guideline concentration for formaldehyde or a maximum individual carcinogenic risk of  $1 \times 10^{-5}$ .

Air toxics modeling must be conducted in accordance with the requirements of the Department's Air Toxics Policy, which can be found at: <http://www.ndhealth.gov/AQ/Toxics.htm>.

This memorandum is meant to provide general guidance regarding dispersion modeling requirements and may not be appropriate in all circumstances. Questions may be addressed to Craig Thorstenson at (701)328-5188 or at [cthorstenson@nd.gov](mailto:cthorstenson@nd.gov).

TLO/CDT:saj

Attach: Criteria Pollutant Modeling Requirements for a Permit to Construct



MEMO TO : Interested Parties

FROM : Terry L. O'Clair, P.E. *T.B.*  
Director *for*  
Division of Air Quality *TLO*

RE : Criteria Pollutant Modeling Requirements  
for a Permit to Construct

DATE : October 6, 2014

Projects Subject to PSD:

Under the Prevention of Significant Deterioration of Air Quality (PSD) rules, dispersion modeling for criteria pollutants is required prior to issuance of a Permit to Construct (PTC) if the permit is for either a new facility classified as a "major stationary source" or a modification to an existing major stationary source when the modification is classified as a "major modification" under the PSD rules (adopted into Chapter 33-15-15 of the North Dakota Air Pollution Control Rules). Modeling is required when emissions exceed the "PSD significant levels", which are defined as follows (only the significant levels for criteria pollutants are shown):

<u>Pollutant</u>	<u>Emissions</u>
Carbon Monoxide	100 tons/year
Nitrogen Oxides	40 tons/year
Sulfur Dioxide	40 tons/year
PM <sub>10</sub>	15 tons/year
Lead	0.6 tons/year
PM <sub>2.5</sub> *	10 tons/year

\* A source that emits 40 tons per year or more of sulfur dioxide and/or 40 tons per year or more of nitrogen oxides is significant for PM<sub>2.5</sub> (40 CFR 52.21(b)(23)(i)).

Projects Not Subject to PSD:

For those projects which are not subject to the PSD rules, as a general rule, modeling will be required if the potential emissions from a new facility or the change in potential emissions from an existing facility exceed the following amounts:

Pollutant	All emissions vent from stacks with height $\geq 1.5$ times nearby bldg. height	Some emissions vent from stacks with height $< 1.5$ times nearby bldg. height
Nitrogen Oxides	100 tons/year	40 tons/year
Sulfur Dioxide	100 tons/year	40 tons/year
PM <sub>10</sub>	40 tons/year	15 tons/year
PM <sub>2.5</sub>	25 tons/year	10 tons/year

Modeling of carbon monoxide and/or lead emissions will generally only be required for sources required to conduct modeling of carbon monoxide and/or lead emissions under the PSD rules.

Additional Information (applicable to both PSD and non-PSD Projects):

Note that there are instances where modeling may be required at lower emissions than outlined above. These include cases when a facility will be located close to a Class I area or there are changes to an existing facility whose current emission rates are causing concentrations approaching either the Ambient Air Quality Standards or the PSD increment levels.

With respect to nearby sources of emissions, the impact of emissions from sources within 20 kilometers (~ 12 ½ miles) shall generally be included in the modeling analysis. The impact of emissions from sources greater than 20 kilometers and less than 50 kilometers (~ 31 miles) shall generally be included if potential emissions from the source of the pollutant being modeled exceed 100 tons/year.

Modeling submitted with a PTC application for a PSD project must address compliance with the Ambient Air Quality Standards as well as the PSD increments. Modeling submitted with a PTC application for a project not subject to the PSD rules must address compliance with the Ambient Air Quality Standards.

Modeling of PSD Class I increments will be required for PSD projects located within 250 kilometers of the nearest North Dakota Class I area, and for non-PSD projects (meeting potential emissions criteria above) located within 50 kilometers of the nearest Class I area. If the subject source significantly impacts a Class I area, a cumulative analysis including other increment-consuming sources must be conducted. The cumulative analysis must include all major sources, located within 250 kilometers and minor sources located within 50 km of the Class I area. The inventory will be provided by the Department. If an analysis is required for Class I increment consumption, a Class II increment consumption analysis shall also be submitted.

**NDDH Class I Significant Impact Levels**  
 $\mu\text{g}/\text{m}^3$

Pollutant	Averaging Time		
	Annual	24-hour	3-hour
SO <sub>2</sub>	0.1	0.2	1.0
PM <sub>10</sub>	0.1	0.2	-
NO <sub>2</sub>	0.1	-	-
PM <sub>2.5</sub>	0.06	0.07	-

TB:saj