

July 6, 2010

General Permit to Install for Diesel Fuel-Fired Engine Generators

Issue

The General Permit to Install for Diesel Fuel-Fired Engine Generators should be withdrawn, or at least suspended from use, until the applicability criteria and special conditions can be revised to ensure compliance with the new 1-hour nitrogen dioxide (NO₂) standard.

Background/Facts

In 2004, the Air Quality Division (AQD) issued a general permit to install for diesel fuel-fired reciprocating engine generators with a maximum nameplate capacity of 5 megawatts (MW). This general permit was issued to streamline the review of permit applications for engine generators and to allow the affected facilities more operational flexibility. The general permit includes terms and conditions necessary to ensure that the source, process or process equipment will comply with all applicable state and federal requirements.

Engine generators, including portable units, are used primarily for power generation including emergency back-up and peak power shaving. Many commercial establishments propose installation of small generators as stand-by units to support themselves in the event of a power outage. Often these types of businesses are located close to other businesses, parking lots, or public streets with short setback distances.

For the development of the general permit, 24 permitted diesel generators were reviewed with an average capacity of 1.6 MW. Emission factors for the criteria pollutants were included in the permits or were calculated from the emission rates provided by the manufacturers. Maximum hourly emissions were calculated by applying the emission factors to a 1.6 MW generator burning 120 gallons of diesel fuel per hour. Annual emissions were based on a maximum fuel use of 136,000 gallons per year for all generators at a source covered by the general permit, to limit NO₂ emissions to 35 tons per year based on a 12-month rolling time period.

Ambient impacts for the general permit were based on dispersion modeling results for a source with 10 permitted engines. The modeling assumed all emissions were exhausted from one 50-foot stack with a total exhaust flow of 14,495 actual cubic feet per minute. The dispersion modeling results showed that the ambient impacts would not exceed the National Ambient Air Quality Standards (NAAQS) for the criteria pollutants, nor consume more than 80 percent of the allowable increments specified in the federal regulations. A total of 24 toxic air contaminants (TACs) were also evaluated in the original modeling resulting in acceptable impacts. The impacts from engine generators operating under the general permit were expected to be less than the results from the modeling because the fuel use is limited to 136,000 gallons per 12-month rolling time period.

In December 2004, the AQD proposed revisions to the general permit to remove the stack height and setback distance requirements. The exhaust gases from most small generators are discharged directly out the top of the unit, without an extended stack. These units are approximately 12 feet tall, so the exhaust gases are discharged above ground level. The 15-foot stack height requirement in the original general permit required the unit to be retrofitted with some type of manufactured stack extension, which often prevented use of the general permit as intended - for portable units temporarily used in an emergency situation. The AQD proposed the permit be revised to require a vertical unobstructed discharge of the exhaust, without a minimum height above ground level.

The modeling results used in the original general permit were then evaluated for all criteria pollutants and toxics. The predicted ambient impacts of all pollutants ranged from 5 to 175 times below the NAAQS or respective screening levels. Because the general permit included a limit on the amount of fuel used over a 12-month rolling time period, the annual emissions would actually be less than the modeled emissions. Based on the fuel limit, a single generator covered by the general permit could only operate for approximately 1100 hours in a 12-month time period, which is representative of a generator being used in an emergency situation. Modeling indicated that small generators covered by the general permit did not have an impact on the ambient air. The Department received no comments during the comment period held prior to revising the general permit.

Analysis

On January 22, 2010, the United States Environmental Protection Agency (EPA) signed a final rule containing a new NAAQS for NO₂ based on a 1-hour averaging time. On April 12, 2010, 188 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) became effective as the 1-hour NAAQS for NO₂. The EPA also suggested a 1-hour Significant Impact Level (SIL) of 7.6 $\mu\text{g}/\text{m}^3$.

Dispersion modeling was run for a hypothetical diesel generator to determine the maximum ambient 1-hour NO₂ impact. Representative stack parameters were used and a building with a peak roof height of 30 feet was assumed. Stack heights of 15, 30 and 45 feet were evaluated. The modeling assumed the generator stack to be an isolated facility with no other sources considered in the analysis. All three alternative stack heights showed a total impact to be above the 1-hour NO₂ NAAQS of 188 $\mu\text{g}/\text{m}^3$.

Recommendation

The current general permit for diesel generators does not limit NO₂ emissions to adequately ensure compliance with the new 1-hour NO₂ limit.

The General Permit to Install for Diesel Fuel-Fired Engine Generators should be withdrawn, or at least suspended from use, until the applicability criteria and special conditions can be revised to ensure compliance with the new 1-hour NO₂ standard.

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