October 18, 2010

Regulation 1125: Requirements for Preconstruction Review, and

Regulation 1130: Title V State Operating Permit Program

AMENDMENTS TO REFLECT REGULATION OF GREENHOUSE GAS EMISSIONS

Summary

Delaware is in a position to regulate greenhouse gases as Regulations 1125 and 1130 do not exclude regulation of carbon dioxide (CO_2) and other greenhouse gases, but it was decided to make several regulation revisions for clarity and to add the new threshold emissions levels required by a recently issued final federal rule, 75 FR 31514 "Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule" (June 3, 2010).

The Supreme Court in April 2007 in Massachusetts vs. EPA determined that EPA had the authority under the Clean Air Act (CAA) to regulate CO_2 and other greenhouse gases. This lawsuit was prompted by a 1998 EPA determination that the CAA did not allow regulation of CO_2 which was contested in a reconsideration petition EPA denied in 2003. With the Court decision, EPA promptly carried out an investigation and determined in 2009 that greenhouse gases did in fact endanger public health and welfare. After clearing up vagaries in certain definitions to facilitate regulation of greenhouse gases, EPA and the Department of Transportation jointly issued a federal rule regulating the emissions of certain greenhouse gases from model year 2012 vehicles which made greenhouse gases actually regulated by EPA rules and will automatically trigger permitting under Prevention of Significant Deterioration of Air Quality (PSD) and Title V regulations. Since these rules are triggered at thresholds of 100 or 250 tons per year of pollutant emissions and greenhouse gases, in particular CO_2, are emitted at or above these quantities from exceedingly small sources, the federal PSD and Title V rules were adjusted ("tailored") to temporarily increase the required triggering thresholds for greenhouse gases, thus reducing or eliminating small sources from permitting for the time being.

As the federal "tailoring" rule was the focus of intense nationwide public review and comment, DNREC believes publication of the proposed regulatory revisions in the Delaware Register of Regulations on October 1, 2010 and the public hearing on November 10 will provide adequate opportunity for public education, review and comment. The final regulation could be published in the December 1, 2010 Register, becoming effective December 11, 2010. The compliance date, that is, the date when the revised regulation provisions will be applied to qualified Delaware major sources, will be January 2, 2011, using a phased approach.

Background

(1) EPA determines they cannot/should not regulate CO_2

The International Center for Technology Assessment and several other environmental organizations petitioned the EPA on October 20, 1999[1] to regulate emissions of carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O) and hydrofluorocarbons (HFC) from new motor vehicles and new motor vehicle engines under section 202 (a) of the CAA. Petitioners position was that the EPA had on several occasions

declared that CO_2 was an air pollutant (which section 202 (a) of the CAA directs EPA to regulate) and that the work of the United Nations Intergovernmental Panel on Climate Change (IPCC) established that global climate change *"may reasonably be anticipated to endanger public health and welfare"*. Following a request for stakeholder comments in 2001[2], EPA rethought their earlier position and denied the petition in 68 FR 52922 (September 8, 2003)[3] because (1) the CAA does not authorize regulation to address climate change and (2) even if the CAA did authorize EPA to regulate CO_2, EPA would not do so at that time as it would conflict with Presidential climate change programs.

(2) <u>Supreme Court Decision in Massachusetts vs. EPA</u>

The EPA decision to not regulate CO_2 was reviewed and upheld by the U. S. Court of Appeals for the District of Columbia Circuit on September 13, 2005[4] and was then taken to the Supreme Court by thirteen states, three cities and eleven environmental organizations. The Court reversed the judgment of the Court of Appeals on April 2, 2007[5] remarking that *"EPA had statutory authority to regulate the emissions of such gases (*greenhouse gases*) from new motor vehicles"*. The Court remanded the case to EPA requiring the agency to articulate a reasonable basis to avoid regulation.

The Supreme Court decision started a train of events in EPA that lead to the Endangerment Finding, meaning that EPA was required to regulate greenhouse gas emissions from new motor vehicles and new motor vehicle engines. EPA clarified what constitutes a pollutant being "subject to regulation", a terminology used to describe, for example, when pollutants "subject to regulation" must be considered under new source review permitting regulations and for inclusion under Title V state operating permit programs. It became apparent that the Endangerment Finding would be implemented in the upcoming Department of Transportation (DOT) regulation to set fuel consumption limitations on model year 2012 automobiles and light-duty trucks (the light-duty vehicle rule or LDVR), which eventually issued as a joint DOT EPA regulation as 79 FR 25324 (May 7, 2010)[6].

(3) <u>Endangerment and Cause or Contribute Findings for Greenhouse Gases under Section 202 (a)</u>

Recognizing that EPA must regulate greenhouse gases if an endangerment finding showed that greenhouse gases, collectively or individually, may be reasonably anticipated to endanger public health or welfare, EPA issued an Advance Notice of Proposed Rulemaking (ANPR) on "Regulating Greenhouse Gas Emissions Under the Clean Air Act" in 73 FR 44354 (July, 30, 2008)[7]. The APNR attracted many comments including some from Administration Cabinet officials arguing that the CAA and the EPA were not the appropriate venue for greenhouse gas regulation. These comment letters are included in the ANPR.

The proposed rules "Proposed Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act" published as 74 FR 18886 (April 24, 2009)[8]. The final rule, 74 FR 66496, was published on December 15, 2009[9]. At about the same time (December 7, 2009), the 210 page "Technical Support Document for the Endangerment and Cause or Contribute Findings for Greenhouse Gases under Section 202 (a) of the Clean Air Act"[10] issued.

The EPA based much of their scientific investigation on the major assessment reports of the IPCC[11] and the U. S. Climate Change Science Program[12] (CCSP). EPA came to the conclusion that (1) there is a connection between the rise in the concentration of greenhouse gases; CO_2 atmospheric concentration, for example, has risen 38% from pre-industrial levels to 2009, while the global atmospheric

concentration of methane has increased 149% since pre-industrial levels through 2007, and a measureable increase in global warming; the global mean surface temperature has risen by 0.74^0C over the last 100 years, (2) the impact of this temperature rise has been recorded, in addition to other effects, in increased arctic sea ice melting and an increase in global sea level (predominately, at this time, likely due to expansion from increased sea warming rather than melting of glacial ice), (3) atmospheric concentrations of CO_2 , methane and nitrous oxide are the predominate contributors to global warming, but hydrofluorocarbons, perfluorocarbons and sulfur hexafluoride concentrations also exert a pronounced effect and their concentrations have been rising rapidly due to increased use of these materials, and should be considered together as the pollutant greenhouse gases (GHG), (3) the observed impacts constitute an endangerment of public health and welfare, and (4) the combined emissions of CO_2, methane, nitrous oxide and hydrofluorocarbons from new motor vehicles and new motor vehicle engines are contributing to this mix of greenhouse gases in the atmosphere and thus to this endangerment of public health and welfare.

The transportation sector is responsible for 23% of total annual U. S. greenhouse gas emissions making it the second largest source in the United States behind electricity generation and is greater than the total greenhouse gas emissions of all other countries with the exception of China, Russia and India.

These findings had a direct impact on the light-duty vehicle rule (LDVR), setting the stage for regulation of other sources. When the LDVR takes effect, greenhouse gases (GHG) would be subject to regulation under the CAA. Therefore Delaware stationary sources deemed major for GHG emission would be subject to Delaware Regulation 1130 Title V permitting and to some provisions of Delaware Regulation 1125, the new source review regulation.

At least ten petitions were received by EPA to reconsider the Findings[13]. EPA's analysis of these petitions showed there was insufficient and inadequate evidence presented and that the arguments did not meet standards for reconsideration under the CAA and the petitions were denied; 75 FR 49556 – August 13, 2010[14].

(4) Meaning of the Terms "Regulated NSR Pollutant" and "Subject to Regulation"

These terms have importance in determining if CO_2 and the other constituents of GHG are considered pollutants under the provisions of regulations for PSD, a part of the new source review regulation (NSR), and the Title V state operating permit program. Also of interest is when is a pollutant considered subject to regulation. Although EPA had considered these issues in earlier guidance memos, actions following the Supreme Court decision in **(2)** above created confusion as to what positions states or EPA Regions reviewing PSD permits should take regarding CO_2. Stephen Johnson, EPA Administrator, issued a definitive memo on this subject December 18, 2008[15] which is well worth reading. There was a reconsideration petition from the Sierra Club and 14 other environmental organization suggesting a number of alternative interpretations. The reconsideration was finalized in 75 FR 17004 (April 2, 2010)[16] upholding the Johnson memo with only a slight modification as to the timing of triggering by "subject to regulation".

The reconsideration:

- Affirmed permitting is not triggered until a nationwide rule requires actual control of pollutant emissions.

- Established that permitting is triggered when the control requirement of the nationwide rule actually takes effect rather than the signature date or date of Register publication. For GHG that means the earliest date when LVDR rule vehicles can be sold in the US; 1/2/11.

- Confirmed there is no grandfathering of permit applications. Permits issued after 1/2/11 must address GHG emissions even if determined "complete" earlier.

Although Delaware does not use the terminology "regulated NSR pollutant", because we have not adopted the NSR Reforms rule (67 FR 80186 – 12/31/02)[17] which introduced this term, our NSR regulation uses the term " subject to regulation under the CAA" which is satisfactory. According to the EPA, any pollutant subject to regulation under the CAA is one that is actually regulated in a national EPA rule. If one reviews the Delaware NSR regulation, 1125[18], the applicability of the PSD section (3.0) to any pollutant subject to regulation under the CAA is apparent. Regulation 1130[19], the Title V regulation, clearly states in the definition of major source that it applies to any source that emits "100 tpy or more of any pollutant". Any pollutant, as determined by EPA and the Supreme Court, includes GHG.

(5) <u>The Light-Duty Vehicle Rule</u>

Now the stage was set to make GHG "subject to regulation" through passage of a nationwide EPA rule regulating GHG, the LDVR.

On May 19, 2009, President Obama announced an historic national policy that would reduce greenhouse gas emissions and improve fuel economy for new cars and trucks sold in the U.S. Under this policy, EPA would coordinate with the Department of Transportation to propose standards for passenger cars, light-duty trucks and medium-duty passenger vehicles, covering model years 2012 through 2016. Together, these vehicle categories account for almost 60% of all U.S. transportation related GHG emissions. The EPA standards would achieve an emissions level of 250 grams/mile of CO_2 in model year 2016 and would reduce GHG emissions by 960 million metric tons and save 1.8 billion barrels of oil over the lifetime of the program.

These vehicles emit four of the six GHG, namely CO_2, CH_4, N_2O and certain hydrofluorocarbons as leakage from air conditioning units.

The LDVR final rule, 75 FR 25324, was published May 7, 2010[20]. The earliest a vehicle, meeting the GHG restrictions of this rule, could be sold in the United States was determined to be January 2, 2011. Therefore, on that date, GHG would be subject to regulation and the provisions of NSR and Title V regulations would apply to GHG. That then set the stage for the requirements NSR and Title V rules must meet.

(6) <u>The Greenhouse Gas Tailoring</u> <u>Rule</u>

EPA recognized that the existing federal regulations for PSD and Title V, which were models for state regulations, were based upon emission thresholds of 100 and 250 tons of pollutant per year. For criteria pollutants, like nitrogen oxides, carbon monoxide and volatile organic compounds, these threshold levels for determining what is and what is not a major source of the pollutant, at and above which the source may be subject to regulation, was satisfactory. For GHG like CO_2, these threshold levels were considered way too low for practicality. A fuel-oil fired boiler operating at 140,000 Btu/hr will emit 100

tpy CO_2. Using such a low threshold for Title V permitting or for source categories in PSD (non-source categories would have a threshold of 250 tpy CO_2 or a firing rate of 350,000 Btu/hr) would bring in many more permitted sources and overload state permitting systems. At these levels we would be permitting, restaurants, schools, large residences, heated swimming pools – a large group of sources never before permitted with owner/operators totally unfamiliar with the permitting process. An EPA study showed that nationwide, Title V permits would increase from a current level of about 14,700 to 6.1 million permits and that the current level of PSD permitting of about 400 permits/yr would increase to over 82,000 permits per year. Clearly something needed to be done to curtail permitting during the early years of GHG permitting under Title V and PSD rules to make the permitting burden fit what could be actually handled until means to improve the permitting process or control the threshold levels could be found. This was the genesis of the "tailoring" rule.

EPA determined that over 70 % of GHG sources could be permitted if the threshold level was set at a level of 100,000 tpy of CO_2e (carbon dioxide equivalents, a term which will be explained shortly) and that only 1,000 additional Title V permits would be required nationally, an increase in permitting that was reasonable, and that PSD permitting would increase nationally by only 900 permits per year. To accommodate PSD modifications a significance level of 75,000 tpy CO_2e was selected[21].

The term CO_2e is based upon taking the mass weight of each individual GHG and multiplying it by its global warming potential as shown in Table A-1 of 40 CFR Part 98 Global Warming Potentials and then by summing all the numbers, one obtains the CO_2 equivalent of all the GHG in tpy.

The final rule "Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule" 75 FR 31514 was published June 3, 2010. With this rule most states could make the adjustments they required to be able to begin permitting for GHG starting 1/2/11. Some states required very significant regulatory development action as their existing framework did not allow treating GHG as a pollutant; thirteen states (not Delaware) are in this situation and EPA is readying federal implementation plans so they may begin permitting 1/2/11 while appropriate revisions are made in-state. Delaware is in a position to regulate GHG but decided to make several regulation revisions for clarity and to add the new threshold emissions levels.

The Delaware Regulations

In another part of this website we have shown the planned revisions to Regulation 1125 and 1130 to incorporate the threshold revisions suggested by EPA in the tailoring rule. We elected to show only the revisions as these regulations are long and searching out the revisions (strike outs indicate text that is proposed to be deleted and underlines denote the text to be added) would be time consuming and small changes could be missed. The full proposed revisions were published in the October 1, 2010 Delaware Register of Regulations, if one cares to review the rules in totality, go to http://regulations.delaware.gov/register/october2010/proposed/14%20DE%20Reg%20263%2010-01-10.pdf. **Please note that the Register Notice on this site specified a public hearing on 10/28. That date has been revised to November 10, 2010 and the place changed to the Delaware Energy Office, 1203 College Park Drive, Suite 101, Dover, DE 19904**

Readers may go to the official Air Quality regulation web site and see and or download the current unrevised regulations and using the revisions shown here see how the changes fit in with the entire regulations. The official Air Quality regilation website can be found at http://regulations.delaware.gov/AdminCode/title7/1000/1100/index.shtml#TopOfPage. Scroll down to

and click on Regulation 1125 for the NSR regulation, the PSD part is section 3.0 and click on Regulation 1130 for the Title V State Operating Permit Program regulation. As one can see, the regulation changes required are relatively minor.

For Regulation 1125 we have added the EPA definition for Greenhouse gases showing the six gases and the method of calculating the CO_2 equivalent emissions in Section 1.9 Definitions. We have also deleted the word ~~only~~ in Section 3.7.3 for clarity and to match earlier EPA rule wording. For Regulation 1130, we have made two EPA suggested revisions to the 2.0 Definitions section. The second item under Major source has added the term subject to regulation and then, still under section 2.0, added the EPA definition for Subject to regulation.

Note, here for the first time we have shown what makes up the GHG constituent hydrofluorocarbons (HFC) as can be seen in Table 1-1 for 1125 and Table 2-1 for 1130. All of the compounds starting with HFC belong in this category, there are 19 of them. Similarly, we show in these same tables the make up of perfluorocarbons (PFC). There are nine compounds in this category.

The global warming potential of some of these compounds is quite large, for example HFC-23 has a GWP of 11,700, meaning it is 11,700 times more potent as CO_2 in effecting global warming – one pound of HFC-23 causes as much global warming as 11,700 pounds of CO_2. For sulfur hexafluoride, a chemical used mainly in electronic microchip manufacturing, one pound is equal to 23,900 pounds of CO_2 in its impact on global warming.

Do not confuse GWP with lifetime in the atmosphere. Atmospheric lifetime, how long a particular molecule of a GHG remains in the atmosphere until it is removed through natural processes, is one of several factors in determining the GWP, but it is a different measure. The lifetime of CO_2 is somewhat variable but is generally considered to be about 120 years. For CH_4 the lifetime is 12, N_2O is 114, HFC-23 is 260 and sulfur hexafluoride is 3200 years[22].

We have discussed only PSD implementation when GHG NSR permitting is discussed. That's because EPA early on decided it was not appropriate to treat GHG like a criteria pollutant which would require assigning a national ambient air quality standard (NAAQS) for GHG. It was not an appropriate approach because the level of CO_2 in the atmosphere, for example, is about 380 parts per million parts of air (ppm). This level is the result of emissions from many sources throughout the world. Reductions by one state likely will not lead to any significant reduction of the level of CO_2 in that state due to air mass flow from state-to-state and from other countries. The concept of a NAAQS is based upon local concentrations of certain pollutants (volatile organic compounds that impacts the ground-level ozone NAAQS for example) that can be reduced thus reducing the local concentration of ground-level ozone. It will take many years of concentrated world-wide GHG reductions to achieve the desired reduction of GHG concentrations, much longer than the provisions for administering a NAAQS will allow. Because EPA did not set a NAAQS, no state can be in non-attainment and all states automatically are regulated under the PSD section of NSR rules.

In applying Regulation 1125 it will be a two step process. In the first step the mass based emissions of GHG will be compared to the 100/250 tpy emissions threshold.

An existing or to be newly constructed source of GHG may be considered a major source under PSD if it emits or has the potential to emit more than 100 tpy and is listed in the list of 28 source categories or, if not so listed, emits or has the potential to emit 250 tpy of GHG.

Under this definition one first determines if the sum of the mass-based quantity of GHG emitted is equal to or exceeds the mass-based threshold limits of 100 or 250 tpy. A source emitting or with the potential to emit the mass-based sum of any of the six greenhouse gases (CO_2, CH_4, N_2O, all HFC, all PFC and SF_6) of less than 100 or 250 tpy (whichever is applicable) will not be considered a major source and is not subject to regulation under the terms of 3.0 of Regulation 1125.

If, however, the mass-based sum of the six greenhouse gases emitted by the source equals or exceeds 100 or 250 tpy (whichever is applicable), the source may be considered a major GHG source.

For a modification to an existing major GHG source (the major source being established as above), the mass-based significant emissions increase and the significant net emissions increase summed for the six greenhouse gases must be determined. The emissions of the six greenhouse gases, or any portion thereof emitted, will be calculated to include the contemporaneous increases and decreases over the past five-year period, including the proposed modification (project netting). For GHG, any increase is deemed significant. If project netting is zero (or negative) for the mass-based sum of the six greenhouse gases, then no further action is required and the proposed modification is not subject to PSD. If the result of project netting is any positive value, the modification is considered significant.

None of this is strange to PSD permitting. If these tests are positive, the source is ready for the second test, otherwise no further action is required.

Throughout the process described so far, the mass-based values for the six greenhouse gases are used, not the global warming potential derived carbon dioxide equivalent.

For the second step, the global warming potential derived carbon dioxide equivalent will be used. The mass emissions of each of any of the six greenhouse gases emitted by the source is multiplied by the global warming potential, as listed under the definition of greenhouse gases in Table 1-1 of Regulation 1125, and summed to obtain the CO_2 equivalent emissions (the CO_2e in tpy). In further determining the applicability of permitting under 1125, the CO_2e will be used.

Beginning January 2, 2011, the pollutant GHG will not be subject to regulation unless a new major stationary source of a non-GHG pollutant already determined to be subject to PSD because of non-GHG emissions (termed “anyway” sources) emits or has the potential to emit 75,000 tpy CO_2e or more; or an existing major stationary source of a non-GHG pollutant, already subject to PSD due to an emissions increase of that pollutant, also has a significant net emissions increase equal to or exceeding 75,000 tpy CO_2e. The intent is that no additional PSD permitting will be necessary solely due to GHG emissions.

On and after July 1, 2011 “anyway” sources will remain subject to PSD, and, in addition, new sources, not major for a non-GHG pollutant, will be considered major for GHG under 3.0 of Regulation 1125 if the source emits or has the potential to emit 100,000 tpy or more CO_2e. For an emissions increase due to a modification or change in method of operation a significant net emissions increase of 75,000 tpy CO_2e or greater must occur.

Now, in looking at Title V, Regulation 1130, it is again a two-step process. If a source that is emitting, on a mass basis (the only way one uses the major source definition), say 60 tpy of SF_6 (one of the six GHG) it isn’t enough to satisfy the definition of a major source under Section 2.0, so nothing more need be done. Emissions have to be 100 tpy or more before proceeding. It matters not that SF_6 has a GWP of

about 24,000 and when applied to the 60 tpy mass based emissions gives a CO_2e of 1,440,000 tpy (well in excess of the 100,000 tpy CO_{2e} threshold for GHG in the definition for "subject to regulation"). If the first test is not satisfied, that is, exceed the 100 tpy mass based emission limit, the source is not subject to Title V permitting.

If a source were emitting 100 tpy of SF6 as of 12/11/10 (when we expect our regulation revisions to be effective) then the first test is passed and for the second test the CO_2e is calculated as 2,390,000 tpy CO_2e (certainly exceeding the 100,000 tpy CO_2e that is a basis of the second test). However, in this case, the definition of "subject to regulation" says in (1) GHG shall not be subject to regulation unless as of July 1, 2011 emissions are 100,000 tpy CO_2e. This means that prior to 7/1/11 GHG cannot be subject to regulation no matter the tpy emissions level. So, from 12/11/10 till 6/30/11, Title V will not apply. On and after 7/1/11 Title V will apply.

If the first test is passed by a source emitting 100 tpy of CH_4 and it is after July 1, 2011, Title V still will not apply as the CO_2e would be 24 GWP x 100 = 2400 tpy CO_2e. The source is not subject to regulation since the CO_2e is below 100,000 tpy.

For GHG to be subject to regulation under Title V, (a) it must be on or after July 1, 2011; (b) the source must emit 100 tpy of the GHG on a mass basis, and; (c) the source must emit 100,000 tpy CO_2e. If a source fails any of these three things, it cannot be subject to regulation and cannot be subject to Title V.

Please note that for simplicity in these examples only one component of GHG was considered to be emitted by a source. In real life a particular source may emit several components of GHG, for example a source emitting CO_2, CH_4, and N_2O is not unlikely. In that case all of those emissions are summed for the mass based and for the CO_2e tests.

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