Administrative Procedures – Scientific Information Statement

Instructions:

In completing the Scientific Information Statement, an agency shall provide a brief summary of the scientific information including reference to any scientific studies upon which the proposed rule is based, for the purpose of validity.

This form is only required when a rule relies on scientific information for its validity.

1. TITLE OF RULE FILING:

   Sulfur Limitations in Fuel

2. ADOPTING AGENCY:

   Agency of Natural Resources

3. BRIEF EXPLANATION OF SCIENTIFIC INFORMATION:

   Reducing the sulfur content of fuel oil has numerous environmental and public health benefits. The emissions from fuel oil (e.g., sulfur dioxide, particulate matter, and nitrogen oxides) have direct adverse health impacts, and emissions lead to the formation of ozone and particulate matter (PM2.5), cause regional haze and contribute to acid deposition. By reducing the sulfur content of fuel oil, sulfur dioxide (SO2) PM2.5 and nitrogen oxides (NOx) emissions decrease, leading to environmental and public health benefits. For example, the adoption of low sulfur heating oil mandates has the potential to reduce SO2 emissions by 75%, PM by 75% and NOx by 10%.

   Fine particles and their precursors, are the major causes of visibility impairment (i.e., regional haze) in the US. Particles affect visibility through the scattering and absorption of light, and PM2.5 particles are most efficient, per unit of mass, at reducing visibility. Regional haze affects urban and

rural areas, including National parks, forests and wilderness areas (Federal Class I areas).

Sulfate aerosols (i.e., particles) are the primary cause of regional haze in the eastern US. Specifically, visibility in VT's Class I area, the Lye Brook Wilderness Area, is impaired by regional haze composed of sulfate aerosol, which is generated by SO2. On the haziest 20% of days, it accounts for one-half to two-thirds of total fine particle mass and is responsible for about three-quarters of total light extinction at Class I sites in the Northeast and Mid-Atlantic. Even on the clearest 20% of days, sulfate typically constitutes 40% or more of total fine particle mass in the region. In order to reduce the secondary formation of sulfate particles in the atmosphere, it is necessary to reduce its precursor, SO2. The utilization of low sulfur oil, directly reduces SO2 emissions, which lead to the formation of haze producing sulfate particles.

Further, exposure to SO2 is associated with adverse respiratory effects, including bronchoconstriction and increased asthma symptom; PM exposure is associated with increased respiratory symptoms, and adverse cardiac outcomes, such as heart attack and premature death; and NOx exposure is associated with increased airway inflammation and respiratory symptoms, such as asthma. The scientific research clearly documents that reductions in the sulfur content of fuel oil will improve the public and environmental health.

4. CITATION OF SOURCE DOCUMENTATION OF SCIENTIFIC INFORMATION:

Batey, J.E. and R. McDonald. 2005. Low Sulfur Home Heating Oil Demonstration Project Summary Report. Project funded by the New York State Energy Research and Development Authority. Contract No. 6204-IABR-BR-00

MANE-VU, Contributions to Regional Haze in the Northeast and Mid-Atlantic United States, MANE-VU Contribution Assessment (August 2006)

MARAMA, Assessment of Reasonable Progress for Regional Haze in MANE-VU Class I Areas, Chap. 8 (July 9, 2007)

NESCAUM, Low Sulfur Heating Oil in Northeast States: An Overview of Benefits, Costs, and Implementation Issues. (December 2005)

Nitrogen Dioxide, Health. U.S. EPA, October 28, 2010. Web. 18 February 2011. http://www.epa.gov/air/nitrogenoxides/health.html

Particulate Matter, Health and Environment. U.S. EPA, October 28, 2010. Web. 18 February 2011. http://www.epa.gov/air/particlepollution/health.html

State of Vermont, Department of Environmental Conservation, Vermont State Implmentation Plan (SIP) Revision, Regional Haze. (January 15, 2009)

Sulfur Dioxide, Health. U.S. EPA, January 28, 2011. Web. 18 February 2011. http://www.epa.gov/oaqps001/sulfurdioxide/health.html

5. INSTRUCTIONS ON HOW TO OBTAIN COPIES OF THE SOURCE DOCUMENTS OF THE SCIENTIFIC INFORMATION FROM THE AGENCY OR OTHER PUBLISHING ENTITY:

For copies of the source documents of the scientific information, please contact Heidi Hales in the Vermont Air Pollution Control Division at (802)241-3848 or heidi.hales@state.vt.us

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