II. OUTDOOR (AMBIENT) AIR QUALITY

PUBLIC HEALTH ISSUE:

Air pollution poses one of the most pervasive environmental health problems in the United States.

Under the federal Clean Air Act, the U.S. Environmental Protection Agency (EPA) has identified six air pollutants as the "criteria air pollutants." In some cases these pollutants are found at concentrations high enough to cause adverse effects on public health and the environment. The criteria pollutants consist of ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, particulate matter, and lead. EPA has set National Ambient Air Quality Standards (NAAQS) for each of these criteria pollutants to protect public health and the environment.

In addition to the criteria pollutants, over 180 federally defined Regulated Toxic Air Pollutants (RTAPs) have been identified as compounds that may be emitted at high enough rates to cause localized health or environmental impacts. RTAPs include toxic air pollutants that may have direct impacts, as well as persistent bioaccumulative toxics such as mercury and dioxins that build up in the body before impacts are noticeable.

ROLE OF THE HEALTH OFFICER:

- Discuss impact of Air Quality health alerts/advisories with concerned citizens.
- Encourage all persons with respiratory illness to reduce or avoid prolonged or heavy exertion during Air Quality Action Days and health alerts.
- Be aware of local actions to reduce air pollution such as anti-idling programs, especially for school buses, and bans on backyard burning.
- Work and collaborate with the NH Department of Environmental Services on local air quality related citizen complaints.

Notification of health alerts is announced through the local media by the New Hampshire Department of Environmental Services, Air Resources Division, and through email notifications to interested parties, including health officers.

CRITERIA POLLUTANTS:

Ozone

Ozone (O_3) is a main ingredient of smog. It can seriously irritate the eyes, nose, throat and respiratory system. Exposure to ozone can result in more serious effects in people with preexisting lung diseases, such as asthma, bronchitis or emphysema. The NAAQS for ozone was first set by EPA for a one-hour average concentration of 120 parts per billion (ppb) to protect the public from intense short-term exposures. In 1997, this

standard was revised to 0.08 ppm for an eight-hour average in order to be more protective against longer-term exposures. In 2008, EPA lowered the eight-hour average standard to 75 ppb, a more stringent standard, based on scientific evidence that the existing eight-hour standard did not adequately protect public health from the harm caused by ozone. Several studies have proven that ozone pollution lowers the yield on many agricultural crops and causes significant damage to some species of trees.

Many sources including automobiles, power plants, petroleum refineries, metal plating industries and many other industrial processes contribute to ozone pollution, by emitting volatile organic compounds (VOCs) and nitrogen oxides (NOx). Significant reductions in VOCs and NOx have occurred as a result of EPA required reduction programs such as gasoline vapor controls for gasoline stations, automobile inspection and maintenance programs, setting tighter motor vehicle emission standards, nitrogen oxide controls for power plants, and expanded VOC controls for industry. Nationally, ozone levels have decreased over the past 10 to 25 years. Although there is a downward trend, New Hampshire still continues to experience unhealthy ozone days each year.

Particulate Matter (Particle Pollution)

Particulate matter (PM), or particle pollution, is the overall category name for dust, dirt, and soot particles in the air. Some particles are large or dark enough to be seen. Others are so small they can only be seen with an electron microscope. Small particles are responsible for a variety of respiratory illnesses and can cause breathing problems and premature death, particularly for people with heart or lung disease. Health studies have shown that small particles pose the greatest hazard to human health. In addition, small particles are a major cause of reduced visibility. Sources of particulate matter include motor vehicles, power plants, factories, forest fires, and road dust. In addition, secondary particles are formed in the atmosphere from sulfur dioxide and nitrogen dioxide. The current NAAQS for small particles (less than 2.5 microns in diameter, $PM_{2.5}$) was set in 2006 and is 35 micrograms/cubic meter ($\mu g/m^3$) for a 24-hour concentration. The NAAQS for particles 10 microns or less in size (PM_{10}) is currently set for 150 $\mu g/m^3$ for a 24-hour concentration. In New Hampshire, monitoring of particulates of 10 microns or less has been below the NAAQS since 1987. There have however been some recent periods, especially in the winter, where unhealthy levels of $PM_{2.5}$ have occurred.

Carbon Monoxide

Carbon monoxide (CO) can have serious effects on the heart and central nervous system by reducing the amount of oxygen in the cardio-vascular system. People with heart disease and pregnant women are particularly at risk to the effect of carbon monoxide. In cities, traffic congestion from cars and trucks tends to raise the rate of CO pollution.

Federal new car standards for controlling pollution have been implemented, which has resulted in significant reductions in carbon monoxide levels. No violations of the NAAQS for CO have occurred in New Hampshire since 1987. The NAAQS for CO is 9 ppm for an 8-hour average and 35 ppm for a one-hour average.

Sulfur Dioxide

Power plants, industrial boilers, smelters, paper mills and steel manufacturing plants, which burn coal and oil for fuel, are the main sources of sulfur dioxide (SO_2) pollution.

SO_2 irritates the upper respiratory tract and worsens existing lung diseases. People with asthma are particularly sensitive to the effects of this pollutant. Repeated exposure to very to high levels of SO_2 over a long period of time can contribute to the development of lung disease. SO_2 is also a major contributor to acid deposition (rain) and small particle pollution.

Long term-improvements have been made by requiring either the use of fuels with less sulfur or the installation of "scrubbing" equipment that reduces SO_2 in smokestacks. The NAAQS for sulfur dioxide is 0.14 ppm for a 24-hour average. There have been no exceedances at the one hour SO_2 standard in many years. In 2010, EPA strengthened the SO_2 standard in the form of a 24 hour NAAQS of 0.075 ppm. Recent monitoring indicates there will be times when unhealthy levels of SO_2 will occur in areas near some large SO_2 sources

Nitrogen Dioxide

This yellowish brown gas is produced from two main sources: motor vehicles and manufacturing plants and utilities. Bronchitis and increased susceptibility to infection can result from inhaling this pollutant. Nitrogen dioxide (NO_2) also contributes to the formation of ozone pollution, small particle pollution and acid deposition. The current NAAQS for nitrogen dioxide is 0.05 ppm (annually) and 0.10 ppm (1-hour). The level of NO_2 in New Hampshire has been below the NO_2 NAAQS since monitoring began in 1987.

Lead

Lead has received publicity as a contaminant in paint products and residential water supplies, and it is also an air pollutant. Lead is a heavy metal that can cause irreversible damage to the brain and kidneys and impair the circulatory and nervous system. It is estimated that 20-50 % of the lead that a person inhales can be taken up and remain in the body.

Lead in the air can be traced to gasoline additives, metal smelters, battery plants and other industrial sites. Regulations on lead content of gasoline have been a major factor in the significant reduction of this air pollutant throughout the nation as well as in New Hampshire. The current NAAQS for lead is 0.15$\mu g/m^3$ for a three-month average. .

HEALTH ALERTS/HEALTH ADVISORIES AND AIR QUALITY ACTION DAYS:

The state has a policy of issuing health advisories called Air Quality Action Days for ozone and small particle pollution. An Air Quality Action Day is issued when ozone or small particle levels are expected to reach "unhealthy for sensitive groups" levels or higher. This equates to an EPA AQI (Air Quality Index) of 100 or more, and ambient air concentrations of at least 75 parts per billion for ozone or 35.5 micrograms per cubic meter for small particles. (See the Air Quality Index table below.) The increase in pollutant levels is usually contingent upon weather changes, wind velocity and direction, and the amount of pollution being transported into the state. Levels of ozone often increase during periods of hot and humid weather. Unlike ozone, which is known to be highest during the months of June, July, and August, levels of particle pollution can be

elevated throughout the year. The health alert usually remains effective until the weather and air quality pattern changes.

The NHDES recommends that people, especially those with respiratory or cardiac illnesses, take precautionary measures to protect their health, such as limiting or avoiding prolonged exertion.

The Air Quality Index (AQI)

Air Quality Index Levels of Health Concern	Numerical Value	Meaning
Good	0-50	Air quality is considered satisfactory, and air pollution poses little or no risk.
Moderate	51-100	Air quality is acceptable; however, for some pollutants there may be a moderate health concern for a very small number of people who are unusually sensitive to air pollution.
Unhealthy for Sensitive Groups	101-150	Members of sensitive groups may experience health effects. The general public is not likely to be affected.
Unhealthy	151-200	Everyone may begin to experience health effects; members of sensitive groups may experience more serious health effects.
Very Unhealthy	201-300	Health alert: everyone may experience more serious health effects.
Hazardous	> 300	Health warnings of emergency conditions. The entire population is more likely to be affected.

OTHER OUTDOOR AIR QUALITY ISSUES FOR HEALTH OFFICERS:

State Air Toxics Regulations

The New Hampshire Air Toxics Control Program, enacted in 1987 and revised in 1996, protects public health by reducing human exposure to toxic air pollutants. Rules governing toxic air emissions went into effect on April 25, 1990 and were replaced in 1997 by the current rule, which is revised annually to keep up to date with current scientific and health information. The regulation establishes ambient air limits (AALs) for approximately 800 regulated toxic air pollutants (RTAPs). Any business emitting one or more of these RTAPs into the ambient air must conduct a compliance demonstration that may be reviewed by the Air Resources Division in order to insure that the AALs are not exceeded.

Regulating Open Burning

New Hampshire's open source air pollution regulations (Env-A 1000) define the administrative requirements for municipal and commercial open burning operations and

clearly identify permissible and non-permissible types of open burning. Highlights include:

- Written authorization from DES is **not required** for open burning by any city or town of brush, including attached leaves, that is five inches in diameter or less. Until December 31, 2014, towns are allowed to burn unpainted and untreated wood from construction and demolition projects in their burn piles without authorization from DES. After that date, municipal burning of this material is prohibited under state law.
- Landowners may also burn brush, including attached leaves that are five inches in diameter or less, provided the brush originates on-site.
- Single-family residential homeowners are allowed to burn clean untreated wood from on-site construction and demolition projects if the residence is occupied by the owner and the material originates on-site.
- Fire permits from a local Forest Fire Warden, the State Forest Ranger, and local authorities are required (if applicable) for permissible opening burning activities.
- The following are strictly **prohibited** statewide:
    - Residential open burning of household trash (see below)
    - Burning of tires and tubes.
    - Burning for salvaging or reclaiming operations (i.e., any activity in which used material is processed for reuse).
    - Burning of treated wood (i.e. plywood or wafer board).

Ban on Open Burning of Residential Trash

“Open burning" of household waste materials such as paper, plastics, household trash and garbage in a burn barrel or backyard incinerator results in many harmful health and environmental effects. Recognizing the environmental and public health effects of residential trash burning, the NH Legislature passed a law (RSA 125-N) that prohibits the "residential burning of combustible domestic waste." The ban includes materials such as household trash, packaging materials, coated or laminated papers, rubber, painted or treated wood, coated or treated cardboard, oily rags and animal, vegetable, and kitchen waste. Penalties for illegal burning of trash may include a warning, with an explanation of the ban, fines of up to $100 for the first offense, and fines of up to $250 for subsequent offenses.

The law gives DES primary responsibility for enforcing the ban, and requires DES, in cooperation with the New Hampshire Department of Resources and Economic Development (DRED), to educate and notify the public regarding the ban. DES works closely with DRED and forest fire wardens on implementing the law.

The ban does not include the outdoor burning of leaves and small brush, campfire wood, and charcoal. These materials can be burned in a burn pile, but not a barrel, with a fire permit from the local fire warden. Penalties for burning without a fire permit include fines of up to $2,000 or one year imprisonment, or both. DRED has enforcement authority under RSA 227-L.

State Law on Outdoor Wood Boilers

A new law was passed in 2008 (Chapter 362 of the Laws of New Hampshire 2008, codified as RSA 125-R) that establishes requirements for the sale, installation, and use of outdoor wood-fired hydronic heaters (also known as outdoor wood boilers or OWBs) in New Hampshire. The law also acts to establish emission standards and prohibit the sale of any units that do not meet those standards. Components of the law include, but are not limited to:

- Sales requirements: Effective April 1, 2010, all OWBs that are sold in the state must meet the Phase II emission limits.

- Selling and Buying responsibilities: Any seller of an OWB is required to provide written notice to a perspective buyer on New Hampshire's law. The written notice must be signed and dated by the buyer and seller, include specific information on the OWB purchased, and be kept on file by the seller for at least three years.

- Setback and stack height requirements for installation of OWBs:
    - Phase II units: Must be 50 feet from the nearest property line; no stack height requirements.

- Permitted fuels: Clean wood and/or wood pellets made from clean wood are the only fuels that can be burned in these devices.

- Prohibited fuels: Burning other materials such as household trash, tires or construction debris is strictly prohibited.

- Enforcement:

    - The NH Department of Environmental Services (DES) has the authority to issue an administrative fine of up to $250 for a first offense and up to $500 for each subsequent offense to any person that violates the law.

    - DES has the authority to issue an administrative order to require compliance with any provision of the law, including setbacks, stack height, fuel type and sale.

    - Under RSA 147:16-b as amended by HB 1405, which went into effect August 10, 2008, when an OWB is operated in a manner that causes a nuisance or is injurious to public health, the health officer, may order that the use of the OWB be discontinued. DES will provide technical assistance to the municipal health officer in the event this situation arises.

Fugitive Dust

Fugitive dust is particulate matter that is not emitted through a smokestack or exhaust vent, but rather becomes airborne because of vehicular traffic, wind, or redistribution

activities. However, like particulate matter that is emitted through a stack or vent, fugitive dust can cause health problems if not properly controlled. While most activities that create fugitive dust are not required to be permitted by the Air Resources Division of the Department of Environmental Services, some are subject to Env-A 1002, which regulates fugitive dust from certain commercial or business activities such as: mining, transportation, storage, construction and demolition maintenance use, and removal activities. In addition, state and federal rules require fugitive dust controls at sand and gravel operations as well as asphalt plants. These rules prohibit the off-site transfer of dust. Precautionary measures that may be employed include wetting, covering, shielding, and vacuuming.

Rock crushers may need to be permitted with the Air Resources Division of DES depending on the size of the crusher equipment.

Permitting Sources of Air Pollution

The Air Resources Division of DES regulates and limits air emissions from a variety of sources within New Hampshire through a statewide permitting program. DES rules (Env-A) outline the permitting process and list sources that require permits for air emissions, either by overall source, specific device, or by pollutant. In addition, DES is responsible for implementing most Federal air pollution control regulations. The purpose of the permitting program is to achieve and maintain air quality standards throughout the state. The Rules include established standards (National Ambient Air Quality Standards or "NAAQS") for the six criteria pollutants (ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, particulate matter, and lead), as well as the basis for establishing ambient air limits for air toxic pollutants.

Sources of air emissions which require permits include point sources (major stationary commercial and industrial facilities), area sources (generally small, but numerous, stationary sources like dry cleaners and print shops), and devices (individual burners, furnaces, machines, etc.). More information on specific devices and sources that require air permits can be found at the DES website www.des.nh.gov under “Permitting-Air” on the A to Z list.

For more information on outdoor air quality:

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