

No major interim improvements are identified for either highway or for the Highway 128/93 intersection. However, some widening of shoulders and bridges along Highway 93 has been done and may be done in the future to improve safety, especially for bicycles.

There are ongoing discussions involving an alternative north/south route on or between Highway 93 and Indiana Street. The purpose of this route is to create a link between the Northwest Parkway and West C470. The NWTC is within the alignment study area, but alignments that would use NWTC lands and other lands associated with RFETS would be somewhat indirect and would face considerable public, technical, cost and environmental obstacles. At this time, this project could be considered more speculative than foreseeable, but circumstances could change over the next few years that narrow the possible alignment corridor and make this project more foreseeable.

3.3 AIR QUALITY

To address minor incremental impacts from NREL operations, NREL implements an Air Quality Protection Program under NREL Policy 6-2.5. The purpose of the program is "to prevent the degradation of local air quality while helping to preserve the quality of the local and regional airshed to the maximum extent possible." The program applies to stationary sources, not to mobile sources such as vehicles. NWTC project managers notify the NREL ES&H Office prior to the beginning of any project that poses the potential for air emissions. The ES&H Office evaluates air emissions and permitting requirements early in a project's planning phase. The ES&H Office is notified of every new piece of fuel-burning equipment and changes in the status of existing equipment. The ES&H Office contacts the Colorado Department of Public Health and Environment (CDPHE) when necessary. The NWTC operates its emissions sources in compliance with all applicable State regulations. State permits are not currently required.

3.3.1 Climate

The NWTC location is characterized by a semiarid climate that exhibits large seasonal and short-term temperature variations typically associated with movement of large continental air masses. The central Rocky Mountains are usually dominated by high pressure and the plains by low pressure. High pressure frequently governs the weather along the Front Range, resulting in fair, dry conditions at the NWTC. Although the average daily temperatures at the NWTC are moderate, large diurnal temperature variations result from the site's 6,000-foot elevation and thinner atmosphere. Average daily winter temperatures range from 20 to 45°F. Average daily summer temperatures range from 55 to 85°F. Temperatures are generally above freezing from about mid-May through mid-September. The NWTC receives approximately 15 inches of precipitation per year. Seventy percent of the precipitation occurs in April through September. The average seasonal snowfall is approximately 65 inches. There are occasional periods of severe drought along the Front Range. Average mid-afternoon humidity is approximately 40%.

Pacific Northwest National Laboratory's Wind Energy Resource Atlas of the United States locates the NWTC in an area that typically exhibits Class 4 to 6 average wind power. Areas described as Class 3 or above are those that are potentially suitable for wind energy applications (NREL web site, 2001). Average wind speeds are approximately 9 miles per hour (mph) at the NWTC. About 35% of wind velocities range from 5.6 to 9 mph. About 34% of the

time, wind velocities exceed 9 mph. Thirty percent of the winds range from 2.2 to 5.5 mph. Winds are calm approximately 1% of the time. The predominant wind direction frequency is from the east-southeast with a mean wind speed of 14.1 mph. A secondary maximum is from the east with a mean wind speed of 12.8 mph. Winds are usually from the southeast or northeast during the day when air temperature warms. The wind direction reverses at night, originating from the northwest. The site is subjected to intermittent, extremely high velocity winds that are conducive to the research conducted at the NWTC. Strong westerly downslope winds can occur during the winter and early spring. Wind speeds as high as 100 mph have been measured during storm events near the NWTC (Integrated Natural Resources Management Plan and Environmental Assessment for Rock Creek Reserve 2000 – 2006, December 2000).

3.3.2 Air Quality Regulatory Authorities

Ambient air quality in a given location is characterized by comparing the concentration of various pollutants in the atmosphere to the standards set by federal and state agencies. The purpose of these standards is to allow an adequate margin of safety for the protection of public health and welfare from adverse effects resulting from pollutants in the ambient air. The primary pollutants of concern for which federal and state ambient air quality standards have been established include criteria pollutants, hazardous air pollutants, and toxic air pollutants.

National Ambient Air Quality Standards (NAAQS) set the absolute upper limits for specific air pollutant concentrations in order to protect human health. These pollutants are called "criteria" pollutants and consist of carbon monoxide (CO), nitrogen oxides (NO_x), sulfur dioxide (SO₂), particulate matter of 10 microns in diameter or less (PM-10), total suspended particulates (State of Colorado designation), ozone, volatile organic compounds (VOCs), and lead. A geographic area that meets or exceeds the limit for a particular pollutant is called a "nonattainment" area. Areas where pollutants are measured below the limits are called "attainment" areas.

Although the Denver area was not in attainment in the past for CO and ozone, it is expected that the area will be redesignated as being in attainment for both pollutants by the end of 2001. Although the NWTC is located in a non-attainment area for PM-10, Colorado has petitioned the U.S. Environmental Protection Agency (EPA) for re-designation of the area as attainment for PM. The Colorado Air Quality Control Division (CAQCD) expects the re-designation to be successful, and the change is expected to occur by the end of year 2002 (CAQCD, Jim Geiger and Mike Silverstein, July 2001). The EPA recently revised both the ozone and particulate matter less than 2.5 microns in effective diameter (PM-2.5) NAAQS; however, the revised limits will not be effective in the state until the EPA approves the Colorado State Implementation Plan. The Denver area is in attainment for the remaining criteria pollutants.

The State of Colorado has primacy to administer the Clean Air Act within the State. The Colorado Air Quality Control Commission (CAQCC) Regulation No.3, Air Contaminant Emissions Notices, provides the provisions for construction and operating permits. An Air Pollution Emission Notice (APEN) is required for:

- Each individual emission point in a non-attainment area with uncontrolled emissions of 1 ton per year (TPY) or more of any individual criteria pollutant, 100 pounds per year of lead, or exceeds the threshold quantity of any reportable pollutant, as defined by the Colorado regulations; and

- Each individual emission point in an attainment area with uncontrolled emissions of 2 TPY or more of any individual criteria pollutant or 100 pounds per year of lead.

Prevention of Significant Deterioration (PSD) regulations limit emissions of pollutants from new sources in attainment areas. In order to implement its policy of non-degradation, the EPA designated types of areas in which certain types of increments of additional pollution would be allowed. Class I areas include federal lands such as national parks, national wilderness areas, and national monuments. These areas are granted special air quality protections under Section 162(a) of the federal Clean Air Act. Class II areas allow additional, well-controlled growth. The NWTC is located in a Class II PSD area for criteria pollutants for which the area is in attainment. The nearest Class I area is Rocky Mountain National Park, approximately 27 miles to the northwest of the site.

Under PSD regulations, a construction permit may be necessary to install a new stationary source or modification of a stationary source (any building, equipment, structure, facility, or installation or any combination, including construction activities) prior to initiation of construction activities. Construction permits are issued on the basis of production/process rates as detailed in the APEN submitted with the permit application or as requested in the application as related to emissions of criteria and hazardous air pollutants.

The National Emission Standards for Hazardous Air Pollutants (NESHAP) are designed to protect human health and the environment by reducing toxic air emissions. The underlying authority for NESHAP is Title III of the Clean Air Act Amendments of 1990 (CAAA-90), which established a listing of Hazardous Air Pollutants (HAPs). Title III of the CAAA-90 specified requirements for the EPA to identify those source categories that emit, or have the potential to emit, one or more HAPs. For each source category identified, EPA was directed to promulgate NESHAPs using standards that are modeled on the best practices and most effective emission reduction methodologies in use at the affected facilities. Threshold quantities determine application of various requirements or exemption from those requirements.

3.3.3 Emission Sources at the NWTC

Emissions at the NWTC include those generated during normal and emergency site operations. Normal operations include placing or modifying tower locations, modifying power, data, and telecommunications cables, and the use of heavy and high-lift equipment associated with the replacement and maintenance of experimental systems. Personal and site vehicles also produce emissions. Fugitive dust is temporarily generated from disturbed soils during construction. Nearby industrial operations also generate fugitive dust and other emissions.

An air emissions inventory dated November 2001 indicates that the facility has 12 primary sources of air emissions. The primary sources consist of one generator used for emergency operations, one generator used to operate a pump used in fire fighting, two generators used in connection with towers, seven generators used with the Hybrid Power Test Bed, and one generator used with the operation of the distributed energy system. Emissions from the 2001 inventory are listed below in Table 3-2. Potential emissions values reflect the operation of all sources of emissions at the site on a continuous year-round basis. Actual emissions of these pollutants from the site are much less because the sources operate intermittently and reflect the amount of pollutants actually emitted.

With respect to hazardous air pollutants, the NWTC may, from time to time, emit acetone, cyclohexane, toluene, xylene, phosphoric acid, and sulfuric acid. The emission quantities are extremely small and use is infrequent. The actual emissions are well below permit and notification thresholds.

Table 3-2. Annual Emissions at the NWTC (Tons Per Year), 2001

	Particulates	SO ₂	NO _x	CO	TOC
Potential to Emit	6.39	5.97	91.04	19.59	7.21
Actual Emissions	0.18	0.17	2.52	0.54	0.20

Source: Compiled from NWTC November 2001 emissions inventory

* Total Organic Compounds (TOCs) are volatile organic compounds plus carbon monoxide, carbon dioxide, carbonic acid, and metallic carbides.

3.3.4 NWTC Permit Status

After reviewing the CAQCC regulations, the NREL determined that submission of APENs associated with site operations is not required. An APEN was recently submitted to the CAQCD in preparation for construction activities associated with the Proposed Action. The CAQCD issued Permit No. 00JE0010L in March 2000, which expires January 31, 2005. NREL also submitted a fugitive dust plan for land development that addresses measures to be taken during construction activities. Fugitive dust consists of emissions that are unplanned and escape from a process by a route other than a stack, chimney, or vent. In cooperation with CDPHE, NREL is in the process of determining whether other permits are necessary.

3.4 NOISE

Noise is defined as unwanted or annoying sound that is typically associated with human activities and that interferes with or disrupts normal activities (Salter, 2000). Sound and noise are measured as sound pressure levels in units of decibels (dB). Response to noise varies according to its type, its perceived importance, its appropriateness in the setting and time of day, and the sensitivity of the individual receptor. Human hearing is simulated by measurements in the A-weighting (dBA) network, which de-emphasizes lower frequency sounds to simulate the response of the human ear. Some typical sound levels from common noise sources are presented in Table 3-3.