

# Air Quality Program

Air Pollution Control Division

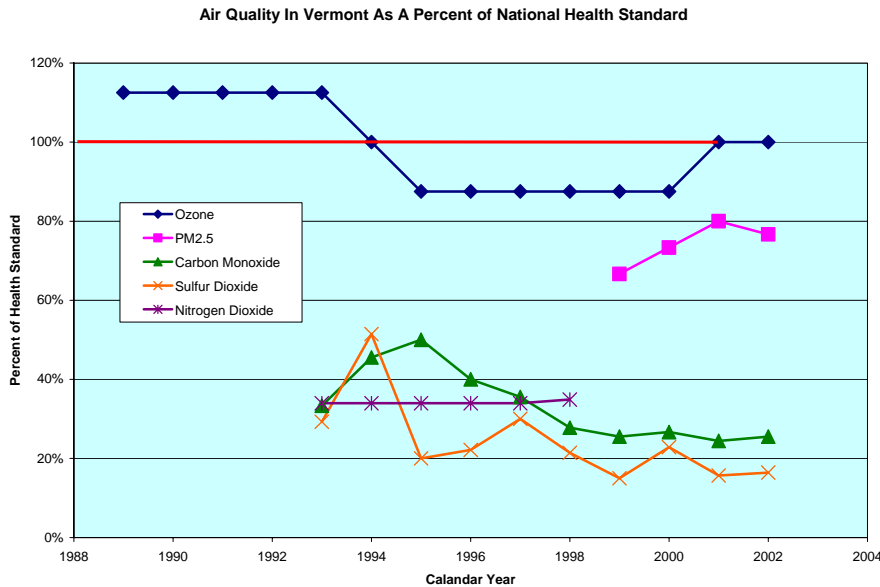
February 6, 2004

## Results:

Maintain air quality through compliance with National Ambient Air Quality Standards and Prevention of Significant Deterioration Increments, and enhance air quality through reductions: in airborne toxins, atmospheric deposition of acidifying and toxic agents, impairments to visual range and climate altering contaminants.

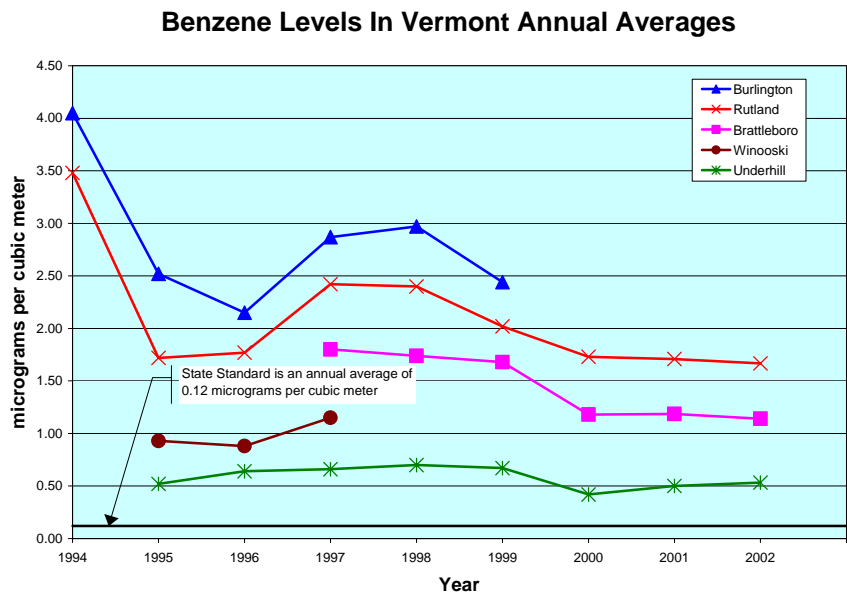
## Key Indicators:

National Ambient Air Quality Standards:



Long term monitoring for compliance with national ambient air quality standards indicates that for Carbon Monoxide, Nitrogen Dioxide and Sulfur Dioxide levels are at a fraction of the standards. However, for the air contaminants Ozone and Fine Particulate Matter (PM2.5) air quality is a significant concern, as levels are either at (100%), or near (70 to 80%) the health based standards.

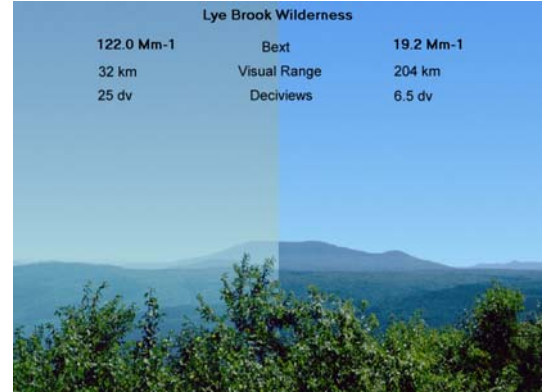
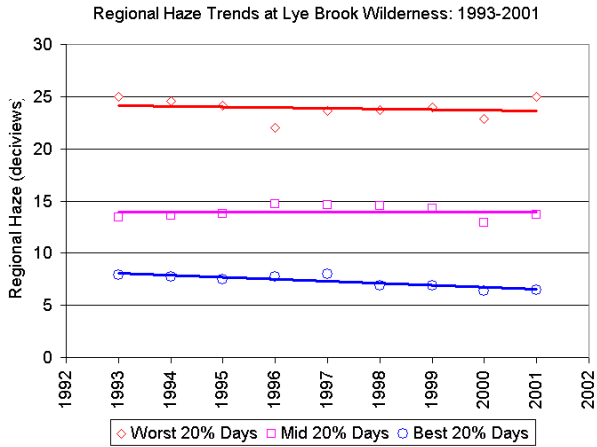
Airborne Toxins:



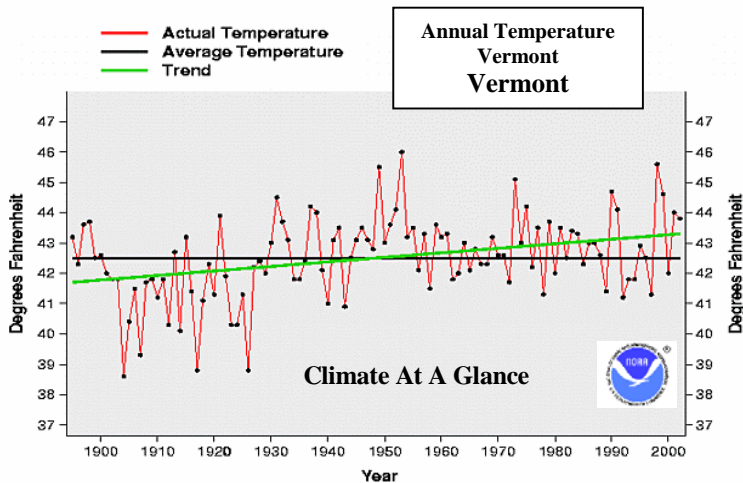
Airborne toxins are multifaceted complex matter. As an indicator of the problem, multi-year data for ambient concentration of Benzene, a known human carcinogen, is presented. These data demonstrate that ambient levels in Vermont are above state health based standards. The Vermont Ambient Air Toxic Monitoring Network measures over seventy substances at four locations throughout the state.

## Visibility/Regional Haze

While slight progress has been made on keeping clear air days clear, much needs to be done to reduce impairments to visibility. Strategies to address regional haze are consistent with efforts to combat regional and local air pollution in general. Many technological advancements have aided our understanding in measuring, analyzing and communicating this important issue, that threatens not only health, but public safety and welfare.

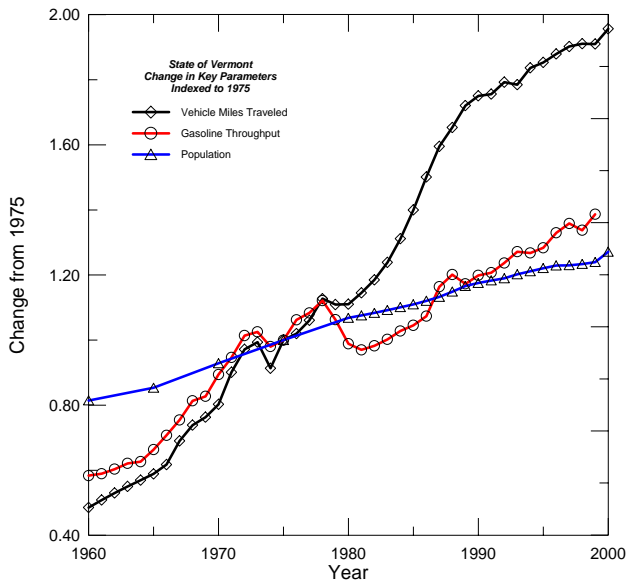


## Climate Change/Instability



Vermont is warming. The average rate of change has been an increase in temperature of  $0.16^{\circ}$  per decade, or  $1.6^{\circ}$  per hundred years. While this average change may seem small on a day-to-day basis, to experience this amount change in average temperature over this long a period of time can affect many aspect of our built and natural environment.

## Source Activity



Motor vehicles are a significant source of air pollution in Vermont. The number of vehicle miles traveled annually in Vermont has doubled since 1975. The Vermont Agency of Transportation (AOT) has placed annual vehicles miles traveled (VMT) at over six billion miles per year, however AOT is reviewing the methodology used to determine VMT, and believes that the current value is a significant underestimate. If so, correcting this underestimate will significantly increase the amount of air pollution attributable to motor vehicle operating in Vermont.

The growth in the number and use of vehicles has outpaced the growth in general population, as has the growth in gasoline motor fuel consumed.

### **Story Behind Baseline Performance:**

#### *National Ambient Air Quality Standards and Prevention of Significant Deterioration Increments:*

The National Ambient Air Quality Standards are authorized by Congress to protect public health and welfare, with an adequate margin of safety. Prevention of Significant Deterioration Increments ensures that areas with air quality better than what is minimally acceptable will not be fully deteriorated.

USEPA has set air quality standards for six air contaminants; Particulate Matter (dust, dirt, soot in the air), Sulfur Dioxide, Carbon Monoxide, Nitrogen Dioxide, Ozone and Lead. Air Quality in Vermont has been monitored beginning in the late 1960s. In the first decade and a half, levels of air contaminants were measured that exceeded the health standard for particulate matter, sulfur dioxide, carbon monoxide and ozone. Through implementation of control programs in Vermont and throughout the nation, Vermont has been declared in 'attainment' of all national ambient air quality standards.

With regard to Ozone, Vermont is declared attainment of this air pollutant, however recorded levels are right at the standard. It is but for the frequency of occurrence of these levels that allows Vermont to qualify for the attainment designation. Compliance is determined by the average of the annual fourth highest level over three years. The numerical standard is 0.080 parts per million (ppm). The three-year average of the fourth highest level in Vermont is 0.080. Should this value increase to 0.085, an increase of 0.005 ppm, Vermont would be a 'nonattainment' area and a host of federal mandates would apply.

Another air contaminant of note is Fine Particulate Matter, or PM<sub>2.5</sub>. For this air contaminant levels in the recent past have been recorded at 60 to 80% of the annual standard. While below the standard, this pollutant remains of great concern because the health science data indicates that there is no threshold to the adverse health effects of this contaminant – that is for every increase in concentration there is a health consequence and for every decrease in concentration there is a health benefit. Further, PM<sub>2.5</sub> crosses over to the issues of acid deposition, airborne toxins, toxic deposition and regional haze.

### *Airborne Toxins:*

Having air quality standards for only six contaminants is inadequate to protect public health from air pollution. As such Vermont has developed state air quality standards for chemical substances known or suspected to be hazardous to public health. These substances are referred to as toxic air pollutants. Examples of airborne toxins include benzene, formaldehyde, perchloroethylene, styrene, acrolein, 1,3-butadiene, methylene chloride, chromium, and arsenic.

The Vermont's Hazardous Air Contaminant Control Program is a comprehensive program of air quality monitoring, emission standards requirements, and source surveillance. Ambient air quality data for benzene is reported as a surrogate for the issue of airborne toxins. Benzene, a human carcinogen, is emitted in significant amounts locally from motor vehicle operation (exhaust, plus evaporative emissions), handling and transport of motor fuels, fuel combustion, most notably the combustion of wood, as well as certain industrial operations and consumer products. The issue of airborne toxins has many aspects to it. Some toxins are gases, some are solids and some can be both, either gas or solid/liquid depending on conditions – all can represent threats to human health because they are toxic, carcinogenic or both.

### *Atmospheric Deposition:*

Contaminants in the atmosphere can be a direct threat to human health by human inhalation. Additionally, atmospheric contamination can be a threat to human health and the environment through the deposition (fall out or wash out) of the contaminants to the terrestrial ecosystem.

Acid rain is a well-known example of the deposition of air contaminants harming forests and adversely affecting aquatic ecosystems. The offending contaminants here are principally sulfur dioxide and nitrogen oxides from the burning of fuels for heat, power and transportation.

Other contaminants that deposit from the atmosphere may be of concern because they are toxic, move through ecosystems and bioaccumulate/bioconcentrate. Mercury, dioxins/furans, PCBs, PAHs, and lead are examples of these contaminants.

### *Impairments to Visibility:*

Fine particle pollution, acid rain, and regional haze are 3 related air quality problems that adversely affect Vermont's human health, environment and public welfare. Sulfate pollution, originating primarily from upwind coal-fired utility sources to our south and west, is the most important contributor to all 3 problems and accounts for about half of Vermont's regional background fine particle pollution (PM-2.5), 60% of the acidity in our precipitation, and almost 80% of the visibility impairment on our haziest days.

Over the past 25 years, a wide range of state, regional, national and international sulfur emissions reduction programs have gradually reduced sulfate concentrations in Vermont, and benefits are most notable in the long-term reductions of the sulfuric acid content of Vermont's precipitation. This rate of improvement has slowed considerably over the past 10 years, only minor improvements can be observed in our background concentrations of fine particles, with virtually no discernable improvement in regional haze levels in recent years.

Recent federal regulations for regional haze in National Parks and Wilderness Areas require a long-term (60-year) reduction in haze on the worst 20% of days from current levels (about 25 deciviews at Lye Brook) to "natural background" levels (about 10 deciviews on the haziest days), and also require that the current clearest 20% of days (about 6.5 deciviews in Lye Brook) do not deteriorate. Progress toward these national visibility goals (improvements of roughly to 0.25 deciviews/year in Lye Brook) will require substantial long-term reductions in upwind sulfur emissions, which in turn will reduce health effects from PM-2.5 and reduce the acidity of our rainfall. Continuing in-state efforts to reduce emissions of nitrogen oxides and

carbonaceous compounds – especially from motor vehicles – will also help reduce regional haze, and will be critical to reducing the nitric acid content of our rain, fine particle and air toxics concentrations in our urban areas, and ozone pollution in Vermont and downwind areas.

*Climate Change/Instability:*

The climate of Vermont is rich in its four season and is quite varied, as it comprises many ecological transition zones. Each season of Vermont is well regarded – winter snows, sugaring in the spring, summer recreation and fall foliage. The climate of Vermont is inextricably linked to the economy of Vermont, both as it relates to revenues and costs. The buildup of greenhouse gases in the atmosphere is cause for altering climates worldwide, and Vermont’s climate as well. What makes Vermont’s beauty makes it especially vulnerable – transitional ecosystems. These ‘edges’ are where change can be experienced first, and the most. As climate change, the climate will become more ‘unstable’. Climate instability will manifest itself in greater extremes, as the overall temperature slowly increases over time.

**Strategies/ Performance Measures / Proposed Accomplishments :**

Permitting: a management tool to ensure new and existing sources of air pollution are well controlled and do not cause or contribute to violation of air quality standards or PSD Increments.

Performance Measure	“P”=Projected and A”=Actual Values	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Number of construction permits for major sources	P								0	1	0	1
	A		1	1	4	1	0	0				
Percent meeting PEP Standards			100	100	100	100	100	100				
Number of construction permits for minor sources	P								15	15	15	15
	A		20	17	11	16	0	17				
Percent meeting PEP Standards			100	88	82	69	85	76				
Number of construction permits for minor sources with hearings	P								12	12	12	12
	A		17	12	16	12	13	9				
Percent meeting PEP Standards			100	83	94	83	69	89				
Number of Administrative Amendments	P								6	6	6	6
	A				10	6	9	3				
Percent meeting PEP Standards				100	83	78	67					
Number of Registrations	P								160	160	160	160
	A		151	161	156	163	163	156				
Number of Indirect Sources	P								1	1	1	1
	A		4	5	3	4	4	1				
Percent meeting PEP Standards			100	100	100	100	100	100				

\* PPA funded

Source Surveillance: a management tool to ensure that discernable sources of air pollution operate in compliance with emissions standards, and standards of operation.

Performance Measure	“P”=Projected and “A”=Actual Values	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
General engineering compliance inspections	P	160	130	105	95	85	74	74	94	85*	75	70
	A	128	84	99	87	69	63	73				
Open burning permits issued	P	40	40	40	40	40	40	40	40	40	40	40
	A	43	40	39	31	36	41	39				
Review of CEMS/COMS excess emissions reports from sources	P	24	24	24	24	24	28	28	26	28	28	28
	A	24	24	24	20	20	22	24				
Stack testing observation & report review	P	9	15	25	25	25	25	25	20	20	20	20
	A	9	15	24	9	16	28	10				
Stage II vapor recovery at gasoline stations (tests observed)	P		20	45	49	100	180	80	35	40	80	100
	A		2	66	40	120	144	31				
Enforcement actions	P	8	8	8	8	9	9	9	9	9	9	9
	A	9	9	12	9	12	6	10				

(\*) - Of the 85 projected inspections for 2004, 15 of them will be performed at Title V major sources, and 13 of them will be performed at synthetic minor sources. Also, Vermont’s Air Pollution Control Division plans to review 18 Title V annual compliance certifications during FFY 2004.

#### Proposed Accomplishments

#### Regulatory Related Activities

2004 –

- Put special emphasis on implementation of state wood furniture manufacturing rule.
- Issue all remaining Operating Permits.
- Update and quality assure permit database.
- Complete Toxic Action Plan for the control of Benzene
- Complete statewide emissions inventory of Green House Gases
- Propose and seek passage of state legislation addressing excessively smoking diesel engines.
- Amend LEV regulation for consistency with California, implement LEVII and medium-duty vehicle requirements.
- Adopt vehicle idling regulations.
- Initiate, support and participate in multi-state litigations, and other initiatives, focused on reducing regional transport of pollution

2005 –

- Focus compliance efforts on air toxics sources, NOx and VOC RACT sources, Stage II vapor recovery and sources with Title V operating permits.
- Develop industry specific guidance documents to assist in permitting.
- Complete Toxic Action Plan for Motor Vehicle toxins
- Develop Green House Gas Action Plan consistent with goals of the New England Governors/Eastern Canadian Premiers Regional Action Plan.
- Work to establish early introduction of ultra-low sulfur diesel fuel.
- Complete Vehicle Inspection and Maintenance pilot project for automating vehicle emissions inspection data collection and management.
- Initiate, support and participate in multi-state litigations, and other initiatives, focused on reducing regional transport of pollution

2006 –

- Put extra effort into monitoring Stage II vapor recovery tests as the 5 year retesting requirement is triggered.
- Develop and implement procedure to streamline permitting, while maintaining air quality protection.
- Complete Toxic Action Plan for Methylene Chloride.
- Implement Green House Gas Emissions Registry.
- Initiate, support and participate in multi-state litigations, and other initiatives, focused on reducing regional transport of pollution

Education and Technical Assistance –

2004 –

- Provide training to the automotive service industry in the diagnosis and repair of vehicles with emission control system failures through a cooperative effort with Vermont Technical College known as the Center for Emissions Repair Technician Training (VCERTT).
- Develop and distribute educational and training materials regarding compliance with wood furniture finishing emissions control rule.
- Conduct training on obtaining an air pollution control permit.
- Conduct public education and outreach forums on Climate Change/Instability and its implications in Vermont.

- Modify and republish outreach materials to reflect program Low Emission Vehicle Program changes, and focus on improving data collection and enforcement mechanisms (coordinated with DMV).
- Maintain and continue to improve web site and the reporting of near real-time air quality data.

2005 -

- Maintain the base offering of VCERTT and develop advanced modules for the diagnosis and repair of key emission systems control components.
- Update Permit Handbook.

2006 –

- Maintain relationship with Vermont Technical College and develop an Annual report and Web site for VCERTT
- Conduct training on obtaining an air pollution control permit.

#### Monitoring, Assessment, and Direct Services –

2004 –

- Maintain base statewide air quality monitoring network and enhance system through addition of the routine measurement of certain toxic elements.
- Develop and obtain EPA approval of a Quality Assurance Plan for air quality monitoring of volatile organic compounds, carbonyls and toxic elements.
- Integrate the Underhill air-monitoring site into the National Air Toxic Trends Sites program.
- Acquire meteorological measurement equipment.
- Analysis impact of regional air pollution within and outside of Vermont.
- Track national legislation on regional emissions control requirements.

2005 --

- Maintain base statewide air quality monitoring network and enhance system through the addition of meteorological monitoring equipment at six air quality monitoring sites.
- Take measure, supported by regional air pollution analyses, which will result in decreased emissions upwind of Vermont.
- Commence meteorological monitoring.

2006 –

- Maintain base statewide air quality monitoring network and enhance system through the addition of measurement of certain toxic semi-volatile organic compounds.