Portneuf Valley

Particulate Matter (PM_{10})

Air Quality Improvement Plan

1998-1999

Idaho Division Of Environmental Quality

NOTICE

On November 5, 1998, a boundary change for the Power-Bannock Counties PM_{10} Nonattainment Area (PBNAA) was approved by the Environmental Protection Agency (EPA).

The PBNAA previously included both state and federally regulated lands. The changes approved by EPA separate the area into two PM_{10} nonattainment areas, based upon jurisdictional authority.

The new western and northern boundaries consist of land under state authority , including the cities of Pocatello and Chubbuck. This area is referred to as the Portneuf Valley PM_{10} Nonattainment Area. The remainder of land located on the Fort Hall Indian Reservation, under federal jurisdiction is known as the Fort Hall PM_{10} Nonattainment Area.

For the purpose of this document, the Power-Bannock Counties PM_{10} Nonattainment Area refers to the newly established Portneuf Valley PM_{10} Nonattainment Area. See Appendix J for details of the Federal Register notice published by EPA.

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Executive Summary

The Clean Air Act Amendments of 1990 established specific requirements for areas which exceeded the National Ambient Air Quality Standards (NAAQS); these areas are referred to as Nonattainment Areas (NAAs). Portions of the Power-Bannock Counties and the Fort Hall Indian Reservation are designated as a NAA due to violations of the NAAQS for small particulate matter, known as PM_{10}.

The Clean Air Act Amendments require that the State submit an air quality improvement plan for the NAAs to the Environmental Protection Agency (EPA). This document is a revision to the Power-Bannock Counties PM_{10} Air Quality Improvement Plan, submitted to EPA in March 1993. This plan will outline control measures that were necessary to comply with the NAAQS and how each measure was implemented.

Recently, IDEQ requested that the Power-Bannock Counties PM_{10} Nonattainment Area (PBNAA) be split into two distinct nonattainment areas: one constituting the State land and the other constituting the Reservation land. This allows the Shoshone-Bannock Tribes and the Environmental Protection Agency (EPA) primary jurisdiction to implement the control strategies on the Fort Hall Indian Reservation, and the State of Idaho the responsibility over all other areas. Specifically, the Tribes and EPA will be responsible for all but a small portion of the FMC facility and the area sources on the Reservation in the Power-Bannock NAA; the Idaho Division of Environmental Quality (IDEQ) will implement controls for the sources in the state portion of the PBNAA.

On November 5, 1998, IDEQ's request to split the PBNAA into two nonattainment areas was approved by EPA. The Reservation land is referred to as the Fort Hall PM_{10} Nonattainment Area and the State land is known as the Portneuf Valley PM_{10} Nonattainment Area.

IDEQ has been monitoring for PM_{10} in the NAA since 1986. Monitors are located at the Pocatello Sewage Treatment Plant, on the campus of Idaho State University, at the corner of Garrett and Gould street, and at the Chubbuck Elementary School. IDEQ has a meteorological station, real time PM_{10} monitors, and a nephelometer set up at the Garrett and Gould site, which gives both indirect and direct indications of PM_{10} levels. Sampling occurs on a vigorous schedule throughout the year.

The Portneuf Valley Nonattainment Area (PVNAA), with a 1997 population of 60,000, experiences stagnant weather conditions in the late fall and winter, along with frequent high winds in the summer and early fall. These conditions, combined with emissions from various sources, can contribute to a buildup of PM_{10} which sometimes exceeds the national and state standards. There are two geographically distinct areas which are experiencing problems - the industrial complex and the urban area. Within each area there are different source impacts causing the exceedances; primarily industrial sources, road dust emissions, and residential wood smoke.

The successful strategies and control measures that have been implemented are reviewed in this plan. For the industrial complex, these controls included the issuance of two Tier II operating permits for Bannock Paving Company and a revised Tier II operating permit for J.R. Simplot Company, to reduce process and fugitive dust emissions. In the urban area, controls included upgrading uncertified wood stoves, improving burning practices, and an establishment of a voluntary curtailment of wood burning on high pollution days. In addition, there are written agreements in place with the cities of Pocatello and Chubbuck, Bannock County, and the Idaho Transportation Department to improve winter road sanding practices.

An inventory of sources, known as an emission inventory was developed for the PVNAA. This inventory identifies sources of pollution in the NAA. The major source within the industrial complex is the J.R. Simplot Company. The major non-industrial source is road dust. This emission inventory and known monitoring data shows no violations or exceedances of the NAAQS since 1993. For this reason, no further control techniques are required for this plan.

Section I provides background on the plan, roles and responsibilities, and a description of the nonattainment area. Section II discusses the air monitoring methods, air quality data and special studies, including a detailed discussion on secondary aerosols. Section III discusses the source contributions and a complete emission inventory. This section is written in greater detail than the rest of the plan due to its technical nature. Section IV reiterates the implemented control strategies and the successes achieved by these controls. Section V discusses community involvement. Section VI and VII details the State permitting policy and legal authority of the State, respectively. Detailed analysis and reports supporting this plan are contained in the Appendices.

I. Introduction

Background

On July 1, 1987, the Environmental Protection Agency (EPA) promulgated a revised National Ambient Air Quality Standard (NAAQS) for airborne particulate matter less than or equal to 10 micrometers in aerodynamic diameter, hereafter referred to as PM_{10}. PM_{10} is exceedingly small, about one-seventh of the diameter of a human hair. The 24-hour PM_{10} standard is 150 micrograms per cubic meter of air, which is not to be exceeded more than once a year. The annual standard is 50 micrograms per cubic meter, which is expressed as an annual arithmetic mean over a 3-year period. These two standards were adopted by the State of Idaho on August 1, 1987.

On November 15, 1990, the Clean Air Act Amendments of 1990 (CAAA) were signed into law. Among the many provisions were new requirements for areas that had not attained the National Ambient Air Quality Standards (NAAQS). The CAAA required EPA to designate all areas exceeding or having a significant potential to exceed the PM_{10} NAAQS prior to January 1, 1989 as nonattainment areas (NAAs). The Pocatello, Chubbuck, and Inkom area and a portion of the Fort Hall Indian Reservation met this criterion. The area was designated as the Power-Bannock Counties PM_{10} NAA.

In June 1995, the town of Inkom was excluded from the Power-Bannock Counties PM_{10} Nonattainment Area and was redesignated to unclassified status. Surrogate PM_{10} data derived from TSP monitoring data collected from 1981 to the final year of data collected in 1988 showed substantial improvement in air quality and no violations or exceedances were reported. IDEQ has continued PM_{10} monitoring and meteorological monitoring in Inkom to provide documentation of particulate levels for the redesignated area. Actual PM_{10} data from the monitoring site show no exceedances have been recorded between 1994 to present.

The State of Idaho was required by the CAAA to prepare a written plan for the Power-Bannock Nonattainment Area (PBNAA) stating controls necessary for the area to comply with the NAAQS. In March 1993, an Air Quality Improvement Plan (also referred to as a State Implementation Plan or SIP) was submitted to the Environmental Protection Agency. The plan described appropriate control measures and emission reductions to maintain the NAAQS. However, the 1993 SIP failed to demonstrate attaintment of the NAAQS, due to the unreliable emission inventory used for modeling, so EPA partially approved the plan. By 1994, IDEQ and the cities of Pocatello and Chubbuck had implemented the control strategies documented in the improvement plan. Subsequently, PM_{10} concentrations declined in the nonattainment area and the state received approval for two extensions of the attainment date.

In April 1998, IDEQ requested that the EPA redesignate the PBNAA, and separate it into two PM_{10} Nonattainment Areas (NAAs): one area constituting the area outside of the Fort Hall Indian

Reservation (State Land) and the other constituting the area within the exterior boundaries of the Reservation (Tribal Land). As described in the Redesignation Request (See Appendix I), the State portion of the NAA has met the responsibilities of the CAA and has demonstrated that RACT/RACM controls are effective. No violations or exceedances of the NAAQS have occurred since the implementation of controls.

On November 5, 1998, EPA approved IDEQ's request to split the PBNAA into two separate nonattainment areas. The Reservation land is referred to as the Fort Hall PM_{10} Nonattainment Area and the State land is known as the Portneuf Valley PM_{10} Nonattainment Area. Therefore, this plan will not include the Fort Hall PM_{10} Nonattainment Area.

As a result of the split, a small portion of the FMC facility is included in the Portneuf Valley PM_{10} Nonattainment Area (PVNAA). IDEQ has completed this SIP revision for the PVNAA which includes that portion of the FMC facility.

Roles and Responsibilities

IDEQ, J.R. Simplot, the cities of Pocatello and Chubbuck, Bannock County, and ITD have made strides in implementing control strategies and improving air quality. The cooperation from local and state governments and industry have helped maintain the NAAQS and will continue to do so in the future.

State Role

The Department of Health and Welfare, through its Division of Environmental Quality, has primary responsibility for the control of air pollution sources in the PVNAA. Through the Idaho Environmental Protection and Health Act and Idaho Code §§ 16.01.01 et seq. the Idaho Division of Environmental Quality (IDEQ) has the authority to promulgate rules, issue permits, adopt State Implementation Plans, and enforce them. These rules are entitled the *Rules for the Control of Air Pollution in Idaho,*IDAPA 16.01.01 et seq.

After adequate public review and comment, IDEQ will submit a SIP to the EPA for federal approval. The SIP submittal will contain enforceable permits and other commitments to implement control strategies for sources under State and local jurisdiction. IDEQ reviews and refines the emission inventories as needed and enforces the overall control strategies throughout the NAA. IDEQ will continue to act as the primary source of public information.

The state government, along with EPA, the Shoshone-Bannock Tribes, other states, and local governments will continue to work together to develop effective implementation plans and control strategies to maintain good air quality.

Nonattainment Area Description

Summary

The Portneuf Valley Nonattainment Area (PVNAA) contains 96.6 square miles of Pocatello, Chubbuck and surrounding areas (See Figure 1). It includes federal land managed by the Bureau of Land Management and the Caribou National Forest, as well as, privately owned land in the cities of Pocatello and Chubbuck.

Bannock Paving Company (BAPCO) which was originally located on the Fort Hall Indian Reservation, relocated to the PVNAA in April 1995. In Appendix C, is a letter from Dave Edel, Materials Manager describing this transition. On September 11, 1998, IDEQ issued BAPCO two Tier II Operating Permits to establish minor source status for collocation of the Asphalt Plant and the Rock Crushing Plant. See Appendix C for permits and further analysis. These two Tier II operating permits will supersede previous permits to construct.

The topography of the PVNAA is complex. The city of Pocatello lies in the Portneuf Valley and extends from the southeast to the northwest, with the Pocatello Mountain Range lying to the east and the Bannock Mountain Range lying to the west. The city of Pocatello is located in the northern part of the valley and the western portion of the NAA is located in the Michaud Flats, which is part of the Snake River Plain. The elevation at the valley floor varies from 4,590 feet above sea level at the extreme eastern end of the valley to 4,445 feet at the Pocatello Airport near the northwestern end of the valley.

Currently, the economy of the area is centered around agriculture and mineral products. Major agricultural crops are potatoes, sugar beets and wheat. Other economic activities include railroads, grain handling, phosphate, and food processing facilities, semi-conductors and medical supplies.

Figure 1. PM10 Nonattainment Areas and Monitoring Sites

Legal Description

A legal description of the previous PBNAA is as follows:

Township	Description
Township 5 South	Range 34E Sections 25-36 Range 35E Section 31
Township 6 South	Range 34E Sections 1-36 Range 35E Sections 5-36 Range 36E Sections 7,8,15-22,27-35
Township 7 South	Range 34E Sections 1-4,10-14, 24 Range 35E Sections 1-30, 32-36 Range 36E Sections 2-11, 14-23, 26-35
Township 8 South	Range 35E Section 1-4 Range 36E Section 3-6
Township 5 South	Range 33E Sections 13-36 Range 34E Sections 15-23
Township 6 South	Range 33E Sections 1-36
Township 7 South	Range 33E Sections 4-6

Legal Description

A legal description of the PVNAA is as follows:

Township 5	Range 34E, Sections 25-36 Range 35E, Sections 31
Township 6	Range 34E, Sections 1-36 Range 35E, Sections 5-9,16-21, 28-33 plus the west ½ of Sections 10,15,22,27,34
Township 7	Range 34E, Sections 1-4,10-14, and 24 Range 35E, Sections 4-9,16-21, 28-33 plus the west ½ of Sections 3,10,15,22,27,34
Township 8	Range 35E, Section 4 plus the west ½ of Section 3

Climatology and Meteorology

The Portneuf Valley is dominated by migratory weather disturbances which are greatly influenced by the complex terrain in the area. Figure 2 shows the climatological data for the area for the period 1939-1997 collected by the National Weather Service. See Appendix J for further climatological data.

Temperatures for that period reflect an annual average of 46.2° F. The average minimum is 33.8° F, and the average maximum is 59.7° F. July is the warmest month with an average temperature of 70.4° F and an average maximum temperature of 88.3° F. December is the coldest month with an average temperature of 26.2° F and an average minimum temperature of 15.6° F.

The annual precipitation is 11.7 inches. Rainfall is distributed throughout the year, with the maximum amount occurring in the spring. Average snowfall is 41.8 inches with the majority of the snow falling from November through April. On average, the greatest snowfall occurs during December.

The most common wind direction in Pocatello is out of the southwest. More than 50% of the observed winds blow out of the quadrant between south and west. See the Pocatello Windrose for October 1996-November 1997 in Appendix I, Figure A-7 on page A-10. The average wind speed is 10.1 mph, with a maximum gust reported of 72 mph. Windy conditions can occur anytime during the year; however, on average, the highest wind speeds occur during wintertime weather disturbances.

The NAA is sheltered from the predominant southwest-to-northeast wind pattern by the Bannock Mountain Range to the south, and the Pocatello Range to the northeast. In spite of some blocking effects from the mountain ranges, the valley ventilates well. This is due in part to consistent southwest winds, which average in excess of 12 mph 11% of the time.

Visibility is generally good in Pocatello. Dense fog is reported on an average of 17 days per year, whereas dense smoke or haze are reported 4.1 days per year. Fog, smoke, and haze occur most frequently during the months of January, February, and December.

In the NAA, there have been two distinct meteorological scenarios that accompany air quality exceedances. In the first case, high wind speeds are prevalent. Although wind speeds with an hourly average greater than 12 mph exist only 11% of the time; 56% of the exceedances occur on these days, with the last exceedance occurring on September 21, 1991. See Table 1 on page 9 for details. The second group of exceedances takes place when atmospheric conditions are stagnant. Low wind speeds and strong ground-based inversions trap pollutants. The last exceedance of this type occurred on January 7, 1993.

Figure 2. Climate Data for Pocatello, Idaho (Source: National Weather Service, Pocatello Airport 1939-1997)

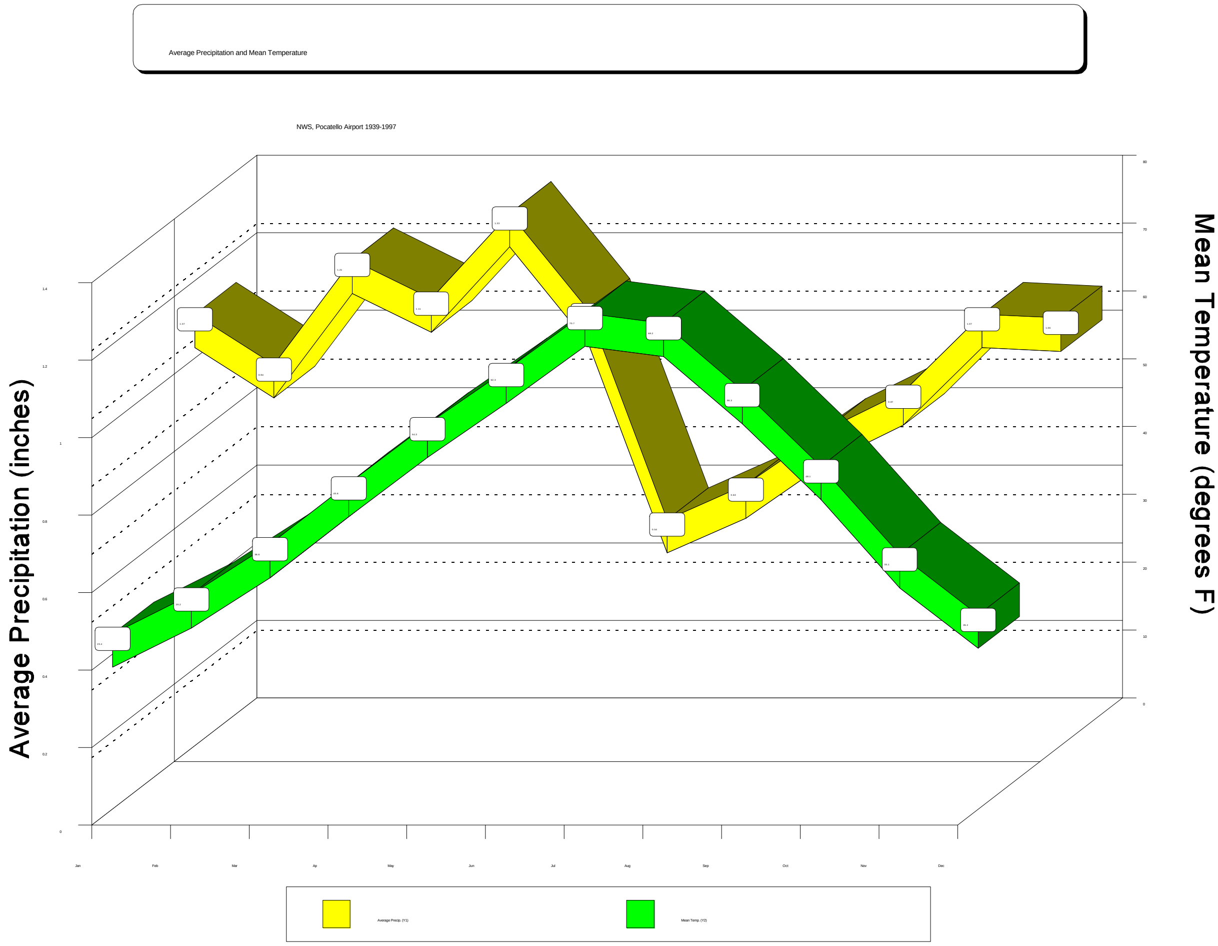


Table 1
PM_{10} Exceedances and Wind Speeds

Site	Date	PM_{10} Concentration in µg/m^3	Wind Speed > 12 mph	24-Hr Average Wind Speed
Sewage Treatment Plant	July 04, 1986	160	Yes	9.1
	August 12, 1986	160	Yes	6.9
	October 16, 1988	171	Yes	15.4
	October 22, 1988	169	Yes	12.9
	October 26, 1988	159	Yes	12.6
	October 11, 1989	167	Yes	13.5
	November 08, 1989	168	Yes	9.8
	January 21, 1990	165	No	3.6
	October 02, 1990	259	Yes	15.4
	September 21, 1991	182	Yes	16.6
Idaho State University	January 28, 1989	181	No	3.1
	January 7, 1993	232	No	5.2
Garrett & Gould	January 7, 1993	204	No	5.2

Source: Source Apportionment Analysis of the Pocatello Nonattainment Area (OMNI Environmental Services Inc., 1991).

The National Weather Service maintains a weather station at the Pocatello Airport, near the northwest end of the NAA. Meteorological data collected at the airport include pressure, temperature, wind speed and direction, relative humidity, precipitation, cloud cover, and visibility. Since they are gathered at an official National Weather Service meteorological site, the data is subject to standardized quality-control procedures. Upper atmospheric measurements are gathered at Salt Lake City, Utah, located about 150 miles south of Pocatello.

IDEQ operates a multi-faceted monitoring station at the Garrett and Gould site in Pocatello. At this site, IDEQ installed a meteorological station, a nephelometer and a PM_{10} monitor in December of 1990. The station passed final quality assurance procedures in early 1991. The parameters being measured are wind speed, wind direction, temperature, solar radiation, and stability. Additional PM_{10} monitors were added in October 1994 and a 1200-A tapered element oscillating microbalance (TEOM) was installed at this site in October 1995. A TEOM is a continuous sampler for PM_{10}.

II. Ambient Air Quality

Monitoring Methods

Air quality monitoring has been conducted since 1986 in the Pocatello area to characterize problems and support air quality improvement planning and analysis. IDEQ has continued this practice and engaged in special studies.

In anticipation of the 1987 change of the State and Federal National Ambient Air Quality Standards (NAAQS) from Total Suspended Particulate (TSP) to Particulate Matter $\leq$ 10 microns (PM_{10}), the IDEQ initiated PM_{10} monitoring in 1986. Table 2 presents a summary of air monitoring history in the area.

Table 2
Particulate Monitoring History

Particulate Type: PM_{10}	**Years Operated**
Sewage Treatment Plant (Batiste & Chubbuck Road)	1986-Present
Idaho State University (Carter & Eighth Street)	1988-Present
Chubbuck School (5045 Hawthorne Road)	1988-Present
Garrett & Gould	1990-Present

Source: Pocatello PM_{10} Data Summary, Idaho Division of Environmental Quality, July, 1992.

State and Local Air Monitoring Sites

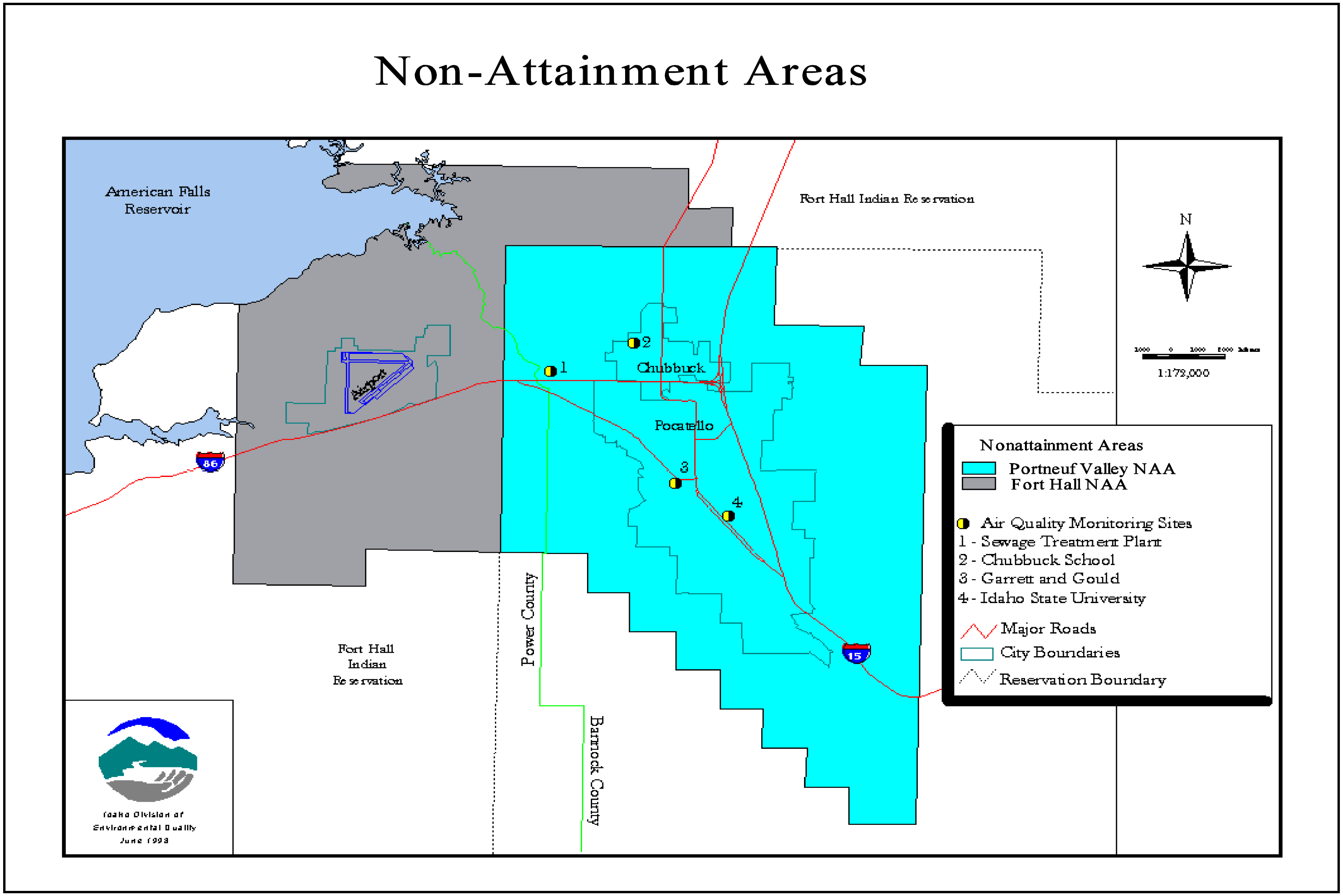
Primary PM_{10} monitoring has expanded from three monitoring sites to four sites in Pocatello and Chubbuck. Historical sites are located at the Pocatello Sewage Treatment Plant (PSTP), Chubbuck School (CS), and Idaho State University (ISU). An additional site was established in 1990 at the intersection of Garrett and Gould (G&G). See Figure 3.
IDEQ has enacted a vigorous monitoring schedule, to adjust to seasonal changes within the area. Through the months of April to October, monitoring occurs once every six days (1:6) at sites G&G, ISU, and CS and every other day at the PSTP site until the 4th quarter of 1994. At that time everyday sampling (1:1) was started at PSTP, ISU, and G&G. During the 3rd quarter of 1997, the schedule was reduced to 1:6 for 2nd and 3rd quarter at ISU and G&G and 1:1 for the 4th and 1st quarters at ISU and G&G. In January 1998, the schedule for PSTP was changed to once every third day (1:3) year-round.

Current Monitoring Schedule

PSTP	**1:3 year-round**
CS	**1:6 year-round**
ISU	**1:1 1st and 4th Quarters**
ISU	**1:6 2nd and 3rd Quarters**
G&G	**1:1 1st and 4th Quarters**
G&G	**1:6 2nd and 3rd Quarters**

The four stations have collected data from 1986 to present and are subject to strict quality-assurance standards. These stations use the EPA Federal Reference Method equipment and regulations for determining the areas' compliance with the NAAQS. The sites have been approved by the EPA for inclusion in the State's overall monitoring network and are designated as State and Local Air Monitoring Sites (SLAMS).

Figure 3. Nonattainment Areas and Monitoring Sites



Special Studies

In addition to the SLAMS network, two special studies were conducted in the Pocatello area, the Road Dust Study and the Dichotomous Sampler Study. A third special study was also conducted to determine secondary aerosol contributions to PM_{10}.

Pocatello Road Dust Study

The intention of this study was to develop an equation to determine PM_{10} and $PM_{2.5}$ emissions, due to vehicular travel on paved roads and to obtain silt loadings. It improved on the original AP-42 procedures by determining the importance of each variable in the equation and using local variables in their place. Two equations were developed for estimating $PM_{10,}$ one for roads within an industrial setting, and one for roads in a non-industrial area. It was determined that the local silt loading factors showed a reduction from the original AP-42 derived factors. These new silt loading factors were used to calculate the revised emission inventory in this plan, however, the equations were not. $PM_{2.5}$ values were not modified due to limited data and the variability in the results.

The Pocatello Road Dust Study was conducted by the Bannock Planning Organization, along with the city, county, state transportation and the IDEQ. The study consisted of collecting silt loading samples for one year and a one-time profile analysis on three different roads. The first part of the study consisted of collecting 12 consecutive, monthly silt loading samples. Each sample was from nine different sites during October 1996 through September 1997. The second part of the study was the full-scale profiling of actual PM_{10} using high-volume samplers. The one time profile analysis was done April 6-17, 1997. This part of the study employed the services and equipment of Midwest Research Institute (MRI). In addition, a limited profile analysis for $PM_{2.5}$ was conducted using Rupprecht and Patashnick (R&P) $PM_{2.5}$ partisol samplers. April was chosen for the profile analyses, as it tends to be the time of year when the roads contain the highest silt loadings due to winter road sanding. For reference, a complete report of the Pocatello Road Dust Study is in Appendix E under Special Studies.

The Dichotomous Sampler Study

A Sierra Instruments Inc. dichotomous sampler was operated at the PSTP SLAMS site during 1987-1988. This unit separated airborne particulate into fine (< 2.5Fm) and coarse (2.5-10.0Fm) fractions. Information on the fraction of large and small particle sizes indicates potential source contribution. Industrial point sources and combustion generally produce fine particles, whereas windblown dust is usually found in the coarse fraction. This dichotomous sampler was operated for short periods during the summer of 1987, and again in the winter from December 1987 to January 1988.

To further understand the significance of fine particulate, IDEQ began a special monitoring program using dichotomous samplers at G&G in January 1995. Since then, IDEQ has gravimetrically analyzed 60 samples. Fifty-two (87%) of the samples were collected between the months of December and March. The high and second high for the fine portion during this period from January 1995 to May 1997 are:

Fine high	= 45 Fg/m^3 on January 16, 1997
Fine 2nd high	= 27 Fg/m^3 on January 3, 1995

The overall average for the fine portion collected in 1995, 1996, 1997 was 9Fg/m^3.
See Dichotomous Sampler Results in Appendix E under Special Studies for graphical representation of these analyses.

The Secondary Aerosol Study

The third study quantified secondary aerosol precursors and their contribution to the overall PM_{10} concentrations. The most recent exceedance of the 24-hour PM_{10} NAAQS in Pocatello occurred on January 7, 1993. This violation and subsequent analysis of the data confirmed that secondary aerosols of ammonium nitrate and ammonium sulfate were significant contributors to PM_{10} levels. The amounts of these compounds on the filters suggest that primary as well as secondary aerosol generating mechanisms were active during that day. These results and other filter analyses have shown that secondary aerosol mechanisms can be active under certain atmospheric conditions in Pocatello. Understanding the formation mechanisms is the key to discovering how to control such pollutants. As such, control measures for secondary aerosol precursors are not yet available. Although, there are general theories explaining the environmental and chemical mechanism conducive to secondary aerosol formation, experimental proof and conclusive evidence of these theories are still being researched. In order to address this issue, IDEQ in conjunction with Western States Air Resources Council (WESTAR), sought proposals from experts in the secondary aerosol field to research this problem. Those proposals are detailed in the WESTAR Council Secondary Aerosol Workshop Proceedings publication in Appendix D. IDEQ opted to implement the proposal from Dr. Judy Chow and Dr. John Watson of the Desert Research Institute (DRI) to conduct a secondary aerosol study based on input from IDEQ technical staff.

Objective

The objective of the study was to determine the magnitude of the secondary aerosol impacts and to identify possible control measures.

Methodology

The proposed methodology was to monitor atmospheric concentrations of oxides of nitrogen (NO_x), sulfur dioxide (SO_2), and nitric acid (HNO_3) precursors. Denuders were used to distinguish between the gas and the particle phase concentrations of these pollutants. These denuders are identified as ammonia and total nitrate denuders. Pollutant samples are acquired through a Teflon-coated inlet and plenum. Each contain a bundle of aluminum oxide treated rods between the inlet and the plenum to remove nitric acid gas from the air stream. One unit has a parallel plate denuder using citric acid impregnated glass fiber filters for plates to remove ammonia gas from the sample stream. All surfaces in the air stream are Teflon coated to minimize absorption of nitric acid and ammonia gas. With this information and chemical filter analysis, it is possible to estimate the percentage of available gaseous precursors that were converted to particulate. This data could then be simulated using a speciated rollback model to evaluate possible control scenarios. Speciated rollback modeling was not conducted. For additional details, see CMB Receptor Modeling / Pocatello Special Winter Study in Appendix D.

An overview of the monitoring/sampling activities
Equipment used for the secondary aerosol study included nitrogen oxide (NO), nitrogen dioxide (NO_2), oxides of nitrogen (NOx), sulfur dioxide (SO_2), and ozone (O_3) ambient samplers, sequential filter samplers, and sequential gas samplers. The equipment was located at two pre-existing state monitoring sites: the Pocatello Sewage Treatment Plant (PSTP) site and the Garrett and Gould (G&G) site. Equipment was operated for a total of eight days in the months of January and February, 1995. Collocated dichotomous samplers were also operating with both teflon and quartz filters. The existing PM_{10} samplers were operated on an every day sampling schedule at G&G, ISU, and PSTP. The IDEQ staff monitored the weather conditions and predicted the appropriate sampling times. Predictions were made based upon nephelometry and meteorological conditions. The data was collected from a 10 meter meteorological tower and sodar, which measures density differences within the atmosphere. The PSTP and G&G sites acted as the denuder sites. The denuders were operated for approximately six hour intervals under winter inversion conditions when aerosol formation was likely to occur. The denuders sampled for ammonia, SO_2, and nitric acid. A sequential filter sampler collected PM_{10} on quartz and teflon filters. Sample periods were selected to capture periods of highest PM_{10} impact on the urban area around the G&G site. Concurrently, aerosol sampling occurred at PSTP.

Through chemical mass balance analyses, chemically speciated aerosols of ammonium nitrate and ammonium sulfate were identified as major contributors to PM_{10} concentrations during winter days with PM_{10} values of 100Fg/m^3 or more. In order to further understand the exact nature of secondary formations of ammonium nitrate and ammonium sulfate, data was needed to ascertain the precursor gas involved and the role of each in the process. The data also provided information to determine which precursor gas controlled the reactions and was the "limiting gas". A limiting gas is one which is available in the free atmosphere to control the rate of reaction, and the ability to form further compounds.

Results of the analysis
The detailed data analysis revealed that on days with elevated PM_{10} levels (>120 Fg/m^3) and a high percentage of secondary aerosols (>16%), certain meteorological patterns were consistently found. Typical patterns are relative humidity greater than 70%, low winds, and limited mixing. Weather observations on these days invariably showed conditions of fog, smoke, and/or haze. Work by Watson et al., 1988: The 1987-88 Metro Denver Brown Cloud Study Vol.III: Data Interpretation, states that above 75% relative humidity, the reaction mechanisms take a different path for conversion of primary gases to secondary particulate. The aqueous phase conversion rates are 10-100 times greater than those for gas phases; therefore, the data clearly shows these occurrences to be essentially a wintertime phenomena most likely to occur in January. Recognizing that wintertime was predominately the problem period for secondary aerosol formation in the urban portion of the NAA; controlling SO_2 seemed to be the most effective approach in reducing the secondary aerosol formations. See CMB Receptor Modeling / Pocatello Special Winter Study in Appendix D.

Results of the study also show that the area atmosphere is ammonia rich during aerosol events. The February 6, 1995 sample period of 0600 hours to 1200 hours was the period of highest overall PM_{10} and the highest ammonium sulfate formation in the study. The period had a 6-hour average PM_{10} concentration of 157Fg/m^3, with ammonium sulfate accounting for 79Fg/m^3 and ammonium nitrate accounting for 12Fg/m^3 of the total PM_{10}. The ammonia denuder sequential gas sampler showed ammonia and ammonium levels for this period at 38Fg/m^3. The continuous gas samplers showed SO_2 and NOx levels to be 1part per billion (ppb) and 139 part per billion (ppb) respectively for the 6-hour period. The 1ppb of SO_2 equals the annual average for SO_2 at G&G indicating that SO_2 was fully converted while excess ammonia and ammonium remained.

Even though the high humidity and stagnation conditions caused a dramatic increase in the secondary particulate formation during the course of the study, these pollutants were not sufficient enough to cause an exceedance of the PM_{10} NAAQS. However, studies by EPA and other agencies reveal that secondary aerosols play a significant role in the formation of $PM_{2.5}$. Since PM_{10} and $PM_{2.5}$ are fundamentally different pollutants based on formation, dispersion mechanisms, and health effects; it is appropriate to address secondary aerosols under the $PM_{2.5}$ standards. If further monitoring substantiates the role of secondary aerosols in $PM_{2.5}$ exceedances, secondary aerosols and their controls will be assessed at that time. Nevertheless, Pocatello and Chubbuck stations will utilize PM_{10} samplers, SO_2, NO_2, O_3 analyzers, nephelometer, and/or denuders to continue to monitor for these gases to be certain that secondary aerosols do not become a $PM_{2.5}$ problem.

Further Meteorological Analysis on Frequency of Aerosol Events
In order to estimate the frequency of high PM_{10} aerosol events, multi-variable meteorological conditions were analyzed for the months of January, February, and December to determine the frequency of aerosol events in the Pocatello area. As cited in the WESTAR Secondary Aerosol Proceedings, meteorological factors do effect aerosol formation. For further detailed information on the frequency of aerosol events, see <u>Multi-Variable Meteorological Analysis of Frequency of Aerosol Events in Pocatello</u> in Appendix D.

<u>Air Quality Data</u>

<u>Exceedances of the National Ambient Air Quality Standards</u>

In October 1994, PM_{10} monitoring frequency was increased to daily monitoring at all State monitoring sites in the PVNAA that had recorded past exceedances of the 24-hour NAAQS. These three sites were: PSTP, ISU, and G&G. Twelve exceedances of the 24-hour standard of 150Fg/m^3 have been recorded in the NAA since 1986, primarily during late summer and fall. Three of these exceedances were recorded under air stagnation conditions: on December 12, 1989, at the ISU site; on January 21, 1990 at PSTP; and on January 7, 1993 at G&G and ISU.

The 24-hour NAAQS for PM_{10} is in a statistical format of expected exceedances over a three year period. Traditionally, actual sampling does not occur every day at the State and Local Air Monitoring

Sites (SLAMS), so the number of days with measured values above the standard must be adjusted to account for days that were not sampled. For example, if a monitor sampled once every six days and there was one measurement above the level of the NAAQS, then the number of days expected to be above the NAAQS in that year would be six. The NAAQS also requires that the expected number of exceedances be averaged over a three year period. For example, three exceedances of the NAAQS on an everyday sampling frequency with zero exceedances for the next two years equals NAAQS compliance.

An analysis of PM_{10} data shows that there have been no violations or exceedances of the 24-hour NAAQS at any of the stations since January 1993. See Table 3 for details. Furthermore, since 1996 all SLAMS have had a 24-hour PM_{10} NAAQS attainment demonstration number equal to 0.0 for the area under State jurisdiction. Appendix E contains the data necessary to demonstrate attainment status.

The annual NAAQS requires that the yearly average of the 24-hour measurements over a three year period is less than 50Fg/m^3. Table 4 presents the annual air quality data for the four SLAMS. An exceedance of the annual NAAQS occurred at the PSTP in 1990, but from 1991 to present, the annual standard has been attained at all state PM_{10} sites.

PM_{10} continues to be monitored at each of these sites; no violations were recorded during the year 1997. The probability of violating the NAAQS under the 1988 standard is demonstrated by data (See Appendix E) which documents that the PVNAA has achieved attainment as a result of implementing RACT/RACM on the major sources located in the State's jurisdiction.

TABLE 3
24-hour PM_{10} Maximums and Exceedances

PSTP Site 24 hr. PM_{10} Data Summary

YEAR	**# OF SAMPLES**	**# SAMPLES >150 UG/M³**	**MAX. CONC UG/M³ (DATE)**	**2ND MAX UG/M³ (DATE)**	**YEARLY EXPECTED # EXCEEDANCES**	**YEARLY ESTIMATED # EXCEEDANCES**
1988	106	3	171 (10/16)	159 (10/22)	6.3	
1989	178	2	168 (11/8)	167 (10/11)	4.2	
1990	171	2	259 (10/2)	165 (1/21)	4.1	4.9
1991	143	1	182 (9/21)	121 (6/11)	2.1	3.5
1992	129	0	150 (10/13)	142 (8/22)	0.0	2.1
1993	172	0	109 (9/30)	90 (1/11)	0.0	0.7
1994	224	0	88 (8/8)	86 (9/3)	0.0	0.0
1995	351	0	66 (11/6)	64 (7/29)	0.0	0.0
1996	353	0	89 (8/30)	87 (9/4)	0.0	0.0
1997	306	0	149 (1/10)	89 (3/23)	0.0	0.0

ISU Site 24 hr. PM_{10} Data Summary

YEAR	**# OF SAMPLES**	**# SAMPLES >150 UG/M³**	**MAX CONC. UG/M³ (DATE)**	**2ND MAX UG/M³ (DATE)**	**YEARLY EXPECTED # EXCEEDANCES**	**YEARLY ESTIMATED # EXCEEDANCES**
1989	63	1	181 (1/28)	137 (12/1)	6.0	
1990	79	0	69 (1/19)	64 (8/4)	0.0	
1991	61	0	133 (1/6)	99 (2/1)	0.0	2.0
1992	47	0	100 (8/22)	94 (10/21)	0.0	0.0
1993	56	1	232 (1/7)	120 (1/31)	6.9	2.3
1994	158	0	138 (12/21)	123 (1/20)	0.0	2.3
1995	355	0	81 (2/6)	80 (1/2)	0.0	2.3
1996	352	0	92 (1/31)	89 (2/1)	0.0	0.0
1997	298	0	68 (1/16)	57 (6/30)	0.0	0.0

CS Site 24 hr. PM_{10} Data Summary

YEAR	# OF SAMPLES	# SAMPLES >150 UG/M_3	MAX CONC. UG/M^3 (DATE)	2ND MAX UG/M^3 (DATE)	YEARLY EXPECTED # EXCEEDANCES	YEARLY ESTIMATED # EXCEEDANCES
1988	45	0	78 (9/6)	72 (7/26)	0.0	
1989	61	0	120 (1/28)	83 (2/15)	0.0	
1990	63	0	145 (10/2)	124 (1/23)	0.0	0.0
1991	52	0	122 (9/21)	99 (1/6)	0.0	0.0
1992	43	0	126 (8/22)	124 (8/28)	0.0	0.0
1993	61	0	119 (1/31)	107 (1/7)	0.0	0.0
1994	60	0	105 (1/20)	60 (12/22)	0.0	0.0
1995	61	0	67 (10/18)	60 (1/3)	0.0	0.0
1996	59	0	52 (8/31)	44 (2/15)	0.0	0.0
1997	61	0	54 (4/4)	41 (10/22)	0.0	0.0

G&G Site 24hr. PM_{10} Data Summary

YEAR	# OF SAMPLES	# SAMPLES >150 UG/M_3	MAX CONC. UG/M^3 (DATE)	2ND MAX UG/M^3 (DATE)	YEARLY EXPECTED # EXCEEDANCES	YEARLY ESTIMATED # EXCEEDANCES
1991	60	0	135 (1/4)	106 (9/21)	0.0	
1992	46	0	80 (8/4)	69 (8/10)	0.0	
1993	59	1	204 (1/7)	105 (3/2)	6.0	2.0
1994	125	0	128 (1/20)	114 (12/21)	0.0	2.0
1995	349	0	97 (2/6)	91 (1/2)	0.0	2.0
1996	345	0	107 (2/1)	89 (2/13)	0.0	0.0
1997	290	0	92 (6/30)	61 (1/16)	0.0	0.0

Yearly expected # of exceedances includes exceptional events.
Estimated # of exceedances = Average of previous 3 years expected #.

Table 4

Annual PM_{10} Concentrations

SITE	YEAR	ANNUAL AVERAGE	3-YEAR AVERAGE
PSTP	1986	53.6 µg/m^3	N/A
	1987	43.4	N/A
	1988	53.6	50µg/m^3
	1989	53.3	50
	1990	46.4	51
	1991*	45.5	48
	1992	52.7	48
	1993	35.7	45
	1994	34.5	41
	1995	27.0	32
	1996	31.1	31
	1997	28.4	29
ISU	1989	30.0 µg/m^3	N/A
	1990	21.9	N/A
	1991*	30.5	28 µg/m^3
	1992*	34.3	29
	1993	36.9	34
	1994	24.9	32
	1995	23.1	28
	1996	22.5	24
	1997	19.8	22
CS	1988*	31.8 µg/m^3	N/A
	1989	34.8	N/A
	1990	30.9	33 µg/m^3
	1991*	28.5	31
	1992*	41.8	34
	1993	35.7	35
	1994	27.9	35
	1995	22.1	29
	1996	22.5	24
	1997	21.1	22
G&G	1991*	32.1 µg/m^3	N/A
	1992*	37.9	N/A
	1993	39.4	36 µg/m^3
	1994	30.5	36
	1995	23.2	31
	1996	24.4	26
	1997	19.8	22

* Year does not meet summary criteria for representative data

Demonstration of Attainment

No violations or exceedances of the 24-hour PM_{10} NAAQS have occurred on the State's monitoring system since January 7, 1993. The data from the State's monitoring system shows 19 consecutive calendar quarters of clean data for the PVNAA. See Table 5.

Figure 4 on page 29 illustrates annual average trends from 1988-1997. The last, and only, violation of the annual PM_{10} NAAQS in the PVNAA occurred in 1990 at the Pocatello Sewage Treatment Plant (PSTP). All other annual data reports document concentrations well below the expected annual mean PM_{10} NAAQS.

An analysis of PM_{10} data shows that there have been no exceedances or violations of the 24-hour PM_{10} NAAQS at any of the SLAMS since January 7, 1993. Furthermore, all SLAMS have had a 24-hour PM_{10} NAAQS attainment demonstration number of 0.0, demonstrating attainment of the 24-hour PM_{10} NAAQS for the Portneuf Valley area. Tables 6,7,8, and 9 illustrate the three year average attainment demonstration numbers from 1988 to the present for each state monitoring site. This has been calculated using the quarterly expected number of exceedances for PM_{10} monitoring sites at Chubbuck School (CS), Pocatello Sewage Treatment Plant (PSTP), Garrett and Gould (G&G) and Idaho State University (ISU). The three year average attainment demonstration numbers for each site are:

1) CS = 0.0 for the period 1990-1997
2) PSTP = 0.7 for the period 1991-1993, and 0.0 for the period 1994-1997
3) G&G = 2.0 for 1993-1995, and 0.0 for 1994-1997
4) ISU = 2.3 for 1993-1995, and 0.0 for 1994-1997

PM_{10} continues to be monitored at each of these sites. No violations were recorded at any of these PM_{10} sites during the 1997 calendar year. Thus, these sites have maintained a PM_{10} attainment demonstration number equal to 0.0, through 1997. The probability of violating the NAAQS under the 1988 standard is demonstrated by this data set which documents that the PVNAA has achieved attainment as a result of implementing RACT/RACM on the major PM_{10} sources under State jurisdiction.

The total number of 24-hour samples over 150Fg/m^3 collected in the PVNAA from 1988 to present are shown in Figure 5 on page 30. This graph shows a downward trend in the number of days over 150Fg/m^3 from a high of three days over 150Fg/m^3 measured in 1988 and 1989. This downward trend continues, interrupted only by the January 7, 1993 event, reaching and remaining at zero from 1994 to present. Figure 6 on page 31 shows this downward trend of number of days over 150Fg/m^3 per year from 1988 to 1997 as a log regression plot.

PM_{10} second maximum concentrations (values which are used in models to determine compliance with the NAAQS) for 1993 through 1997 are shown in Figures 7, 8, 9, and 10. The graphs of the urban sites (CS, G&G, and ISU) show a decreasing trend throughout this period. The graph for the industrial site (PSTP) shows a decrease until 1995, then a slight increase from 1995 through 1997. A 149Fg/m^3 concentration was measured at the PSTP site in 1997.

Table 5
PM_{10} EXCEEDANCES ON STATE MONITORS

YEAR	1st Qt.	2nd Qt.	3rd Qt.	4th Qt.
1988	0	0	0	STP(10) STP(10) STP(10)
1989	ISU(1)	0	0	STP(10) STP(11)
1990	STP(1)	0	0	STP(10)
1991	0	0	STP(9)	0
1992	0	0	0	0
1993	ISU/G&G(1)	0	0	0
1994	0	0	0	0
1995	0	0	0	0
1996	0	0	0	0
1997	0	0	0	0

A. ( ) denotes month exceedance occurred.
B. # of Exceed. in Quarter * (Days in Quart./Days Sampled)= Expected Violations for that Quarter.
C. Sum of Expected Violations for 3 consecutive years/3= Attainment Demonstration Number.
D. If Attainment Demon. Number is 1.0 or less, attainment is demonstrated.

Since the second quarter of 1993, when SIP controls were placed on all major PM_{10} sources, 1,366 PM_{10} samples were collected through December 31, 1997 at PSTP. Only this one sample came within 25% of the PM_{10} NAAQS. This equates to 0.07% of the 1,366 PM_{10} samples that were in the range of 112Fg/m^3 to 150Fg/m^3 and none exceeded the PM_{10} NAAQS. The other 99.93% of the samples remained under 112Fg/m^3. This value did not exceed the 24-hour PM_{10} NAAQS and appeared to be an outlier, therefore it was not indicative of the overall trend of improved air quality measured at the State monitors. Presently, all data remain significantly under the PM_{10} 24-hour NAAQS. Figure 11 shows yearly annual averages for each site in the PVNAA. The graph also shows a convergence of values in 1993 and a decreasing trend from that point onwards.

Background Contribution

The amount of particulate matter in ambient air will never equal zero due to naturally occurring air pollution. In some areas background particulate levels would exist even if humans did not occupy the area. Typically, this background particulate is a combination of windblown plant and insect debris, mineral soil, plant pollen, and even smoke from wildfires. In the context of the document, it also reflects particulate matter generated by sources outside the nonattainment area and transported into the nonattainment area.

In order to determine the appropriate background concentration level for the NAA, a review of recent monitoring data in southeast Idaho was conducted. Measurements were taken at Craters of the Moon, located 50 miles northwest of the NAA. Based on these measurements a regional background level was determined.

Total suspended particulate matter (TSP) measurements were taken at Craters of the Moon from 1958 through 1990. Review of TSP data (1986-1990) revealed mean daily concentrations of approximately 16Fg/m^3. Assuming that PM_{10} levels are 50% of the measured TSP values, a corresponding mean daily PM_{10} level of 8Fg/m^3 is estimated for Craters of the Moon. Minimum PM_{10} levels measured during the saturation studies at locations within the NAA, averaged approximately 13Fg/m^3. These levels, which would be indicators of an upper-bound of background levels are generally consistent with the measurements taken at Craters of the Moon.

Based on the data reviewed, a level of 10Fg/m^3 was selected to represent both the 24-hour and the annual background levels, because the long-term data record showed minor variation in the measured levels.

Table 6 - EXPECTED EXCEEDENCES
Sewage Treatment Plant Vg (Ng/ng) = eq

Year	*Qtr*	*Vg*	*Ng*	*ng*	*eq*	*4 qtr*	*3 yr*
1988	1	0	91	14	0		
	2	0	91	26	0		
	3	0	92	22	0		
	4	3	92	44	6.27	6.27	
1989	1	0	90	44	0		
	2	0	91	45	0		
	3	0	92	45	0		
	4	2	92	44	4.18	4.18	
1990	1	1	90	43	2.09		
	2	0	91	39	0		
	3	0	92	44	0		
	4	1	92	45	2.04	4.13	4.86
1991	1	0	90	39	0		
	2	0	91	28	0		
	3	1	92	43	2.13		
	4	0	92	33	0	2.13	3.48
1992	1	0	91	30	0		
	2	0	91	38	0		
	3	0	92	35	0		
	4	0	92	26	0	0	2.08
1993	1	0	90	40	0		
	2	0	91	46	0		
	3	0	92	45	0		
	4	0	92	41	0	0	.71
1994	1	0	90	43	0		
	2	0	91	46	0		
	3	0	92	45	0		
	4	0	92	90	0	0	0
1995	1	0	90	88	0		
	2	0	91	87	0		
	3	0	92	90	0		
	4	0	92	86	0	0	0
1996	1	0	91	90	0		
	2	0	91	89	0		
	3	0	92	88	0		
	4	0	92	86	0	0	0
1997	1	0	90	87	0		
	2	0	91	73	0		
	3	0	92	64	0		
	4	0	92	82	0	0	0

eq = estimated number of exceedences
Vg = observed number of exceedences
Ng = number of days in quarter
ng = number of days in quarter with observed PM_{10} data

Table 7 - Idaho State University Vg (Ng/ng) = eq

Year	*Qtr*	*Vg*	*Ng*	*ng*	*eq*	*4 qtr*	*3 yr*
1988	1	-	-	-			
	2	-	-	-			
	3	-	-	-			
	4	0	92	9	0	0	
1989	1	1	90	15	6.0		
	2	0	91	15	0		
	3	0	92	15	0		
	4	0	92	18	0	6.0	
1990	1	0	90	28	0		
	2	0	91	18	0		
	3	0	92	14	0		
	4	0	92	20	0	0	0
1991	1	0	90	27	0		
	2	0	91	8	0		
	3	0	92	13	0		
	4	0	92	13	0	0	2.0
1992	1	0	91	10	0		
	2	0	91	7	0		
	3	0	92	16	0		
	4	0	92	14	0	0	0
1993	1	1	90	13	6.92		
	2	0	91	15	0		
	3	0	92	14	0		
	4	0	92	14	0	6.92	2.3
1994	1	0	90	15	0		
	2	0	91	15	0		
	3	0	92	40	0		
	4	0	92	88	0	0	2.3
1995	1	0	90	87	0		
	2	0	91	90	0		
	3	0	92	89	0		
	4	0	92	89	0	0	2.3
1996	1	0	91	89	0		
	2	0	91	90	0		
	3	0	92	87	0		
	4	0	92	86	0	0	0
1997	1	0	90	88	0		
	2	0	91	91	0		
	3	0	92	30	0		
	4	0	92	89	0	0	0

eq = estimated number of exceedences
Vg = observed number of exceedences
Ng = number of days in quarter
ng = number of days in quarter with observed PM_{10} data

Table 8 - Garrett & Gould - Vg (Ng/ng) = eq

Year	*Qtr*	*Vg*	*Ng*	*ng*	*eq*	*4 qtr*	*3 yr*
1988	1	-	-	-			
	2	-	-	-			
	3	-	-	-			
	4	-	-	-			
1989	1	-	-	-			
	2	-	-	-			
	3	-	-	-			
	4	-	-	-			
1990	1	-	-	-			
	2	-	-	-			
	3	-	-	-			
	4	0	92	15	0		
1991	1	0	90	21	0		
	2	0	91	10	0		
	3	0	91	15	0		
	4	0	92	14	0	0	
1992	1	0	91	13	0		
	2	0	91	12	0		
	3	0	92	6	0		
	4	0	92	15	0	0	0
1993	1	1	90	15	6.0		
	2	0	91	14	0		
	3	0	92	15	0		
	4	0	92	15	0	6.0	2.0
1994	1	0	90	13	0		
	2	0	91	15	0		
	3	0	92	16	0		
	4	0	92	81	0	0	2.0
1995	1	0	90	84	0		
	2	0	91	89	0		
	3	0	92	89	0		
	4	0	92	87	0	0	2.0
1996	1	0	91	90	0		
	2	0	91	83	0		
	3	0	92	85	0		
	4	0	92	87	0	0	0
1997	1	0	90	88	0		
	2	0	91	86	0		
	3	0	92	27	0		
	4	0	92	89	0	0	0

eq = estimated number of exceedences
Vg = observed number of exceedences
Ng = number of days in quarter
ng = number of days in quarter with observed PM_{10} data

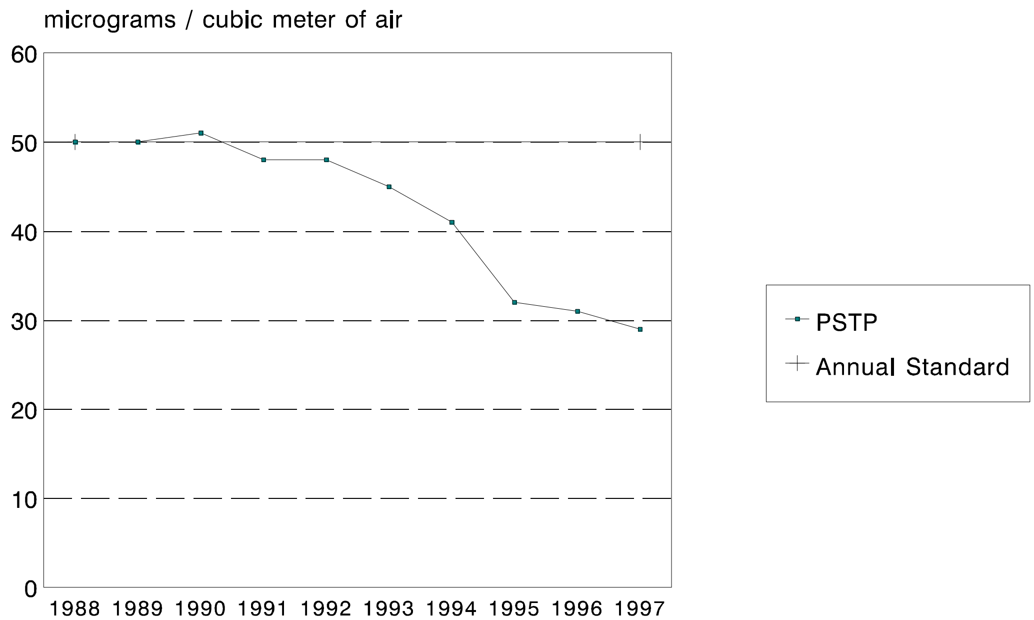
Table 9 - Chubbuck School - Vg (Ng/ng) = eq

Year	*Qtr*	*Vg*	*Ng*	*ng*	*eq*	*4 qtr*	*3 yr*
1988	1	-	91	-	0		
	2	0	91	14	0		
	3	0	92	15	0		
	4	0	92	15	0	0	
1989	1	0	90	15	0		
	2	0	91	15	0		
	3	0	92	15	0		
	4	0	92	16	0	0	
1990	1	0	90	19	0		
	2	0	91	15	0		
	3	0	92	14	0		
	4	0	92	15	0	0	0
1991	1	0	90	15	0		
	2	0	91	10	0		
	3	0	91	13	0		
	4	0	92	13	0	0	0
1992	1	0	91	14	0		
	2	0	91	12	0		
	3	0	92	13	0		
	4	0	92	4	0	0	0
1993	1	0	90	15	0		
	2	0	91	16	0		
	3	0	92	15	0		
	4	0	92	15	0	0	0
1994	1	0	90	15	0		
	2	0	91	15	0		
	3	0	92	15	0		
	4	0	92	15	0	0	0
1995	1	0	90	15	0		
	2	0	91	15	0		
	3	0	92	16	0		
	4	0	92	15	0	0	0
1996	1	0	91	15	0		
	2	0	91	15	0		
	3	0	92	16	0		
	4	0	92	13	0	0	0
1997	1	0	90	15	0		
	2	0	91	15	0		
	3	0	92	15	0		
	4	0	92	16	0	0	0

eq = estimated number of exceedences
Vg = observed number of exceedences
Ng = number of days in quarter
ng = number of days in quarter with observed PM_{10} data

Figure 4

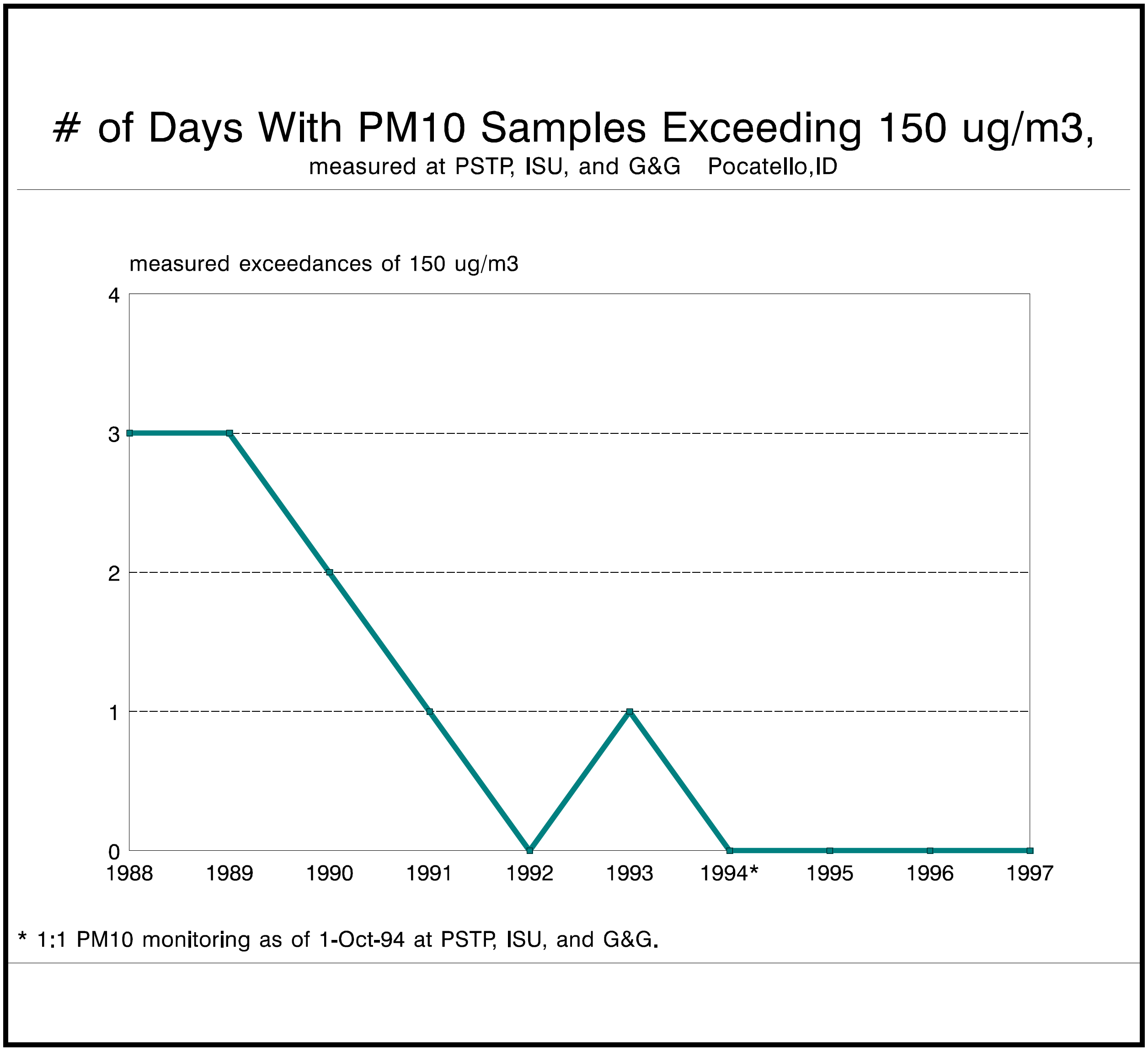
PSTP PM10 EXPECTED ANNUAL ARITHMETIC MEAN CONCENTRATIONS



	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
PSTP	50	50	51	48	48	45	41	32	31	29
Annual Standard	50									50

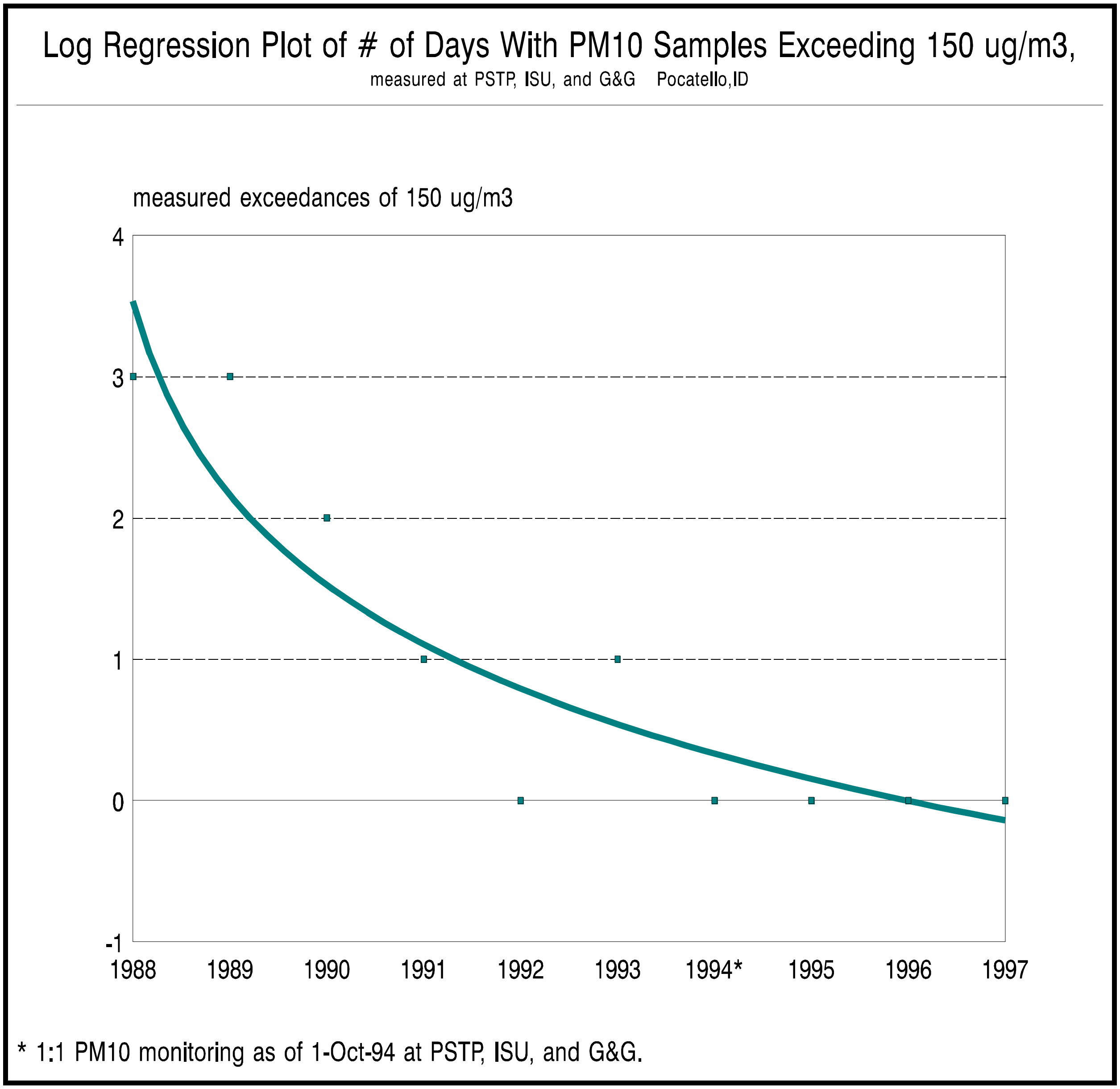
Annual average standard attainment as per CFR Pt. 50, App. K, 2.2
Fractional values equal to or greater than 0.5 are rounded up.

Figure 5



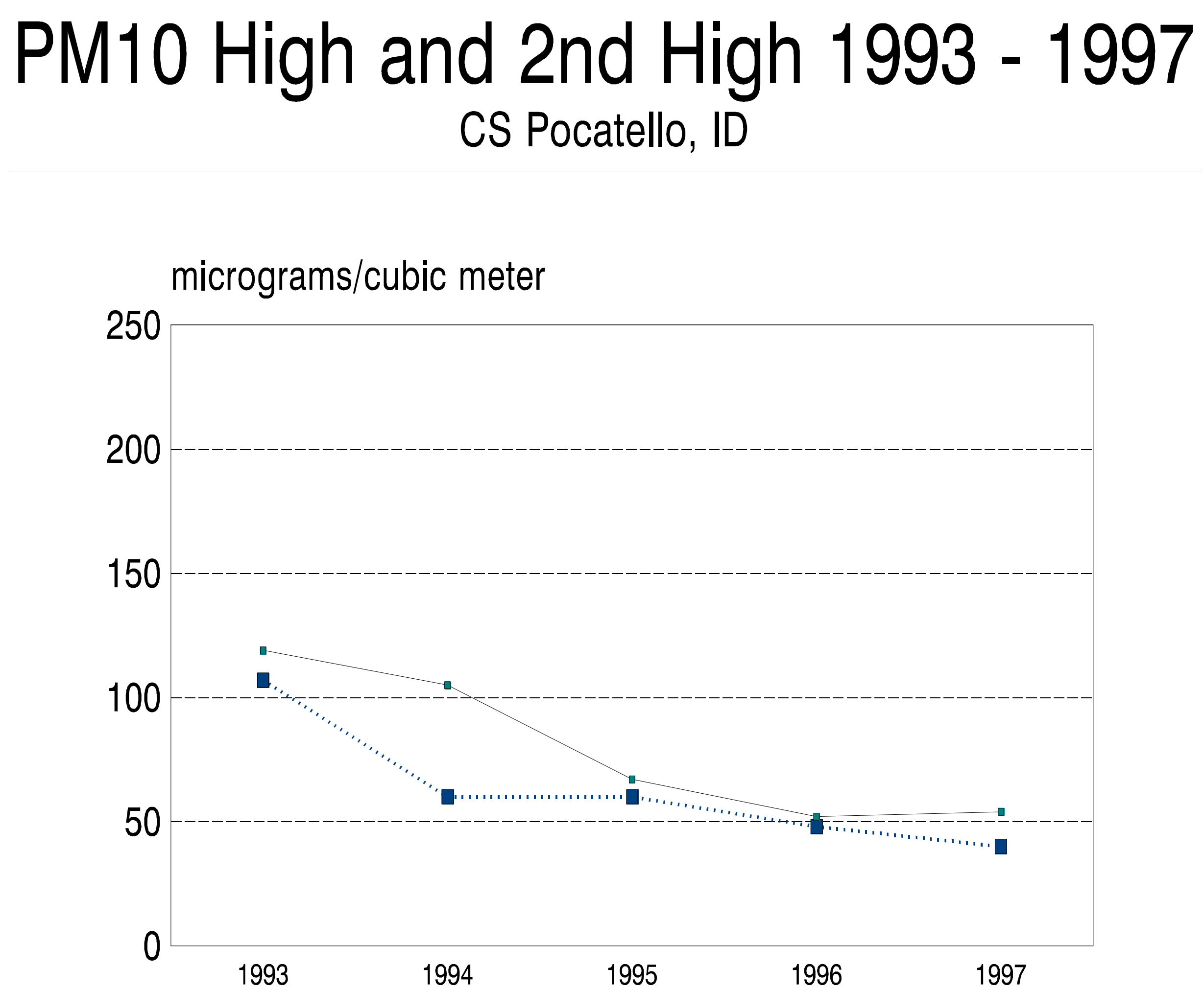
# of Days With PM10 Samples Exceeding 150 ug/m3,
measured at PSTP, ISU, and G&G Pocatello,ID
measured exceedances of 150 ug/m3
4
3
2
1
0
1988
1989
1990
1991
1992
1993
1994*
1995
1996
1997
* 1:1 PM10 monitoring as of 1-Oct-94 at PSTP, ISU, and G&G.

Figure 6



Log Regression Plot of # of Days With PM10 Samples Exceeding 150 ug/m3,
measured at PSTP, ISU, and G&G Pocatello,ID
measured exceedances of 150 ug/m3
4
3
2
1
0
-1
1988
1989
1990
1991
1992
1993
1994*
1995
1996
1997
* 1:1 PM10 monitoring as of 1-Oct-94 at PSTP, ISU, and G&G.

Figure 7

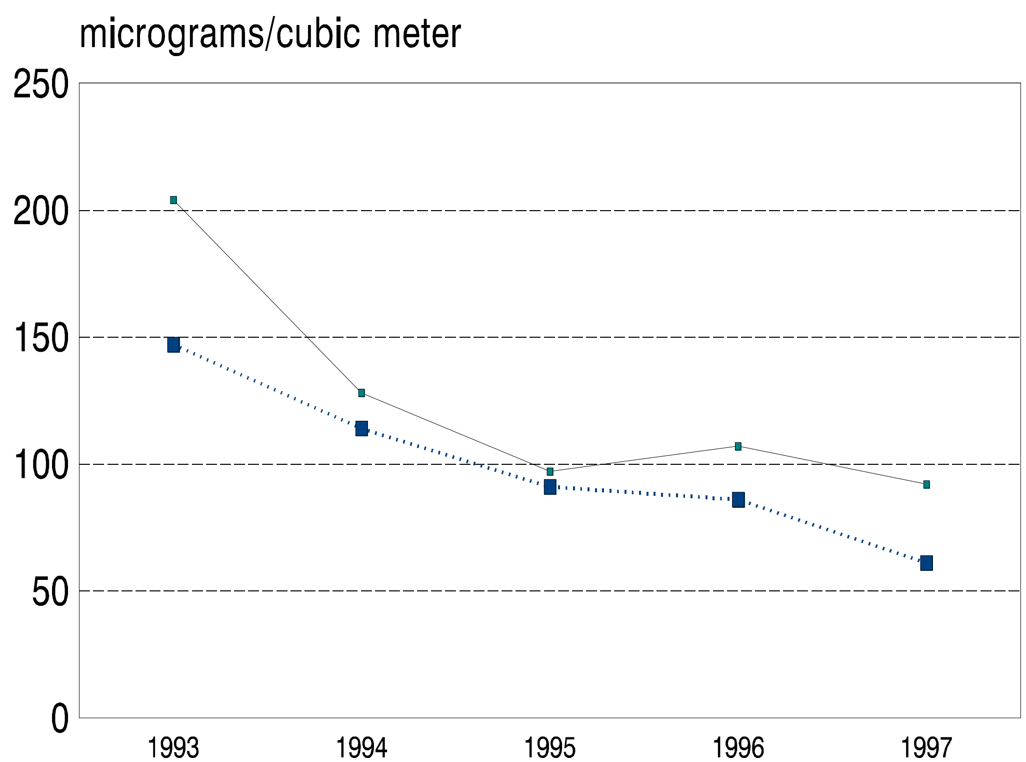


	1993	1994	1995	1996	1997
High	119	105	67	52	54
2nd High	107	60	60	48	40

Figure 8

PM10 High and 2nd High 1993 - 1997

G&G Pocatello, ID

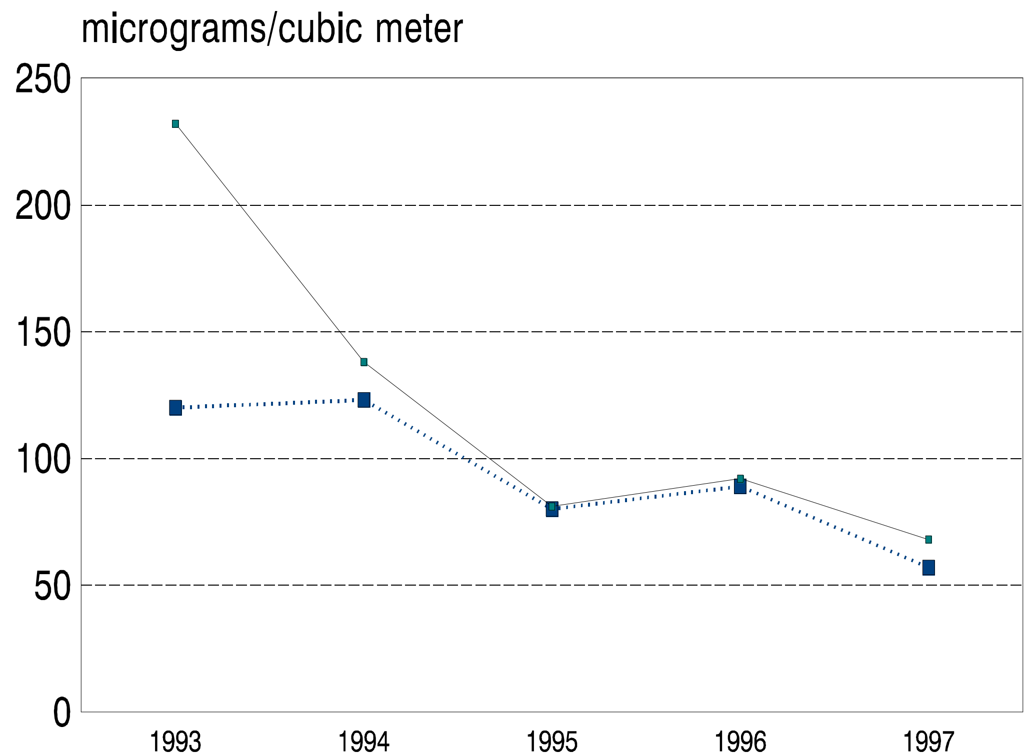


	1993	1994	1995	1996	1997
High	204	128	97	107	92
2nd High	147	114	91	86	61

Figure 9

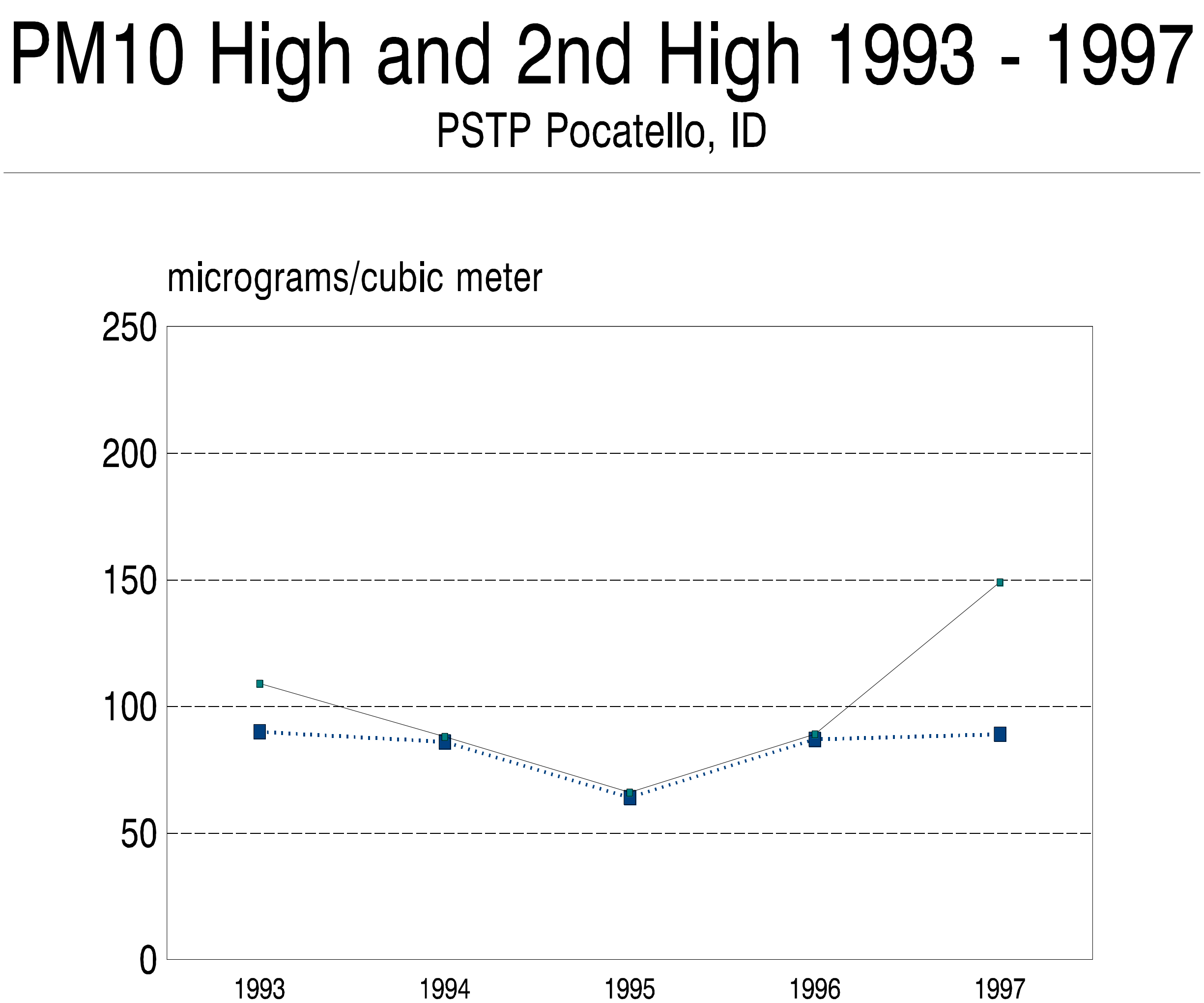
PM10 High and 2nd High 1993 - 1997

ISU Pocatello, ID



	1993	1994	1995	1996	1997
High	232	138	81	92	68
2nd High	120	123	80	89	57

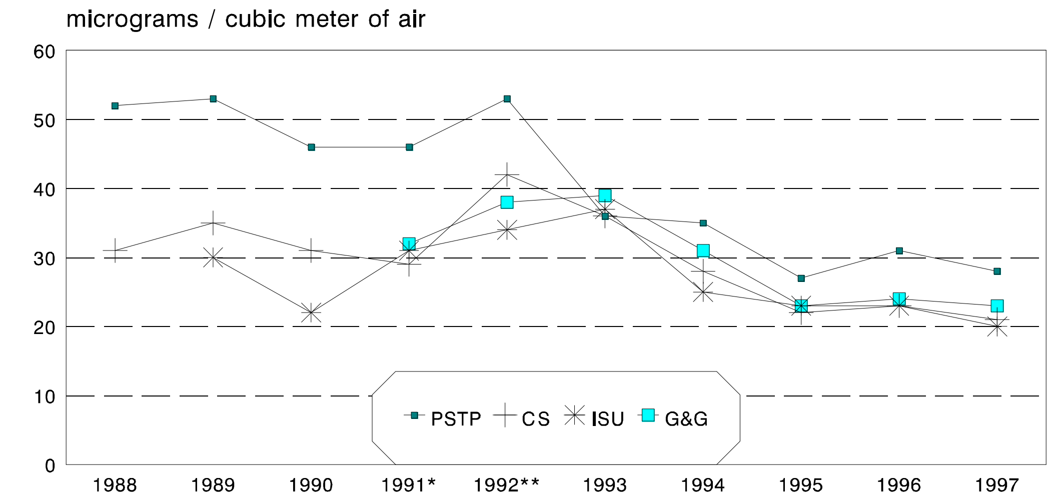
Figure 10



	1993	1994	1995	1996	1997
High	109	88	66	89	149
2nd High	90	86	64	87	89

Figure 11

PM10 ANNUAL AVERAGES



	1988	1989	1990	1991*	1992**	1993	1994	1995	1996	1997
PSTP	52	53	46	46	53	36	35	27	31	28
CS	31	35	31	29	42	36	28	22	23	21
ISU		30	22	31	34	37	25	23	23	20
G&G				32	38	39	31	23	24	23

* Data set does not meet summary criteria for 75% data completeness/quarter at STP,CS,ISU,and G&G
**Data set does not meet summary criteria for 75% data completeness/quarter at CS,ISU,and G&G
hg3\data\annav

III. Source Contribution

Emission Inventory

Introduction

An emission inventory identifies sources of PM_{10} and measures the rate emitted into an air-shed. By definition, an emission inventory is a compilation of sources and their emissions within a designated area. A working interpretation of this definition would be that an air emission inventory is a listing, by source, of all pollutants released into the atmosphere of a community. For the PVNAA, the air emission inventory is comprised of three different categories of sources: point, area, and mobile. A general definition of each, as pertains to the current inventory, is given below.

< **Point Source Emissions** are those emissions generated due to a specific process and fixed location (stationary), commonly ducted through a stack, and typically associated with industrial processes.

< **Area Source Emissions** represent air emissions from a collection of many small, unidentified points within a specified geographical area. These emissions generally constitute emissions produced from fixed locations that are too small and/or too numerous to be surveyed and characterized individually. Examples of these include, but are not limited to, residential wood combustion, agricultural emissions, and fugitive road dust.

< **Mobile Source Emissions** are a subset of the area sources, but are compiled differently. Emissions from on road and off road motor vehicles (not including fugitive road dust), aircraft, and locomotive emissions are some examples of sources in this category.

In the PVNAA air-shed, chemical analysis of the particulate matter reveals significant contributions from secondary aerosols, i.e., particulate matter resulting from chemical reactions of gaseous pollutants in the atmosphere (see Section II Special Studies and Appendix D). Measurable secondary aerosol contributions happen only under certain, infrequent meteorological conditions. As a result, the emission inventory focused on sources that emitted PM_{10} directly into the atmosphere, as well as condensible sources of PM_{10}, and secondary aerosol precursors. The point source emission inventory and the area and mobile source components are combined into one segment in Appendix F. Reports that include detailed documentation of methodology, calculations and sources of information are also included in the appendices.

The current inventory presented in this chapter meets all the requirements for a level II State Implementation Plan (SIP) inventory, per EPA guidance. This means that this inventory will provide data supportive of strategic decision making or standard setting.

Approach

The emission inventory provides information on the spatial distribution of emissions and also tracks the amount of pollutants released as a function of time. It should be noted that the inventory is performed under two major classifications: industrial, including facility inventories, and area, comprising everything not included in the industrial section. The industrial emission inventory is averaged on a short-term pounds per hour (lb/hr) basis and annual tons per year (TPY) basis. Area source emissions are averaged on an annual, daily, and wintertime daily basis. PM_{10} emission rates are expressed in terms of tons of particulate per year (TPY) or in pounds of particulate per day (lbs/day.) The winter time frame is of concern since a significant portion of the exceedances of the NAAQS from 1986 to 1993 occurred during the winter season.

Emission rates are calculated from emission factors and source activity records. Emission factors are typically obtained from the Compilation of Air Pollutant Emission Factors, Volume I: Stationary Point and the Area Sources. AP-42. Fourth Edition, September 1985, and reported as weight of the pollutant emitted per weight of material processed (e.g., grams of PM_{10} per kilogram of wood burned). Several other EPA publications, research publications, and industry recommended emission factors are also used in the compilation of these inventories.

The following activities were undertaken to compile the 1993 base year inventory for the 1998 SIP. Source activity information was obtained by a wide variety of methods such as public surveys, process log books, census data, traffic counts, and questionnaires. For example, a demographic study was conducted in the Pocatello and Chubbuck area to update the residential wood burning portion of the emission inventory. A detailed questionnaire was mailed to most of the major industries in the area to update the point sources emission inventory. The compilation of results in this document present the domain represented by the area designated as state lands (detailed in Section I). This provides consistency for making comparative analysis and subsequent planning.

1993 PBNAA SIP

Originally, emission inventories were produced for two separate time periods: a 1990 base year inventory, and a projected inventory for 1997. A base year inventory is used to represent the area's actual emissions scenario for the selected year, as closely as possible. IDEQ selected 1990 because at the time of the original SIP submittal, it represented the most recent year for complete source activity information, ambient monitoring data, and meteorological data. The Clean Air Act Amendments of 1990 require nonattainment areas to reach compliance with the ambient standard by December 31, 1994. Therefore, 1994 was selected to demonstrate attainment and 1997 was used to show that attainment will be maintained into the future.

1998 PVNAA SIP

The industrial point source emission inventory was fully revised in 1998 to reflect several administrative and technical changes. Primary among those changes were the need to quantify and understand the role of secondary aerosol precursors and their contribution to the overall PM_{10} concentrations. The inventory domain was decreased, as mentioned in the introduction, due to tribal lands being regulated by a Federal Implementation Plan, and the Inkom area being removed from the original nonattainment area due to topographical constraints to PM_{10} transport to the

PVNAA. The 1998 inventory is for the area designated as state lands and as depicted by the township-range boundaries specified in Section I.

The revised inventory addressed numerous other changes that dramatically improved the accuracy and reliability of the data. The base year for the SIP revision was changed from 1990 to 1993 to reflect substantial equipment changes and operational practices within industrial facilities, and to quantify additional sources that may contribute to secondary aerosol precursors. New emission factors, research, and several layers of quality assurance procedures were built in to the latest inventory. The inventory was then projected to 1997 and 2003, representing the attainment and maintenance years. Although projections were made to 2003, the revised analysis scope of this document required detailed analysis of only the 1997 inventory. As such, the 2003 inventory is not presented in this document but is available in IDEQ databases.

Base Year Annual Emissions

The base year will reflect PM_{10} emissions calculated for 1993 based on surveys and site visits. The 1993 base year was selected using criteria listed in the guidance for selection of the base year. 1993 represents the most recent year of emissions, meteorological, as well as ambient air quality monitoring data at the time the inventory was initiated (1995). The details of the information gathering process are described in the Industrial and the Area/Mobile sources reports in Appendix F.

The emission inventory for 1993 indicates that area sources dominate the annual emissions scenario during that year. The attached pie charts (Figure 12) indicate that there are potentially three significant sources of PM_{10} during the winter. These are fugitive road dust, residential wood combustion, and industrial. Of the area sources, roads are the single major category with 38%, with all other sources accounting for 62%. Two categories in Figure 12, report combined emission rates. The category "Mobile Sources" combined emissions from vehicle tailpipes, vehicle brake and tire wear, aircraft, and railroad locomotives. The "other areas" category combined emissions from all other area sources listed in the summary table.

These annual emissions have been “modulated” to daily and hourly values using activity factors available through facility records, operational logs, and other research. The finer details required to make the inventory model-ready have not been performed on this inventory. The inventory will have to be checked for the accuracy of coordinates and other required modeling parameters before the inventory can be classified model-ready.

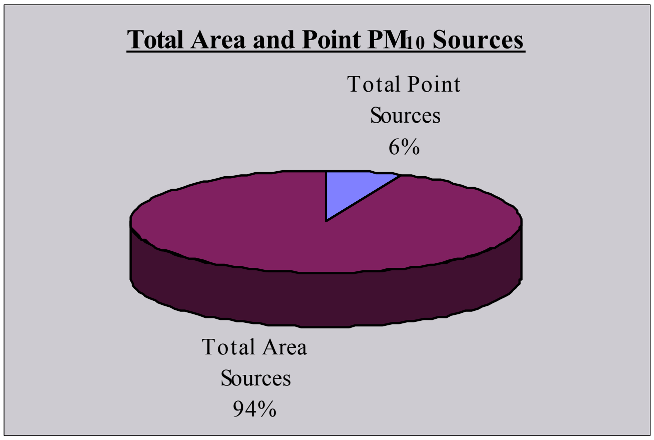
TABLE 10
1993 ANNUAL EMISSION SUMMARY FOR POINT AND AREA SOURCES

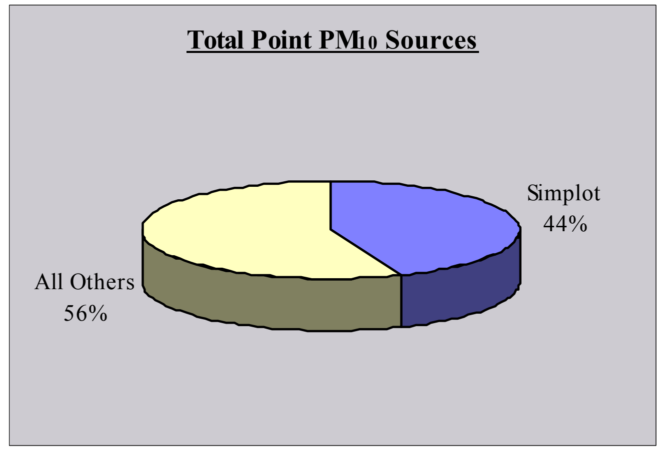
(all units are tons/year)

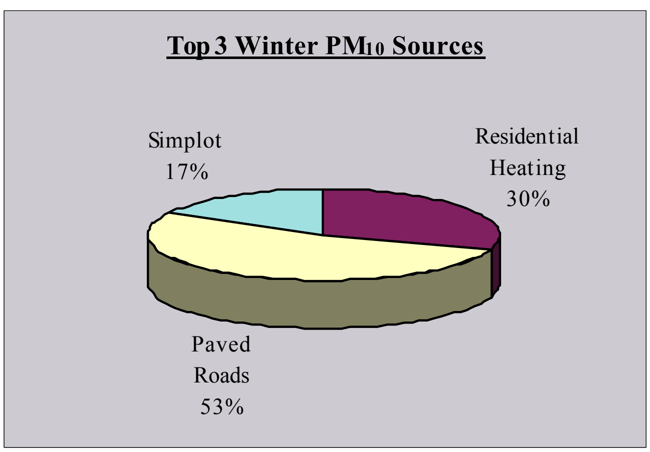
Source	PM10	PM2.5	SO2	NOx	CO	NH3
Point Sources						
Simplot	134.96	24.25	1914.86	403.26	145.46	303.41
Bannock Paving	76.05	24.71	7.04	5.53	1.27	0.09
AMI	0.41	0.41	0.02	2.86	0.60	0.01
Alpine Animal Hospital	0.01	0.01	0.01	0.01	0.01	0.00
Community Animal Hospital	0.00	0.00	0.00	0.01	0.00	0.00
Dal-Tile	1.89	0.61	0.01	2.12	0.47	0.01
Dykes Electric	0.05	0.03	0.00	0.12	0.02	0.00
General Mills - Pocatello	9.47	0.63	0.00	0.00	0.00	0.00
Great Wester Malting	13.92	2.49	18.09	16.97	4.22	0.39
Hunziker Construction	5.96	2.06	1.26	1.64	1.45	0.00
Idaho State Univ.	15.91	2.88	58.56	42.51	2.91	0.12
JK Merrill #30	1.03	0.28	0.00	0.00	0.00	0.00
Kerly Ag.	0.01	0.01	0.98	0.28	0.07	1.02
McNabb Grain	2.50	0.19	0.00	0.00	0.00	0.11
Monroc Concrete Plant	1.10	0.32	0.00	0.10	0.02	0.00
Monroc Aggregate Plant	2.00	0.90	0.00	0.00	0.00	0.00
Pocatello Medical Center	0.24	0.19	0.22	1.35	0.57	0.00
Pocatello Ready Mix	2.52	0.79	0.00	0.05	0.01	0.00
Union Pacific RR	30.94	24.48	49.25	260.11	80.02	2.91
Weight Watchers	9.49	3.93	0.04	7.92	2.46	0.09
Area Sources						
Agricultural Tilling	375.93	179.01	0.00	0.00	0.00	0.00
Agricultural Harvesting	0.07	0.00	0.00	0.00	0.00	0.00
Windblown Dust (non ag)	492.24	196.90	0.00	0.00	0.00	0.00
Windblown Dust (ag)	893.81	357.52	0.00	0.00	0.00	0.00
Livestock Emissions	0.00	0.00	0.00	0.00	0.00	18.19
Landfill Emissions	27.27	4.09	0.00	0.00	0.00	0.00
County/State Storage Piles	0.25	0.08	0.00	0.00	0.00	0.00
Municipal Waste Treatment Facility	0.00	0.00	0.00	0.00	0.00	69.35
Residential/Commercial Const.	175.28	0.00	0.00	0.00	0.00	0.00
Residential Heating	236.76	35.50	144.13	118.16	2074.21	0.78
Commercial Heating	10.92	1.64	109.30	1053.18	417.74	0.57
Fires	362.72	54.40	0.00	72.18	2722.67	0.00
Fertilizer Application	0.00	0.00	0.00	0.00	0.00	174.96
Human Emissions	0.00	0.00	0.00	0.00	0.00	18.56
Road Construction	141.78	21.26	0.00	0.00	0.00	0.00
Aircraft Emissions	1.01	0.03	1.41	2.23	87.87	0.00
Agricultural Equipment	2.21	2.03	1.43	14.49	5.92	0.00
Railroad Emissions (area)	29.70	4.45	67.71	439.52	154.43	1.13
Brakes	5.51	2.12	0.00	0.00	0.00	0.00
Tire Wear	3.76	1.58	0.00	0.00	0.00	0.00
Unpaved Roads	1299.92	342.29	0.00	0.00	0.00	0.00
Paved Roads	419.13	211.20	0.00	0.00	0.00	0.00
Mobile Exhaust	37.99	34.23	47.38	1216.63	11212.05	0.00
Snowmobiles	0.26	0.04	0.01	0.09	9.15	0.00
ATV's	0.01	0.00	0.01	0.11	5.80	0.00
Total of ALL Sources	**4824.98**	**1537.57**	**2421.71**	**3661.41**	**16929.41**	**591.72**
Total Point Sources	**308.46**	**89.18**	**2050.30**	**744.82**	**239.57**	**308.18**
Total Area Sources	**4516.53**	**1448.39**	**371.37**	**2916.58**	**16689.84**	**283.54**

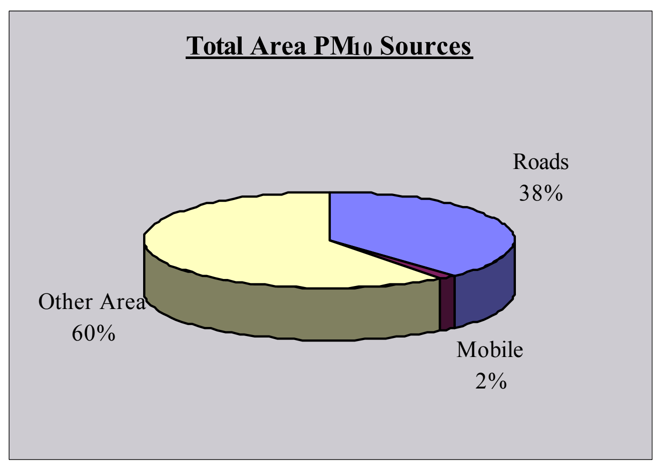
Figure 12

Emission Summary for the 1993 Base Year for Pocatello, ID
State Land Sources only









Projected Year Annual Emissions

The purpose of the projected emissions inventory is to establish the growth of sources in the nonattainment area and to document the increase in emissions due to growth. For industrial sources, growth can consist of expansion of a range of products or services, single unit expansions, increase of capacity, or mergers and acquisitions or any activity that creates an increase in air pollutant emissions into the airshed in the NAA. For area sources, most growth is related to demographic factors, such as population and households and related expansions that may cause an increase in air emissions. For mobile sources, growth includes an increase in vehicle miles traveled and additional roadways which may cause an increase in mobile air emissions.

The projected inventory is used in other analytical tools such as dispersion models to establish the attainment of standards, in spite of the growth and increase in emissions. The level of emissions that indicate attainment is still possible, inclusive of growth, is called the attainment level of emissions. This could be used to set an area-wide emissions cap.

In this document, emissions projected to the year 1997 are illustrated. Changes in the federal air quality standards, with associated technologies and regulation changes will create a new focus for the agency in the coming years. IDEQ will be required to prepare new inventories for the next two years. However, IDEQ already has in its possession a 2003 inventory, which can be used as a first approximation if needed.

Industrial Projections
In general, the technique used to project industrial emissions is similar to that adopted in previous SIP's in Idaho. In order to clarify the discussion, allowable emissions are defined herewith. Allowable emissions are the amount of pollutants on a mass/time or a capacity basis that a source is legally allowed to emit to the atmosphere, as specified by the conditions within a permit issued by the State of Idaho. The following classifications made to project emissions for industrial sources are summarized below (more detailed text within Appendix F).

1) Sources with Permits - Allowable emissions are based on the permit and/or rule limit(s) for the specific pollutants. Permits may be issued with mass/time limitations or throughput capacity limitations. Fugitives are increased as denoted in the permit or linearly to meet the increase in demand due to the increase in emissions from other points.

2) Unpermitted sources for which a rule applies - Allowable emissions are then determined based on the rule.

3) Unpermitted sources with no applicable rule - Projected emissions are based on maximum hourly emissions for base year and annual projections are based on 8760 hours/year of operation, and/or the maximum throughput design capacity of the operating unit.

4) Process fugitive (unpermitted) for which a rule applies - The limits are based on the rule limit for the specific pollutant. Annual emissions are based on 8760 hours/year and/or maximum throughput capacity.

5) Miscellaneous fugitive sources (roads, piles, etc.,) - projected emissions will be based on emissions calculated in 1993 increased, by ratio, to the maximum applicable throughput or activity level associated with 8760 hours/year of operation.

6) Unregulated pollutants - Projected emissions will be determined by speciation or other means, consistent with the emissions calculated for the permitted/regulated pollutants or for criteria pollutants for unregulated sources.

Although this is the general method, in practice, different methods were used to project industrial emissions. Facilities were consulted for growth determination of their individual facility. The growth percentage for each facility is documented in the Industrial Emission Inventory report in Appendix F. The industrial projections are depicted in Table 11 and Figure 13.

Area-Mobile Source Projections
Demographic factors such as population growth, household increase, and small scale commercial growth to meet this increase in population, are used in the projection of area-mobile source emissions. The demographic changes are calculated on a tract basis from the 1990 census and use growth factors provided in the Bannock County Demographic Report (1993). The 1997 projections were compared to a separate estimation made by a commercial entity (endorsed by the Idaho State University) and found to be remarkably close. These emissions are also summarized in Table 11 and Figure 13.

The 1997 projections indicate that the industrial source component of PM_{10} emissions has increased to about 29% from 6% in the base year. Much of this increase is associated with a nearly 350 ton per year increase in PM_{10} emissions from the J.R. Simplot Company's Don Plant facility and a 60 ton per year increase from the Hunziker Construction facility. The total emissions from industrial facilities have increased from 310 tons per year in 1993 to 703 tons per year in 1997. There is also a 340 ton per year increase in area-mobile emissions making for a total increase of about 730 tons per year of PM_{10} emissions for the 1997 projected year.

The J.R. Simplot Company has more of a contribution in the wintertime source mix. Residential heating and paved roads decrease as sources of significance during the wintertime. J.R. Simplot's individual contribution to the industrial pie goes up from 44% to 69%. Roads occupy a significant portion of the contribution in the area sources pie, by going up about 20% from the 1993 scenario. Other pollutants included in this inventory are part of the secondary aerosol analysis. This portion gives a detailed idea of the magnitude of precursor emissions that could potentially contribute to secondary aerosol formation under the appropriate meteorological conditions.

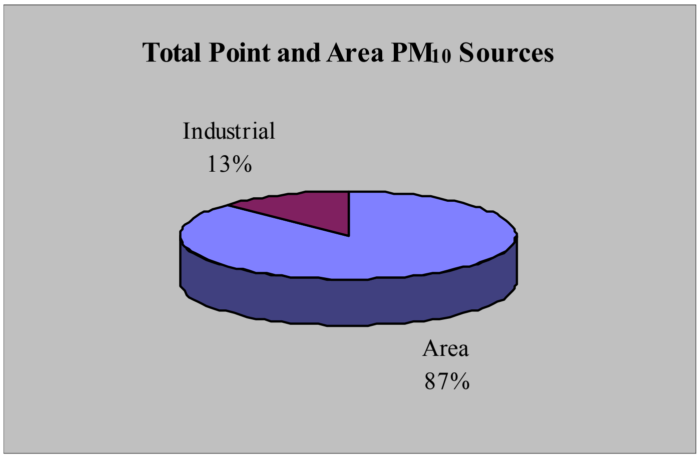
The quality assurance procedures followed are documented along with the reports for the individual categories in Appendix F.

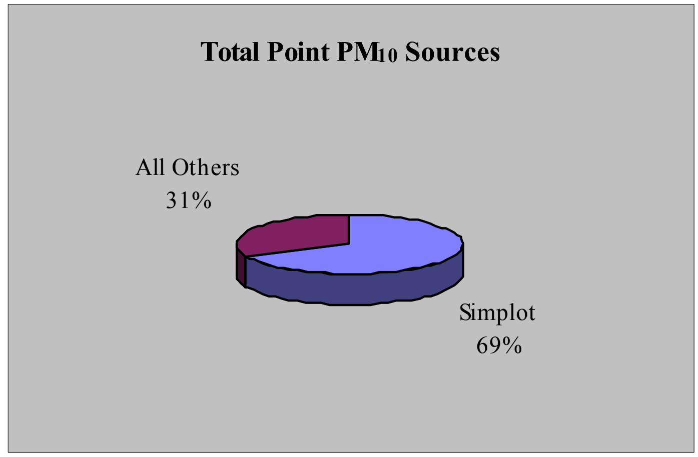
TABLE 11
1997 ANNUAL EMISSION SUMMARY FOR POINT AND AREA SOURCES
(all units are tons/year)

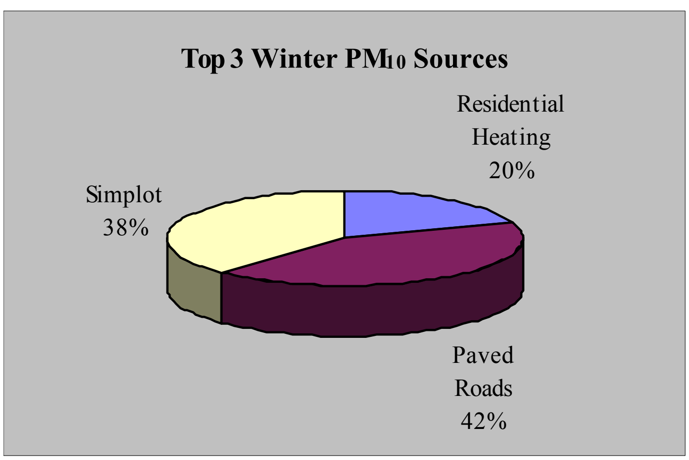
Source	PM10	PM2.5	SO2	NOx	CO	NH3
Point Sources						
Simplot	482.30	91.78	2554.51	755.79	181.75	132.91
Bannock Paving	35.46	11.63	15.34	3.49	0.32	0.00
AMI	3.80	3.80	0.30	31.60	6.51	0.20
Alpine Animal Hospital	0.02	0.02	0.02	0.04	0.03	0.00
Community Animal Hospital	0.01	0.00	0.00	0.01	0.01	0.00
Dykes Electric	0.10	0.07	0.00	0.25	0.05	0.00
General Mills - Pocatello	9.38	0.63	0.00	0.00	0.00	0.00
Great Western Malting	15.69	2.79	20.42	18.95	4.72	0.44
Hunziker Construction	64.90	44.25	67.32	75.51	16.58	0.00
Idaho State Univ	19.01	5.77	66.98	58.24	3.54	0.15
JK Merrill #30	1.54	0.42	0.00	0.00	0.00	0.00
Kerly Ag	0.02	0.01	1.10	0.31	0.08	1.15
McNabb Grain	2.82	0.22	0.00	0.00	0.00	0.11
Monroc Concrete Plant	9.74	2.96	0.00	0.11	0.02	0.00
Monroc Aggregate Plant	2.17	0.96	0.00	0.00	0.00	0.00
Pocatello Medical Center	1.12	0.94	0.58	5.37	1.85	0.02
Pocatello Ready Mix	3.02	0.92	0.00	0.05	0.01	0.00
Union Pacific RR	30.38	23.40	50.48	230.65	76.01	0.03
Weight Watchers	21.58	10.45	0.21	39.92	10.52	0.55
Area Sources						
Agricultural Tilling	375.93	179.01	0.00	0.00	0.00	0.00
Agricultural Harvesting	0.07	0.01	0.00	0.00	0.00	0.00
Windblown Dust (non ag)	492.24	196.90	0.00	0.00	0.00	0.00
Windblown Dust (ag)	893.81	357.52	0.00	0.00	0.00	0.00
Livestock Emissions	0.00	0.00	0.00	0.00	0.00	18.19
Landfill Emissions	28.78	4.32	0.00	0.00	0.00	0.00
County/State Storage Piles	0.25	0.08	0.00	0.00	0.00	0.00
Municipal Waste Treatment Facility	0.00	0.00	0.00	0.00	0.00	0.00
Residential/Commercial Const	175.36	73.06	0.00	0.00	0.00	0.00
Residential Heating	249.37	37.66	144.35	123.40	2166.57	0.80
Commercial Heating	39.55	5.93	109.32	1053.18	417.74	0.57
Fires	362.72	54.40	0.00	72.18	2722.67	0.00
Fertilizer Application	0.00	0.00	0.00	0.00	0.00	174.95
Human Emissions	0.00	0.00	0.00	0.00	0.00	20.53
Road Construction	148.12	21.26	0.00	0.00	0.00	0.00
Aircraft Emissions	1.11	0.03	1.41	2.23	87.87	0.00
Agricultural Equipment	2.21	2.03	1.43	14.49	5.92	0.00
Railroad Emissions (area)	29.70	4.45	67.71	439.52	154.43	1.13
Brakes	5.76	2.22	0.00	0.00	0.00	0.00
Tire Wear	3.93	0.89	0.00	0.00	0.00	0.00
Unpaved Roads	1473.50	388.10	0.00	0.00	0.00	0.00
Paved Roads	544.79	230.75	0.00	0.00	0.00	0.00
Mobile Exhaust	30.02	27.20	48.60	1178.34	10776.31	0.00
Snowmobiles	0.29	0.04	0.01	0.10	10.16	0.00
ATV's	0.01	0.00	0.01	0.12	6.27	0.00
Total	**5560.58**	**1786.88**	**3150.10**	**4103.84**	**16649.94**	**351.73**
Total Point Sources	**703.06**	**201.02**	**2777.27**	**1220.28**	**302.0**	**135.56**
Total Area Sources	**4857.51**	**1585.86**	**372.84**	**2883.56**	**16347.94**	**216.17**

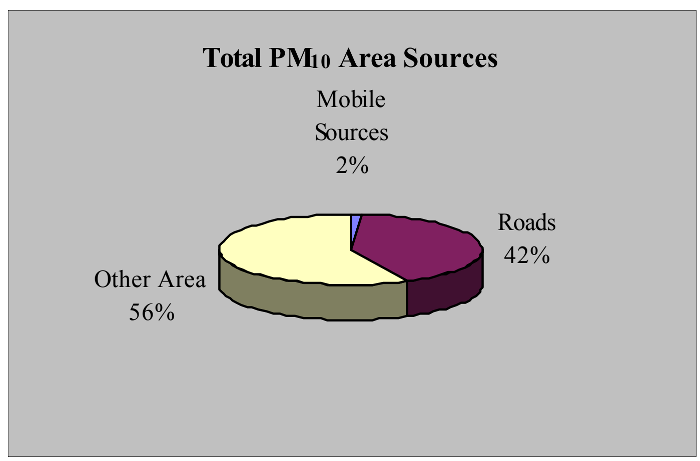
Figure 13

Emission Summary for the 1997 Projected Year for Pocatello, ID
State Land Sources only









IV. Implementation of Control Strategies

Introduction

In the 1993 SIP, multiple control strategies were discussed. The overall strategy for improving air quality consisted of many different components, all of which were interactive. Collectively, they are responsible for reducing PM_{10} emissions in Pocatello and Chubbuck and have contributed to the demonstration of attainment of the NAAQS. Therefore, no further control strategies are required. However, this does not preclude regulated sources from implementing better controls in the future.

The present control strategies that were implemented are listed below:

- Tier II Operating Permit for J.R. Simplot Company
- Residential Wood Combustion Program (RWC)
- Air Quality Index (AQI) Program
- Road Sanding Improvement Agreements
- Tier II Operating Permits for Bannock Paving Company

Industrial Sources

Based on engineering review by IDEQ, the point or ducted sources are controlled at several of the Pocatello facilities by technologies considered to be Reasonably Available Control Technology (RACT) or even Best Available Control Technology (BACT). A unit delineated list of the control technologies used is provided in the detailed emission inventory for each facility (See Appendix F). RACT and BACT verification were done consistent with the California EPA's BACT Clearinghouse, and the US EPA's RACT/BACT Clearinghouse.

Industrial facilities in the PVNAA have their fugitive dust emissions controlled in accordance with IDAPA 16.01.01.650 of the *Rules for Control of Air Pollution in Idaho.* For the control of fugitive dust, the *Rules* require reasonable controls, such as, the application of water and/or chemical dust suppressants, the use of hoods, fans, fabric filters, and enclosures of some nature. This level of control is standard for all the permitted industries and is enforced by routine, periodic inspections. Typical of most industries, fugitive emissions constitute the major portion of the total facility emissions. As a first step in evaluating control measures, the above mentioned controls and practices for fugitive emissions, when specified by an enforceable rule or regulation, are considered to meet the RACT guidelines established by EPA. In addition to these controls, facilities are constantly encouraged to improve operational practices and consider pollution prevention philosophies. Additionally, facilities voluntarily take preventive actions such as paving haul road segments and installing additional controls such as baghouses on certain points and enclosures on certain operations. Adoption of the above mentioned operational philosophies and installation of these controls has significantly moved PVNAA industrial control practices toward total application of RACT.

As a result of the recent boundary change, a small portion of the FMC facility's stockpiles and roads are included in the PVNAA. FMC is required to take all reasonable precautions to prevent the generation of fugitive dust pursuant to IDAPA 16.01.01.650, which constitutes RACT/RACM. This portion accounts for approximately 8 tons/year of emissions which is reflected in the 1997 emission inventory and does not significantly contribute to PM_{10} concentrations in the PVNAA. See Emission Estimation for State portion of FMC Facility in Appendix F for details.

The monitoring data for the past four years, presented in Section II, show compliance with the 24-hour NAAQS. The level of production for different operational scenarios under varied weather conditions, with the existing controls, do not cause or contribute to an exceedance of the NAAQS when the emissions are combined with area sources and background contributions. This analysis further reinforces that the existing level of control at the industrial facilities is RACT at the very minimum.

On August 29, 1994, J.R. Simplot Company was issued a Tier II operating permit to reduce actual emission levels, it is included in Appendix C. The Bannock Paving Company was issued two Tier II operating permits on September 11, 1998 to establish minor source status. These permits are in Appendix C. Emissions from all other small industrial sources were estimated to be 182 tons/year; therefore, the need for controls on these sources was not necessary.

Urban Area Sources

Local Ordinances for Wood Burning Appliances

The City of Pocatello has had a voluntary "no burn" program since 1990. The Residential Wood Combustion (RWC) program was developed to provide the public with information on good burning practices. In January 1994, the City of Pocatello passed an ordinance prohibiting the burning of refuse or other solid material, operation of any solid waste incinerator, solid fuel heating appliance, or open fireplaces during a declared air quality alert. This city ordinance prohibited the sale or offering for sale of any solid fuel burning appliance which was not certified by the EPA, or exempted by the EPA. The ordinance also provided that a permit must be obtained from the City of Pocatello Fire Department prior to installation of any solid fuel burning appliance. It also prohibited any person to burn coal in a solid fuel heating appliance designed for wood fuel. The first public reading for the Pocatello ordinance was December 2, 1993, the second was December 16, 1993, and the third was January 6, 1994, when the ordinance was passed. Both Pocatello and Chubbuck had open city council meetings and advertised the meeting and agenda in the local newspaper. The City of Chubbuck passed a similar ordinance in November 1993. These ordinances are included in Appendix A.

Pocatello provided a 30-day public comment period prior to passing the ordinance; however, Chubbuck at their November city council meeting chose to dispense with typical "three readings" (ordinances are read at three consecutive city council meetings) because they felt they needed the ordinance in place for the entire winter season beginning in November. As described, ordinances prohibiting the use of non-certified stoves were in place by January 1994 in Pocatello; in Chubbuck the ordinance was in effect in November 1993.

Reducing the use of cordwood burning devices
The State of Idaho recently modified an existing tax code to provide a tax reduction for anyone replacing old non-certified wood stoves with gas, propane, pellet, or EPA certified wood stoves. IDEQ hosted a press conference in Pocatello with the Mayor and a local heating appliance retailers in February 1995. Due to the media coverage, IDEQ's staff answered more than 50 requests for additional information. In addition, IDEQ worked with local retailers to determine trends in heating appliance sales. Gas stoves have been the best sellers in the past years with pellet and EPA certified wood stoves following. Because vendors keep sales records differently, retailers were only able to provide estimates of sales. The following table estimates the sales in 1994.

Type of Stove	**Number sold in 1994**
Gas	223
Pellet	100
EPA Certified Wood	105

Episodic Wood Burning Curtailment Program
Several recommendations including more aggressive public education and notification activities were identified. These activities included developing an "Air Quality Index" and hotline. The hotline was initiated on November 1, 1993 and still exists today. Anyone can call the hotline number anytime for a prerecorded message of the previous day's air quality index, the estimated daily air quality index, and burn ban information.

Pocatello and Chubbuck city ordinances prohibit residential wood stove burning during poor air quality episodes. The ordinances call for a voluntary ban when the nephelometer estimates particulate levels between 80 and 120Fg/m^3 and a mandatory ban when levels exceed 120Fg/m^3. Every morning IDEQ faxes air quality index and burn ban information to all media and interested industries. The Portneuf Valley area has not yet had a mandatory burn ban, but has had six voluntary bans since 1994. The following table indicates the dates of those burn bans and actual PM_{10} measurements.

Type of Burn Ban	Date of Burn Ban	Actual PM_{10} Levels
Voluntary	December 11-12, 1994	98 and 40Fg/m^3
Voluntary	December 21-23, 1994	69,114,88,53Fg/m^3
Voluntary	January 2-5, 1995	39,91,76,60,33Fg/m^3
Voluntary	February 6-8, 1995	54,97,55Fg/m^3
Voluntary	February 1-2, 1996	79,107,78Fg/m^3
Voluntary	January 17, 1997	61 and 78Fg/m^3

Fugitive Dust / Road Sanding
From the 1993 emission inventory data, primary sources of fugitive dust emissions include wintertime road sanding, agricultural dust, and small industries. Road sanding and agricultural emission reductions are outlined below and the small industries are covered in the Industrial Sources section.

Four techniques for reducing winter road sanding emissions were identified in the 1993 plan. They included reducing the quantity of sanding material used, cleanup of sanding materials as soon as conditions allow, improved specifications for sanding material, and the use of alternative materials such as chemical deicers. All four techniques have been implemented by city, county, and state transportation departments. Bannock County, Pocatello, Chubbuck, and the Idaho Transportation Department all estimate they have reduced the amount of sanding material anywhere from 15% to 30%.

Bannock County uses 2% calcium chloride liquid deicer in their sand/salt application, and has reduced the amount of salt in sanding material from 10% to 5%. This new system has proven to be effective by reducing the number of anti-skid material applications, and thus costs less than their previous sanding system. With the use of Congestion Mitigation and Air Quality Improvement Program (CMAQ) funds, Bannock County was able to purchase a regenerative air street sweeper in January 1995 and retro-fit their sanding trucks with deicing equipment.

The State of Idaho Transportation Department (ITD) uses a combination of sanding material and salt. The ITD has reduced the application of sanding material by providing training for equipment operators on how to effectively apply sanding material. ITD also uses a regenerative street sweeper when needed. The cities of Pocatello and Chubbuck use calcium chloride in their sand and salt mixtures. Pocatello uses sodium chloride in the downtown area and mixes calcium chloride with the salt when temperatures are near or below zero. Chubbuck uses sodium chloride wetted with calcium chloride on their high-traffic areas and steep sloped roadways. Chubbuck also purchased a regenerative air street sweeper using CMAQ funds.

In addition to new practices and equipment, the cities of Pocatello and Chubbuck, Bannock County, and the Idaho Transportation Department have signed agreements with IDEQ stating they will reduce the amount of sanding material, use material that passes the Los Angeles Abrasion test of 30% maximum loss, and will clean sanding material from roads as soon as possible. These written agreements can be found in Appendix B.

Agricultural Sources

Agricultural activities, such as, plowing, fertilizing, cultivating, planting and harvesting add to the PM_{10} emissions in the atmosphere. Dust emissions are also generated by wind erosion from open agricultural fields. The influencing factors for dust emissions include the percent of silt in the surface soil, the climate and wind speed, the unsheltered field width, the amount of vegetative cover, soil erodability, and crop related factors such as surface roughness and the number of tillage events.

In many instances, source emission strengths do not imply proportional source impacts. For example, chemical analysis techniques have shown that agricultural sources are not contributing significantly to the urban PM_{10} problem. Although agricultural emissions are a significant source according to the emission inventory, they were seasonally and geographically distant from the filters that were analyzed. Data analyzed by IDEQ from the Pocatello Road Dust Study also indicated that agricultural sources did not significantly contribute to the PM_{10} problem. Therefore, no agricultural control strategies have been identified.

Resources Required to Implement the Plan

Resources needed to implement the control strategies set forth in the 1993 Plan were provided by IDEQ, ITD, local and Tribal governments.

IDEQ wrote the operating permit for the J.R. Simplot Company and developed draft residential wood combustion ordinances and sanding agreements. IDEQ has the infrastructure to provide meteorological, engineering, and other scientific experts necessary to operate the air quality index program, provide liaison to local governments and industry, as well as any technical support for the area sources.

Equipment and material resources came from all entities involved in achieving the air quality standards. EPA provided financial resources through program support and supplemental grants. The State provided in-kind support and monitoring equipment for the road dust study. IDEQ developed brochures for supporting the wood stove program. Materials previously developed for the wood stove programs were also available for the States use in the PVNAA.

Local governments shared in equipment costs related to changes in their road sanding practices. Industry covered the cost of implementing control measures.

Conformity

The Clean Air Act (CAA) requires that federal actions conform and are consistent with air quality standards. Conformity addresses pollutant emissions through the process of reviewing plans, projects, and programs which are funded and/or approved by the federal government prior to implementation. The conformity process assures that State and local entities plan and discuss programs that will achieve clean air. The State has the authority to prohibit certain federal actions which do not "conform" to the SIP, if these actions substantially increase pollutant emissions within the nonattainment area. Without these conformity requirements, the State might need to adopt additional control measures to reduce pollutant emissions. Consequently, this may increase the overall cost of achieving clean air.

IDEQ is awaiting completion of a series of federal conformity rule amendments by EPA. Following the finalization of these amendments, IDEQ will adopt a conformity rule package which will address both transportation and general conformity requirements on a statewide basis. In the period between federal rule promulgation and state rule package adoption, the State of Idaho will utilize the final CAA federal conformity rule requirements developed in 1993. The federal rule requires that actions which are funded, permitted and/or approved by the federal government within or adjacent to an air quality nonattainment area do not:

- cause or contribute to NAAQS violations;
- increase the frequency or severity of existing violations; and/or,
- delay timely attainment of the federal and state ambient air quality standards or milestones identified by the applicable SIP.

General Conformity

The federal rule requires the preparation of both a qualitative and quantitative conformity analysis for all federal actions in nonattainment or maintenance areas which are defined as regionally significant. In the case of general conformity, regional significance is defined as any federal action or combination of actions which will result in direct and indirect pollutant emissions greater than 100 tons per year; or product emissions which exceed 10% of the existing emissions budget defined for the "moderate" nonattainment area.

General conformity analyses prepared under the federal rule and its amendments must fulfill several requirements. Following regional significance screening, proponents should consult with IDEQ on analytical design. The emission analysis which is prepared for the actions must be approved by IDEQ. Then, the emissions budget from the applicable SIP will be compared to the significant federal action emissions, to assure conformance among short and long-term planning efforts prior to approval. The process curtails increases in air pollution related to federal actions through design, planning and review.

Transportation Conformity

Transportation conformity is a mechanism for ensuring that transportation activities (plans, projects, and programs) are reviewed and evaluated for their impacts on air quality prior to funding or approval. The process insures that transportation projects do not negatively impact air quality.

Certain types of transportation activities are subject to conformity if they occur within or affect a designated nonattainment or maintenance area. If the activities within the nonattainment or maintenance area do not conform, those projects requiring conformity determination cannot be federally funded.

Reduction of the size and quantity of winter sanding materials, use of chemical deicers, street clean up, and treatment of unpaved surfaces are presently being done to help reduce PM_{10} emissions from transportation activities and roads. For future PM_{10} reductions, controls similar to these or alternative technologies are anticipated to be used on a case by case basis. However, these controls must demonstrate equivalent or greater control efficiencies than the ones already in place.

For conformity purposes, the emissions budget in this plan is the combined amount of transportation sources. These include paved roads, unpaved roads, tire wear, brakes, road construction, mobile exhaust, snowmobiles and ATV's. According to Table 11 on page 45, these sources total 2206 tons per year. This emissions budget will be compared to the significant transportation activity emissions to assure conformance among the short and long-range planning efforts. This analysis requires coordination between local, regional, and state entities who propose projects, such as the Idaho Transportation Department, Bannock Planning Organization, City of Pocatello, City of Chubbuck, Bannock County and the Idaho Division of Environmental Quality.

V. Community Involvement

Public Involvement

General Public

The general public is actively involved and concerned about air quality in Pocatello and Chubbuck. Frequent newspaper articles have informed residents about the issues and the problems. Air staff are frequently asked to speak to groups about air quality. Public-information meetings have been held to inform the public of the issues and provide opportunity for discussion. A public hearing is also held during the 30 day comment period to provide the format for recognizing official/public comments prior to formal adoption of the Air Quality Improvement Plan.

Local Committees

Environmental Resources Board

In June 1998, the IDEQ and Pocatello City Council established an Environmental Resources Board. This group includes representatives from local and state government, surrounding businesses, civic groups, industry, and concerned citizens. The initial discussion focused on environmental issues within the city and their impacts. Air quality in the PVNAA is one of the top priorities for discussion.

The Board started meeting in August 1998 and had presentations on a variety of environmental topics, including air quality. The members of the Environmental Resources Board are responsible for keeping their representative organizations informed. Members have talked about air quality planning, the Clean Air Act, and SIP development. They provided feedback on this Plan and its process. They were involved with the public information meetings and public hearings.

Intergovernmental Consultation

The development of this plan is dependent on intergovernmental consultation since it will take three sovereign governments to achieve attainment of the NAAQS. Additional consultation has taken place with local governments to implement and enforce the city and county control strategies. Communication between all the governmental entities continues.

VI. Permitting Policy

Permitting Strategy

The control strategies used for demonstrating attainment in this plan are specific to each facility and each source within the facility, and the strategies have been determined in conjunction with the affected industries. Thus, each controllable source has its own control strategy to limit emissions to a prescribed level. However, the regulatory agency will allow industry through the operating permit program, to develop alternative means for achieving comparable reductions.

Each industrial facility may choose to develop control strategies that are equivalent to, or more enhanced than those proposed in this document. No facility however, may remove an existing piece of control technology or apply one that is less effective than what is currently present. Equivalency for these source generated control strategies must be demonstrated to the regulatory agency through dispersion modeling, or alternatively, using mutually negotiated techniques. Once alternative strategies have been evaluated, those selected will be incorporated in operating permits which will then be issued to the industrial sources.

New Sources

IDEQ will evaluate all new industrial sources of PM_{10} emissions for applicability to the *Rules for Control of Air Pollution in Idaho (Rules)* and also for consistency with the controls identified in the emission inventory submitted with this air quality plan. This will include all PM_{10} emissions from portable permitted sources such as crushers, batch plants and asphalt plants. As standard practice all inventories in this air quality plan have been and continue to be refined, taking into account, all air emission sources from all facilities. This practice is to be extended to all air emission sources in the Pocatello and Chubbuck area, specifically including fugitive emissions from processes as well as support activities such as material transfers, piles, vehicles and road dust.

Future Permitting in the Pocatello Area

As an overview, all emission inventories for the industrial facilities described above were developed through direct consultation with the facilities. The projected inventories were developed using allowable emissions for permitted sources and worst case operating scenarios for other sources. Future emission modifications for the existing facilities and any new source reviews shall be completed in accordance with the *Rules.* Through the application of these rules it shall be determined that the modification, in combination with collocated sources and inclusive of the background concentration will not cause or significantly contribute to an exceedance of applicable PM_{10} standards.

Specifically, IDEQ will regularly evaluate future growth and comprehensively analyze PM_{10} emissions for NAAQS compliance. Detailed summaries and industrial source inventories are included in Appendix F. Appendix F also describes the methodology and assumptions used to develop the inventories, including detailed process information.

Proper modeling is crucial to future permitting. If modeling analyses are not performed for industrial facilities that exceed the permitted emissions, this improvement plan may be jeopardized. Eventually, this will impact the plan's ability to demonstrate attainment of the NAAQS.

VII. Legal Authority

The Environmental Protection and Health Act (EPHA) found at Idaho Code §§ 39-101 et seq. gives the Department of Health and Welfare the duty to enforce rules, issue and enforce permits to protect Idaho's air quality. Idaho Code §§ 39-105 and 39-115. These rules are entitled the *Rules for the Control of Air Pollution in Idaho (Rules)* and are found at IDAPA 16.01.01 et seq. The EPHA gives the Board of Health and Welfare authorization to promulgate these *Rules*. The *Rules* contain specific provisions regarding particulate matter emissions, including a specific provision that prohibits a source from causing or contributing to a violation of an ambient air quality standard. See IDAPA 16.01.01.577 and 16.01.01.006.08. Permit limitations are set based on conservative modeling exercises to ensure that each proposed source will not cause or significantly contribute to a violation of any ambient air quality standard. IDAPA 16.01.01.203.02. IDAPA 16.01.01.550 through 562 define criteria for an air pollution emergency, formulate a plan for preventing or alleviating such an emergency and specify rules for carrying out the plan. Additionally, Idaho Code § 39-112 gives the Board of Health and Welfare and the Governor the authority to issue emergency orders that require the person or persons responsible for the operation or operations in question to reduce emissions or discontinue emitting immediately.

More specifically, as noted in a letter from the Idaho Attorney General's Office to Wallace Cory of IDEQ, the Department of Health and Welfare has adequate existing authority to require and issue Tier II operating permits containing reasonably available control technologies/measures (RACT/ RACM) for implementing control strategies for the Portneuf Valley PM_{10} Nonattainment Area. See Appendix G.

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Appendix A. Residential Wood Combustion City Ordinances
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2. City of Chubbuck

Appendix B. Road Sanding Agreements
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2. City of Chubbuck
3. Bannock County
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Appendix C. Operating Permits
1. J.R. Simplot Company
2. Bannock Paving Company

Appendix D. Secondary Aerosol Research
1. CMB Receptor Modeling Winter Study
2. Pocatello CMB Analyses Results
3. WESTAR Council Secondary Aerosol Workshop Proceedings
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Appendix E. Ambient Air Quality Monitoring Data
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Appendix F. Emission Inventory
1. 1993 Spreadsheets on CD-ROM
2. 1997 Spreadsheets on CD-ROM
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Appendix G. Legal Authority
1. Letter from Attorney Generals Office

Appendix H. Public Involvement
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2. Newspaper announcements / advertisements

Appendix I. Boundary Redesignation Request

Appendix J. EPA's Federal Register Notice