



Quality Assurance of the 2002 WRAP Stationary Sources Emissions Inventory

Prepared for:

**Western Governors' Association and
The Western Regional Air Partnership,
Stationary Sources Joint Forum**

Prepared by:

**Eastern Research Group, Inc.
1600 Perimeter Park Drive
Morrisville, North Carolina 27560**

January 27, 2006

3484.00.002.001

QUALITY ASSURANCE OF THE 2002 WRAP STATIONARY SOURCES EMISSIONS INVENTORY

Prepared for:

Western Governors' Association (WGA) and the
Western Regional Air Partnership (WRAP),
Stationary Sources Joint Forum (SSJF)
Denver, Colorado

Prepared by:

Eastern Research Group, Inc.
1600 Perimeter Park Drive
Morrisville, North Carolina 27560

January 27, 2006

TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
LIST OF TABLES	ii
PREFACE	iii
ACRONYMS	v
1.0 INTRODUCTION	1-1
2.0 DATA SOURCES	2-1
3.0 POINT SOURCES	3-1
3.1 Gap Filling	3-3
3.2 Tribal Data	3-4
3.3 Control Device Information	3-4
3.4 State, Local and Tribal Point Source Revisions to the NEI	3-5
3.5 Stack Parameters	3-6
3.6 BART Flag	3-7
3.7 Point Source Reporting Thresholds	3-7
4.0 AREA SOURCES	4-1
4.1 Gap Filling	4-2
4.2 Oil and Gas Data	4-2
4.3 Area Source Controls	4-2
4.4 State, Local, and Tribal Agency Revisions to the 2002 Draft NEI Inventory	4-3
5.0 2002 REVISED WRAP POINT AND AREA SOURCE EMISSION INVENTORY RESULTS	5-1
5.1 Improvements Made	5-1
5.2 Emission Summaries	5-2
6.0 REFERENCES	6-1

LIST OF TABLES

<u>Table</u>		<u>Page</u>
2-1	Point Sources EDMS File Submittal Dates	2-2
2-2	Area Sources EDMS File Submittal Dates.....	2-3
3-1	Summary of Point Source QA Revisions	3-1
3-2	EGU Emissions Summary	3-3
3-3	State, Local and Tribal Point Source Revisions to the NEI in June 2005	3-5
3-4	3-Year NEI/WRAP Point Source Reporting Thresholds	3-8
4-1	State, Local, and Tribal Area Source Revisions to the NEI in June 2005.....	4-3
5-1	Comparison of Area Source Categories	5-2
5-2	2002 Revised WRAP Point Source Emissions Summary by State and Tribe.....	5-4
5-3	2002 Point Source Emissions by Sector.....	5-6
5-4	2002 Revised WRAP Area Source Emissions Summary by State and Tribe	5-9
5-5	2002 Area Source NO _x Emissions by Sector	5-10
5-6	2002 Area Source SO ₂ Emissions by Sector	5-14
5-7	2002 Area Source PM ₁₀ -PRI Emissions by Sector	5-18

PREFACE

Regulatory Framework for Tribal Visibility Implementation Plans

The Regional Haze Rule explicitly recognized the authority of tribes to implement the provisions of the Rule, in accordance with principles of Federal Indian law, and as provided by the Clean Air Act §301(d) and the Tribal Authority Rule (TAR) (40 CFR §§49.1-.11). Those provisions create the following framework:

1. Absent special circumstances, reservation lands are not subject to state jurisdiction.
2. Federally recognized tribes may apply for and receive delegation of federal authority to implement CAA programs, including visibility regulation, or “reasonably severable” elements of each programs (40 CFR §§49.3, 49.7). The mechanism for this delegation is a Tribal Implementation Plan (TIP). A reasonable severable element is one that is not integrally related to program elements that are not included in the plan submittal, and is consistent with applicable statutory and regulatory requirements.
3. The Regional Haze Rule expressly provides that tribal visibility programs are “not dependent on the strategies selected by the state or states in which the tribe is located” (64 Fed. Reg. 35756), and that the authority to implement §309 TIPs extends to all tribes within the GCVTC region (40 CFR §51.309(d)(12)).
4. The EPA has indicated that under the TAR tribes are not required to submit §309 TIPs by the end of 2003; rather they may choose to opt-in to §309 programs at a later date (67 Fed. Reg. 30439).
5. Where a tribe does not seek delegation through a TIP, EPA, as necessary and appropriate, will promulgate a Federal Implementation Plan (FIP) within reasonable timeframes to protect air quality in Indian country (40 CFR §49.11). EPA is committed to consulting with tribes on a government to government basis in developing tribe-specific or generally applicable TIPs where necessary (See, e.g. 63 Fed. Reg. 7263-64).

It is our hope that the findings and recommendations of this report will prove useful to tribes, whether they choose to submit full or partial 308 or 309 TIPs, or work with EPA to develop FIPs. The amount of modification necessary will vary considerably from tribe to tribe. The authors have striven to ensure that all references to tribes in the document are consistent with principles of tribal sovereignty and autonomy as reflected in the above framework. Any inconsistency with this framework is strictly inadvertent and not an attempt to impose requirements on tribes which are not present under existing law.

Tribes, along with states and federal agencies, are full partners in the WRAP, having equal representation on the WRAP Board as states. Whether Board members or not, it must be remembered that all tribes are governments, as distinguished from the “stakeholders” (private interest) which participate on Forums and Committees but are not eligible for the Board. Despite this equality of representation on the Board, tribes are very differently situated than states. There

are over four hundred federally recognized tribes in the WRAP region, including Alaska. The sheer number of tribes makes full participation impossible. Moreover, many tribes are faced with pressing environmental, economic, and social issues, and do not have the resources to participate in an effort such as the WRAP, however important its goals may be. These factors necessarily limit the level of tribal input into and endorsement of WRAP products.

The tribal participants in the WRAP, including Board members Forum and Committee member co-chairs, make their best effort to ensure that WRAP products are in the best interest of the tribes, the environment, and the public. One interest is to ensure that WRAP policies, as implemented by states and tribes, will not constrain the future options of tribes who are not involved in the WRAP. With these considerations and limitations in mind, the tribal participants have joined the state, federal, and private stakeholder interests in approving this report as a consensus document.

ACRONYMS

AP-42	Compilation of Air Pollution Emission Factors
BART	Best Available Retrofit Technology
CAMD	Clean Air Markets Division
CEM	continuous emissions monitoring
CERR	Consolidated Emissions Reporting Rule
CO	carbon monoxide
DOE	Department of Energy
EDMS	Emission Data Management System
EGU	electric generating unit
EIA	Energy Information Administration
EIIP	Emission Inventory Improvement Program
NAICS	North American Industrial Classification System
NEI	National Emissions Inventory
NH ₃	ammonia
NO _x	nitrogen oxides
PM	particulate matter
PTE	potential to emit
SCC	Source Classification Code
SIC	Standard Industrial Classification
SO ₂	sulfur dioxide
SSJF	Stationary Sources Joint Forum
TPD	tons per day
TPY	tons per year
TSD	Technical Support Document
US EPA	United States Environmental Protection Agency
VOC	volatile organic compounds
WRAP	Western Regional Air Partnership

1.0 INTRODUCTION

The Western Regional Air Partnership (WRAP), Stationary Sources Joint Forum (SSJF) initiated the Emission Inventory and Control Technology Technical Support project to improve the 2002 WRAP emissions inventory, particularly for oil and gas area sources, and for large point sources on selected Tribal lands; estimate a reliable 2018 base case emissions inventory; and conduct analyses related to control technologies for WRAP point sources to facilitate the future development of control strategy scenarios needed to meet WRAP's visibility goals for 2018 and beyond. This project was conducted by Eastern Research Group, Inc. (ERG) and subcontractors ENVIRON International Corporation, and Alpine Geophysics under the following tasks:

- Task 1A: 2002 WRAP Stationary Sources Inventory Quality Assurance
- Task 1B: 2002 and 2018 WRAP Area Sources Oil and Gas Inventory
- Task 1C: 2018 WRAP Point and Area Sources (Non-Oil and Gas) Inventory
- Task 2: Control Technology Analysis
- Task 3: Tribal Inventories for 2002 and 2018
- Task 4: California Inventories for 2002 and 2018
- Task 5: Temporal Profiles for WRAP Electric Generating Units

This report lays out the procedures that ERG implemented to review and improve the 2002 base year WRAP point and area (i.e., stationary) sources emissions inventory (Task 1A). Details on the development of the work conducted under the other tasks, such as the oil and gas area source estimates and Tribal point sources inventories are provided under separate cover. This report discusses the emission inventory data reviewed, the review methods and tools used, priorities, and gap filling approaches implemented. Throughout this task, ERG strived to incorporate all feedback provided by state, local, and tribal contacts, and other stakeholders.

This task has resulted in emissions inventory improvements by conducting quality assurance (QA) activities on the WRAP 2002 point and area sources emissions inventory, and collecting more comprehensive information on existing control technology types and efficiencies than were

previously reported in WRAP's 2002 inventory files. Ultimately, the goal of this task is to develop a comprehensive base year 2002 emissions inventory that can be projected to 2018, and used in planning efforts by WRAP.

Following this Introduction, Section 2 discusses the data sources used to compile the 2002 WRAP inventory, and the dates the files were obtained. Section 3 provides details on how the point source inventory data were compiled, and quality assured. Section 4 provides details on how the area source inventory data were compiled and quality assured. Section 5 presents summaries of the WRAP 2002 point and area sources inventory.

2.0 DATA SOURCES

The 2002 emission inventory data that were reviewed consisted primarily of the 2002 Emission Data Management System (EDMS) Version 1.0 inventory,¹ along with the draft base year 2002 National Emission Inventory (NEI) data.^{2,3} These data were provided by state, local, and tribal agencies to the WRAP and/or the U.S. Environmental Protection Agency (EPA). The 2002 inventory covers sulfur dioxide (SO₂), nitrogen oxides (NO_x), particulate matter (PM, PM_{2.5}, and PM₁₀), volatile organic compounds (VOC), carbon monoxide (CO), and ammonia (NH₃). The source category coverage for this phase of the inventory review was stationary point and area sources (excluding oil and gas). The review focused on top emitting NO_x, SO₂, VOC, NH₃, and PM sources, such as electric generating units (EGUs), boilers, turbines, internal combustion engines, and oil and gas production. (QA activities for area source oil and gas operations are not addressed in this task; Task 1.B. focuses on these sources in detail.) Mobile sources, prescribed burning and wildfires (SCCs 28015xxxxx and 28100xxxxx), windblown dust (SCCs 27014xxxxx and 27301xxxxx), fugitive dust from paved and unpaved roads (SCCs 2294xxxxxx and 2296xxxxxx), and agricultural production-livestock (SCC 2805xxxxxx) were excluded from this review.

Other sources of emission inventory data included in this review task were

- 2002 Clean Air Markets Division (CAMD)⁴ and Department of Energy (DOE) EGU data⁵
- The final 1999 NEI Version 3 for point and area sources (<http://www.epa.gov/ttn/chief/net/1999inventory.html#final3crit>)⁶
- The 1996 baseline inventory used in the WRAP's §309 Technical Support Document (TSD)⁷
- The Emission Inventory Improvement Program (EIIP) point sources document (<http://www.epa.gov/ttn/chief/eiip/techreport/volume02/i12.pdf>)⁸
- The potential BART-eligible source list developed by ERG for the SSJF⁹

The 2002 EDMS Version 1.0 inventory¹ is based on state, local, and tribal agency inventory submittals. The EDMS is managed by the WRAP Emissions Forum. Tables 2-1 and 2-2 summarize the EDMS files received by ERG for review, with the date they were originally submitted to the EDMS Database Administrator (DBA).

Table 2-1. Point Source EDMS File Submittal Dates^a

State/County	Date Submitted
Alaska	12/16/04
Arizona	07/16/04
Arizona- Maricopa County	12/15/04
California	09/30/05 ^b
Colorado	08/03/04
Idaho	08/05/04
Montana	08/11/04
Nevada	07/20/04
Nevada- Clark County	05/19/04 ^c
Nevada- Washoe County	12/27/04
New Mexico	08/09/04
New Mexico- Bernalillo County	07/20/04
North Dakota	07/15/04
Oregon	08/19/04
Oregon- Lane County	08/20/04
South Dakota	08/16/04
Utah	08/06/04
Washington	05/14/04
Washington- Olympia	09/10/04
Washington- Puget Sound	07/26/04
Wyoming	11/05/04

^a Point source data for other states, counties, and some tribes were populated in the EDMS with 2002 Draft NEI data provided in February of 2005.

^b California emissions were provided directly by the Air Resources Board for this project.

^c A replacement inventory was provided by Clark County.

The EPA's 2002 draft NEI files^{2,3} are based on June 2004 state, local, and tribal agencies inventory submittals, and include revisions based on EPA's QA/QC activities and input from the various agencies. The 2002 draft NEI files were released by EPA in February and March of 2005 for more in-depth review. EPA requested revisions by June 2005.

Table 2-2. Area Source EDMS File Submittal Dates^a

State/County	Date Submitted
Arizona- Maricopa County	12/15/04
California	09/30/05 ^b
Colorado	08/06/04
Idaho	08/06/04
Nevada- Clark County	12/27/04 ^c
Nevada- Washoe County	12/27/04
New Mexico- Bernalillo County	08/09/04
Oregon	08/20/04
Utah	08/06/04
Washington	08/06/04
Wyoming	01/03/05

^a Area source data for other states, counties, and tribes were populated in the EDMS with 2002 Draft NEI data provided in March of 2005.

^b California emissions were provided directly by the Air Resources Board for this project.

^c A replacement inventory was provided by Clark County.

In addition to these two key data sources, information from the EPA’s CAMD was obtained. CAMD collects data from “affected sources” to support the EPA’s Acid Rain Program (<http://www.epa.gov/airmarkets/arp/>).⁴ Sources included in this program are existing utility units serving generators with an output capacity of greater than 25 megawatts and all new utility units. Continuous emissions monitoring (CEM) data for this allowance trading system for SO₂, NO_x, and heat input have been collected since 1995.

The Department of Energy’s Energy Information Administration (EIA) uses Form-767, *Steam-Electric Plant Operation and Design Report*, to collect monthly boiler-level data from steam EGUs, whether they are utilities or non-utilities (<http://www.eia.doe.gov/cneaf/electricity/page/eia767.html>).⁵ This is a steam-electric plant data file that includes annual data from organic-fueled or combustible renewable steam-electric plants with a generator nameplate rating of 10 or more megawatts. The EIA-767 file contains data on plant operations and equipment design (including boilers, generators, cooling systems, flue gas particulate collectors, and stacks).

The final 1999 NEI Version 3 for point and area sources⁶ was released by EPA in February of 2004. Like the draft 2002 NEI, this database contains information on stationary and mobile

sources that emit criteria air pollutants and their precursors. Emission estimates are available for individual point sources (facilities), as well as county level estimates for area sources.

Version 3 of the 1996 baseline inventory used in the §309 Technical Support Document (TSD) was released by WRAP in March of 2003.⁷ This inventory was compiled to be used in model testing, model validation, and for developing estimated future-year inventories that can be used to test the effects of various control strategies.

Chapter 12 of the Emission Inventory Improvement Program (EIIP) point sources guidance document, *How to Incorporate the Effects of Air Pollution Control Device Efficiencies and Malfunctions into Emission Inventory Estimates*,⁸ was used in gap filling for control device efficiencies. The EIIP is a collaborative effort between the State and Territorial Air Pollution Program Administrators and the Association of Local Air Pollution Control Officials (STAPPA/ALAPCO) and the EPA to promote the use of standard emission inventory development procedures.

Updated versions of Appendices H and K of the WRAP report, *Identification of BART-Eligible Sources in the WRAP Region*,⁹ were used to populate the BART eligibility status field in the 2002 inventory files, and identify and verify facility name changes and closed facilities (prior to 2002).

3.0 POINT SOURCES

This section provides details of the point source QA issues encountered, and how they were resolved. In most cases, the state, local, or tribal agency responsible for the inventory development was contacted to help resolve an issue. Table 3-1 presents a summary of the QA revisions made to develop the 2002 WRAP point source inventory.

Table 3-1. Summary of Point Source QA Revisions

State/County	QA Revisions
Alaska	Added a missing facility
Arizona—Pinal County	Created inventory for Title V sources
Arizona	Obtained missing NO _x and PM emissions for all sources
California	Outliers—Converted NH ₃ reported emissions from tons to pounds, corrected mislabeled PM
Colorado	Removed emissions data for mobile asphalt plants
Montana	Allocated mobile asphalt emissions to specific counties
New Mexico	Outliers—Adjusted emissions for one facility
Washington	Corrected transposed emission estimate
Wyoming	Outliers—Adjusted VOC emissions for one facility

For point sources, the QA review focused on completeness of geographic coverage (e.g., were any counties not included in the inventory), facilities, and pollutants, and identification of outliers. In addition, the issue of how to handle point source emissions data for mobile asphalt plants, which are assigned a FIPs county code of 777 to reflect the nature of their mobile activities, was discussed with two state agencies. Lastly, an important revision was made in the 2002 WRAP inventory for EGUs that were sources reporting to CAMD's Acid Rain Program in 2002; this is described below. Specific state and county issues addressed include:

- Added the Conoco Phillips Central Production Facility #2 to the Alaska inventory.
- Added missing NO_x and PM emission records for all point sources in the Arizona inventory.
- Corrected the units for the reported ammonia estimates in California from tons to pounds.

- Corrected mislabeled California PM filterable (PM-FIL) to PM primary (PM-PRI).
- Corrected the emission estimates for the Intel facility in Rio Rancho, New Mexico from 8,888 tons to the correct values.
- Added records for the Title V sources in Pinal County, New Mexico.
- Corrected a transposed emission estimate for a Weyerhaeuser facility in Washington.
- Corrected the VOC estimates provided for Sinclair Oil-Bairoil Station in Wyoming.

Staff in the Montana Department of Environmental Quality were contacted regarding their reported point source emissions for mobile asphalt plants. The issue with these sources concerns how their emissions are handled in air quality models—they are reported with a county code of 777, which does not indicate a specific county. For these sources in Montana, ERG totaled the reported emissions and apportioned them to specific counties using the ratio of the road construction emissions in each county to the total road construction emissions for the state. The county centroids for each county were used to locate the emissions apportioned to each county.

For the mobile asphalt plants reported for Colorado, ERG was instructed to remove the 777 emissions data from the point source inventory.

EPA's CAMD compiles unit data for EGUs that are regulated sources under the Acid Rain Program. These estimates are based on hourly CEM measurements, thus they are presumably the most accurate source of SO₂ and NO_x emissions data for EGUs, and it was therefore decided to use the CAMD emissions instead of the agency submitted SO₂ and NO_x emissions for the subject EGUs.

Also, in order to accurately reflect the CAMD CEM data in the WRAP inventory, the unit-level data were matched to the state, local, and tribal EGU units in the 2002 WRAP inventory. This was necessary so that the state, local, tribal EGU SO₂ and NO_x emissions could be removed from the inventory and would not be double-counted. The unit-level EGU matching was based on location, the facility name, the facility code (EIA plant code, NEI code), and the unit and boiler codes. The primary goal of the matching was to account for as

many EGUs and tons as possible. Table 3-2 presents a summary of the state/local/tribal agency submitted NO_x and SO₂ data, vs. the CAMD reported emissions, which were given priority in this inventory. It should be noted that for California, that state's data were provided directly for this project, and their EGU emissions were *not* replaced with the CAMD emissions. Also, Alaska and Idaho have no EGUs that report to CAMD.

Table 3-2. EGU Emissions Summary^a

State or Tribe	CAMD NO _x	CAMD SO ₂	Agency-Provided NO _x	Agency-Provided SO ₂
Alaska	--	--	--	--
Arizona	45,711	63,555	44,130	63,329
Idaho	--	--	--	--
Montana	35,130	20,650	34,367	19,607
Navajo Nation	41,577	32,847	49,084	27,809
North Dakota	75,947	140,534	75,365	140,786
Nevada	41,002	49,209	38,911	49,198
New Mexico	36,659	17,968	32,449	15,083
Oregon	8,616	12,271	8,614	12,271
South Dakota	14,954	11,756	14,856	11,756
Utah	64,977	31,151	60,498	31,144
Washington	15,470	19,032	15,528	19,034
Wyoming	83,052	79,506	78,750	76,626

^a California EGU data as provided by the Air Resources Board were retained, thus no CAMD data were used. Also, Alaska and Idaho have no EGUs that report to CAMD.

3.1 Gap Filling

Keeping in mind that one goal of this QA task is to develop a complete 2002 WRAP inventory by facility and pollutant, all of the available WRAP inventories were compiled in a master database. For most states, local agencies and tribes, the 2002 EDMS data files were quite similar to the 2002 NEI files. The 1999 NEI, the 1996 WRAP inventory, and the 2002 CAMD CEM data were also compiled in the master database. Common NEI Unique Facility IDs were assigned, so that facilities were not double counted in the different base year inventories, and external data sources were used to try to identify facilities that closed prior to 2002. The 2002 WRAP inventory therefore contains some facilities that were pulled

forward from the 1999 and 1996 inventories. It also includes pollutant-specific additions from the 1999 or 1996 inventories if they were not included in the 2002 files.

3.2 Tribal Data

In Task 3 of the Emission Inventory and Control Technology Technical Support project, emissions data were gathered for large point sources located on the following lands:

- Arapahoe and Shoshone Tribes of the Wind River Reservation
- Confederated Tribes and Bands of the Yakama Nation
- Confederated Tribes of the Colville Reservation
- Confederated Tribes of the Warm Springs Reservation
- Tohono O'Odham Nation
- Navajo Nation
- Ute Mountain Ute Tribe of the Ute Mountain Reservation

These emission estimates are included in the 2002 WRAP point source inventory. Details on development and collection these point source datasets are provided in the report *Point Source Emission Inventories on National American Reservations and Tribal Lands*.¹⁰

3.3 Control Device Information

For point sources, the first check was to see how many sources indicated the emissions are controlled and provided complete control information (control device codes and control efficiencies). For these sources, the only QA step necessary was to ascertain that the control device is appropriate for the source category and the pollutant (i.e., the control device code is correct) and the efficiency was within the expected range.

In other cases, if a control device was indicated but no control efficiency was reported, Chapter 12 of the Emission Inventory Improvement Program (EIIP) point sources guidance document, *How to Incorporate the Effects of Air Pollution Control Device Efficiencies and Malfunctions into Emission Inventory Estimates*,⁸ was used in gap filling for the control

device efficiency. If a control device efficiency was provided but the control device was not specified, the control device was simply flagged as “miscellaneous.” Lastly, the control device information was revised for consistency with the Control Strategy tasks in the Emission Inventory and Control Technology Technical Support project.

3.4 State, Local, and Tribal Agency Revisions to the NEI

To ensure the 2002 WRAP point source inventory is as up-to-date as possible, ERG incorporated state, local, and tribal agency revisions that were provided to the EPA for the NEI in June 2005. Table 3-3 lists the agencies that provided point source revisions to the EPA.

Table 3-3. State, Local, and Tribal Point Source Revisions to the NEI in June 2005

State/County	Type of Revision
Arizona – Maricopa County	Revised records for numerous sites
Idaho	Revised records for numerous sites
New Mexico – Bernalillo County	Removed sites, revised emission estimates
Oregon	Revised records for numerous sites
Utah	Revised records for 25 sites
Washington	Revised records for two sites
Tribe	Type of Revision
Assiniboine and Sioux Tribes of the Fort Peck Indian Reservation	Revised emission estimates
Cabazon Band of Cahuilla Mission Indians of the Cabazon Reservation	Provided new file
Fort Mojave Indian Tribe	Revised emission estimates
Salt River Pima-Maricopa Indian Community of the Salt River Reservation	Provided new file
Shoshone-Bannock Tribes of the Fort Hall Reservation	Provided new file

3.5 Stack Parameters

The Regional Modeling Center (RMC) is WRAP's contractor for meteorological, emissions, and air quality modeling and analysis. The RMC provides the analytical results needed to address the requirements of the Regional Haze Rule. The WRAP RMC work has focused primarily on developing a 2002 annual air quality modeling database that can be used to simulate visibility impairment in the western United States. The 2002 WRAP point and area source inventories will be integrated into a base 2002 emissions data set. It was important, therefore, that QA checks and revisions be implemented on the point source emission release points for stack height, exit gas temperature, diameter, exit gas velocity, and flowrate. The following approach was implemented, based in part on the methods used by EPA for the NEI:¹¹

- For emission types labeled as fugitive, the following surrogate data were inserted for null data sets:
 - Height: 10 ft
 - Temperature: 72°F
 - Diameter: 0.003 ft
 - Velocity: 0.0003 ft/sec
 - Flow: 0 cu ft/sec
- For emission types labeled as non-fugitive, surrogate data were inserted for null heights and temperatures using the SCC-based lookup tables posted by EPA.¹¹
- Temperatures reported greater than 2000°F were replaced with a value of 2000°F.
- Null stack diameters, or reported diameters greater than 50 ft, were replaced with surrogate data in the SCC-based lookup tables posted by EPA.
- Whenever the diameter was replaced with a surrogate value, the exit gas velocity and flow were also replaced.
- If the diameter and exit gas velocity were provided but not flow, flow was calculated using the following equation:

$$\text{Stack Flow [cu ft/sec]} = (\pi * \text{Stack Diameter [ft]} / 2 ^ 2) * \text{Stack Velocity [ft/sec]}$$

- Flow was also recalculated using this equation if diameter, velocity, and flow were provided, but not consistent with one another.

3.6 BART Flag

The federal regional haze rule requires each state to submit a list of BART-eligible sources as part of its implementation plan or implementation plan revision. To aid in this process, the SSFJ has released a draft report that presents a regionally-consistent, preliminary list of eligible, non-eligible, and possibly-eligible BART sources. Updated versions of Appendices H and K of the WRAP report, *Identification of BART-Eligible Sources in the WRAP Region*,⁹ were used to populate the BART eligibility status field in the 2002 inventory files. The 2002 WRAP point source inventory includes SSFJ's initial BART assignment at the site level. The assignments are:

- Yes
- Likely
- Potentially
- Do not know
- No

For EGUs, there is also a BART assignment (if yes) at the unit level. There are no BART flag assignments for other types of units at this time.

3.7 Point Source Reporting Thresholds

In preparing an emission inventory, one key consideration is the point source reporting threshold. Emissions from facilities, or activities within facilities, that emit levels of pollutants below the threshold level for point sources will be addressed in the area source inventory. The point source reporting thresholds vary based on state or local regulations, or federal requirements. Some agencies, such as the Colorado Air Pollution Control Division, have a very low reporting threshold. This means that the point source inventory is likely to include some "traditional" area source categories such as gasoline stations and industrial boilers. As shown in Table 3-4, the point source reporting thresholds for the agencies can be based on actual emissions, or potential to emit (PTE), and may vary by pollutant. In evaluating and comparing emissions inventories from different agencies, it is important, therefore, that both point and area source categories be evaluated.

Table 3-4. 3-Year NEI/WRAP Point Source Reporting Thresholds

State	Point Source Reporting Cutoff
Alaska	100 tons PTE
Arizona ^a	100 tons PTE and synthetic minors
California	Varies by Air District
Colorado	2 tons
Idaho	100 tons
Montana	25 tons PTE
Nevada ^a	5 tons PTE
New Mexico	25 tons PTE
North Dakota	100 tons PTE
Oregon	40 tons PTE
South Dakota	100 tons
Utah	100 tons PTE
Washington ^{a, c}	5 tons CO; 2 tons NO _x , SO ₂ and VOC; 1.25 tons PM; 0.75 tons PM ₁₀
Wyoming	25 tons PTE
Tribes	Varies ^b

^a Local Air Districts may differ.

^b Typically Title V sources are inventoried as point sources.

^c Insignificant emission unit limits for permitting.

4.0 AREA SOURCES

For area sources, the QA of the 2002 WRAP inventory addressed all source categories with the following exceptions. These categories are handled separately by WRAP, and are not included in the 2002 WRAP area source inventory files:

- Wildfires, prescribed burning, agricultural burning, and rangeland fires;
- Ammonia from livestock, fertilizer usage, domestic sources, native soils, and wild animals;
- Biogenic sources; and
- Road dust and windblown dust.

The following section provides details, where appropriate, of the area source QA issues encountered, and how they were resolved. In most cases, the state, local, or tribal agency was contacted to help resolve an issue.

The area source QA consisted of checking for outliers and invalid codes, overlap between source categories, and completeness. To check for outliers and invalid codes, the EPA's Basic Format & Content Checker 3.0 was run on the files. Minor revisions were needed based on the results.

Several state agencies were contacted to confirm that there was no overlap within the reported area source estimates for the following source categories:

- Architectural surface coating - total vs. architectural surface coating - not elsewhere classified.
- Petroleum product storage: all storage types, working loss - total vs. petroleum product storage: all storage types, working loss - gasoline.
- Petroleum product transport: marine vessel, gasoline vs. petroleum product transport: marine vessel, gasoline via barge.
- Fabricated metals: coating, engraving, and allied services - total vs. fabricated metals: coating, engraving, and allied services - abrasive blasting.

The possibility of overlap within source category estimates developed by EPA was also evaluated -- commercial agricultural pesticide application vs. consumer pesticide application.

EPA staff were contacted to discuss this issue in case there is double-counting between these categories, and to determine if any adjustments should be made. EPA staff indicated that there is no double counting between these estimates; the total estimated VOC emissions (used only for gap filling) were simply divided evenly between the two categories.

4.1 Gap Filling

For most states, local agencies and tribes, the 2002 EDMS Version 1.0 inventory files were quite similar to the 2002 NEI files. The 1999 NEI and the 1996 WRAP inventory were also compiled in the master database. The 2002 WRAP inventory therefore contains some source category records that were pulled forward from the 1999 and 1996 inventories. It also includes pollutant-specific additions from the 1999 or 1996 inventories if they were not included in the 2002 files.

4.2 Oil and Gas Data

In Task 1.B of the Emission Inventory and Control Technology Technical Support project, emission estimates were developed for oil and gas area sources such as drill rigs, gas compressor engines, and coalbed methane pump engines. These emission estimates are included in the 2002 WRAP area source inventory. Details on development and collection of these area source datasets are provided in the report *Oil and Gas Emission Inventories for the Western States*.¹²

4.3 Area Source Controls

In the 2002 inventory files, the following area source categories are populated with control device flags for select states and counties—wind erosion, SIC 15-17 construction, road construction, and gasoline distribution Stage I. Other categories are regulated, based on information provided in the *Regional Technical Support Document for the Requirements of §309 of the Regional Haze Rule*.⁷ These include residential fuel combustion, open burning, and agricultural tilling. Any controls in place for these categories are reflected in the

reported emission levels for these categories. Likewise, controls in place because of Federal New Source Performance Standards (NSPS), National Emission Standards for hazardous air pollutants (NESHAPs), and Section 183(e) Rules for Volatile Organic Compounds are reflected in the reported emission levels. The area source categories affected by these standards may include, among others:

- Steam generating boilers
- Municipal solid waste landfills
- Degreasing
- Printing and publishing (surface coating)
- Consumer and commercial products
- Automobile refinish coatings
- Architectural coatings

4.4 State, Local, and Tribal Agency Revisions to the 2002 Draft NEI Inventory

To ensure the 2002 WRAP area source inventory is as up-to-date as possible, ERG incorporated state, local, and tribal agency revisions that were provided to the EPA for the draft NEI in June 2005. Table 4-1 lists the agencies that provided area source revisions to the EPA.

Table 4-1. State, Local, and Tribal Area Source Revisions to the NEI in June 2005

State/County/Tribe	Type of Revision
Arizona-Maricopa County	Revised 3 processes (commercial cooking)
Cortina Indian Rancheria of Wintun Indians of California	Added 2 residential fuel combustion categories
NM-Bernalillo County	Revised 10 categories
Utah	Revised numerous categories; 2 submittals
Colorado	Requested original state data for numerous categories
Oregon	Revised numerous categories
Washington	Revised 3 categories

5.0 2002 REVISED WRAP POINT AND AREA SOURCE EMISSION INVENTORY RESULTS

A draft revised 2002 WRAP inventory was posted for review by interested state, local, and tribal agencies in July 2005. Input was received and incorporated for Alaska, Arizona (Maricopa County), Colorado, Idaho, Oregon, New Mexico, North Dakota, South Dakota, Utah, and Washington, and a final revised inventory was placed into NIF3.0 format and submitted to the WRAP EDMS. This inventory was then posted to EDMS, along with revisions to emissions from other source types (e.g., mobile and nonroad sources), as inventory Version 1.2.

Subsequent to the posting of EDMS inventory Version 1.2, there was another round of comments received on the revised 2002 WRAP point and area sources inventory. This other round of comments resulted from state, local, and tribal agency and other stakeholder review of the 2002 emissions contained within the draft 2018 base case inventory prepared by ERG under Task 1.C. Upon WRAP/SSJF's request, ERG revised the 2002 inventory again; these final results are contained within the emissions summary tables described below, and posted to EDMS.

5.1 Improvements Made

The 2002 WRAP stationary sources inventory QA task was initiated to improve the 2002 WRAP emissions inventory, particularly for oil and gas area sources, and for large point sources on selected Tribal lands. A number of key improvements were made to the point and area source inventories as a result.

As discussed in Section 3, key point source improvements included supplementing Version 1.0 of the 2002 EDMS inventory with draft NEI data files for missing states, counties and tribes. Another critical improvement was the incorporation of CAMD SO₂ and NO_x CEM emissions data for EGUs that are regulated sources under the Acid Rain Program. Incorporation of the CAMD emissions makes the 2002 WRAP inventory consistent with the use of historical CEM data for the temporal profiles used by the WRAP RMC. Other key improvements were made for states where their inventory database systems failed to output data for all of the pollutants, or mislabeled emissions or emission units.

Section 4 discusses the area source QA activities for the 2002 WRAP emissions inventory. Again, one of the most critical improvements was the incorporation of draft NEI files for missing states, counties and tribes. As shown in Table 5-1, this is very important for states that do not inventory area sources. The incorporation of oil and gas production estimates, prepared in Task 1.B of the Emission Inventory and Control Technology Technical Support project, is also an important inventory improvement for states such as Colorado, Montana, New Mexico, and Wyoming. Oil and gas production has been recognized as a major contributor to stationary source emissions in the WRAP domain, but the emissions were not well-quantified in past inventories. Lastly, the incorporation of review comments provided by agencies via NEI and the 2002 WRAP area source review processes resulted in more accurate area source inventories for several states.

Table 5-1. Comparison of Area Source Categories

State/Tribe	Number of Categories in 2002 EDMS	Number of Categories in Revised 2002 Inventory
Alaska	--	67
Arizona	123	136
California ^a	--	96
Colorado	71	62
Idaho	104	106
Montana	--	115
Nevada	78	157
New Mexico	120	147
North Dakota	--	116
Oregon	96	138
South Dakota	--	111
Utah	56	107
Washington	27	111
Wyoming	63	129
Tribes (Total)	--	20

^a No gapfilling was performed for California.

5.2 Emission Summaries

Table 5-2 presents a summary of the 2002 point source emissions at the tribal- and state-level. Table 5-3 disaggregates the point source inventory into significant sectors (e.g., coal-fired EGUs,

copper smelters, cement and lime kilns, etc.). Table 5-4 presents a summary of the 2002 area source emissions at the tribal- and state-level. The disaggregated area source inventories for NO_x, SO₂, and PM₁₀ are presented in Tables 5-5 through 5-7.

In addition to the tabular presentation of results, the 2002 emission estimates can be viewed graphically (and compared to projected 2018 estimates) in the report *WRAP Point and Area Source Emissions Projections for the 2018 Base Case Inventory*.¹³

The tabular and graphical presentation of results indicate some interesting findings, such as:

- The distribution of emissions between point and area sources varies by pollutant. Both VOC and PM₁₀ are predominantly from area sources, while SO₂ is mainly from point sources. NO_x is similar to SO₂; however, the area source contribution is larger. In fact, area source NO_x exceeds point source NO_x in California and Idaho.
- Coal fired EGUs contribute over 50% of the point source NO_x emissions, and 70% of the point source SO₂ emissions.
- Oil and gas production contributes 33% of the area source NO_x emissions.
- Fuel combustion (residential, commercial/institutional, industrial, all fuels) contributes 73% of the area source SO₂ emissions.
- Agriculture production-crops contributes 44% of the area source PM₁₀ emissions.

Summary spreadsheets are also available that present emissions by State, Tribe, and county (2002PointStateSummaries.xls, 2002AreaStateSummaries.xls, 2002Point_CountyTotals.xls, and 2002Area_CountyTotals.xls).

Table 5-2. 2002 Revised WRAP Point Source Emissions Summary by State and Tribe

State	State FIPs	NO _x (Tons)	SO ₂ (Tons)	VOC (Tons)	CO (Tons)	PM10-PRI (Tons)	PM25-PRI (Tons)	NH ₃ (Tons)
Alaska	02	74,471	6,811	5,688	27,910	5,933	1,237	578
Arizona	04	64,084	93,756	5,464	15,232	9,533	1,059	531
California	06	104,435	42,120	54,151	120,089	29,946	20,276	433
Colorado	08	117,869	97,011	91,750	35,951	21,125	29	539
Idaho	16	11,486	17,597	2,113	23,981	1,085	443	1,074
Montana	30	53,415	36,879	7,577	33,199	8,127	309	318
Nevada	32	59,737	50,720	2,213	11,083	4,738	1,075	629
New Mexico	35	100,352	37,436	17,574	36,589	3,826	2,678	75
North Dakota	38	87,425	156,668	2,086	11,944	3,277	2,712	518
Oregon	41	24,959	17,587	27,846	35,494	10,442	8,885	948
South Dakota	46	20,697	14,022	2,542	4,700	974	246	100
Utah	49	91,044	42,838	7,482	51,572	12,904	4,473	1,937
Washington	53	43,631	52,969	18,616	114,317	9,910	3,642	3,863
Wyoming	56	117,883	119,645	19,663	36,361	31,731	13,653	685
Tribes (Total)	00	87,215	38,208	1,710	6,297	6,342	3,006	125
Total		1,058,702	824,265	266,484	564,719	159,892	63,723	12,352
Tribe	Tribal FIPs	NO _x (Tons)	SO ₂ (Tons)	VOC (Tons)	CO (Tons)	PM10-PRI (Tons)	PM25-PRI (Tons)	NH ₃ (Tons)
Arapahoe Tribe of the Wind River Reservation, Wyoming	281	54	939	60		11		
Assiniboine and Sioux Tribes of the Fort Peck Indian Reservation, Montana	206	151	1	25	104	42		
Cabazon Band of Cahuilla Mission Indians of the Cabazon Reservation, California	568	190	52	11	4	9		
Coeur d'Alene Tribe of the Coeur d'Alene Reservation, Idaho	181	323	12	289	569	1,127		

Table 5-2. 2002 Revised WRAP Point Source Emissions Summary by State and Tribe (Continued)

Tribe	Tribal FIPs	NO _x (Tons)	SO ₂ (Tons)	VOC (Tons)	CO (Tons)	PM10-PRI (Tons)	PM25-PRI (Tons)	NH ₃ (Tons)
Confederated Tribes and Bands of the Yakama Nation, Washington	124	60	16	120	95	96		
Confederated Tribes of the Colville Reservation, Washington	101	227	22	58	570	308		
Confederated Tribes of the Umatilla Reservation, Oregon	143					6	1	
Fort Mojave Indian Tribe of Arizona, California & Nevada	604					13		
Gila River Indian Community of the Gila River Indian Reservation, Arizona	614	65	15	124	69	181		
La Posta Band of Diegueno Mission Indians of the La Posta Indian Reservation, California	577	1	0	0	0	5		
Navajo Nation, Arizona, New Mexico & Utah	780	83,387	37,028	915	4,621	4,115	2,929	125
Pueblo of Laguna, New Mexico	707	1,439	0	10				
Pueblo of Santa Ana, New Mexico	715	209	53	49	64	54		
Salt River Pima-Maricopa Indian Community of the Salt River Reservation, Arizona	615	212	65	29	95	284	69	
Shoshone-Bannock Tribes of the Fort Hall Reservation of Idaho	180	855	1	20	106	2		
Tohono O'Odham Nation of Arizona	610	42	3			68		
Ute Mountain Tribe of the Ute Mountain Reservation, Colorado, New Mexico & Utah	751					23	7	
Total		87,215	38,208	1,710	6,297	6,342	3,006	125

Table 5-3. 2002 Point Source Emissions by Sector

State	NO _x (Tons)	SO ₂ (Tons)	VOC (Tons)	PM ₁₀ -PRI (Tons)	PM ₂₅ -PRI (Tons)	NH ₃ (Tons)
WRAP Point Sources Total	1,058,743	824,260	266,469	159,905	63,741	12,352
Coal-fired EGUs Total	574,643	581,397	3,988	32,064	14,760	2,884
Arizona	45,401	66,642	193	1,129	96	172
California	397	342	3	19	7	
Colorado	72,513	89,157	450	2,455	0	299
Idaho	0	0	0	0	0	
Montana	35,644	21,846	331	632	0	11
Nevada	38,872	49,198	186	2,657	426	127
New Mexico	33,997	18,233	184	1,769	399	5
North Dakota	75,950	140,534	781	2,911	2,349	378
Oregon	8,401	12,262	62	695	2	31
South Dakota	14,954	11,756	108	234	234	50
Utah	71,388	32,130	306	3,689	1,645	1,303
Washington	15,463	19,032				
Wyoming	84,518	83,411	852	11,774	6,673	382
Tribes	77,146	36,854	533	4,100	2,929	125
Other EGUs Total	66,689	19,811	10,671	10,510	4,933	1,295
Alaska	11,077	3,339	153	814	2	
Arizona	5,819	1,680	344	1,053	378	288
California	16,369	1,029	1,601	3,072	3,003	88
Colorado	4,327	96	553	821	29	154
Idaho	19	0	0	2		
Montana	395	1,550	24	115		0
Nevada	13,070	108	449	712	117	342
New Mexico	3,075	46	148	186	70	7
North Dakota						31
Oregon	497	23	44	122	37	130
South Dakota	967	786	4	37		
Utah	1,891	1,138	122	172	90	40
Washington	5,721	2,791	2,121	2,274	1,207	178
Wyoming	3,243	7,171	5,098	1,108		36
Tribes	218	56	12	23		
Copper Smelters Total	538	25,044	205	832	155	0
Arizona	377	24,105	195	639		0
Utah	161	939	10	194	155	0

Table 5-3. 2002 Point Source Emissions by Sector (Continued)

State	NO _x (Tons)	SO ₂ (Tons)	VOC (Tons)	PM ₁₀ -PRI (Tons)	PM ₂₅ -PRI (Tons)	NH ₃ (Tons)
Cement and Lime Kilns Total	56,061	8,489	1,192	8,190	1,884	31
Arizona	6,533	987	38	1,410		
California	20,555	3,292	248	3,498	1,388	0
Colorado	3,844	670	208	958		
Idaho	672	40	7			6
Montana	3,570	601	9	509	0	1
Nevada	4,547	426	144			
New Mexico	804	15	37	97		
Oregon	1,741	38	15	64		
South Dakota	3,846	760	108	270		
Utah	3,965	374	326	835	367	24
Washington	3,747	1,068	0	280	128	0
Wyoming	2,232	210	46	232		
Tribes	6	9	4	38		
Oil & Gas Refining and Distribution Total	38,522	65,051	23,248	4,250	2,007	357
Alaska	2,256	518	864	169	33	16
Arizona	1,559	1	39	24	10	10
California	14,077	22,305	8,070	1,675	1,599	
Colorado	1,047	2,584	822	304		1
Montana	2,644	8,827	3,408	461	1	41
Nevada	82	93	62			
New Mexico	1,572	3,645	2,777	276	194	4
North Dakota	4,345	10,245	356			0
Oregon	805	4	25	9	1	
South Dakota	0	0	0	0		
Utah	1,947	2,781	1,342	300	156	272
Washington	4,647	7,674	1,501	413	14	2
Wyoming	1,753	6,374	3,972	617	0	11
Tribes	1,789	0	10	1		
Oil & Gas Production Total	188,134	36,133	93,808	5,053	4,007	133
Alaska	45,822	826	2,310	2,253	822	21
Arizona	2,735	3	233	48		
California	16,707	2,556	7,101	1,698	1,699	7
Colorado	25,955	93	63,960	401		
Idaho	2,590	7	78			
Montana	4,275	11	687	22	0	
Nevada	83	0	23	0		
New Mexico	57,173	14,156	11,527	330	1,382	32

Table 5-3. 2002 Point Source Emissions by Sector (Continued)

State	NO _x (Tons)	SO ₂ (Tons)	VOC (Tons)	PM ₁₀ -PRI (Tons)	PM ₂₅ -PRI (Tons)	NH ₃ (Tons)
North Dakota	4,739	2,949	187	7	7	1
Oregon	1,182	8	40	15	0	
South Dakota	323	10	26	128		
Utah	3,311	1,457	852	22	24	73
Washington	1,281	19	64	72	54	
Wyoming	15,015	13,822	6,283	27	18	0
Tribes	6,943	217	437	30		
All Other Point Sources Total	134,156	88,334	133,357	99,006	35,996	7,651
Alaska	15,317	2,127	2,360	2,697	379	542
Arizona	1,661	334	4,410	5,226	570	59
California	36,330	12,597	37,136	19,984	12,580	339
Colorado	10,182	4,411	25,758	16,186		85
Idaho	8,206	17,550	2,027	1,085	442	1,068
Montana	6,887	4,044	3,118	6,388	307	265
Nevada	3,121	896	1,350	1,395	558	160
New Mexico	3,730	1,342	2,900	1,169	633	27
North Dakota	2,392	2,939	763	359	356	107
Oregon	12,333	5,252	27,659	9,537	8,845	787
South Dakota	607	709	2,297	305	13	50
Utah	8,382	4,019	4,526	7,692	2,036	224
Washington	12,773	22,386	14,930	6,873	2,239	3,683
Wyoming	11,122	8,658	3,411	17,973	6,962	255
Tribes	1,113	1,071	714	2,137	77	

Table 5-4. 2002 Revised WRAP Area Source Summary by State and Tribe

State	State FIPs	NO _x (Tons)	SO ₂ (Tons)	VOC (Tons)	CO (Tons)	PM10-PRI (Tons)	PM25-PRI (Tons)	NH ₃ (Tons)
Alaska	02	8,488	5,531	13,020	27,258	15,042	5,474	472
Arizona	04	9,049	2,677	108,332	49,957	99,963	28,290	5,922
California	06	114,471	8,314	343,778	374,891	179,932	85,948	7,510
Colorado	08	34,846	6,559	124,578	87,628	157,875	42,612	77
Idaho	16	30,318	2,916	123,944	34,271	50,992	5,729	1,684
Montana	30	12,072	3,299	55,104	36,903	153,207	35,456	460
Nevada	32	5,787	12,954	29,977	13,737	68,009	16,074	1,120
New Mexico	35	85,576	6,559	219,124	37,284	109,381	26,626	636
North Dakota	38	15,457	5,748	69,795	21,970	287,622	60,308	368
Oregon	41	14,825	9,932	251,802	352,955	177,460	69,096	227
South Dakota	46	6,345	10,167	42,661	24,249	209,041	45,029	381
Utah	49	11,335	3,581	85,320	42,929	30,256	4,975	1,320
Washington	53	18,355	7,388	198,283	222,555	283,542	93,472	4,471
Wyoming	56	34,891	17,902	140,248	29,292	37,511	10,804	389
Tribes (Total)	00	2,932	49	8,472	283	1,978	398	0
Total		404,749	103,577	1,814,439	1,356,163	1,861,810	530,289	25,034
Tribe	Tribal FIPs	NO _x (Tons)	SO ₂ (Tons)	VOC (Tons)	CO (Tons)	PM10-PRI (Tons)	PM25-PRI (Tons)	NH ₃ (Tons)
Arapahoe Tribe of the Wind River Reservation, Wyoming	281	1,169	46	3,961	49			
Assiniboine and Sioux Tribes of the Fort Peck Indian Reservation, Montana	206	57	1	1,374	118	1,976	398	0
Cortina Indian Rancheria of Wintun Indians of California	513	0	0	0	2	2		
La Posta Band of Diegueno Mission Indians of the La Posta Indian Reservation, California	577	0	0	0	0	0	0	
Navajo Nation, Arizona, New Mexico & Utah	780	1,167	2	2,344	101			
Ute Mountain Tribe of the Ute Mountain Reservation, Colorado, New Mexico & Utah	751	540	0	793	13			
Total		2,932	49	8,472	283	1,978	398	0

^a The 2002 inventory includes emissions for Broomfield County, CO, (FIPS 08014). However, the Regional Modeling Center allocates emissions for this relatively “new” county to the surrounding counties.

Table 5-5. 2002 Area Source NO_x Emissions by Sector

State	NO_x (Tons)
WRAP Area Sources (all categories)	404,718
Commercial/Institutional Heating - Natural Gas	26,871
Alaska	760
Arizona	1,462
California	14,564
Colorado	1,893
Idaho	739
Montana	657
Nevada	483
New Mexico	613
North Dakota	522
Oregon	1,231
South Dakota	486
Utah	219
Washington	2,742
Wyoming	490
Tribes	9
Industrial Combustion - Bituminous Coal	9,807
Arizona	565
Idaho	1,631
Montana	530
Nevada	962
New Mexico	196
South Dakota	2,079
Utah	0
Washington	434
Wyoming	3,408
Industrial Combustion - Distillate Oil	12,235
Arizona	1,267
California	203
Colorado	1,371
Idaho	1,508
Montana	681
Nevada	1,037
New Mexico	412
North Dakota	1,440
Oregon	359
South Dakota	831
Washington	1,502
Wyoming	1,625

Table 5-5. 2002 Area Source NO_x Emissions by Sector (Continued)

State	NO_x (Tons)
Industrial Combustion - Natural Gas	75,563
Alaska	2,048
Arizona	301
California	33,875
Idaho	1,067
Montana	333
Nevada	621
New Mexico	16,821
North Dakota	6,908
Oregon	2,360
South Dakota	822
Washington	2,711
Wyoming	7,697
Oil and Gas Production	133,252
Alaska	886
California	8,071
Colorado	23,147
Montana	7,792
Nevada	62
New Mexico	60,446
North Dakota	4,631
Oregon	85
South Dakota	367
Utah	5,190
Wyoming	19,699
Tribes	2,875
Residential Heating - LPG	4,373
Alaska	32
Arizona	215
California	1,146
Colorado	549
Idaho	421
Montana	158
Nevada	124
New Mexico	340
North Dakota	301
Oregon	162
South Dakota	286
Utah	150
Washington	355

Table 5-5. 2002 Area Source NO_x Emissions by Sector (Continued)

State	NO_x (Tons)
Wyoming	107
Tribes	25
Residential Heating - Natural Gas	45,564
Alaska	751
Arizona	1,654
California	21,978
Colorado	5,419
Idaho	958
Montana	943
Nevada	1,499
New Mexico	1,688
North Dakota	515
Oregon	1,809
South Dakota	593
Utah	3,860
Washington	3,374
Wyoming	508
Tribes	15
Woodstoves and Fireplaces	13,649
Alaska	157
Arizona	183
California	3,761
Colorado	916
Idaho	170
Montana	273
Nevada	118
New Mexico	144
North Dakota	181
Oregon	4,293
South Dakota	213
Utah	150
Washington	2,851
Wyoming	238
Tribes	0
OTHER	83,404
Alaska	3,853
Arizona	3,402
California	30,872
Colorado	1,552
Idaho	23,824
Montana	704

Table 5-5. 2002 Area Source NO_x Emissions by Sector (Continued)

State	NO_x (Tons)
Nevada	880
New Mexico	4,886
North Dakota	959
Oregon	4,526
South Dakota	669
Utah	1,766
Washington	4,384
Wyoming	1,119
Tribes	7

Table 5-6. 2002 Area Source SO₂ Emissions by Sector

State	SO₂ (Tons)
WRAP Area Sources (all categories)	103,577
Commercial/Institutional Heating - Bituminous Coal	8,550
Alaska	2,474
Arizona	2
Colorado	2,054
Idaho	106
Montana	30
Nevada	11
New Mexico	63
South Dakota	1
Utah	1,749
Washington	186
Wyoming	1,872
Commercial/Institutional Heating - Natural Gas	138
Alaska	5
Arizona	7
California	72
Colorado	5
Idaho	4
Montana	4
Nevada	5
New Mexico	4
North Dakota	3
Oregon	8
South Dakota	3
Utah	2
Washington	16
Wyoming	1
Tribes	0
Industrial Combustion - Bituminous Coal	26,031
Arizona	918
Idaho	1,746
Montana	1,095
Nevada	4,935
New Mexico	508
South Dakota	6,966
Utah	0
Washington	750
Wyoming	9,111

Table 5-6. 2002 Area Source SO₂ Emissions by Sector (Continued)

State	SO ₂ (Tons)
Industrial Combustion - Distillate Oil	26,956
Arizona	1,117
California	249
Colorado	2,920
Idaho	90
Montana	1,450
Nevada	7,301
New Mexico	878
North Dakota	3,068
Oregon	1,453
South Dakota	1,769
Washington	3,200
Wyoming	3,461
Industrial Combustion - Residual Oil	11,132
Alaska	130
Arizona	55
California	2,555
Idaho	7
Nevada	396
New Mexico	2,913
North Dakota	254
Oregon	2,693
South Dakota	752
Wyoming	1,377
Oil and Gas Production	3,828
Alaska	66
California	57
Colorado	260
Montana	227
Nevada	1
New Mexico	1,444
North Dakota	358
South Dakota	8
Utah	147
Wyoming	1,213
Tribes	48
Residential Heating - LPG	82
Alaska	0
Arizona	1
California	61

Table 5-6. 2002 Area Source SO₂ Emissions by Sector (Continued)

State	SO₂ (Tons)
Colorado	4
Idaho	3
Montana	1
Nevada	1
New Mexico	2
North Dakota	2
Oregon	1
South Dakota	2
Utah	1
Washington	2
Wyoming	1
Tribes	0
Residential Heating - Natural Gas	296
Alaska	5
Arizona	11
California	145
Colorado	35
Idaho	6
Montana	6
Nevada	9
New Mexico	11
North Dakota	3
Oregon	12
South Dakota	4
Utah	25
Washington	22
Wyoming	4
Woodstoves and Fireplaces	1,931
Alaska	24
Arizona	28
California	550
Colorado	177
Idaho	26
Montana	42
Nevada	11
New Mexico	22
North Dakota	28
Oregon	616
South Dakota	33
Utah	23
Washington	332

Table 5-6. 2002 Area Source SO₂ Emissions by Sector (Continued)

State	SO ₂ (Tons)
Wyoming	20
Tribes	0
OTHER	24,633
Alaska	2,828
Arizona	538
California	4,625
Colorado	1,104
Idaho	928
Montana	443
Nevada	286
New Mexico	714
North Dakota	2,031
Oregon	5,149
South Dakota	628
Utah	1,635
Washington	2,879
Wyoming	843
Tribes	1

Table 5-7. 2002 Area Source PM₁₀-PRI Emissions by Sector

State	PM₁₀-PRI (Tons)
WRAP Area Sources (all categories)	1,861,810
Agriculture Production - Crops	812,343
Arizona	17,088
California	36,186
Colorado	90,207
Idaho	15,429
Montana	89,485
Nevada	559
New Mexico	17,158
North Dakota	235,684
Oregon	32,379
South Dakota	156,837
Utah	20,626
Washington	95,762
Wyoming	3,034
Tribes	1,910
Commercial/Institutional Heating - Natural Gas	2,139
Alaska	58
Arizona	86
California	1,177
Colorado	224
Montana	50
Nevada	75
New Mexico	47
North Dakota	40
Oregon	99
South Dakota	37
Washington	208
Wyoming	37
Tribes	1
Construction	669,647
Alaska	5,326
Arizona	61,695
California	70,655
Colorado	52,168
Idaho	27,050
Montana	27,913
Nevada	52,443
New Mexico	76,802
North Dakota	20,571

Table 5-7. 2002 Area Source PM₁₀-PRI Emissions by Sector (Continued)

State	PM₁₀-PRI (Tons)
Oregon	93,264
South Dakota	10,984
Utah	6,478
Washington	140,333
Wyoming	23,964
Tribes	2
Food and Kindred Products	23,256
Alaska	228
Arizona	1,973
California	12,288
Colorado	1,843
Idaho	431
Montana	365
Nevada	109
New Mexico	619
North Dakota	180
Oregon	1,746
South Dakota	252
Utah	605
Washington	2,411
Wyoming	205
Mining and Quarrying	146,311
Alaska	3,644
Arizona	9,923
California	1,377
Montana	29,250
Nevada	12,142
New Mexico	8,745
North Dakota	27,683
Oregon	6,246
South Dakota	34,473
Washington	6,767
Wyoming	5,999
Tribes	62
Oil and Gas Production	189
California	189
Open Burning - Land Clearing Debris	15,723
Arizona	2,189
Montana	888
Nevada	215
New Mexico	1,159

Table 5-7. 2002 Area Source PM₁₀-PRI Emissions by Sector (Continued)

State	PM₁₀-PRI (Tons)
North Dakota	37
Oregon	1,834
South Dakota	205
Washington	8,805
Wyoming	392
Open Burning - Residential Household Waste	24,803
Alaska	664
Arizona	2,773
Idaho	5,819
Montana	1,235
Nevada	367
New Mexico	1,936
North Dakota	884
Oregon	3,501
South Dakota	1,115
Utah	131
Washington	6,012
Wyoming	367
Residential Heating - Natural Gas	3,216
Alaska	61
Arizona	134
California	1,876
Colorado	438
Montana	76
Nevada	90
New Mexico	136
North Dakota	42
South Dakota	48
Washington	273
Wyoming	41
Tribes	1
Woodstoves and Fireplaces	130,820
Alaska	1,746
Arizona	2,097
California	41,298
Colorado	11,388
Idaho	2,263
Montana	3,025
Nevada	640
New Mexico	1,565
North Dakota	2,000

Table 5-7. 2002 Area Source PM₁₀-PRI Emissions by Sector (Continued)

State	PM₁₀-PRI (Tons)
Oregon	37,628
South Dakota	2,361
Utah	1,575
Washington	20,854
Wyoming	2,378
Tribes	0
OTHER	33,364
Alaska	3,316
Arizona	2,006
California	14,887
Colorado	1,606
Idaho	0
Montana	920
Nevada	1,369
New Mexico	1,214
North Dakota	502
Oregon	761
South Dakota	2,729
Utah	840
Washington	2,117
Wyoming	1,094
Tribes	2

6.0 REFERENCES

1. 2002 Emission Data Management System (EDMS) Version 1.0 Inventory for Point and Area Sources. Western Regional Air Partnership, Emissions Forum. 2005. http://www.wrapdms.org/default_login.asp
2. Documentation for the Draft 2002 Point Source National Emissions Inventory. U.S. Environmental Protection Agency, Emission Inventory Group, Research Triangle Park, North Carolina. 2005. <http://www.epa.gov/ttn/chief/net/2002inventory.html#point>
3. Documentation for the Draft 2002 Nonpoint Source National Emission Inventory for Criteria and Hazardous Air Pollutants. U.S. Environmental Protection Agency, Emission Inventory Group, Research Triangle Park, North Carolina. 2005. <http://www.epa.gov/ttn/chief/net/2002inventory.html#nonpoint>
4. 2002 Emission Tracking System/Continuous Emissions Monitoring (ETS/CEM) Annual and Ozone Season Data Files, U.S. Environmental Protection Agency, Clean Air Markets Division, Washington, D.C. 2004. <http://www.epa.gov/airmarkets/arp/>
5. Steam-Electric Plant Operation and Design Report, Form EIA-767, Data Files for 1985-2002, U.S. Department of Energy, Energy Information Administration, Washington, D.C. 2003. <http://www.eia.doe.gov/cneaf/electricity/page/eia767.html>
6. Documentation for the Final 1999 National Emissions Inventory (Version 3) for Criteria Air Pollutants and Ammonia. U.S. Environmental Protection Agency, Emission Inventory Group, Research Triangle Park, North Carolina. 2004. <http://www.epa.gov/ttn/chief/net/1999inventory.html#final3crit>
7. Regional Technical Support Document for the Requirements of §309 of the Regional Haze Rule. WRAP Technical Oversight Committee. 2003. <http://www.wrapair.org/309/index.html#TSD>
8. How to Incorporate the Effects of Air Pollution Control Device Efficiencies and Malfunctions into Emission Inventory Estimates. Emission Inventory Improvement Program (EIIP) Point Sources Committee. Volume II, Chapter 12. 2000. <http://www.epa.gov/ttn/chief/eiip/techreport/volume02/ii12.pdf>
9. Draft Report: Identification of BART-Eligible Sources in the WRAP Region. Western Regional Air Partnership, Stationary Sources Joint Forum. 2005. <http://www.wrapair.org/forums/ssjf/bartsources.html>
10. Point Source Emission Inventories on Native American Reservations and Tribal Lands. Western Regional Air Partnership Stationary Sources Joint Forum. 2006.

11. NEI Quality Assurance and Data Augmentation for Point Sources. U.S. Environmental Protection Agency, Emission Inventory Group, Research Triangle Park, North Carolina. 2005.
http://www.epa.gov/ttn/chief/net/augmentation/2002_nei_qa_augmentation_report02012005.pdf
12. Oil and Gas Emission Inventories for the Western States. Western Regional Air Partnership Stationary Sources Joint Forum. 2005.
13. WRAP Point and Area Source Emissions Projections for the 2018 Base Case Inventory. Western Regional Air Partnership Stationary Sources Joint Forum. 2006.