Refining and Analyzing Point and Area Source Emissions Data for Use in Regional Haze Planning

Paula G. Fields
Eastern Research Group, Inc. (ERG)
8950 Cal Center Drive, Suite 348, Sacramento, CA 95826
Paula.Fields@erg.com

Lee Gribovicz
Western Regional Air Partnership (WRAP)
3218 Locust Drive, Cheyenne, WY 82001
lg@westgov.org

ABSTRACT

The Western Regional Air Partnership (WRAP) is assessing air quality impacts and evaluating emission control strategies for implementing a regional haze program within its geographic domain. The domain includes the states of Alaska, Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, North Dakota, Oregon, South Dakota, Utah, Washington, Wyoming, and the Native American reservations located within those states. To assist the WRAP with this assessment and to provide base year (2002) and projection year (2018) inputs into the visibility models used by the WRAP's Regional Modeling Center, the WRAP and its contractors developed initial inventories during calendar year 2005, and then continued to refine them over succeeding years to make corrections and updates, in an effort to provide the most accurate inventories possible.

This paper provides a background on the point and area source emissions inventories developed for the WRAP region, their evolution, and how improvements have been made. Also explained are the ways the emissions data have, and continue to be, used by WRAP and its members to address special analytical needs of the visibility planning process. Some of the uses to which the Emission Inventories have been put include: developing stationary source emission limits for sulfur dioxides (SO_2) and nitrogen oxides (NO_x) under Best Available Retrofit Technology (BART) implementation; evaluating reasonable progress toward regional haze reduction goals; providing a baseline and subsequent annual emissions milestones for the SO_2 Annex (i.e., an alternative SO_2 Milestone and Backstop Emissions Trading Program); and providing emissions in formats needed for modeling and dissemination to the WRAP's state, local and tribal members. This paper also examines the strengths and weaknesses of the inventories to-date, with an eye on continued opportunities for improvement in the future.

INTRODUCTION

The purpose of the WRAP is to identify regional or common air management issues, develop and implement strategies addressing these issues, and formulate and advance western regional policy positions on air quality. Included in this purpose is the implementation of the Grand Canyon Visibility Transport Commission's recommendations on Regional Haze.[1] The WRAP Charter and Bylaws set forth the organizations goals, principles, and operating procedures.[2]

The scope of the project discussed in this paper covers stationary point and area sources located within the WRAP states of Alaska, Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, North Dakota, Oregon, South Dakota, Utah, Washington, and Wyoming, plus tribal sources within those states. Certain area sources are excluded because they have been dealt with by other contractor teams (e.g., fugitive dust, fires, area ammonia sources, etc.). The 2002 WRAP-wide emissions inventory was compiled, and a 2018 inventory was developed in 2005, and both were revised in 2007. This paper describes how the inventories were revised and improved, and subsequently used in

analyses by the WRAP members for assessing emission impacts from specific sectors, identifying sources for control, and regional haze modeling.

Looking forward, the WRAP is implementing three interrelated goals for simultaneous concurrent action between 2008 and 2012:

1. In 2008-09, coordinate and support the submittal, review, and approval of regional haze implementation plans.
2. In 2009, begin refinement of regional data and development of analysis tools for strategic evaluation of ongoing and future control programs for air quality planning focusing on:
    a) Tracking, reporting, and analyzing progress for regional haze;
    b) Regional contributions to ozone and particulate matter (PM) health and welfare standards' nonattainment issues at various scales;
    c) Understanding and analyzing the nature and causes of mercury, acid deposition, and critical loads in the West; and
    d) Regionally-appropriate and effective emissions management strategies and programs.
3. In concert with emerging efforts to manage and adapt to climate change, fully integrate data for both energy supply and use as well as activity changes for sources of greenhouse gas emissions into air quality analyses.

The WRAP is composed of several forums, committees, and work groups. All these groups include participation from the WRAP membership (states, tribes, and federal agencies) and interested stakeholders. Stakeholders include members of affected business and industry, local governments, academia, environmental organizations, and the general public. An organizational chart of the WRAP forum/committee/workgroup structure is presented in Figure 1. WRAP committee and forum members are expected to represent and communicate with their agencies and constituents. Forum and committee members are responsible for establishing mechanisms that will ensure this communication occurs. These mechanisms may involve working through trade groups, state and tribal organizations such as the Western States Air Resource Council (WESTAR Council), the National Tribal Environmental Council (NTEC), and intra- and inter-agency forums. The WRAP operates through consensus, not a majority basis. Stakeholders, in addition to states, tribes, federal land managers (FLM), and U.S. EPA representatives, are included in the consensus process at the committee, forum, and work group levels.

Emissions inventory data are one of the cornerstones for identifying regional management issues and developing strategies to address these issues. Emissions data lay the foundation for identifying source contributions and geographic location of emissions affecting ambient air quality. Also, emissions data are one of the critical input parameters for modeling air quality impacts in a given area of concern. Baseline conditions, impacts of implemented air pollution control strategies, and demonstrating reasonable progress called for in the Regional Haze Rule (RHR) are all outputs of the modeling process that would be impossible to characterize without the necessary emission inventory data that are theoretically distributed through the air quality modeling process.

WRAP MODELING EMISSION INVENTORY REFINEMENTS

As shown in Figure 2, the WRAP 2002 point and area sources "base case" emissions inventory was first compiled in January 2006.[3] Then in May 2007, some issues with the 2002 and 2018 base case emissions inventories were corrected, while others were deferred if they were too extensive to be dealt with under that project's schedule and budget.[4] The objective of the most recent emission inventory

improvement efforts in late 2007 was to make a second and final revision to the 2002 emissions inventory for regional haze planning and modeling purposes. This revision is referred to as the Plan02d emissions inventory.

The emissions inventory refinements in the Plan02d inventory addressed these specific changes:

- Remaining 2002 issues that were deferred from the work completed in May 2007 (e.g., missing sources, updated 2002 emissions, etc.);
- Updating the current status of point sources related to the Best Available Retrofit Technology (BART) requirements under the regional haze rule; and
- Correcting erroneous or missing Standard Industrial Classification (SIC) and/or source classification code (SCC) codes.

Outstanding issues from previous revision. In May 2007, when the 2018 inventory was revised, certain revisions affected 2002 emissions, as well. For example, it was discovered that $PM_{2.5}$ emissions were missing for some sources operating in Clark County, Nevada. These were updated in the 2018 inventory during the revision in May 2007, but the change was not yet reflected in the 2002 base year inventory. Therefore, the change was made during the final update to Plan02d.

BART status lists. The WRAP 2002 emissions inventory database was updated to reflect the most current BART status based on the information contained in the WRAP BART "Clearinghouse" spreadsheet (2007-10-31_WRAP BART Tracking Sheet.xls).[5] Spreadsheets were generated, by state and tribe, containing records with assigned BART "flags" (i.e., "Y" if the source is either subject to or eligible for BART; "N" if the source has been determined not to be subject to or eligible for BART). A focus of this review was to ensure that the flags were assigned correctly, and that the appropriate records (i.e., units or SCCs) carried the flag. In some cases, the BART clearinghouse did not denote the specific unit at a subject facility, so ERG assigned the flag to all records associated with the facility. The agencies were requested to confirm this assignment to individual units.

Potentially erroneous SICs and SCCs. An objective of this project was to correct any mistakes in the SICs and/or SCCs for a given facility, with a focus on SIC 4911 (Electric Services), SIC 4931 (Combination Electric and Gas and Other Utilities), and SCCs beginning with 101 (External Combustion Boilers, Electric Generation). During previous updates it became apparent that some records were coded with a SCC of 10100501 (External Combustion Boilers: Electric Generation – Distillate Oil – Grades 1 and 2 Oil), for example, when they should have been coded with a SCC of 10200501 (External Combustion Boilers: Industrial – Distillate Oil – Grades 1 and 2 Oil).

Spreadsheets containing a list of outstanding issues, a BART flags worksheet, and SIC/SCC list worksheet were transmitted via e-mail to each agency with sources affected by these changes. Agencies were asked to respond to questions or confirm changes to be made in the corresponding 2002 record(s). After each agency responded, updates were made to the 2002 emissions inventory data to reflect the changes. The result was the Plan02d emissions inventory.

Figures 2, 3, and 4 summarize the NO_x, SO_2, and PM_{10} emissions in the WRAP region for the most sources having the highest level of emissions. The emissions are shown along with the count of facilities contributing to the emission levels. For example, all three figures show that show that Electric Generating Units (EGU) burning bituminous coal are the single largest contributor of point source NO_x, SO_2, and PM_{10} emissions in the WRAP region. However, these pollutants are emitting from a relatively small number of sources (i.e., 54 to 58 facilities).

Remaining Potential Improvements to the Point Source Inventory. Figures 2, 3, and 4 indicate that for coal-fired EGU facilities, all three pollutants (NO_x, SO_2, PM_{10}) are not reported for all facilities,

indicating potential missing pollutant emissions. For example, the NOx chart in Figure 2 shows 58 facilities contributing all NO_x emissions from EGU boilers burning bituminous/subbituminous coal, while 59 facilities contribute all SO_2 emissions from EGU boilers burning bituminous/subbituminous coal. In fact, a coal-fired power plant in Montana has reported emissions of SO_2 and none of NO_x, which is apparently an error (although this needs to be confirmed). Also, it has been observed that agencies do not use consistent pollutant codes or designations for reporting PM_{10} and $PM_{2.5}$ emissions in their inventories to the U.S. EPA, and these inconsistencies have been carried through to the WRAP point source inventory. For example, one agency may report PM10 emissions as "PM-PRI" (i.e., primary PM), while another agency may report PM_{10} emissions as "PM10-PRI" (i.e., primary PM_{10}). Only PM10-PRI emissions are incorporated in the WRAP inventory, thus creating an underestimate in the WRAP inventory for PM_{10}.

Another area of improvement in the point source emissions inventory is the lack of existing control information. As the visibility planning efforts move to focus on the non-EGU sectors to achieve additional emission reductions, the emissions data for the non-EGU point sources will be used more and more. An important element to be examined will be to determine the level of existing controls in place. However, because control data (e.g., control device type, capture and control efficiencies) are not "required" fields for emissions reporting to the U.S. EPA, most inventories do not contain this information, making it difficult to assess the opportunity for emission reductions from control of these sources.

ANALYSIS WITH WRAP EMISSIONS INVENTORY DATA

The various emissions inventories developed for the WRAP region support regional haze compliance in several ways. First, they provide a comprehensive baseline of sources and emissions of visibility pollutants in the WRAP states. They provide a forecast of future year emissions, assuming growth occurs and existing on-the-books regulations are fully implemented. Emissions data are also used to identify sources subject to specific control requirements under the Regional Haze Rule, and to assess "reasonable progress" toward emission reduction goals. These types of analyses using the WRAP point and area source emissions inventories are described below.

Best Available Retrofit Technology (BART) Analyses

The Best Available Retrofit Technology (BART) rule was finalized by U.S. EPA in 2005. A BART-eligible source must meet three criteria contained in the U.S. EPA BART Guidelines (July 6, 2005 FR). First, the source must have been constructed or reconstructed between 1962 and 1977. Second, it must be an industrial process that is included as one of the 26 source categories shown in Table 1.[6] Finally, to be a BART-eligible source, it must have the potential-to-emit (PTE) greater than 250 tons per year (TPY) of "visibility-impairing pollutants." Figure 6 illustrates the process for determining BART eligibility.

Once determined to be BART-eligible, the next test is whether the source is "Subject to BART". This is accomplished by dispersion modeling (or an alternative process known as "Model Plants") to demonstrate whether the source may "reasonably be anticipated to cause or contribute to … visibility impairment in a Class I area." If this source is shown to "cause or contribute" visibility impairment, it is now defined as being "Subject to BART". A "Subject" source must then undergo a "BART engineering analysis" to determine the level of control necessary based on a set of economic and environmental factors specified in the BART Guidelines. States must include these BART determinations in their visibility SIPs, and mandated retrofit emission controls must be implemented within five years of U.S. EPA approval of the SIP.

The WRAP has developed the "BART Clearinghouse" for cataloging activity related to BART eligibility and BART determinations. This clearinghouse is a spreadsheet that lists the BART-eligible sources that have been identified in each of the WRAP Region States and Tribal Lands. Periodic revisions to the spreadsheet then track over time the status of the "Subject to BART" determinations and the conclusions reached by the Regulatory Authority (states, local, federal, and tribal air agencies) as to appropriate control measures/emission rates warranted by the cost and environmental considerations of the BART analyses. Updates to the BART Clearinghouse spreadsheet are posted on the WRAP Web site.

Information contained in the BART Clearinghouse is obtained via consultation between the WRAP Staff and representatives of the State/Tribal Air Agencies. As of February 2008, there were approximately 44 BART-Eligible Electric Generating Units (EGU) Facilities and 49 other Non-EGU Facilities identified within the WRAP Region that were being evaluated under the BART program. As shown in Table 2, no BART determinations had been completed on any of those eligible facilities by that time, and none were expected prior to mid to late 2008.

A crucial first phase in complying with the BART rule is determining which sources are BART-eligible according to the procedure and criteria shown in Figure 6. Integral to this process is having an accurate emissions inventory that reflects the current "allowable" emissions of each source in order to determine if the source's emissions would exceed the threshold of 250 TPY. During 2007, the WRAP concentrated efforts to record and track BART-eligibility within the emissions inventory framework. A field was added to the NIF format to record BART eligibility (Yes or No), and then reports were generated to examine emissions from these sources.

SO_2 Milestone Program Analysis

The Regional Haze Rule (RHR) gives certain states in the Grand Canyon Visibility Transport Region the option of submitting State Implementation Plans for 16 Class I areas on the Colorado Plateau under §309. That option was chosen by four states (Arizona, New Mexico, Utah and Wyoming) and consists of an alternative SO_2 Milestone and Backstop Emissions Trading Program. Rather than implementing BART SO_2 controls, this plan sets annual SO_2 emission milestones for the four participating states through the end of the first planning period in 2018. If sources do not voluntarily control emissions sufficiently, and the total SO_2 emissions for those four states exceed the milestone threshold in any year, then the mandatory "Backstop Emissions Trading Program" is triggered. Once triggered, the trading program awards sources successively tighter annual "allowances" for SO_2 emissions which they must meet for the remaining years in the first planning period. They can meet their annual allowance limits by either installing emission controls, or by purchasing surplus allowances from the market place.

The original §309 SIPs were submitted to the U.S. EPA at the end of 2003, but due to delays caused by legal challenges to the RHR these original §309 plans were never officially approved by the U.S. EPA. The four §309 States began working to develop a revised §309 plan for re-submittal to EPA in 2007, and they finalized their proposal for a revised §309 Program in the spring of 2008. The resulting four-state SO_2 milestones are listed below. These milestones represent the maximum allowable SO_2 emissions tonnage that can be emitted in the designated year by the sources included in the trading program and that are located within those the four §309 states.

Year	Milestones (Tons of SO_2)
2008	293,921
2013	249,114
2018	234,624

Key documents supporting this §309 program include memos, reports, and spreadsheets which display the individual yearly milestones through to 2018, as well as provide details of milestone tracking procedures, the trading program triggering mechanism and other aspects of program implementation and enforcement.[7] The states now must each complete their own administrative public notice and hearing procedures leading to adoption of their individual SIPs.

The §309 states used the PRP18 emission inventory to predict emissions in 2018 after BART controls are implemented, and to design the final regional milestone cap. Also, they have obtained the most up-to-date stationary source SO_2 emission inventories (through 2006) to understand the existing SO_2 emission profile in the region, and used these to design the interim milestones for the years leading up to the end of 2018.

WRAP Emissions Data Dissemination

WRAP emissions inventory data have several uses, including those described above as well as modeling and, in some cases, to improve the various states' inventory accounting for submittal to the U.S. EPA's National Emissions Inventory. WRAP's inventories are generally formatted into two main formats:

- U.S. EPA National Emissions Inventory Format (NIF) Version 3.0, used by States to submit emissions inventory data to U.S. EPA under the Consolidated Emissions Reporting Rule (CERR); and
- Sparse Matrix Operator Kernel Emissions (SMOKE)/Inventory Data Analyzer (IDA) format, used as input to visibility models.

Several types of systems are used to disseminate the WRAP point and area source emissions data. These are described below.

Pivot Tables

"Pivot Tables" were developed as a tool for baseline and future year projection emission analysis. The Pivot Tables are spreadsheets that allow the user to "drill down" into these various versions of the WRAP stationary point and area source emission inventories for more detail on specific state, pollutant, and source category emission totals. The tables summarize the Plan02 and PRP18 inventories by state, pollutant, SCC, and facility. An example Pivot Table screen is shown in Figure 7. The Pivot Tables also are used by WRAP staff to summarize data to provide to the states for analyzing progress toward future goals; this is explained in more detail below.

WRAP EDMS

The WRAP Emission Data Management System (EDMS) is a Web-based emission inventory database and summary display system constructed to provide a central repository for compilations of emissions inventory data from the entire WRAP Region.[8] It provides charts and graphs of the emissions inventory data, as well as tabular numbers which are downloadable for spreadsheet or text data manipulation.

First time users must register through a simple process available at the log in page. A General User is allowed to view standard reports and data summaries, with this status granted routinely by the site manager. If a user wishes additional privileges to download data or perform ad hoc data inquiries, they can be granted status of Data Analyst upon approval of the WRAP Technical Coordinator. Finally, for those seeking to upload and input EI data into the system, the WRAP Technical Coordinator must approve a Data Owner status for the applicant.

WRAP TSS

The WRAP Technical Support System (TSS) is a Web-based compendium of monitoring, modeling, source apportionment, and emissions data used by Regional Haze Planners for assessing various aspects of visibility impairment for completing their Regional Haze SIPs.[9]

The emissions data contained in the TSS represents the inventories that have been used in modeling various baseline and future case scenarios in the evaluation of visibility impairment at Class I areas in the WRAP region. In addition to the data from the WRAP region, there is emissions data from the balance of the states in the eastern United States, from Mexico, Canada and from both the Pacific and Atlantic Ocean Offshore emission activities.

Assessing Reasonable Progress

One of the tasks facing Regional Haze Planners is assessing Reasonable Progress towards meeting the ultimate visibility goal in the RHR, that of returning United States Class I areas to "natural" visibility in 60 years from initial SIP submission (i.e., by 2064). In order to determine what the Uniform Rate of Progress (URP) should be to bring visibility conditions to this 2064 "natural" state, planners measure the current visibility conditions at these Class I areas in deciviews (dV) and draw a straight line down to the "natural" visibility conditions defined for 2064 (either U.S. EPA default values or values determined by research into impacts of anthropogenic versus natural emissions). By then assessing the impact of emissions projected to occur at the end of the first planning period due to growth, retirement and control strategies, the states can determine whether they are below, on, or above the URP in 2018.

A number of factors affecting emission totals are outside the control of the states including growth and retirement of industrial stationary point sources; population changes affecting area, mobile and non-road emissions; international emissions coming from outside U.S. borders; and emissions from sectors such as wildfire, windblown dust and other biogenic and geogenic emission processes. Therefore, one of the primary control mechanisms left to the state regulators is the implementation of BART retrofit controls on existing stationary point sources. If modeling BART scenarios do not predict that the URP will be met in 2018, then the RHR requires regulatory agencies to look at the feasibility of controlling other point and/or area sources of emission, using similar economic and environmental factors as originally applied to those in the BART universe (a "4 Factor" Analysis).

One use of the WRAP emission inventories has been to provide the states some quantification of the amount of emissions coming from various sectors of the inventory defined by Source Classification Codes (SCC's). Once the analysis is complete, the regulatory agencies have a clearer understanding of what sources (SCC categories) are responsible for "significant" portions of the emissions, and they can focus on evaluating feasibility and costs of controls for these "significant" emission sources.

By using Pivot Tables to determine percentages of emissions at various SCC levels (down to the individual plants for point sources), the states have been provided summaries of their future year emission inventories which they can use to identify those significant categories that might warrant additional emission control in 2018. These summaries are compared to the overall county-by-county emission totals for specified pollutants (i.e., SO_2 and NO_x), to determine geographically where those emissions are located. This then allows states to further refine the significant emission categories into more localized geographic locations, again providing information that can be used in decisions on appropriate control strategies.

Figure 8 provides an example source allocation provided to Wyoming. The source allocation shows the tons per year (TPY) emissions for each source type for each county. Accompanying tables provide details on the SCC-level emissions for point sources.

RECOMMENDATIONS FOR IMPROVING WRAP POINT AND AREA SOURCE EMISSIONS INVENTORIES

The WRAP and the Visibility Improvement State and Tribal Association of the Southeast (VISTAS) acknowledge several priorities for determining the success of long-term visibility strategies, including the need for improved coordination and completeness of regulated sources' emissions data.[10] This priority suggests emissions data to be more closely linked to permitting, control, and emission management programs to more accurately and efficiently analyze costs and benefits of additional emission control programs. This suggestion supports an overall finding of this paper, that is, due to the importance of the visibility analyses conducted using emissions data, those data should be continually improved and enhanced.

Several specific recommendations of how to improve point and area source emissions data in the WRAP region are as follows:

- Correct inconsistencies (missing data) with pollutants reported across source types (e.g., electric generation, coal-fired boilers should all emit NO_x, SO_2, CO, VOC, PM_{10} and $PM_{2.5}$ emissions);
- Focus improvements on key source categories such as industrial boilers, industrial processes, internal combustion engines, and residential wood combustion;
- Improve accuracy of SCCs for key source categories;
- Improve data on existing controls and control/capture efficiency;
- Improve activity data for sources varying with commodity prices (e.g., aluminum, copper, etc.);
- Improve projection factors for non-EGU point sources using local- or source-specific data; and
- Routinely (year-to-year) track point and area emissions for most important emissions categories.

REFERENCES

1. "Recommendations for Improving Western States Vistas", Report of the Grand Canyon Visibility Transport Commission to the United States Environmental Protection Agency. Downloaded from the Internet at: http://www.wrapair.org/WRAP/reports/GCVTCFinal.PDF.

2. About the Western Regional Air Partnership. Information available on the Internet at: http://www.wrapair.org/about/index.html

3. "Quality Assurance of the WRAP 2002 Stationary Sources Emissions Inventory – Final." Prepared for the Western Governors' Association and WRAP Stationary Sources Joint Forum by Eastern Research Group, Inc. January 27, 2006. Available on the Internet at: http://www.wrapair.org/forums/ssjf/documents/eictts/projections.html

4. "WRAP 2018 Preliminary Reasonable Progress Emissions Inventory – Final, Revised." Prepared for the WRAP Forums and Workgroups by Eastern Research Group, Inc. June 18, 2007. Available on the Internet at : http://www.wrapair.org/forums/ssjf/documents/eictts/projections.html

5. WRAP Best Available Retrofit Technology (BART) Clearinghouse spreadsheet. Available on the Internet at: http://www.wrapair.org/forums/ssjf/documents/bart/2008-02-15_WRAP_BART_Tracking_Sheet.xls

6. Best Available Retrofit Technology Guidelines. Available on the Internet at: www.epa.gov/air/visibility/pdfs/guidelines_2005_6_24.pdf

7. WRAP SO_2 Milestone Program Documentation. Available on the Internet at: http://www.wrapair.org/forums/309/docs.html

8. WRAP Emissions Data Management System (EDMS). On-line system available on the Internet at: http://wrapedms.org/default_login.asp

9. WRAP Technical Support System (TSS). On-line system available on the internet at: http://vista.cira.colostate.edu/tss/

10. Moore, T.; Brewer, P. "Regional Haze Planning in the Western and Southeastern United States," Environmental Manager (Air & Waste Management Association), September 2007.

KEY WORDS

- emission data analysis
- emission inventory projections
- WRAP
- BART
- Visibility

Table 1. Best Available Retrofit Technology (BART) Categories

BART Category ID	BART Category
BART-01	Fossil fuel-fired steam electric plants with a heat input capacity greater than 250 MMBTU per hour
BART-02	Coal Cleaning Plants (thermal dryers)
BART-03	Kraft Pulp Mills
BART-04	Portland Cement Plants
BART-05	Primary Zinc Smelters
BART-06	Iron and Steel Mill Plants
BART-07	Primary Aluminum Ore Reduction Plants
BART-08	Primary Copper Smelters
BART-09	Municipal Incinerators capable of charging greater than 250 tons of refuse per day
BART-10	Hydrofluoric, Sulfuric, and Nitric Acid Plants
BART-11	Petroleum Refineries
BART-12	Lime Plants
BART-13	Phosphate Rock Processing Plants
BART-14	Coke Oven Batteries
BART-15	Sulfur Recovery Plants
BART-16	Carbon Black Plants (Furnace Process)
BART-17	Primary Lead Smelters
BART-18	Fuel Conversion Plants
BART-19	Sintering Plants
BART-20	Secondary Metal Production Facilities
BART-21	Chemical Process Plants
BART-22	Fossil fuel-fired boilers with a heat input capacity greater than 250 MMBTU per hour
BART-23	Petroleum Storage and Transfer Facilities with a capacity of greater than 300,000 barrels
BART-24	Taconite Ore Processing Plants
BART-25	Glass Fiber Processing Plants
BART-26	Charcoal Production Facilities

Table 2. Probable BART Completion Matrix

State	BART Completion Date	
	Mid to late 2008	Other
Alaska	✓	
Arizona	✓	
California		Later ?
Colorado	✓	
Hawaii		Later ?
Idaho	✓	
Montana	✓	
Nevada	✓	
New Mexico	✓	
North Dakota	✓	
Oregon	✓	
South Dakota	✓	
Utah	✓	
Washington	✓	
Wyoming	✓	
Tribal	✓	

Figure 1. Organization of the Western Regional Air Partnership

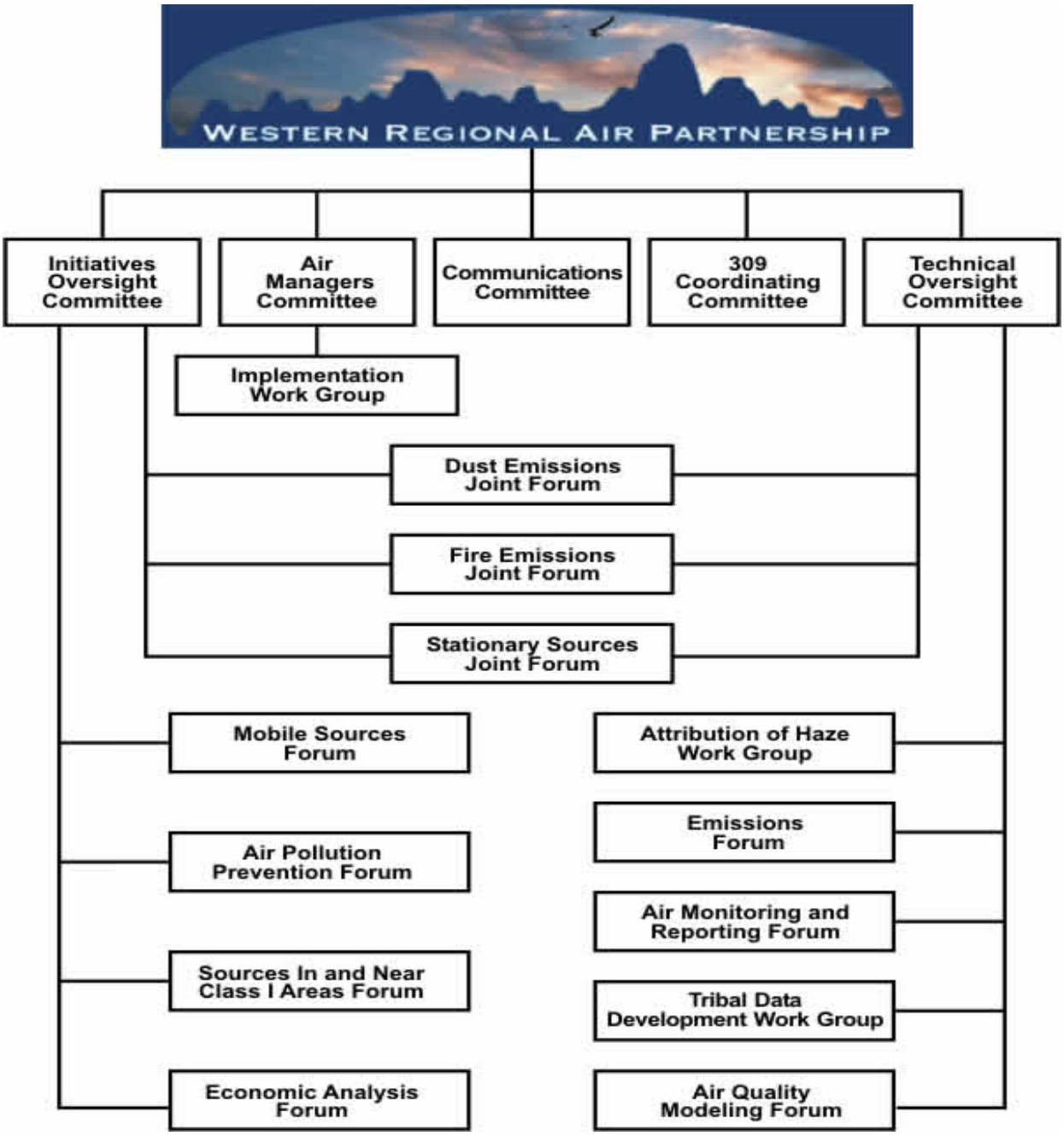


Figure 2. Timeline for Development and Revision of WRAP Point and Area Source Emission Inventories

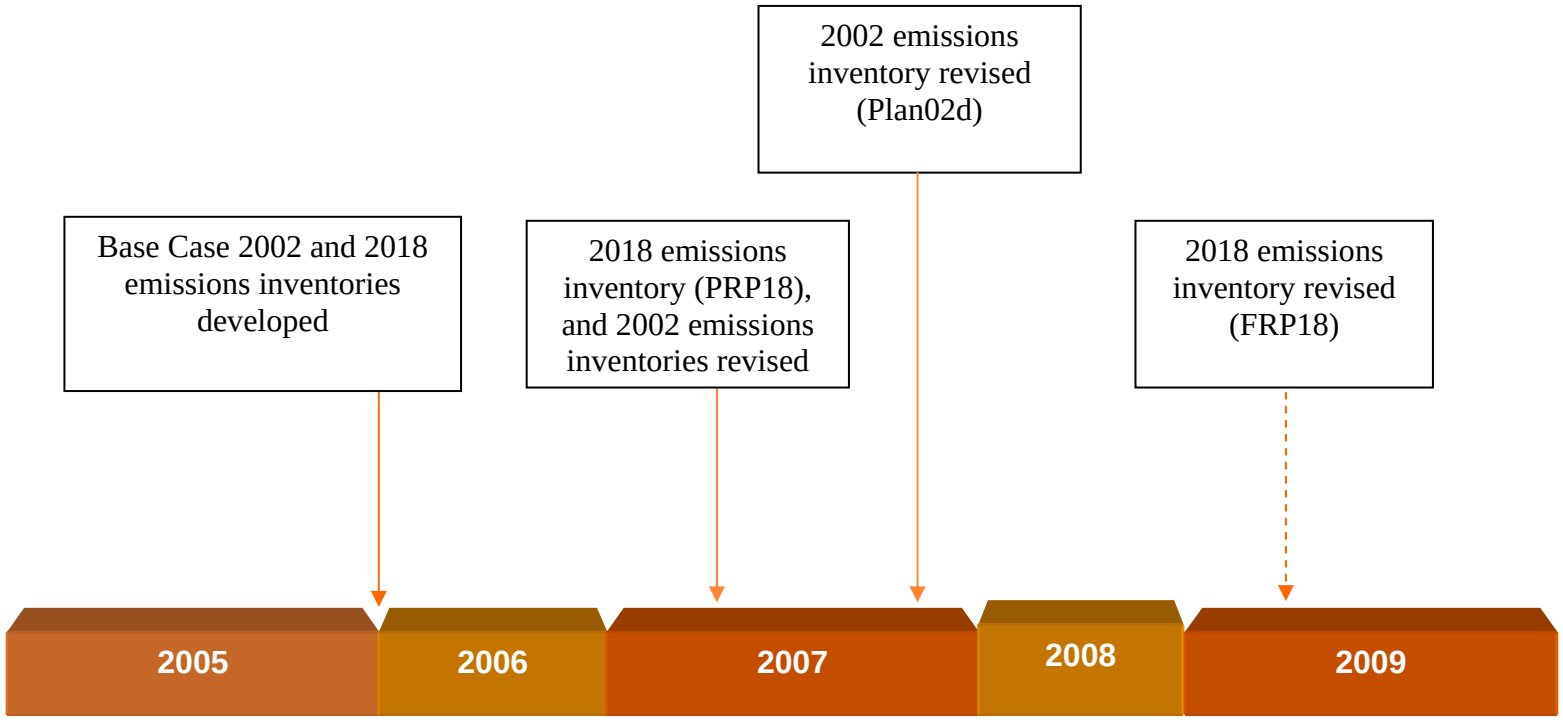


Figure 3. WRAP NO_x – Point Source Emissions and Facility Counts – 2002 (September 2007)

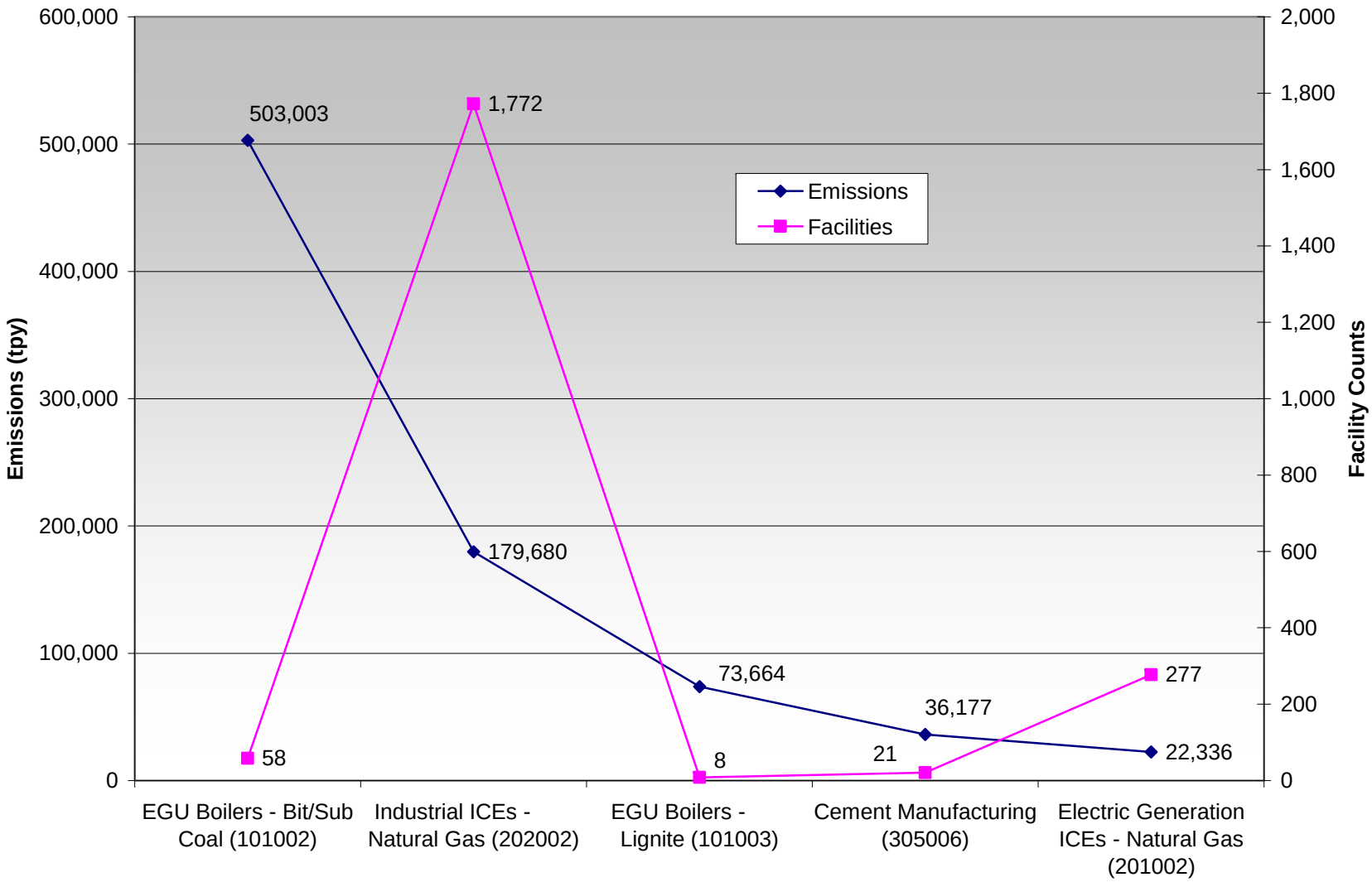


Figure 4. WRAP SO_2 – Point Source Emissions and Facility Counts – 2002 (September 2007)

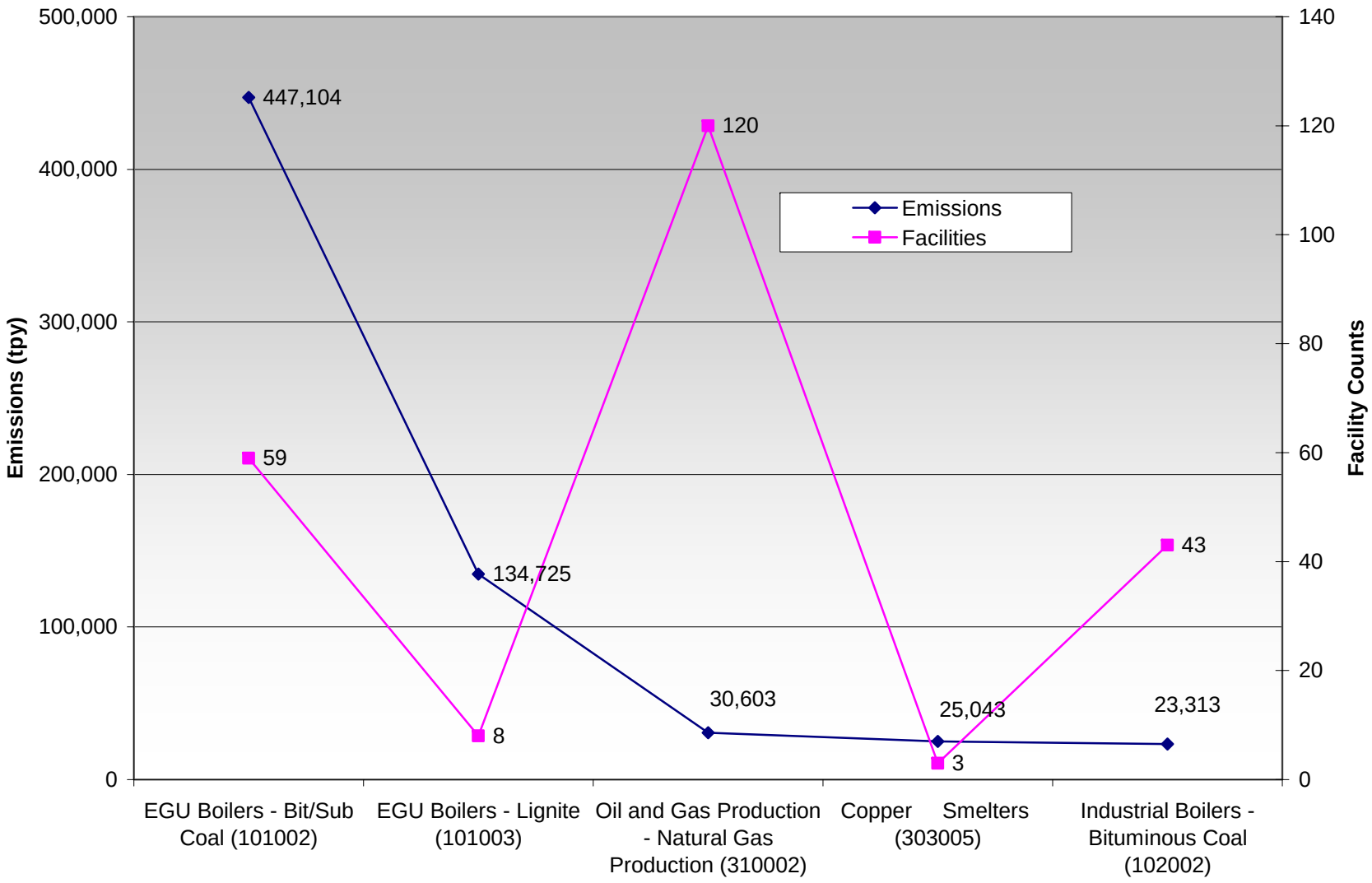


Figure 5. WRAP PM_{10} – Point Source Emissions and Facility Counts – 2002 (September 2007)

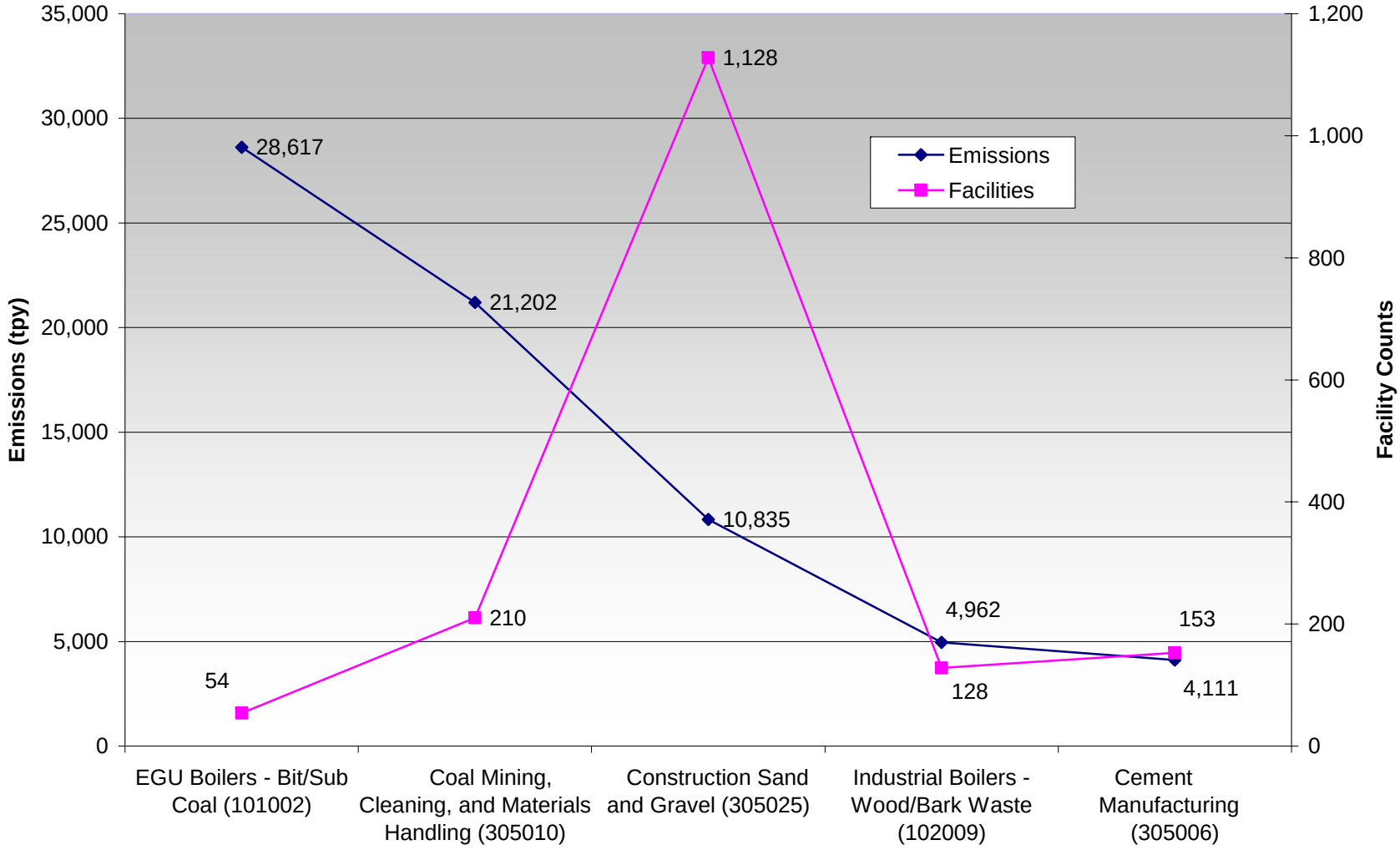
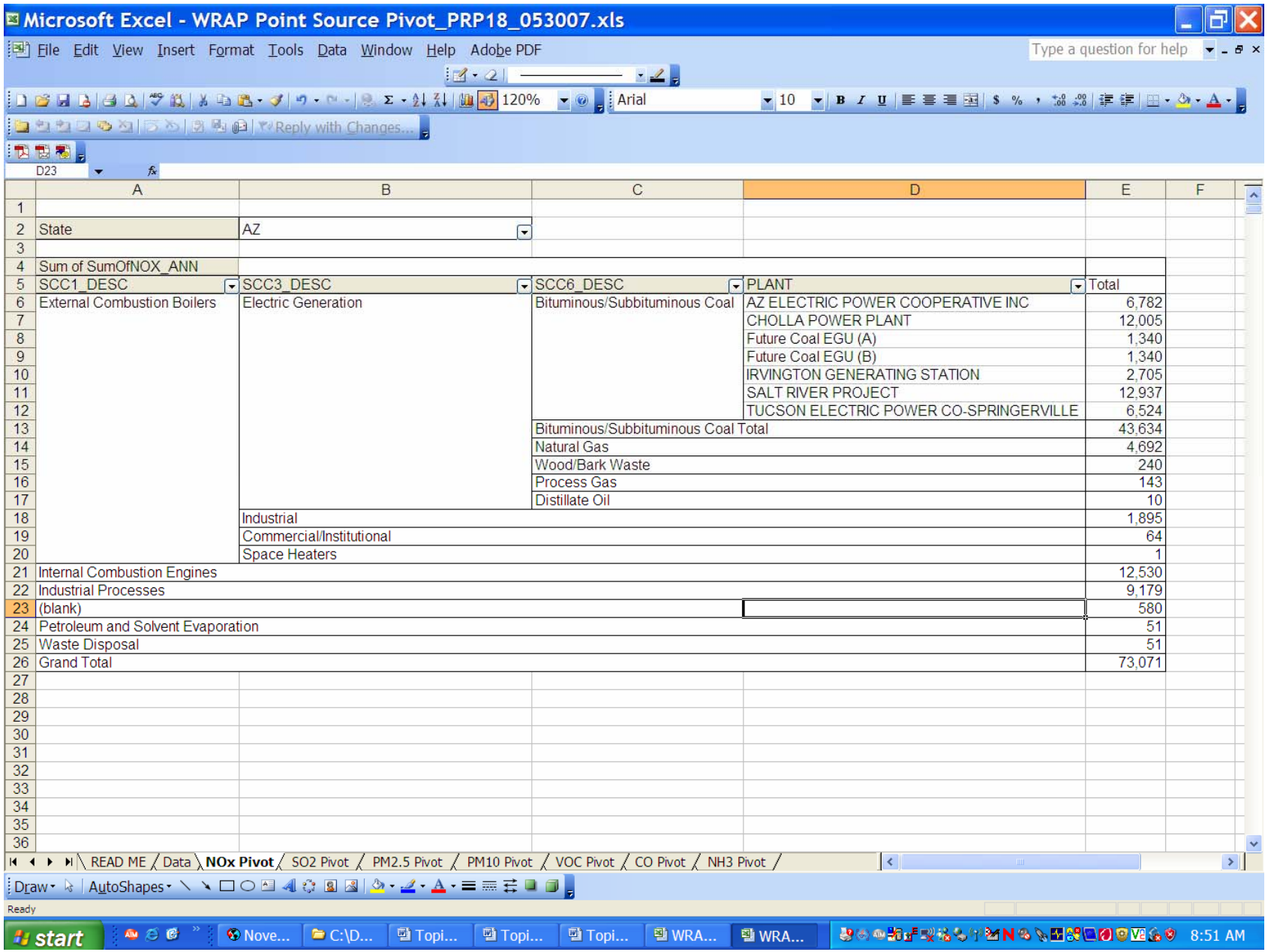


Figure 6. Determining BART Eligibility

Step 1: Identify emission units in the BART categories.
Does the plant contain emission units in one or more of the 26 categories? No? ☐ Stop Yes? ☐ Proceed to Step 2
Step 2: Identify the start-up dates of these emission units.
Do any of these emissions units meet the following two tests – in existence on August 7, 1977 AND began operation after August 7, 1962? No? ☐ Stop Yes? ☐ Proceed to Step 3
Step 3: Compare the potential emissions to the 250 ton/year cutoff.
Add the current potential emissions from all emission units identified in Steps 1 and 2 that are included within the ‘‘stationary source’’ boundary. Are the potential emissions from these units 250 tons per year or more for any visibility-impairing pollutant? No? ☐ Stop Yes? ☐ These emission units comprise the “BART-eligible source”

Figure 7. Screen Print from WRAP PRP18 Pivot Table – Arizona NO_x Point Source Emissions



Microsoft Excel - WRAP Point Source Pivot_PRP18_053007.xls

File Edit View Insert Format Tools Data Window Help Adobe PDF — Type a question for help

D23

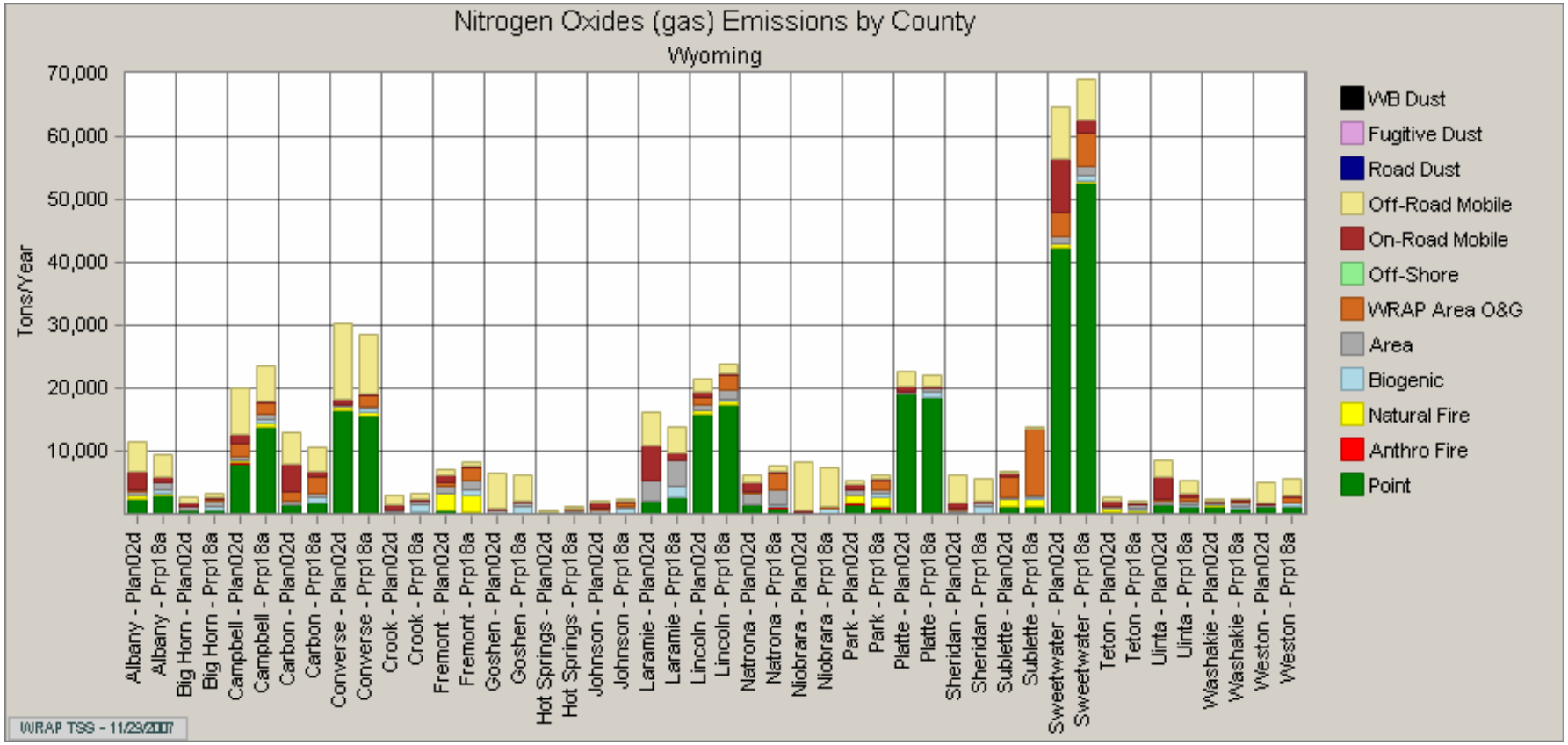
	A	B	C	D	E	F
1						
2	State	AZ				
3						
4	Sum of SumOfNOX_ANN					
5	SCC1_DESC	SCC3_DESC	SCC6_DESC	PLANT	Total	
6	External Combustion Boilers	Electric Generation	Bituminous/Subbituminous Coal	AZ ELECTRIC POWER COOPERATIVE INC	6,782	
7				CHOLLA POWER PLANT	12,005	
8				Future Coal EGU (A)	1,340	
9				Future Coal EGU (B)	1,340	
10				IRVINGTON GENERATING STATION	2,705	
11				SALT RIVER PROJECT	12,937	
12				TUCSON ELECTRIC POWER CO-SPRINGERVILLE	6,524	
13			Bituminous/Subbituminous Coal Total		43,634	
14			Natural Gas		4,692	
15			Wood/Bark Waste		240	
16			Process Gas		143	
17			Distillate Oil		10	
18		Industrial			1,895	
19		Commercial/Institutional			64	
20		Space Heaters			1	
21	Internal Combustion Engines				12,530	
22	Industrial Processes				9,179	
23	(blank)				580	
24	Petroleum and Solvent Evaporation				51	
25	Waste Disposal				51	
26	Grand Total				73,071	
27						
28						
29						
30						
31						
32						
33						
34						
35						
36						

READ ME / Data / NOx Pivot / SO2 Pivot / PM2.5 Pivot / PM10 Pivot / VOC Pivot / CO Pivot / NH3 Pivot

Draw AutoShapes — Ready

start — Nove... C:\D... Topi... Topi... Topi... WRA... WRA... 8:51 AM

Figure 8. Wyoming NO_x Point Source 2018 Emission Inventory Allocation



Counties w/ "Significant" Point NO_x
Albany
Campbell
Carbon
Converse
Laramie
Lincoln
Platte
Sublette
Sweetwater
Uinta
Weston

PRP 18a SCC1 Breakdown	TPY	Percent
External Combustion Boilers	111,124	83.4%
Industrial Processes	11,571	8.7%
Internal Combustion Engines	9,725	7.3%
(blank)	11,571	8.7%
Stationary Source Fuel Combustion	2	0.0%
Petroleum and Solvent Evaporation	1	0.0%
Waste Disposal	0	0.0%
Grand Total	133,216	100.0%