APPENDIX D

Air Quality Advisory Board Meeting Minutes

April 22, 2003
Afternoon Session: 1:30 PM

[This page intentionally left blank.]

AIR QUALITY ADVISORY BOARD MEETING
HERSCHLER BUILDING - ROOM 1299
APRIL 22, 2003 - AFTERNOON SESSION: 1:30 PM
CHEYENNE, WYOMING

BOARD MEMBERS PRESENT: Ronn Smith, Darrell Walker, Ed Wright, Dolly Potter

OTHERS PRESENT: Dan Olson, Administrator, Air Quality Division,
John Corra, Director, Department of Environmental Quality,
Sandy Schoneberg, Air Quality Division,
Darla Potter, Air Quality Division,
Cara Casten, Air Quality Division,
Tina Jenkins, Air Quality Division,
Lee Gribovicz, Air Quality Division,
Mike Stoll, Air Quality Division,
Lori Bocchino, Air Quality Division,
Jamie O'Dell, Air Quality Division,
Amber Potts, Air Quality Division,
Cortnie Morrell, Air Quality Division,
Alan Dugan, PacifiCorp, Glenrock, Wyoming,
Chris Hockett, USFS, Golden, Colorado,
Bernadette Hinshaw, PacifiCorp, Gillette, Wyoming,
Fred Carl, Black Hills Corporation, Rapid City, South Dakota,
Susan Connell, TRC Environmental Corporation, Laramie, Wyoming,
Michelle Barlow, Wyoming Outdoor Council, Laramie, Wyoming,
Paul Seby, FSPT, Denver, Colorado,
Terry Ross, CEED, Franktown, Colorado,
Fernando Roman, Wind River Environmental Quality Commissioners, Fort Washakie, Wyoming,
Stu Fischbeck, Frontier Refining, Inc., Cheyenne, Wyoming.

Ronn Smith: This is the afternoon session of the Advisory Board Meeting. This entire afternoon is devoted to visibility. We will have a presentation by Darla Potter and what we would like to do, there are four sections to this, after each section if you have questions of a clarification nature, if you didn't understand something that was presented, that would be a good time to ask those questions. As far as the comments on the whole process, we would like to reserve those for last on the agenda. When you do comment, we would ask you to come up and use the microphone so your comments will be entered into the record, which will be part of the process of finalizing this plan. We will start that comment period addressing comments submitted by EPA and then open it up to everyone else. Dan did you have any introductory comments?

Dan Olson: Yes. Thank you Mr. Chairman. We are here this afternoon to present a summary

of the Draft of the 2003 Wyoming Long Term Strategy for Visibility Protection and to take public comment to consider in the final report, which we will make available to the public and to EPA on June 1 of this year. This strategy addresses impairment that is reasonably attributable to a single source or a small group of sources. Think about visibility. There are two kinds of visibility impacts. One of them is called reasonably attributable, which used to be called plume blight. If you stand in a Class I area and you can see a smoke plume coming from a stack impacted in that area that is reasonably attributable. The other part is regional haze. Regional haze is a widespread impairment over a wide geographical area. That is a different kind of strategy and a different kind of an implementation plan, but together those two things represent the Federal requirements for visibility protection. We are here to talk about the first one today. Our regulations require this to be conducted, that a strategy review be conducted every three (3) years. This is the fifth one, our regulations being in effect since about 1988 or 1989. Now the draft on this strategy was available to the public on April 1. The meeting today is to take additional public comment. Then the comment period will close April 30. So, you have an opportunity to listen to the presentation today and provide further written comment. Darla will go over how we want to receive those comments. But, you will have an additional period of time to do that.

Darla Potter, of my staff, and Cara Casten, of my staff, will make the presentations today. I think that it bears listening to both of them. They are considered by most people in this particular area, to have somewhat high degree of expertise in reviewing this very complicated issue. I know that I will listen with a certain deal of interest because every time I listen to something about visibility I learn something more in this very complicated issue. Darla is going to start off with an introduction that describes the requirements and the process of the long term strategy that we have got out for public comment right now and give a brief overview of the contents of that document. Although she is not going to go into great detail on the specifics because you can all read that at your leisure. After that introductory section, Cara Casten will present the latest emissions information that we have for all source categories throughout the State, and how we focus on the trends and to some extent on the source contributors, where these kinds of emissions come from. Then Darla will present visibility monitoring data and talk about the historical trends that we see from all of that information. In both the text and in the presentations today, you will see Wyoming's emphases on Air Quality management in general and visibility in particular.

There are three (3) basic elements to this management concept. First one is emissions. Guiding principal, less is good. The less emissions you put into the air the smaller the problem you have when you are dealing with impacts from those emissions whether it be on public health or on things like visibility. Smaller growth impact by implementing Best Available Control Technology to reduce the emissions or more room for additional growth depending on where you are going. The second element is modeling. This can have a realistic assessment of current as well as future growth using the modeling system that includes things like transport, air chemistry, and that type of thing to try to identify whether or not you have impacts in terms of visibility, increment consumption or health affects through the Ambient Air Quality Standard. Finally, the third element, and one that is near and dear to my heart, when you listen to Darla, in particular, she will tell you about it, and that is monitoring. You have emissions, you have

modeling, and you have monitoring and monitoring is the reality check. The model is the best guess. The monitoring tells you what is there. Without any one of those elements, you can't really manage air quality to any degree of success. So, listen carefully. As Ronn indicated, when it comes time for comments make sure that you annunciate your comments clearly because we want to hear them. We want to understand them and we want to respond to them in the final document.

Ronn Smith: Thanks Dan. Darla while you are getting set up, I would remind everyone in attendance that the comment period is through April 30. So, in addition to comments today, any written comments that you submit please do so by that date.

Darla Potter: In addition to that, for those of you who are here this afternoon, we will put a copy of this afternoon's minutes only, as an appendix to the final 2003 report. So if you would sign the sign up sheet once again. If you were here this morning, we have a different sign up sheet for this afternoon to record everyone's presence this afternoon.

[Slide 2] To briefly over cap, I will give you an introduction as to the 2003 Draft Review Report, review of the long term strategy review process and an overview of the report itself. Cara will then give you a presentation on the emission trends information that is included in the report. I will then close out the presentations with a presentation on the visibility data assessment and the preliminary conclusions that we have come to based on the information in the Draft Review Report. Then we will open it up to oral comments at that time.

[Slide 3] In 1977 the Clean Air Act Amendments set forth a national visibility goal. At that time, Congress declared the prevention of any future and the remedying of any existing impairment of visibility in mandatory Class I Federal areas, which impairment results from manmade air pollution the goal. That is why out of those amendments, as well, two programs were established to address visibility. One of those is in the Prevention of Significant Deterioration Program. The other one was a stand alone visibility program.

[Slide 4] Before we get too far into this, we need to explain what we are talking about in terms of visibility. It is not only how far you can see that matters but how well you can see. The color, form, texture, contrast and brightness of the scene are very important. The fact that you cannot only see the Grand Teton when you go there but how well you can see the features of it are very important. So, it is more than just how far you can see that really does matter when we talk about these things.

[Slide 5] Dan mentioned that we have two types of visibility impairments. There are variations on those. We have plume blight impairment, which is at the lower left and that is what we are talking about today. We also have a layered haze, which is in the upper right and that can be a ground based haze or an elevated haze and it just means that you can see a distinct top and a distinct bottom, but you don't know where the haze is coming from. On the lower right a uniform haze. Both the upper right and the lower right would be variations of regional haze and they can appear in those fashions. So basically when we talk about visibility impairment, you lose the clarity in the air when you are viewing a scene and that loss of clarity results because the

view is scattered by the gases and aerosols, the light is scattered by those.

[Slide 6] In 1980 EPA promulgated the stand alone visibility regulations. Dan referred to those as plume blight. It is basically when you can see a distinct band or layer of visible air pollution that is reasonably attributable to a single stationary pollution source or a small group of stationary sources. At that point and time EPA deferred the regulations on regional haze visibility impairment until there were better technical tools and a better scientific understanding of the components of haze so that they could approach that problem.

[Slide 7] As a result of EPA's 1980 visibility regulations the State of Wyoming implemented the reasonably attributable visibility impairment SIP and regulation. The SIP and regulation go hand and hand. The regulation is in Chapter 9, Section 2 of our Air Quality Standards and Regulations. The SIP is specifically for Class I visibility protection. Both of those were approved as a State requirement in May of 1988 and were also approved by EPA in February of 1989.

[Slide 8] In terms of that regulation, we have seven (7) Class I Federal areas in the State of Wyoming. Congress established one hundred fifty-six (156) national parks, wilderness areas, international parks in other areas termed Federal Class I areas in the 1977 Clean Air Act Amendments. Those areas received the most stringent protection from increases in air pollution and are also protected from visibility impairment. In addition to that, the Savage Run Wilderness Area is a State Class I area subject to both the PSD regulation within the State as well as the visibility regulation in the State. That is because Savage Run Wilderness was established by the Forest Service as a wilderness area in February of 1978. However, the regulation in the Prevention of Significant Deterioration Regulations of the Division state that the date, any wilderness area as of January 25, 1979 is a Class I area. So due to that timing, although it is not established by Congress, it is a Class I area for the purposes of prevention of significant deterioration and visibility within the State of Wyoming. All seven (7) of Wyoming's mandatory Federal Class I areas are in the western northwestern part of the State. They include Yellowstone and Grand Teton National Parks. The North Absaroka Wilderness, Fitzpatrick Wilderness, Teton Wilderness, Washakie Wilderness, and Bridger Wilderness areas.

[Slide 9] As Dan mentioned, we are required every three (3) years to review and revise our long term strategy. This includes a Federal Land Manager Meeting that must be conducted, and we conducted it at the beginning of March of this year. It requires that a draft review report be prepared and made available for public comment and also for the provisions of a public meeting, which we are doing today. This is not a rulemaking action. This is strictly a review and revision of the long term strategy update. We are not changing any rules in this afternoon's action nor are we changing any of the SIP provisions. Any of the oral comments that we record today will be taken into consideration in the finalization of the Review Report as well as any written comments that we receive. To date, we have not received a reasonably attributable visibility impairment certification within Wyoming. So, none of the Class I areas, which I mentioned, has visibility from reasonably attributable source been certified.

[Slide 10] The process that we have gone through to get to this point and where we will go from

here is, in early February the Federal Land Managers within the State of Wyoming were notified of the review and report schedule. At the beginning of March, we held a meeting with the Federal Land Managers in Cheyenne with both the Park Service and the Forest Service present. On March 21, a public notice of this meeting was publicized in the newspapers noticing both the morning session and the afternoon session and on April 1, as Dan mentioned, we noticed the availability of the 2003 Draft Review Report, which signified the initiation of the thirty (30) comment period as well as re-noticing this afternoon's meeting. Obviously, we are here today to go over what is in the Review Report but to take your comments not only on the Review Report but on visibility protection from reasonably attributable impairment.

[Slide 11] From here where we go is, April 30 is the last day to submit comments on the 2003 Draft Review Report. The Division requests that those comments be submitted in writing and they must contain the written signature of the person commenting. It can be mailed to me at the office in Cheyenne. From there we will take all of the oral comments as well as the written comments into consideration, finalize the Review Report so that it can be at EPA on June 1, 2003 as required by the regulation.

[Slide 12] Most of what is in the introductory section of the 2003 Review Report I have already highlighted for you. The other section that I have not spoken about is the regional haze regulation, which Dan touched on earlier today. Basically, the Regional Haze Regulation was promulgated by EPA on July 1, 1999 and it will address regional haze visibility impairment that uniform haze from a multitude of sources that can travel great distances over a very large region. The State of Wyoming has the responsibility to submit a SIP to address regional haze no later than December 31, of 2008. So, we will be working on that. As Dan mentioned, once we implement a SIP for a regional haze as well as the existing reasonably attributable SIP and regulation, we will have a complete Class I area visibility protection program for the State of Wyoming.

[Slide 13] The second section of the Review Report is the addressing of the progress toward the national visibility goal. There are six (6) areas that the State of Wyoming is required to address to determine the progress toward that goal. The first of which is the progress achieved in remedying existing impairment of visibility in any one of Wyoming's Class I areas. As I mentioned, we do not have a certification of reasonably attributable visibility impairment. So this section just basically points that out and we move forward to protect future impairment.

[Slide 14] The second Requirement is the ability of the long term strategy to prevent future impairment of visibility in any Class I area. Building off of what Dan mentioned in terms of the emissions data, the modeling, and the monitoring, we go into great deal on programs within the New Source Review Program, the Operating Permit Program and the Monitoring Program that aid the Division's ability to prevent future impairment of visibility. Within the discussion of the New Source Review Program, we focus on the permitting of oil and gas production facilities, coal bed methane facilities, the application of Best Available Control Technology to minimize emissions, the application of a new source review permit management system to keep track of what sources are permitted in the State and make sure that those permits remain active and current as well as a prevention of significant deterioration permit coordination that we conduct to

make sure that we are coordinating with the Federal Land Managers that have an affirmative responsibility for those Class I areas. Within the Operating Permit Program, we discussed the Title V permit issuance and a renewal process as well as the application of the compliance assurance monitoring requirements. Within the Monitoring Program, we discussed the Wyoming Visibility Monitoring Network, which is a fairly new advent since our last report as well as the discussion of the other ambient air monitoring that occurs within the State. Requirement three is any change in visibility since the last such report including an assessment of existing conditions. In this section of the report several conclusions are drawn from the Division's visibility monitoring data assessment, which I will go over later today. Requirement four is any additional measures, including the need for SIP revisions, that maybe necessary to assure reasonable progress toward the national visibility goal. Measures to remedy existing impairment are not necessary as visibility impairment has not been certified. However, the measures to prevent future impairment were previously addressed under Requirement two, which are the Division's New Source Review Program, Operating Permit Program and our Monitoring Program. In addition to those programs the development of a regional haze SIP will play a key role in future remedying of regional haze visibility impairment within the State of Wyoming.

[Slide 15] Requirement five is the progress and implementing Best Available Retrofit Technology or BART and meeting other schedules set forth in the long term strategy. As visibility impairment has not been certified there are no schedules for the implementation of Best Available Retrofit Technology (BART) required. However, in the 1997 Review Report a schedule was included not for Best Available Retrofit Technology application but a schedule for the SWWYTAF modeling project, which is the Southwest Wyoming Technical Air Forum modeling project. From the schedule that was included in the 1997 Review Report, the study was significantly delayed due to a variety of issues and was finally completed as of June 2001. The significant findings of that report are discussed as well as the study itself and I would like to just touch on a few of the more significant findings that we highlight in the report. The CALPUFF model that was utilized for that study estimated the measure of primary pollutants like SO_2 with accuracy from the in-domain sources without consideration of the impacts from outside that domain, the boundary conditions. Only when the boundary conditions were considered did the model accurately replicate both the primary, that is the SO_2 emissions, as well as the sulfate and nitrate aerosol species that effect visibility. With approximately 70% of the impact on the primary emissions being attributed to the in-domain sources, including sources in Idaho and Utah, and approximately 90% of the visibility impact coming from sources outside of that large domain. In addition to that, the emissions inventory as well as the secondary organic aerosol visibility module predicated that the impacts of visibility were dominated by the biogenic, that is the natural VOC emissions, not the anthropogenic VOC emissions, which had long been a question in southwest Wyoming. Whether or not the VOC emissions from the oil and gas sources and other sources were having a significant impact. So, the study did conclude that it was more of an impact from the natural sources not the anthropogenic sources. The report also discusses the additional analysis that is forthcoming using components of the SWWYTAF model. That is as much as we will say about that today. Requirement six and the last Requirement to assess the progress for the national goal is the progress in developing the original components of the strategy. When the strategy was originally developed there were five (5)

components, one of which still remains to be fully developed. The one that remains to be fully developed is the smoke management techniques. We talked a little bit about the smoke management in this morning's meeting and noted that the Division has been very active in participating in the Western Regional Air Partnership Fire Emissions Joint Forum. It is the Division's intent to take the expertise that we have gained through that process and build on the consistent framework that is being produced by the Fire Emissions Joint Forum, tailor those work products to the needs of the State of Wyoming and officially develop programs related to fire for inclusion in our Regional Haze State Implementation Plan. Elements such as smoke management programs. So, that is the mechanism that we are choosing to address that smoke management technique requirement from the long term strategy.

[Slide 16] After going through the progress toward the national goal, there is a section in the report that discusses the provisions not addressed. There are two (2) provisions in the Federal rule that are not in the State of Wyoming's rule. EPA approved the absence of those provisions in the approval of our SIP in 1989. Those two (2) provisions are the impact of any exemption granted from applying Best Available Retrofit Technology. At the time that Wyoming developed their SIP, it was developed without an exemption from BART so it is more stringent then the Federal rule and it was approved as such. The second is the need to apply Best Available Retrofit Technology to remedy existing impairment of any integral vista listed in the plan since the last such report. An integral vista is if you are within a Class I area looking out. Federal Land Managers had the opportunity to list those vistas and as of the deadline none of those were officially declared by the Federal Land Managers. As such, when the SIP was approved in the State of Wyoming that was removed because the Federal Land Managers had not established any integral vistas at that point and time. So that is not a provision. We have a fairly significant portion of the report that is devoted to emission trends from a variety of sources. For the purposes of today's meeting I won't get into those here, but Cara will be presenting information on each of those emissions inventory areas a little bit later on.

[Slide 17] One of the final and most significant sections of the report is the progress toward the 2000 Review Report recommendations. There were four (4) recommendations in the 2000 report and I will briefly go over our progress toward those here, but for more detail you should really take a look at the report. In terms of regional haze, Dan has already discussed today that the Division continues to be heavily involved in the Western Regional Air Partnership, which is producing coordinated multi-state regional solutions for such things as emissions inventory development, modeling protocols and emission reduction strategies and we are anticipating that these things will assist the State of Wyoming in the development of a Regional Haze SIP. As many of you are aware, the Regional Haze Rule consists of two (2) paths to follow. The Section 309 provisions are the provisions that implement the recommendations of the Grand Canyon Visibility Transport Commission and the Section 308, which are the nationally applicable provisions. Wyoming is one of the states that does have the choice to follow either of those provisions, but at this point in time we have not yet made that decision. We will make that decision and submit a SIP, depending on the option chosen, but no later than December 31, 2008. Earlier in this morning's session Dan mentioned the legislation that was passed this Session on the Emission Trading Programs and that will allow Wyoming to chose either Section 308 or 309 and enable us to accomplish an Emission Trading Program within our Regional Haze

SIP. The recommendation for this Southwest Wyoming Technical Air Forum Air Quality modeling project was to see that through and do some further work. As I mentioned earlier, that project was significantly delayed. The modeling files were received in February 2001 with a final report being received in June of 2001. Both the final reports as well as the modeling files were made available upon written request starting in September of 2001 and we have filled several of those requests. The components of the SWWYTAF model have been and will continue to be used to analyze impacts from major PSD source applications within the State of Wyoming. So components of the modeling system are already in use. However, there is additional analysis that has yet to take place and is discussed in the report. There was a recommendation in the 2000 report for additional visibility monitoring to be considered. There is currently visibility monitoring at the Bridger Wilderness Area, Yellowstone National Park, North Absaroka Wilderness Area, and Brooklyn Lake in southeast Wyoming that is conducted through the IMPROVE Program, that is the national monitoring program which I will describe in more detail later today. The Division concluded their monitoring in the Green River Basin. It went from 1996 through 2000 for the visibility information and through 2001 for the gaseous data. The two (2) new stations that have been established by the Division are at the Cloud Peak Wilderness Area and at the Thunder Basin National Grasslands in northeast Wyoming. Those sites were installed in 2001 and we were successful in lobbying the national visibility monitoring program, the IMPROVE Program, to incorporate the aerosol samplers at both of those sites in the national program. So those will be long term samplers that will be there and are part of that national network now. The final recommendation was to continue efforts to develop a Smoke Management Program. Our cooperative effort within the State to develop that Smoke Management Program stagnated really before the 2000 report. We were unsuccessful in devoting the time to regenerate that, but we have been participating in the WRAP Fire Emission Joint Forum and plan to jump off from those efforts to do further development work within the State of Wyoming. The public notification and meeting section discusses basically that, the public notification procedure and today's meeting. The last two (2) sections of the Draft Review Report at this point and time are blank, but will be filled in for the final. Section 7 will be a review and response to comments. We will take the written comments as well as the oral comments and review those and respond to those within the report. We will make final recommendations that will be ensconced in that report that will be revisited in three (3) years.

[Slide 18] There are several appendices to the document. Appendix A contains Wyoming Air Quality Standards and Regulations Chapter 9, Section 2 is the Visibility Regulation. Appendix B contains a copy of the Wyoming State Implementation Plan for Class I Visibility Protection. Both of those were approved by EPA back in 1989. Appendix C is basically process documentation, the review and report schedule, Federal Land Manager Meeting agenda and mailing list, the notices for the Board Meeting and the news release for the availability of the draft report.

[Slide 19] Appendix D will contain the meeting minutes from this afternoon's meeting. That is why we asked you to be very clear when you are stating your comments or questions so that we can record that properly for the inclusion in the report. Appendix E focuses on the visibility and monitoring data. It includes a section on the IMPROVE trends analysis, those are long term trends, as well as the Division's monitoring data assessment. There is an appendix devoted to

the Southwest Wyoming Technical Air Forum, which includes the timeline for that modeling work that was included in the 1997 Review Report. Discusses a report on the Southwest Wyoming Technical Air Forum, it describes the forum, the modeling study including conclusions, the timeline and funding and a variety of other elements as well. The SWWYTAF Technical Committee summary, which was developed to resolve concerns expressed by SWWYTAF participants regarding the final report, is also included. That summary identifies, amongst other things, the uses for which the model is valid as well as concerns and drawbacks for the application of the model.

[Slide 20] Appendix G contains all of the graphs associated with the emissions data assessment. The final appendices is Appendix H, which will contain the written comments that are received through April 30.

[Slide 21] At this point and time, as Ronn mentioned, if you have any clarifying questions on the introduction, the long term strategy review process or the 2003 Draft Review Report of review, I will be happy to answer those, but we ask you to hold your comments until after we are done with all of the presentations. Thank you.

Ronn Smith: Any questions? (No one indicated that they wanted to ask any clarifying questions.) Okay. Thank you Darla.

Darla Potter: I would like to introduce to you Cara Casten. Cara joined our staff in mid 2002. She has been the one that has been working the most with the emission inventory data since she has come to work for the Division.

Cara Casten: Thanks Darla. I am going to be talking to you about the emission inventory data that we put together for this Review Report.

[Slide 2] First thing that I want to say is, the data is presented in Appendix G of the report. What I will be showing to you today is just some of the trend graphs. If you want more specific information you can look in the appendix for numbers or specific permit actions that go along with reductions, etc. First of all, as I am sure most of you know, emission inventory data tracks pollutants emitted into the air from various sources. We use this data in conjunction with our monitoring assessment to figure out where the pollution is coming from and what is having the largest effect on our visibility.

[Slide 3] This is a list of the inventories that we covered in this report. We have the Western Regional Air Partnership (WRAP's) 1996 Emission Inventory, EPA's Aerometric Information Retrieval System or the AIRS Inventory. We have the Air Quality Division's Air Quality Data System inventory, that is our own data system that we use here to track our permitting processes. The Air Quality Division's Northeast Wyoming NO_x Inventory.

[Slide 4] I am going to start with the WRAP. The 1996 Emission Inventory. Recently in 2002, the WRAP completed the western states inventory for the year 1996. It was intended to be a base year regional scale inventory for use in modeling practices. The inventory covers area, on-

road, mobile, non-road mobile, prescribed fires, wildfires, paved road dust, and unpaved road dust. In the inventory they account for regulated pollutants such as SO_2, NO_2, PM_{10}, $PM_{2.5}$. They also cover carbon monoxide, ammonia and VOCs.

[Slide 5] So how did they come up with this inventory? The WRAP began with the National Emission Inventory from EPA which is also called the NEI or the NET sometimes and they used Forums that they put together of people to collect data from their specific source categories. So, the Emissions Forum collected data for the point and area sources. The Fire Emission Joint Forum collected prescribed fire and wildfire data and the Mobile Sources Forum did the on-road, non-road mobile sources and the paved and unpaved road emissions.

[Slide 6] So, we have some emission source categories here. A point source, as you know, is just a fixed source of pollution. What the WRAP did was, kind of took the NEI data, sent it out to each state, each state looked at it, determined what they wanted to put in there, how they wanted to break up their sources and sent it back. So Wyoming chose to just use their Title V major sources as the point source emissions. An area source is just a source that generally extends over a large area like home heating. On-road vehicles is pretty self explanatory, cars, trucks, motorcycles. Non-Road motor vehicles are the aircraft, locomotive, marine craft, agricultural equipment, construction, etc.

[Slide 7] Prescribed fires are defined as wildland fires ignited by management actions to meet specific objectives. This is basically what the Federal Land Managers might do, but this does not include agriculture burning for this inventory. Wildfire is any unwanted or non-structural fire. The paved road dust is re-entrained roadway fugitive dust from a paved road. This does not include vehicle emissions. Unpaved road dust is the same thing just from unpaved roads.

[Slide 8] We are going to start looking at the results from the WRAP. The important thing about NO_x is that NO_x is kind of the precursor that converts to ammonium nitrate, which is a visibility affecting pollutant. If we look at what WRAP found, they found approximately 48% of the NO_x emissions that are coming from point sources and area sources are the next largest source at 23%.
[Slide 9] SO_2 is a little different. The major source for those are point sources and SO_2 is important of course because it is the precursor for ammonium sulfate, which is another visibility effecting pollutant.

[Slide 10] For PM_{10}, it is a little more spread out. We have wildfires, area sources and point sources being the major sources of emission. PM_{10} is a primary pollutant, but large particles do not affect visibility as much as smaller particles do. So, it is not as important as $PM_{2.5}$.

[Slide 11] The smaller particles more efficiently scatter the light, which causes us not to be able to see. So, the major sources for this are wildfire 49%, point sources and area sources.

[Slide 12] On to our next inventory is the AIRS database. These are actual emissions from Title V major sources, which is 100 tons per year of a regulated pollutant or 10 tons per year of an individual HAP, 25 tons per year of combined HAPs. They started annually collecting the

inventory from the major sources in 1991. For this report we analyzed NO_x, PM_{10}, SO_2, and VOCs through 2001.

[Slide 13] This is our map. In order for us to better be able to see what is going on we like to split it up into quadrants so that we can kind of pinpoint what is coming from where. Obviously we have the northeast, southeast, southwest, and northwest quadrants of the State.

[Slide 14] Remember these are for the major sources. So, for northeast Wyoming we don't really see any significant trends here. It is kind of holding steady, mainly under 15,000 tons per year of any pollutant.

[Slide 15] The same thing for northwest Wyoming, we don't have any significant changes and they are all under 10,000 tons per year.

[Slide 16] In southeast Wyoming we start to see some trends here. I will start off with this noticeable reduction right here. In 1991 the CO emissions were tested from two (2) refineries. They did some stack testing and were found to be much lower than they estimated by emission factors. That is not technically an actual reduction. It was just more accurate data because they started to actually see what was coming out of the stack. We are also starting to see a downward trend here in our SO_2, which is good. This comes from power generation modifications and refinery modifications, switching coal, switching fuel oil to reduce the SO_2.

[Slide 17] In southwest Wyoming a most noticeable decrease is the CO right here and those are from some soda ash plants doing some modifications and installing CEMs. Like I said before, the changes are detailed in Appendix G so if you want to find out what permit actions lead to these things, etc. you can check it out there.

[Slide 18] So, for the entire State, along with all of the other things that I just mentioned, the other noticeable thing on this graph is this point right up here 1985 and the reduction of SO_2 from here to here we had a power generation plant reduction with an SO_2 reduction program from 1985 to 1991. So, that is where that is coming from. That was an actual reduction.

[Slide 19] Now I will move on to our Air Quality Data System by the Division. We developed this system in 1997 for the New Source Review, Compliance, and Operating Permit Programs to track what we are doing, what we are permitting. So, we track changes and potential emissions from the newer modified sources. We track both major and minor sources and all of these sources are going through the permitting process. In the graphs that we will see, we looked at CO, NO_x, SO_2, PM_{10}, VOCs, and HAPs. Through these graphs you will be able to see the changes from year 2000 to year 2002 what is going up, what is going down.

[Slide 20] So, this is our total for the entire State here. Of note, we have the CO that is on an upward trend here. We also have the NO_x that is on an upward trend here. VOCs on an upward trend here. To a lesser extent, we also see that the PM_{10} here and here is kind of going up as well. So, I will examine it by quadrant by quadrant to find out what is going on.

[Slide 21] First in northwest Wyoming we really have no significant changes at all.

[Slide 22] Southeast Wyoming, we are seeing a little bit of VOC increase. We have some oil and gas production increase in Carbon County. We also see a little SO_2 reduction here, which is great. We had some refinery modifications.

[Slide 23] I am going to talk about northeast Wyoming next. Our big issue in northeast Wyoming is coal bed methane development. Coal bed methane requires compression after being extracted from the well so it can be transported through the pipelines for use. The compressors require compressor engines that emit CO, NO_x and VOCs. The development is mostly concentrated in the northeast quadrant, but there are some options being explored down in the southern part of the State.

[Slide 24] Let's look at our graph here. Like I said, we have the CO, NO_x and VOC increases here from the compressor engines mainly and also permitting of a new power generation facility. We also have our small PM_{10} relatively increase from the issuance of a coal mining production permit.

[Slide 25] We are going to move on to the southwest part of the State where we have the oil and gas development. Starting in 1995 we initiated a program to insure that oil and gas production units were permitted. That resulted in our Oil and Gas Guidance. The rise in permitted VOCs on the graphs is kind of misleading because we were getting permits from already constructed sources as well as permits from new sources. So it is not all new source growth. It is old sources that are being permitted now. Like I said before oil and gas is in the southwest and southeast quadrant of the State.

[Slide 26] Let's look at southwest Wyoming. First of all we have this CO decrease, CO and SO_2 actually decrease here. We had a gas plant that put in a co-generation facility and acid gas re-injection so that lowered some of their emissions. The VOC increases here from oil and gas. Way back in 1998 we had a power generation facility that did some modifications and that is where this big drop here is from.

[Slide 27] In the agreement that we have with the BLM, we track emissions in the Rock Springs district and these numbers are from our Air Quality Data System as well.

[Slide 28] Here is where the BLM district is in the State. You see the same trends that we saw in southwest Wyoming. It is just kind of on a smaller scale because Fremont County isn't included in this area.

[Slide 29] So, we see that big NO_x reduction here. Our CO reduction here and our VOCs kind of going up there.

[Slide 30] The last inventory that I am going to talk about is our Northeast Wyoming NO_x inventory. We developed this inventory for 2000 actual or 2001 potential NO_x emissions. We wanted to present the most recent NO_x numbers available. Our inventory began, we began doing

the inventory in 2001 because we wanted to get in as much as the 2001 permits as possible. In the inventory we covered the railroad, coal mine, urban, highway and point sources. The railroad, urban and highway sources are actual numbers. We got these from cooperating agencies like WDOT and other places. We don't permit the railroad, urban and highway emissions, so the actual emissions are what you are going to get. The point sources and the coal mines we do issue permits, so those are our potential emissions from the permits.

[Slide 31] Now this is the inventory area. It is larger than the northeast quadrants that we were talking about before. We decided to include Natrona, Converse, and Niobrara Counties.

[Slide 32] So these are our 2000-2001 potential emissions for NO_x. As you can see here we have the point sources at 64%. They are the major contributor, followed by railroads and coal mines. Urban and highway are kind of lesser contributors.

[Slide 33] If we break down the point sources, because those are our largest, we can see Campbell County is at almost 50%, Converse County is at almost 40% and that is almost 90% of the emissions concentrated in these two counties. Campbell County is where the majority of the coal bed methane development has been taking place. Converse County to a lesser extent and we also have a power plant in Converse County.

[Slide 34] So in summary, our actual emissions from the major sources are steady. We have a slight reduction in SO_2. NO_x and SO_2 actual emissions, they are approximately equal on the graphs. I am sorry I forgot to show you that, they are approximately equal on the graphs. However, as Darla will tell you visibility impacts from sulfate are out weighing those of the nitrate. Emission reductions from major sources and minor sources are reflected in our own Air Quality Data System. Those were the potential emissions.

[Slide 35] The increase in potential NO_x , CO, VOCs in the northeast quadrant are primarily due to coal bed methane. Increase in potential VOCs emission in the southwest quadrant are due to the oil and gas permitting.

[Slide 36] In addition to these continuous data system inventories we continue and participate inventories so we can find out more about a specific source category or a specific point in time.

[Slide 37] If you have any clarification questions, I can answer those now. Thank you.

(No one indicated that they wanted to ask any clarifying questions.)

Darla Potter: Now we will take you through the visibility data assessment portion of the report. Highlighting the graphs that are tied to the main conclusions that are in Requirement three of the report. So, we are not going to go through all of them for you this afternoon, (A) people start to sleep, mainly because of data overload. Bear with me, you have about another half hour to go.

[Slide 2] For a lot of you, the first section of this presentation is going to be a review, yet again,

of some of the visibility topics and the visibility monitoring. So, those of you who hear this on an annual basis please bear with me. We will get to the data. The next section we will focus on is the IMPROVE trends analysis. IMPROVE has done some long term trending, which we have brought forward in this report, which we have not had the benefit of having before. The last part we will focus on the visibility monitoring data assessment. We will talk about data from the Wyoming IMPROVE sites, both the aerosol concentrations as well as the aerosol extinctions. We will take a look outside of the State of Wyoming at a subgroup of regional IMPROVE sites to kind of give you a feel for where we are at with respect to other sites monitoring in the states around us. We will take a look at some of the data from the Green River Basin Visibility Study that was conducted in southwest Wyoming. We will also take a look at the optical monitoring data that is now available from the sites that we recently established in northeast Wyoming.

[Slide 3] This slide is rather busy. Basically the point that I want to get across to you is, there are several important factors that affect how well you see a scene. Things such as the characteristics of the observer. Their value judgments on what is clean, what is not clean, and how well they can see to start with will affect that. The illumination of the scene, whether it be the sun angle or whether it is overcast out, the condition of the sky on that particular day. The viewed scene itself, the color and texture of the scene. If you have something distinct to look at or in a lot of cases in Wyoming, if you really don't have something to look at. But there are lots of pretty things in Wyoming. Finally the thing that we are going to focus on today, all of those things are important factors but what affects visibility are the gases and the particles in the atmosphere that scatter and absorb the light and that is what we are talking about when we are talking about the monitoring data. Light is both scattered and absorbed as it travels through the atmosphere and reaches the observer. The light scattering can result from two things. It can result from natural blue sky scattering, just the natural oxygen and nitrogen in the atmosphere. Beyond that there are the aerosols, the gases and the particles that scatter and absorb that light. Finally, the light absorption results from the gases and particles in the atmosphere. So that is the primary part that we will talk about today in terms of the visibility monitoring data.

[Slide 4] What is visibility monitoring? We can characterize the scene using automatic cameras to tell us what it looks like. We will show you some of those pictures in a little bit. We can measure the amount of light scattering and light extinction with tools called nephelometers and transmissometers. Finally, we can measure the air particles that actually produce the light extinction with aerosol samplers. The bulk of what I am going to be showing you today is focused on aerosol samplers.

[Slide 5] Within the State of Wyoming, a great significance has been placed upon monitoring. As Dan calls it, they are his reality checks. So, within the State of Wyoming we are very fortunate. The Bridger Wilderness Area and Yellowstone National Park monitoring sites have been there since the last 80s so we have great historic record at those two sites. The sites at the North Absaroka Wilderness Area as well as the Brooklyn Lake site were added in the year 2000. The Green River Basin Visibility Study site in southwest Wyoming monitored visibility from 1996 - 2000. As I mentioned earlier, the Cloud Peak Wilderness Area and the Thunder National Grassland sites were established in 2001 with the aerosols monitors at those sites being adopted by the IMPROVE Program in June of 2002. So, throughout the State of Wyoming, as of today,

we have quite a bit of visibility data that is being collected and great coverage even in areas that aren't designated as Class I.

[Slide 6] Fine particles, those particles that are around $PM_{2.5}$ size are the ones that cause the greatest visibility impairment because they scatter the light so efficiently. The five (5) particle types that make up nearly all of the fine particle mass in the atmosphere that affects visibility are due to the organic aerosols, the sulfate and nitrate aerosols and the fine soil aerosols. Those all scatter light fairly efficiently. The fine aerosol that absorbs light is known as elemental carbon. The only other particulate species in aerosol that I will talk to you about today, in terms of visibility impact, is coarse mass. Coarse mass is a fraction between $PM_{2.5}$ and PM_{10}. It affects visibility but it doesn't scatter light as efficiently due to its larger size. So, it also affects visibility but not as greatly.

[Slide 7] This is a general sources list of where these aerosols can come from. Cara mentioned primarily the SO_2 emissions result in the ammonium sulfate aerosols that affect visibility. The NO_x emissions convert in the atmosphere forming an ammonium nitrate that affects visibility although to a lesser degree. Organic carbon is the least understood of the species in terms of source attribution, but it is a mixture of both manmade as well as natural sources that affect that. Elemental carbon is primarily a manmade contributor although to a certain extent it is affected by fires as well. Fine soil is the $PM_{2.5}$ fraction that can be from dust mineral processing and mining and the coarse fraction, they mainly have natural origins. Most of the fine particles the ammonium sulfate through the fine soil are usually manmade in nature. They transport great distances, while the coarse particles trend to have more natural origins and deposit out closer to the source.

[Slide 8] In the visibility data assessment, you will see things referred to as cleanest, average, and haziest. What these terms really mean is that when we talk about the cleanest, we actually looked at the arithmetic mean of the 20% least impaired valid data within that monitoring period. So it is the lowest amount of visibility impairment that is monitored. Average is the arithmetic mean of all of the valid data within that monitoring period, which is traditionally how we had looked at things in past. On the haziest conditions that is the arithmetic mean of the 20% most impaired valid data within that period and that is the highest amount of visibility impairment that is being monitored. All of the data that was analyzed was analyzed using full calendar years. This is a departure from what has been done because before we used to go on a sample year basis, based on seasonal quarters and things and now we are looking at things based on full calendar years. Most of these changes and how we are looking at things have been brought about due to the requirements with the Regional Haze Rule. So we have started to look at things in light of looking forward to what we need to do under that rule.

[Slide 9] To give you an idea of what some of the conditions are, this is a view at the Bridger Wilderness Area. It is a view that is looking east, southeast at Mount Bonneville. Mount Bonneville is approximately 36 kilometers away. The pictures were all taken at 3:00 o'clock because as I mentioned that sun angle can be pretty important. In the upper left you have got what it looks like on the best 20% days. Upper right, the average days, maybe you are losing some clarity, but you can still basically see Mount Bonneville because it is still 36 kilometers

away. On the worst 20% days, you can still see Mount Bonneville but it is definitely kind of a shadow effect verses being able to see the details of it. On the lower right we do end up with views where Mount Bonneville is completely obscured and that does happen at Bridger Wilderness less then 1% of the time.

[Slide 10] This is a view at Yellowstone National Park. This is a view looking east, southeast basically the same direction but here we are looking at Avalanche Peak, which is approximately 21 kilometers away. But these slides were taken at 9:00 o'clock. So the sun angle makes a tremendous difference. Just in looking at these, you would think that Yellowstone was much hazier, but in fact it is due to the sun angle. So, things like that play a very important part in determining how good the visibility is. The upper left of the screen, on less than 1% of the days at Yellowstone we have pristine conditions. That is just natural blue sky scattering that is not affected by manmade or natural pollutants. On the upper right, what it looks like on the best 20% days, the lower left on the average days, and the lower right on the worst days. You can see because of that sun angle in addition to the addition of the visibility impairing pollutants the details of that scene are greatly affected.

[Slide 11] I'll show you a couple more pictures. On the left we have some photographs of the Teton Wilderness. On the upper part. On the right is Cloud Peak. Cloud Peak is not a Class I area, but it is pretty spectacular, and we have some photographs there. The two (2) upper pictures are what basically what those views are when it is pristine. The lower graphs are what a uniform haze would look like at those two areas. The mountains are pretty obscured. The details are no longer there.

[Slide 12] The data that we will show you on the graphs translates into the deciview scale. The deciview scale is a fairly new scale in terms of us utilizing it within these reports. Three (3) years ago we introduced it briefly at the end to say that this is a picture of things to come. We are switching to this scale because this is the scale that will be utilized within the Regional Haze Rule to look at things. The idea of the deciview scale is that it is linear with respect to how a human perceives visual changes in air quality. A one deciview change, Dan mentioned today, is termed a just noticeable change and will be perceived the same on a clear day in Wyoming as it would be on a hazy day out East. So, it is supposed to be a uniform change throughout the entire country. It doesn't matter whether you have a clean place to start from or a hazy place to start from. At a pristine atmosphere the deciview is zero. That is as clean as you can get. As that value increases, the visibility decreases.

[Slide 13] To give you a relative idea of how this progresses, what we have got on the left here, the left most scale is the deciview scale, the middle scale is light extinction, and that is what most of the scientists use in terms of terminology and the right most scale is the visual range. Visual range is exactly opposite of the deciview, the larger the number the further you can see. You can see through these progression pictures at the West Elk Mountains in Colorado that you can go from five to ten, in five deciview increments you start to loose the details of the scene. You go from 20 to 25 and you start to loose these features. You go from 35 to 40 and all of that is obscured. So this is to give you a relative idea of how much those changes really mean.

[Slide 14] This is a picture that shows you the IMPROVE monitoring sites throughout the entire country. These are the aerosol monitoring sites, the aerosol samplers. IMPROVE stands for Interagency Monitoring of Protected Visual Environments, which is a mouth full so that is why we call it IMPROVE. It is nationally recognized as a scientifically acceptable method for monitoring visual air quality. It started in 1988 as basically a research effort to see what visibility was like in Class I areas and it has expanded greatly to include sites like at Cloud Peak and Thunder Basin that are sampling Class II areas as well.

[Slide 15] It just became recent that IMPROVE finally had enough data to do long term trending on a statistical basis. The graphs that I am going to show you now are based on eleven (11) years of data that was collected from 1988 through 1998. The trending was all conducted by the folks at IMPROVE and on these we focused on just Yellowstone and Bridger in the report because those are the two (2) sites within Wyoming that have that much data. But, if you see a solid dot it indicates there is not a significant slope. There is not a significant change in visibility or the aerosol concentrations one way or the other. An empty triangle, if it is pointing up means that it is a positive slope, down a negative slope at a 10% significance and if it is a solid triangle it means that there is even more significance. They are pretty sure it is a definitive trend. Again, if the arrow is pointing up it is an increasing trend, pointing down a decreasing trend. I will take you through some of the major conclusions, basically for Yellowstone and Bridger as we go through these. Always on the upper left will be the graph or the chart that shows the worse 20% days. The haziest conditions. The lower right the best 20%, the cleanest conditions. These graphs are for the deciview scale for this visibility. If there is a decreasing trend, the arrows pointing down, it means that there is an improvement in the visibility. If there is an arrow pointing up it means that there has been a decrease in the visibility over those eleven (11) years. At the Yellowstone site, visibility is improving on the cleanest days, but there is not a significant change recorded on the haziest days. To give you a point of reference, up in this corner that is the Yellowstone site. Then at the Bridger site, which is this site right here, there is no significant change in visibility either on the haziest or the cleanest days.

[Slide 16] If we break this down further and we start to look at the aerosols that affect visibility, first we are going to look at the sulfate aerosol. For these aerosol concentration graphs, the same concept exists if it is an arrow pointing down, the aerosol concentration is lessening. As you decrease the amount of aerosol your affect on visibility decreases along with it. If it is an arrow pointing up, it is an increasing trend. At both Yellowstone and Bridger the sulfate aerosol concentrations are decreasing at a statistically significant rate on the cleanest and the haziest days. So, over that eleven (11) year period at Bridger and Yellowstone the sulfate concentrations have been decreasing.

[Slide 17] Another large contributor at those two (2) sites is the organic aerosol. What we see is that the organic aerosol concentrations are increasing at varying degrees of statistical significance at both Yellowstone and Bridger on the haziest days. This is primarily due to high fire activity years in that eleven (11) year period. In 1994 and in 1996 both Bridger and Yellowstone were highly affected by fire activity. That translates through the data analyses into that trend. However, on the cleanest days the organic aerosol concentrations are decreasing at a statistically significant rate at Bridger and there is no change recorded at Yellowstone. So even

the long term trends can be highly affected by years where we have got some pretty significant fire events.

[Slide 18] Fine soil. On the cleanest days the fine soil aerosol concentrations are decreasing at a statically significant rate at Bridger, while there is no change recorded at Yellowstone. But on the haziest days the fine soil aerosol concentrations are decreasing at a statistically significant rate at Bridger and at Yellowstone no change was recorded.

[Slide 19] This is the last of these that I have got in terms of coarse mass. At Bridger, the coarse mass aerosol concentrations are decreasing at a statistically significant rate on the haziest days, while no changes were recorded on the cleanest days. At Yellowstone there is no change recorded for the coarse mass aerosol concentration on the haziest days, but there is a statistically significant increase on the cleanest days. Out of these, the one that you might notice that is not there is the nitrite aerosol concentration trend. There is not a nitrate aerosol concentration trend. The data collected before 1996 in the IMPROVE Program, they are investigating an artifact on that data. So, on the website there are no longer any trends of the nitrate data present. The nitrate data, at lease in Wyoming, great importance has been placed on that due to the NO_x emissions from oil and gas activities. So, that is the piece of the long term trends that is missing. However, overall, visibility is either staying the same or improving at both of our sites.

[Slide 20] We will change gears a little bit and focus back in on the State of Wyoming. What we are going to talk about now is data that is collected by the aerosol samplers. At the Bridger Wilderness Area, Yellowstone National Park, North Absaroka Wilderness Area and Brooklyn Lake sites. These samplers all have data that extend through 2001. Our difficulty with the sites is that we are dealing now with sites that don't always start at the same time. It used to be easy because we had data from 1988 for both Bridger and Yellowstone. So what we have done so that we can give you an accurate comparison amongst the sites is just focused on the most recent data, which is the 2001 for the most part. Where we have some long term trends, we will show you that. But for site to site comparison, we are going to focus on 2001.

[Slide 21] This graph focuses on the aerosol concentrations, what is actually monitored by that aerosol sampler on the cleanest, average, and haziest days. What this does for us, it tells us the relative contribution of each of the coarse and fine particle concentrations to the total mass that affects visibility. As we go from left to right, the ammonium sulfate aerosol concentration which is the blue bottom portion of the bar, as Cara mentioned earlier, we have significantly more sulfate aerosol that is affecting visibility then the nitrate, which is this bar right here. That is evident on this graph. Basically, in term of percent contributions, the ammonium sulfate varies between 15 to 25 percent on the clean days, 9 to 18 percent on the hazy days, which is well above the 4 to 9 percent for the ammonium nitrate. The organic carbon aerosol, which is this light yellow bar that runs through here is another large contributor to visibility and as I mentioned earlier it is the least understood of the source attribution for that particular source. We have a significant amount of coarse mass as well at these sites, but the coarse mass doesn't scatter light as efficiently, so it doesn't affect visibility as much.

[Slide 22] This is our one long term trend for the State of Wyoming. This graph as we go from

left to right, this is 1989 which was our first full calendar year of data through 2001. The scale is deciview starting at zero and going to 16. The green sites on each one of these is the Bridger Wilderness Area, which consistently shows better visibility than the Yellowstone site, which is the blue site on each of these. Toward the end, these lines here represent the North Absaroka site, which was put in in January of 2000. These triangles represent the Brooklyn Lake site. What is encouraging to us is that although we have limited visibility data available at North Absaroka and Brooklyn Lake, that the magnitude of those visibility conditions that are being monitored fall right within where the other sites are at.

[Slide 23] In terms of aerosol extinction or how much each of these aerosols affect visibility, we take the contribution of the amount of the particle concentration, which I showed you earlier, multiply it by how well it scatters light come up with this graph and these are the units of extinction in inverse megameters. What is interesting on these graphs is that on the cleanest days the ammonium sulfate aerosol, which again is on the bottom in the blue, has the greatest impact on visibility on all of the Wyoming sites. So, all of the Wyoming sites are affected the greatest by that particular aerosol varying from 43% at Bridger to 51% at Brooklyn Lake. So that is how much each of those affects visibility. But then on the haziest days when we get over here, there is kind of a split between ammonium sulfate and the organic carbon. They affect visibility in almost equal percentages and in fact at the Bridger site it is a 32% contribution out of both of those. At Brooklyn Lake about 40% from ammonium sulfate. At North Absaroka and Yellowstone, organic carbon dominates. So as you go from the cleanest days to the haziest days you have a change in what affects visibility the most. The fine soil, which is this dark piece of the pie towards the top, second from the top. That has the least affect on visibility on both the cleanest days and the haziest days. Between 2 to 4 percent on the cleanest days and 5 to 7 percent on the haziest days. So that is the piece of the pie that affects the visibility the least, once you take into account how well it scatters the light.

[Slide 24] We are going to expand our view a little bit now and look outside of the State of Wyoming. Primarily to kind of put Wyoming in perspective of where we compare Wyoming with other sites around us. The closest sites that we looked at, the Jarbidge Wilderness Area in northern Nevada, Canyonlands National Park is the longest period of record site in Utah. We have Mount Zirkel and Rocky Mountain in the northern portion of Colorado. We have Wind Cave and Badlands National Park in South Dakota. For these sites, as well, we have varying periods of data collection so we focused on the 2001 data for these graphs, for the most part.

[Slide 25] This is a long term graph. There are a lot of things on here, but basically what I want you to take away from this is that as we go from the cleanest days to the average days to the haziest days, the bulk of the sites stay pretty well clustered. The exception to this rule, which gets more dramatic as you go from the cleanest to the haziest days is that there is a separation. First of all of the Badlands site, which is the pink site, the top line. We recently have two complete calendar years of data from the Wind Cave site and that is this site. So, it kind of splits the difference between the other clustered sites and the Badlands site. So, visibility at Wind Cave is not as impaired as it is at Badlands but it doesn't fit within the cluster of those other regional sites that we see. In the graphs in the report it is also evident once you take a closer look that the Bridger Wilderness Area and Jarbidge Wilderness Area sites have had and continue

to have the best visibility out of all of those sites that we have looked at in the region.

[Slide 26] We can look at these sites in terms of the cleanest, average, and haziest days in terms of the total reconstructed extinction, how much each of the aerosols affect visibility. But the one thing that is consistent in all of these is this large blue bar on the bottom. That is the natural blue sky scattering, which the protocol calls for being held constant throughout all of the sites. So what is important here is that the amount of the aerosols on top of that that are affecting visibility. Everything else is held constant. It is very interesting because we are looking at a fairly large region, but the pattern of the extinction budget, that is which aerosols affect the visibility at each site, stays fairly constant amongst all of the sites. There is an average, if you put these in pie form, basically on average 65% of what affects visibility at these sites is just natural blue sky scattering, which is fantastic. On the cleanest days, which is what we show here, the visibility conditions among the sites from the cleanest sites to the haziest site vary by only 4.3 deciviews. That is minimized to only 2.1 deciviews when Badlands and Wind Cave are taken out of that piece. So, for the most part, those sites are fairly close.

[Slide 27] As we move on to the average conditions, which is this upper left, and the haziest conditions you can see that pattern of what aerosols affect visibility to what degree at each site becomes more pronounced. There is more of a differentiation at each site as we go from clean to average to hazy. On the average days in 2001 the visibility conditions vary by 6 deciviews between all of the cleanest and haziest site. That is reduced to only 2.4 deciviews when Badlands and Wind Cave are taken out of that equitation. On the haziest days, the sites vary by only 6.5 deciviews between the cleanest and the haziest but that is reduced to 3 deciviews when Badlands and Wind Cave are taken out. So that summarizes the data that is collected by the national IMPROVE Network.

[Slide 28] In the State of Wyoming we have been very fortunate to have the Green River Basin Visibility Study. It started in 1996 and monitored through December of 2000. The site was established to monitor visibility conditions in the Green River/ Hams Forks Basin. The monitoring data for NO_x and ozone was conducted through December of 2001. Monitoring was conducted in this part of the State not because it is a Class I area, it is a Class II area, but there were concerns by the local citizens about visibility in the area. This particular site followed the IMPROVE protocols but was not an official part of the IMPROVE Program so that is why we are discussing it separately.

[Slide 29] We have four (4) complete calendar years of monitoring data 1997 through 2000. It is too short of a period to really assess a trend and that was not the intent of the Green River. Green River was to basically characterize the conditions. We went for four (4) years and basically found there wasn't a whole lot of change from one year to another. In fact, on the cleanest, average, and haziest days they held roughly constant varying only by roughly one deciview over that entire four (4) year period. Given the variability of visibility impacts and what can affect visibility at any given time gave us a pretty good baseline to go from. So, you can see that we are around 7 deciviews on the cleanest days, around 10 ½ - 11 on the average days, and around 14 on the haziest days.

[Slide 30] In terms of the aerosols that affect visibility, again the bottom part is the Rayleigh contribution, even though this was not part of the IMPROVE Program, it did follow IMPROVE protocols. So, we have compared it to the two closest IMPROVE aerosol samplers and those are at Bridger and Yellowstone. What we can see from this is that the Green River site does in fact have a more impaired atmosphere than the Bridger and Yellowstone sites which one would expect given its Class II versus Class I, but not tremendously different. The natural blue sky scattering contribution on the cleanest days is roughly 17% cleaner at Bridger and Yellowstone, 12% on the average days and only 8% on the haziest days. So there is a difference there, but it is not as dramatic as one might think in terms of what affects visibility. Roughly, as you go across the graph and kind of convert this to deciview between what we have at Green River and the Bridger and Yellowstone sites on both the cleanest, the average and the haziest days, it is only a 3 deciview change. So, visibility on all 3 of those condition days is 3 deciviews different between the Green River site, the Bridger and the Yellowstone site.

[Slide 31] Normally what we see, as I pointed out, it is really evident as you look at the regional bar graphs, is that typically we have different pollutants that affect visibility on the clean days versus the hazy days. What is very interesting at the Green River site is that is not the case. We have basically the same contributions on the clean days in terms of percentage breakdown amongst the aerosols as we have on the hazy days. The difference is, you have more of it on the hazy days. The contribution of it doesn't flip flop. You don't have organics contributing more than ammonium sulfate like we do at Bridger and Yellowstone so you have that contribution roughly staying the same between your clean days and hazy days, which is not normally the case. So, it is a constant aerosol breakdown pattern at that particular site.

[Slide 32] The final data that I am going to point out to you is the data collected at our Cloud Peak Wilderness Area site which is roughly where this yellow triangle is here and our Thunder Basin National Grassland sites, which is this yellow triangle up here. These sites, as I mentioned earlier, became operational in 2001. Both are located at Class II Areas. Cloud Peak Wilderness is not a Class I. Both sites follow IMPROVE protocols although they were not started up as part of the IMPROVE Program. Now the aerosols samplers have become part of the IMPROVE Program. The downside of that, as far as the aerosol samplers go, we don't have any data back yet. So, what we have got for you today is data collected by the nephelometers and transmissometers. Basically those pieces of equipment measure the light extinction and the light scattering. They are not directly comparable because they measure two different things. They are also not directly comparable because the transmissometer measures the light extinction over about a 5 kilometer site path while the nephelometer is a single point measurement. So we have some differences in the data, but what we do have we wanted to show to you today.

[Slide 33] We've got data for a partial year in 2001 and all of 2002. Again broken down the cleanest, average, and haziest days with the transmissometer data being on the left and the nephelometer data being on the right. Typically, the nephelometer has greater data capture so you are actually seeing more data points. It has also less impact by weather, but it is only measuring the scattering component. So it is not measuring that absorption component that also affects visibility. So there can be differences in the data, but basically in this graph as well, one of the things that is different is that we are talking standard visual range. How far you can see a

dark object against the horizon sky in terms of kilometers. At Cloud Peak between 200 and 250 kilometers on the cleanest days down to around 80 on the haziest days from the transmissometer. With a nephelometer between 330 and 380 on the cleanest days down to around 100 on the haziest days. While at Thunder Basin we are around 150 to 180 on the cleanest days with the transmissometer. Around 60 on the haziest days with the nephelometer, up around 330 on the cleanest days and down to between 90 to 115 on the haziest days. So, we are starting to get data back from the site. Once the aerosol data is back our contractor will go through and compare that data with the transmissometer and nephelometer data to make sure that we are getting good agreement amongst all of the sampling equipment and once we have that data we will go back and analyze that as well. That is the last piece of the visibility data.

[Slide 34] What I would like to do now is present to you some preliminary conclusions that we have drawn based on all of the information that is contained in the 2003 Draft Review Report.

[Slide 35] The emissions inventories that Cara presented indicate that the NO_x and the SO_2 actual emissions from the major stationary sources are approximately equal while the ammonium sulfate aerosol concentrations are well above the ammonium nitrate aerosol concentrations measured at the Wyoming IMPROVE sites. Based on the emissions inventories the aerosol concentrations and how those aerosols affect visibility, we have concluded that the NO_x emissions have a significantly smaller impact on visibility in Wyoming then the SO_2 emissions.

[Slide 36] All of the Wyoming IMPROVE sites are subject to impacts from long range transport of visibility impairing aerosols. This makes the development and implementation of a Regional Haze State Implementation Plan a key role to prevent and remedy future regional haze visibility impairment in Wyoming mandatory Class I areas.

[Slide 37] I think I sound like a broken record on this by now, but there has been no certification of visibility impairment that can be reasonably attributed to a source or small group for sources in Wyoming. Therefore the focus of the Long Term Strategy Review Report is on what the existing conditions are and what we can do in the future to help prevent visibility impairment that is reasonably attributable. Last but not least, the Long Term Strategy, the Visibility SIP, the Air Quality Standards and Regulations Chapter 9, Section 2 Visibility along with Air Quality Standards and Regulations Chapter 6, Section 2 and 4 for Prevention of Significant Deterioration in New Source Review are adequate for making reasonable progress toward the national visibility goal of remedying existing and preventing future impairment that can be attributed to a source or a small group of sources.

[Slide 38] With that, if you have any clarifying questions on the data assessment or the preliminary conclusions we will address that and please hold you comments until after we have gone into the EPA letters. Thank you.

Ronn Smith: Any questions or are you ready to be quizzed?

Paul Seby: Are you taking questions from the audience?

Dan Olson: Clarifying first, then questions.

Paul Seby: Darla you talked about one of the conclusions, that Wyoming is a receptor state of visibility emissions from other areas outside of State. What conclusions were you able to draw about the amount and types of that transport that arise in Wyoming?

Darla Potter: The piece of the information that we presented very briefly earlier that tells us roughly how much is from outside of the State is based on the work that we have conducted through the Southwest Wyoming Technical Air Forum Modeling Study and what that study demonstrated was that approximately 90% of the visibility impairing aerosols were due to sources outside of that boundary. That includes sources, the boundary was not just southwest Wyoming, that boundary extended over into Idaho and includes the Wasatch Front in Utah as well as some of Colorado. So, the best information that we have in terms of impacts to the Bridger and Fitzpatrick Wilderness is that approximately 90% is coming in from outside of that large modeling domain. So, the other thing that we can tell just in looking at the source contribution, say between Bridger and Yellowstone because we have got fairly significant periods of record at both sites, is that each of those sites has slightly different aerosol patterns. So the likelihood that we have different sources from outside of the State, and for that matter inside of the State, affecting Yellowstone, than Bridger and Fitzpatrick are evidenced in that. But our best estimate right now is about 90% is the best information that we have.

Paul Seby: Are you able to tell with that 90% how much is natural or anthropogenic?

Darla Potter: No. At the time the SWWYTAF Study was conducted, the Regional Haze Rule wasn't yet final and there was not an emphasis on natural or anthropogenic, so that wasn't part of it.

Ronn Smith: What was your name?

Paul Seby: Paul Seby.

Ronn Smith: If we could get you to identify yourself when you ask a question.

Lee Gribovicz: One quick question Darla. On the map of the northeast monitoring you had Thunder Basin and Cloud Peak. There is another yellow triangle on there south of Gillette. Is that a NO_x monitoring site?

Darla Potter: There was another yellow triangle on there. It is about 15 miles south of Gillette. That site is a site that is in a process of being established. It is not a visibility monitoring site so I didn't mention it today. It is a site that is being established by the Division to monitor NO_x, ozone, PM_{10} as well as meteorological conditions. We are anticipating that going in in a fairly short order, hopefully within the next month. The site has been selected. We are in the process of getting the power run to the site so that it can be put in. The purpose of that site was to monitor ambient air quality in a coal bed methane development area of northeast Wyoming.

Fernando Roman: Fernando Roman with the Wind River Environmental Quality Commission. I was wondering about your visibility pictures of the Teton Wilderness and Cloud Peak. Were those pictures taken at the same time of the day. It looked like Cloud Peak was more pristine then the Teton Wilderness Area.

Darla Potter: They were, and I have to remember, I believe that the Teton Wilderness pictures were taken at noon and the Cloud Peak, and I might have them flip flopped, one was taken at noon and the other set was taken at three. But they were consistent in terms of the pristine compared to the uniform haze. Those were taken at the same time for both Teton and Cloud Peak. One set was noon and the other set was three. I can't remember which set was which.

Paul Seby: Again Paul Seby. You showed several slides that talked about the types of pollutants that exist that impair visibility in Class I areas in Wyoming and the clarifying question is, there was an assumed constant level of Rayleigh light scattering for each of those. If I understood right, you said that was because of the IMPROVE protocol that requires that?

Darla Potter: That is traditionally what IMPROVE does. Rayleigh scattering is affected by atmospheric pressure. So, it is highly dependent of the elevation of your site. What the IMPROVE Program does is it assumes a 10 inverse megameter Rayleigh condition throughout all of the sites to basically give them a level playing field. Most of the data analysis that is conducted by IMPROVE ends up talking about the extinction and the ultimate visibility impact verses just the aerosol concentration. So to be consistent with what IMPROVE does, we have made that constant as well.

Paul Seby: Have you ever looked at it by defining the actual elevation verses the assumed?

Darla Potter: We have, but we haven't done that for quite sometime. We didn't for this analysis. We focused on just using 10.

Fernando Roman: On your preliminary conclusions could you also add that the ammonium sulfate aerosol concentrations, 90% come from out of state rather than in state?

Darla Potter: We could. I think that we would have to made it broader to include sulfate and nitrate because the SWWYTAF Study didn't differentiate between the two. They were looking at the total visibility impact, predominately due to those two species, but we could probably add that as a conclusion for the final report as well.

Lee Gribovicz: Could we say all secondary pollutants because we have got secondary organic aerosol as well?

Darla Potter: We cannot say that for secondary organic aerosol because the decision was made when the Forum (SWWYTAF) ventured into adding boundary conditions to the modeling effort. There was a decision that was made not to add the biogenic, the secondary organic aerosol fraction was not added with the boundary conditions. So, we couldn't extend to that conclusion because we only had in-domain sources. We could state that the bulk of the organic contribution

was due to biogenic sources verses anthropogenic sources but we can't state that 90% of it is from outside of the domain because they weren't part of that equation.

Paul Seby: One last clarifying question. Can you help me understand the role of the Board in SIP selection, which regional haze option might be selected, and what that process is, and is there a role for the Board in rulemaking?

Darla Potter: That is beyond the scope of today, and I will refer that to Dan to answer your question.

Dan Olson: Thank you Darla. There is a role for the Board. We have, as we mentioned earlier this morning, now Legislative authority or Statutory authority to develop regulations for Emissions Trading Programs, which as you know is part of either option. We are going to have to go through a process involving stakeholders to try to identify for the State of Wyoming which option is the best. Regardless of what option that we choose, whether it is 308 or 309 we need to develop regulations, which will implement that trading program. When we do that we will develop those regulations for whatever specific propose it is, those regulations will have to come to this Board, in a public process, for public comment, and approval or recommendation to take to the next level, which is the Environmental Quality Council where we will go through the public process yet another time and seek approval from the Environmental Quality Council to implement those regulations into a State rule. Then they will go through our administrative procedures and go through the Attorney General's office, and the Governor's office for the Governor's final approval. So, it will be an open process, a public process when we get to the regulation phase. The process of deciding whether we go 308 or 309 will also be a public process. Whether or not the Board is specifically involved in that is something we haven't focused on yet. The Board is a good vehicle for public information. So, that is kind of where we are going to go.

Ronn Smith: Any other questions?

Fernando Roman: I have one last question for Darla. Is the ammonium concentrations or are they transport?

Darla Potter: Ammonium itself?

Fernando Roman: Yes, because you have one sulfate and one nitrate.

Darla Potter: What the IMPROVE Program assumes is that sulfate, in terms of what affects visibility, is that the pollutants that are measured are assumed to be fully converted to ammonium sulfate and ammonium nitrate. Through the SWWYTAF Study we have determined that southwest Wyoming, in the domain that we are talking about, is ammonium limited with the assumption with the IMPROVE Program that it is fully naturalized, fully converted to ammonium sulfate and ammonium nitrate. So, we use those same equations that have been tested throughout the country and agree fairly well with what our actual monitored conditions are at the transmissometers and nephelometers. So that is why we use that terminology.

Darrell Walker: Darla I have a couple questions Darla. On organic carbon, can you say that Yellowstone is higher than that at the Bridger due to biogenic sources?

Darla Potter: We can say that it is higher. We can't say why it is higher. One of the problems that we have with the organic carbon is that from what is picked up on the filter we cannot differentiate what the source of it is. So we can't tell if it is from a fire that went on or if it is from just the natural vegetation in the area or if it is from anthropogenic VOCs from industrial development. It is higher. Is it due to biogenics? Yellowstone has more vegetation than Bridger so that is probably a likely conclusion, but the data doesn't tell us that.

Darrell Walker: What affect does the differences in taking pictures, at different times of day, between Yellowstone and Bridger and the rest of them, how does that affect your conclusions?

Darla Potter: You know the time of day does not affect our conclusions. What is really important to point out though is, why it is really important to point that out is that you need to be aware of when the pictures were taken so that you can compare pictures that are taken at the same time of day. It is a lot like looking at the plume from a smoke stack on an industrial facility. If you look at it with the sun to your back shining into it verses the sun shining in your face while you are looking at that plume on the same day it looks two completely different ways. So, for visibility it is important to know what time of day those photographs were taken because the sun angle affects how well you can see it. When you are looking at the view like we were with Yellowstone what is happening is you are getting sun scatter back into your face and the camera, so it affects how well that is illuminated. If it is from your back and you are looking at that direction or directly overhead all of that affects how well you can see something and you might think just because of the sun angle that it is a highly impaired day when in fact if you get the visibility data from that day from a monitor, that day may be just as clean as any other day. It is just because you have looked at it from another angle. So, when we look at pictures it is really important.

Darrell Walker: So if you don't know the time of day it was taken, you could get a totally -

Darla Potter: You could get it wrong. That has happened in the past with photographs that have been taken from varying sun angles. It may be the exact same visibility condition, just with a different sun angle and it will look completely different. So it is important to compare those with the same time of day. That is why for the Teton Wilderness and the Cloud Peak, even though I couldn't remember which one was noon and which one was three, the pictures that I picked of the pristine condition verses the uniform haze condition were from the same time for the Teton, one set of time, versus the Cloud Peak so that you aren't mixing those. When you mix them you have problems.

Darrell Walker: One other question. Ammonium sulfate, like when they are flaring, have you looked into how much difference that might make or will that come out with the monitoring later when they are going to go into enclosed flaring or improved flaring by using different sized flaring tools?

Darla Potter: You would have to, that is where it becomes very key to have the emission trends along with the visibility data. One of the problems with enclosed verses open is that the only information that we have for those facilities is the potential emissions. We don't collect actual emission inventories from minor sources. So, we don't specifically have an inventory that will track whether the emissions were reduced or not and then you would have to look at the visibility more closely in terms of the year when you know they weren't enclosed to the year when you know they were enclosed and look at those more on a seasonal comparison. Visibility is highly variable from year to year just because of meteorological conditions and what gets transported into an area. So, over the long term it depends on significant reduction, it is whether or not the monitor will actually pick it up.

Darrell Walker: Like if the Pinedale Anticline or the Jonah Fields go to enclosed flaring - do you think that would be an insignificant source?

Darla Potter: Any reduction that can happen is a good reduction, which is basically the philosophy of the State of Wyoming. Would we be able to see it or not, I don't know. It takes a lot of change to affect visibility in terms of what is perceptible and what the monitor can pick up. It would be great if they are doing that, because anything that we can to reduce will help. But I just don't know if the monitors will pick it up.

Darrell Walker: Thank you.

Ronn Smith: Any other questions? Okay let's move to the comment section. We will start with some comments submitted by EPA that Dan will review for us.

Dan Olson: Thank you Mr. Chairman. What I want to do is, I have a letter dated April 16, which I received by fax April 16, which I will introduce into the record. These are comments from the EPA office in Region VIII relative to this long term strategy. We worked with them in terms of ensuring that they got their comments in in a timely fashion so that we can address them in the final report. I want to paraphrase it, this thing is at least three (3) pages long. There is a main message that I want to just say. One of them was, they were reminding us that even through we have discussed extensively in this strategy regional haze even though it is a strategy relative to reasonably attributable that we will continue to have to do these long term strategy reviews for reasonably attributable until such time as we can marry that strategy with the regional haze strategy and start to develop a strategy for visibility that includes both. My response to them will be that I understand that. The second comment concerns whether or not we have addressed the issue of Class I areas in South Dakota. Darla's presentation today and some of the information in the appendices that you can read indicate that the visibility in the Badlands and the Wind Cave is more affected than most other Class I areas in the region. We understand that, and we also understand that, like Wyoming, there has been no certification of reasonably attributable impairment at either one of those Class I areas in South Dakota by the Federal Land Managers, so that is why we didn't address any Wyoming impacts to that certification since there isn't one. The bulk of their concern is, as Darla has mentioned to you, relative to SWWYTAF and what we intended to do back in the 1996 - 1997 timeframe when we

were naive enough to think that you could develop a program and a model to address visibility impacts and impacts on air quality related values in nine (9) months. She also addressed the issue that it took us from that time until 2001 or 2002 to actually get everything done. We spent twice as much time developing an inventory as we anticipated using for the whole program. We did develop the modeling scenario. We did get senses from all of the stakeholders that the CALPUFF/CALMET system was the tool of choice so that we could stop arguing about tools and start arguing about results and what they mean. It is note worthy, I think, I just got a copy of a federal register just the other day and noticed that CALPUFF has now been declared a model for use for transport. Relative to increment consumption, they are still taking about AQRVs and visibility to some extent. We use that model. We are going to continue to use that model. I think that EPA's concern is that there were some comments made in 1997 about how we were going to approach the analysis of potential impacts of the Bridger Teton Wilderness Areas after we once got that model. They are insisting on a schedule that we do that. We attempted to clarify for them in our narrative in the actual report where we were going in terms of those types of analyses so what we will probably do is expand on that to make it clear that even though we made a comment in the days where we were relative naive about what could happen. We still respect that comment and we will honor it, but we will honor it in a different fashion that was envisioned back in 1997. So we will respond to those questions and that is primarily their comments on this issue.

Ronn Smith: Okay. Thank you Dan. Does the Board have any comments before we open it up to the public?

Ed Wright: Dan, what about EPA's other letter?

Dan Olson: I had two letters from EPA. I am sorry. I had one dated March 10 also, which was a preliminary letter. I think the result after our meeting with the Federal Land Managers, and in that letter EPA suggested to us expectations for this long term strategy and part of their expectations was related to this SWWYTAF analysis and they were expecting that the long term strategy that we would include an updated emissions inventory and a model run addressing those questions in 1997. A note on this letter says "let's talk about this when we have a few minutes". I did talk with them as soon as I had a few minutes and it would of been nice if we talked about this letter before you sent it because this was two (2) weeks before we were going to put the document out and there was no way in the world their expectations were going to be fulfilled.

Ronn Smith: Okay. Again we would ask if anyone from the public wishes to comment to please use the microphone and identify yourself.

Michelle Barlow: Michelle Barlow with the Wyoming Outdoor Council. Our comments are in draft form, so I don't have copies to distribute to the Board or to Dan this afternoon. I think I will just go ahead and read excerpts from our comments. As with past reviews WOC continues to be disappointed with the State's review of its LTS for visibility protection in the State's Class I areas. It has been shown that projected industrial growth in Wyoming will significantly affect visibility in the Bridger Wilderness Class Area as well in the nearby Wind Cave and Badlands National Parks in South Dakota. The Clean Air Act mandates that existing visibility impairment

be eliminated and future impairment be prevented in these Class I areas. However, the State's LTS review continues to ignore these national mandates.

So, I will go on and just highlight four (4) primary concerns, which cover four (4) areas and just read the highlights from each of these four (4) areas to try to give you information about where our concerns lie. Number one, the State's LTS review does not insure prevention of future visibility impairment due to industrial growth in southwest Wyoming. The State's LTS review does not include an adequate evaluation of the plans ability to prevent future visibility impairment in the State's Class I areas. In 1996 EPA informed Wyoming of the need to perform an adequate analysis of the visibility impacts resulting from current and proposed oil and natural gas development in southwest Wyoming. As detailed in EPA's September 17, 1996 letter, to the State, this analysis was to include an inventory of emissions from oil and gas development and a projected 2010 inventory during the period of maximum activity which was to be used in a visibility modeling analysis to determine whether additional SIP revisions were necessary to insure progress towards the attainment of the Clean Air Act visibility goal. EPA's 1996 letter indicated that if the State did not address these issues in its long term strategy review the State "will not meet its obligations under the approved visibility SIP in the Federal Clean Air Act." So, here we find ourselves today the third long term strategy review undertaken by the State since EPA's 1996 letter and the State has again failed to meet its obligations under the SIP and the Clean Air Act as outlined in the 1996 letter from EPA. Although the visibility model developed by the SWWYTAF is now complete and available for use, the State instead relies on the Air Quality analysis of the Pinedale Anticline EIS to fulfill its commitment to EPA to evaluate the ability of the State's visibility plan to prevent future visibility impairment. The State's use of a 1999 EIS to satisfy requirements of its 2000 long term strategy review is flawed for several reasons. The Pinedale analysis from the 1999 EIS is dated as it was based on existing emissions inventory for 1998. Furthermore, several EISs for additional oil and gas development in southwest Wyoming have been finalized since that time or currently in the works. I would jut like to describe twelve (12) projects that are under going EIS documentation analysis. South Piney Natural Gas Development Project, 210 wells in Sublette County; Wind River Natural Gas Development Project, 325 wells in Fremont County; Jonah Field Infill Drilling Project, specifically 1,250 new wells in Sublette County; Seminoe Road Coal bed Methane Natural Gas Project, 1,240 wells in Carbon County; Little Moment Unit Natural Gas Project, 31 wells in Sweetwater County; Copper Ridge, Shallow Gas Project, 89 wells in Sweetwater County; Kennedy Oil Pilot Project CBM, 20 wells in Sweetwater; Atlantic Rims, CBM Project, almost 4,000 wells in Carbon County; Vermillion Basin Natural Gas Development Project, 56 wells in Sweetwater County; Desolation Flats Natural Gas Development Project, 385 wells in Carbon and Sweetwater County; South Baggs Area Natural Gas Development Project, 50 wells in Carbon County and Supplemental DEIS for the Jack Morrow Hills, 205 wells proposed. So just doing a quick back of the envelope calculation assuming that all of the records of decisions are approved for all of these projects, and some have been approved, that would cover up to approximately 8,000 new wells just in southwest Wyoming. So, the point really is that none of this additional oil and gas development or associated air pollution were evaluated in the Pinedale EIS. As a follow up point, the Pinedale Anticline EIS did not address other sources of visibility impairing emissions such as mobile source growth. So, again we just believe that the Air Quality analysis for the Pinedale Anticline can not be relied upon for this current strategy

review. I am going to skip parts of this because you will be receiving these comments in written form. The visibility impairing emissions from oil and gas development need to be assessed and mitigated in spite of the State's claim that other sources of emissions are causing the visibility problems in southwest Wyoming. We believe that, according to your review the State apparently plans on relying on the regional haze SIPs which are not due to be adopted until 2008 to in fact address this issue of visibility problems in the Bridger and Fitzpatrick Wilderness areas. The emission inventory used in the SWWYTAF model, already eight (8) years old, shows that roughly 60% of the NO_x emissions come from Wyoming sources and 5% come from natural gas development in Wyoming. Thus, a large percentage of the emissions in the area could potentially be regulated by the State and that percentage has likely increased over the last eight (8) years. So, in summary this first area of concern, states are still required to review and update their long term strategy until the Regional Haze SIPs are adopted.

Our second area of concern regards the State's review and its failure to address future sources contributing to visibility impairment in South Dakota's Class I areas. The Clean Air Act in long term strategy regulations require Wyoming's plan to remedy existing and prevent future visibility impairment in neighboring state's Class I areas that may be affected by sources within the State. While the State's 2003 Long Term Strategy Review acknowledges new sources of emissions that have been projected to significantly impact visibility in the Badlands and Wind Cave National Parks in South Dakota. The State has not implemented or recommended any mitigation measures to insure that Wyoming sources won't cause future visibility impairment in these Parks. As discussed in the most recent or the 2000 LTS review the BLM predicated significant visibility impacts that Wind Cave and Badlands National Parks through the EIS process for CBM development in northeastern Wyoming. Yet, in fact the State's LTS review, this go around, continues to find the visibility SIP adequate to prevent future visibility impairment. On the issue of the WYGEN coal fire power plant, which was brought up earlier, the National Park Service testified to the State in July 2002 that the proposed WYGEN II coal fired power plant would have a significant visibility impact. Defined by the Park Service in its testimony is causing greater than 5% change in visibility at Wind Cave and Badlands National Parks. In addition, as discussed in our June 2000 comment letter on the proposed permit for this power plant, the State discounted several viable best available control technology options that would of resulted in much lower emissions and less lower impacts to visibility in these South Dakota Class I areas. However, the State's LTS review does not mention this issue of the WYGEN II plants predicated visibility impairment in the South Dakota Class I areas. Something that we haven't addressed yet, but is a concern, is the recently wrapped up DM&E Railroad expansion into northeast Wyoming and the likely potential for air pollution from that development.

As a third area of concern, the State's LTS review we believe lacks an analysis for remedying existing visibility impairment. As stated in Wyoming's Long Term SIP the Federal Land Managers certified existing visibility in all Class I areas in 1985. Consequently, Wyoming was required to identify and analyze the best available retrofit technology or BART. There was existing stationary sources, which may reasonably be anticipated to contribute to visibility impairment. The State incorrectly asserts, we believe in its long term strategy review that no further action is required because the Federal Land Managers have not attributed the visibility

impairment to any source or small group of sources. Since it is clearly the State's responsibility to make this determination pursuant to CFR 51 302(c)(4)(i).

Finally, our fourth area of concern can be summarized as the State's review, the current review, failing to consider all measures that appear to be necessary to prevent future visibility impairment. To explain that idea a little more, the State's LTS review must include an assessment of measures that are obviously necessary to meet the national visibility goal of preventing future visibility impairment. While WOC greatly supports Wyoming's application of strict BACT requirements to minor sources associated with CBM and natural gas development, minimizing the growth and NO_x emissions from these sources does not necessarily insure prevention of future impairment. Furthermore, the State clearly did not apply strict BACT requirements to the proposed WYGEN II power plant, which is proposing to burn surprisingly high sulfur coal when compared to typical Powder River Basin coal. If the State wants to continue with this high level of industrial growth, it should consider requiring emission offsets of new sources in addition to meeting BACT as one measure to help prevent future visibility impairment. Without sufficient emissions reductions to off set the continued growth in visibility impairing emissions, the State must realize that Wyoming cannot support this level of industrial growth and still comply with the national visibility goals of the Clean Air Act to protect the Air Quality in these most treasured Parks and wilderness areas. As I mentioned, we will go ahead and submit the final written comments by the April 30 deadline.

Ronn Smith: Okay. Thank you Michelle.

Dan Olson: I have a question for Michelle. Michelle did you leave anything out?

Michelle Barlow: Those are the primary areas of concern. Thank you for your attention.

Ronn Smith: Anyone else.

Dan Olson: Michelle has given us plenty of work. I can work on her summaries until I get the actual comments.

Ronn Smith: I guess I do have a question. Maybe I am confused. This morning you talked about WYGEN II and the tighter BACT standard that were applied. I am wondering if that was after their comments were received or before?

Dan Olson: The issue there is what is BACT. This is the same kind of an issue we talk about when we talk about BACT in any situation. There are technologies that are available to do lots of things, but part of the BACT process and, it is a process it is not a number, that is developed by Ohio or California or whatever, the Division has to take the technical reasonableness or the technical ability, proven control technologies, look at the economics, look at the environmental and other kinds of factors that come into a decision on what we decide as BACT. In this particular instance we came with a BACT decision that gave us a very low emission level that we permitted the plant at. But there are other technologies out there that could get it lower and all they do is, they cost money and sometime they take a little bit of proving that they actually

work in practice. So, when we look at this BACT process, we look at all of the technology that is available. We look at the economics, we look at other environmental factors and come to a decision based on all of those things together not just whether or not there is a control technology that will work. And we are always going to be in a difference of opinion with the Park Service or with the Wyoming Outdoor Council or with EPA on whether that decision is the only decision. But we maintain that the Clean Air Act gives that authority to the State permitting agency in SIP PSD Programs. We will have to deal with those controversies as they come and make our decisions accordingly and then be able to defend those decisions like I will in response to these comments.

Ronn Smith: Now the 5% visibility impairment that the modeling showed was that before or after the latest -

Dan Olson: I don't remember, do you remember Bernie?

Bernie Dailey: No, I don't recall.

Dan Olson: It actually doesn't really matter because you have to remember in these decisions that we are making we do have to consider the impacts on the Class I areas. The levels of concern, the Federal Land Mangers have done a really good job of documenting in the FLAG Report so that all of the various Federal Land Managers can approach their analyses in a similar fashion. They are not standards, they are not rules, they are not emission limits and we have to factor that into our decision on where we go.

Ronn Smith: Okay.

Dan Olson: Nobody said it was going to be easy.

Ronn Smith: You don't need an action from us on this.

Dan Olson: No, we just needed to conduct a public hearing or public meeting. What we will do now is just what Darla indicated. We will take the comments we have got today and anything that we receive in a written form prior to the close of business on April 30, and we will respond to each of those comments in the final document.

Ronn Smith: Okay, so we need to schedule our next meeting. I believe that is the last item on the agenda.

Dan Olson: We better do that. You guys are getting off way too easy.

Ronn Smith: We might get out of the habit.

Dan Olson: I think we ought to shoot for three (3) months from now. If we do nothing, except one thing that I want to mention is, one of the things that needs to be part of these meetings is these kinds of discussions. The Forest Service is taking a lot of data in the various parts of the

Class I areas in Wyoming and I have asked Terry Svalberg of the Forest Service if he would be willing to make a presentation on an annual basis to the Board to let them know how that data is coming and what the Forest Service is doing with it and what they see. So, whether or not we have a regulatory agenda, we might have an information type meeting where we can get that presentation from the Forest Service. Depending on how successful I am with the odor thing, you might see that again sometime in the near future, but I wouldn't count on it. Then we have some regulatory issues that we have a log jam with EPA. If we are able to get that broken we will be doing some regulatory stuff. I think that we ought to be looking for a meeting three (3) months from now, whenever that is, like sometime in August. July or August.

Lee Gribovicz: 309 or 308 Decision.

Dan Olson: We ought to have that by then, that is for sure. We could bring you up to speed on that. So I think sometime around July, August and we will have Sandy work with you folks to find out what your availability is and then we will talk with Terry.

Ronn Smith: Do we want to establish a place? Any suggestions. Last time we met in Pinedale. I would vote for Casper.

Dan Olson: Let's tentatively set it way. We will work it out and see what we can come up with.

Ronn Smith: Okay, meeting is adjourned. Thank you all for coming.

[This page intentionally left blank.]

Wyoming's Long Term Strategy for Visibility Protection

2003 Draft Review Report

Wyoming Air Quality Advisory Board
April 22, 2003 1:30 p.m.

Cheyenne, WY

1

Afternoon Session

- Introduction
- Long Term Strategy Review Process
- 2003 Draft Review Report Overview
- Emission Trends
- Visibility Data Assessment
- Preliminary Conclusions
- Oral Comments
  - Federal Land Managers
  - Public

2

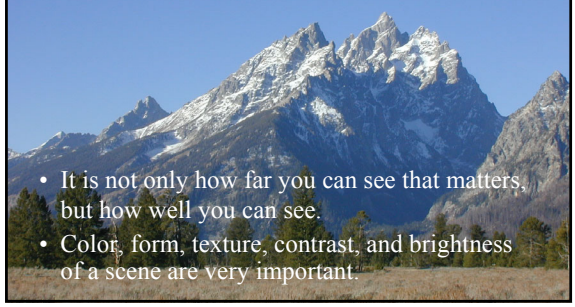
Introduction

- 1977 Clean Air Act Amendments
  - Section 169A. Visibility Protection for Federal Class I Areas

    (a)(1) Congress hereby declares as a national goal the prevention of any future, and the remedying of any existing, impairment of visibility in mandatory Class I Federal areas which impairment results from manmade air pollution.
  - Established two programs to address visibility
    - Prevention of Significant Deterioration Program
    - Visibility Program

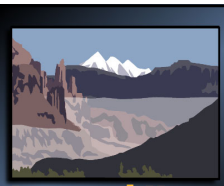
3

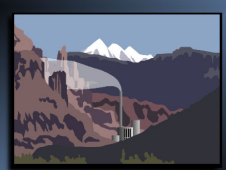
What is Visibility?

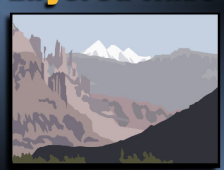


- It is not only how far you can see that matters, but how well you can see.
- Color, form, texture, contrast, and brightness of a scene are very important.

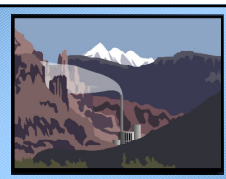
Types of Visibility Impairment







40 CFR Part 51, Subpart P Section 300-307



- Promulgated in December 1980
- "Plume blight" visibility impairment
  - A distinct band or layer of visible air pollution that is "reasonably attributable" to a single stationary pollution source or small group of stationary sources.
- Deferred regulations on regional haze visibility impairment.

6

Wyoming's Visibility SIP

- Visibility impairment "Reasonably Attributable" to a single stationary source or small group of stationary sources.
  - Chapter 9, Section 2 Visibility of the Wyoming Air Quality Standards and Regulations
  - Wyoming State Implementation Plan for Class I Visibility Protection
- May 10, 1988 State Requirement
- February 15, 1989 EPA Approved

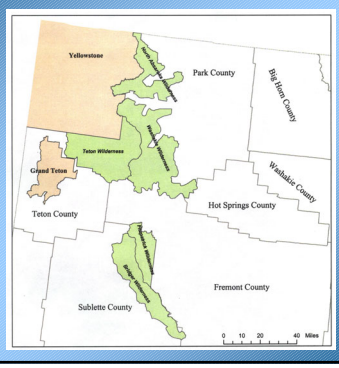
7

Class I Area

- Class I Federal Areas in Wyoming
  - Established in 1977 Clean Air Act Amendments
    - Congress identified 156 national parks, wilderness areas, international parks and other areas that were to receive the most stringent protection from increases in air pollution.
- Savage Run Wilderness Area
  - State Class I Area
    - Established as a wilderness area in February 1978 prior to the date of January 25, 1979 in WAQSR Chapter 6, Section 4(c) that designated areas as Class I, for the purposes of WAQSR Chapter 6, Section 4 and Chapter 9, Section 2.

8

Wyoming's Mandatory Federal Class I Areas



9

Long Term Strategy Review and Update

- Review and Revise every 3 years
  - Federal Land Manager meeting
  - 2003 Draft Review Report
    - Public Comment
    - Public Meeting
    - **Not** a rulemaking action
- No "reasonably attributable" visibility impairment certification has been made in Wyoming.

10

Long Term Strategy Review Process

February 3, 2003	• Notify FLMs of review and report schedule
March 3, 2003	• FLM Meeting with AQD
March 21, 2003	• Public Notice of AQAB Meeting
April 1, 2003	• Public Notice of 2003 Draft Review Report availability – 30-day comment period
April 22, 2003	• Public Meeting – 2003 Draft Review Report and visibility protection from reasonably attributable impairment

11

Long Term Strategy Review Process

April 30, 2003	• Last day of 30-day comment period – Submit comments in writing – Comments must contain written signature of person commenting • Darla J. Potter, Visibility Coordinator WDEQ - Air Quality Division Herschler Building 4 West 122 West 25th Street Cheyenne, WY 82002
June 1, 2003	• 2003 Final Review Report to EPA Region VIII

12

2003 Draft Review Report Overview

1. Introduction
   1. Background
   2. Long Term Strategy Review and Update
   3. Regional Haze Regulation
2. Progress Toward National Goal
   1. Requirement I

      The progress achieved in remedying existing impairment of visibility in any of Wyoming's Class I areas.

13

2. Progress Toward National Goal

2. Requirement II

   The ability of the Long Term Strategy to prevent future impairment of visibility in any Class I area.

   1. New Source Review Program
   2. Operating Permit Program
   3. Monitoring Program
3. Requirement III

   Any change in visibility since the last such report, including an assessment of existing conditions.
4. Requirement IV

   Additional measures, including the need for SIP revisions, that may be necessary to assure reasonable progress toward the national visibility goal.

14

2. Progress Toward National Goal

5. Requirement V

   The progress in implementing BART and meeting other schedules set forth in the Long Term Strategy.

   1. Southwest Wyoming Technical Air Forum
6. Requirement VI

   The progress in developing the components of the strategy.

   1. Review of Impact from New or Modified Sources
   2. Emission Reductions Due to Ongoing Control Programs
   3. Smoke Management Techniques
   4. Other Factors Which Must Be Considered
   5. Adequacy of Long Term Strategy

15

2003 Draft Review Report Overview

3. Provisions Not Addressed
4. Emission Trends
   1. AIRS Actual Emissions Inventory
   2. AQDS Potential Emissions
   3. Northeast Wyoming NO_x Inventory
   4. WRAP 1996 Emission Inventory

16

2003 Draft Review Report Overview

5. Progress Toward 2000 Recommendations
   1. Regional Haze
   2. SWWYTAF Air Quality Modeling Project
   3. Additional Visibility Monitoring
   4. Smoke Management Program
6. Public Notification and Meetings
7. Review and Response to Comments
8. Recommendations

17

Appendices

Appendix A WAQSR Chapter 9

Appendix B WY SIP for Class I Visibility Protection

Appendix C Process Documentation

- Review and Report Schedule
- FLM Meeting Agenda & FLM Mailing List
- AQAB Meeting Public Notice
- AQAB Meeting News Release & Agenda
- Public Notice of 2003 Draft Review Report availability and 30-day comment period

18

Appendices (cont.)

Appendix D AQAB Meeting Minutes

Appendix E Visibility Monitoring Data Assessment

- IMPROVE Trends Analysis
- Visibility Monitoring Data Assessment

Appendix F Southwest Wyoming Technical Air Forum

- Timeline for SWWYTAF CALPUFF/CALMET Modeling Work April 2, 1997
- Southwest Wyoming Technical Air Forum
- SWWYTAF Technical Committee Summary

19

Appendices (cont.)

Appendix G Emissions Data Assessment

- AIRS Database Actual Emissions Inventory
- AQDS Permitted Potential Emissions
- Northeast Wyoming NOx Inventory
- WRAP 1996 Emission Inventory

Appendix H Written Comments

20

Questions

Introduction

Long Term Strategy Review Process

2003 Draft Review Report Overview

21

Emission Inventory Data

Wyoming's Long Term Strategy
for Visibility Protection
2003 Draft Review Report

Air Quality Advisory Board Meeting
April 22, 2003
Cara Casten

1

Emission Inventory Data

- Data presented in Appendix G of report
- Emission inventory data tracks pollutants emitted into the air from various sources
- Inventory data used in conjunction with visibility monitoring data to determine what is having the largest effect on Wyoming's visibility

2

Emission Inventory Data
(continued)

- Inventories used in this report:
  - Western Regional Air Partnership (WRAP) 1996 Emission Inventory
  - USEPA Aerometric Information Retrieval System (AIRS) Inventory
  - WDEQ-AQD Air Quality Data System (AQDS) Inventory
  - WDEQ-AQD NE Wyoming NOx Inventory

3

WRAP 1996 Emission Inventory

- In 2002, the WRAP completed a western states emission inventory for 1996
- Intended to be a base-year, regional scale inventory for use in modeling
- Covers point, area, on-road mobile, non-road mobile, prescribed fires, wildfires, paved road dust and unpaved road dust
- Inventory includes regulated pollutants (except lead), carbon monoxide (CO) and ammonia (NH_3)

4

WRAP 1996 Emission Inventory
(continued)

- WRAP began with USEPA National Emission Inventory (NEI) and used forums to collect data from the specific source categories:
  - Emission Forum: Point & area sources
  - Fire Emission Joint Forum: Prescribed fires and wildfire
  - Mobile Sources Forum: On-road and non-road mobile sources, paved and unpaved road emissions

5

Emission Source Categories

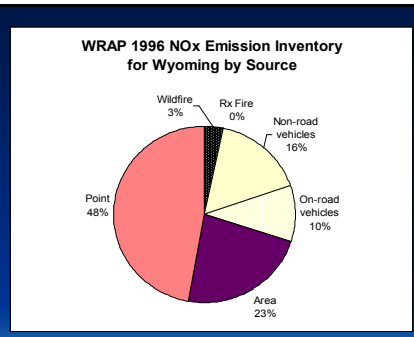
- Point source: A fixed source of pollution, Title V major sources
- Area source: A source that generally extends over a large area (i.e.home heating)
- On-Road vehicles: Cars, trucks, buses and motorcycles
- Non-Road Vehicles: Aircraft, locomotives, marine craft, construction equipment, agriculture, etc.

6

Emission Source Categories

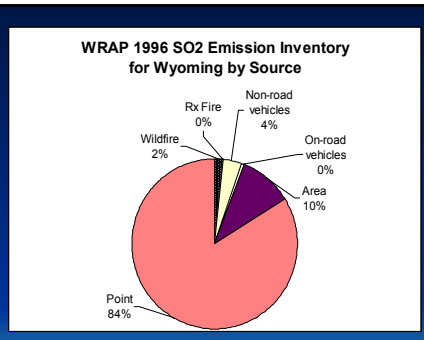
- Prescribed fire: Wildland fires ignited by management actions to meet specific objectives
- Wildfire: Any unwanted, non-structural fire
- Paved Road Dust: Re-entrained roadway fugitive dust from a paved road, does not include vehicle emissions
- Unpaved Road Dust: Re-entrained roadway fugitive dust from an unpaved road, does not include vehicle emissions

7



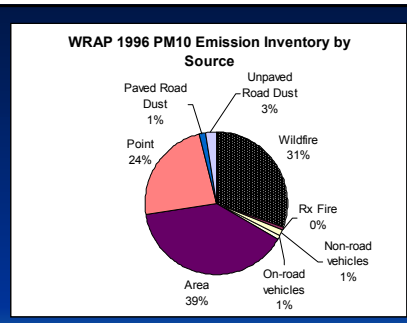
Total WY NOx = 279,202 tons

8



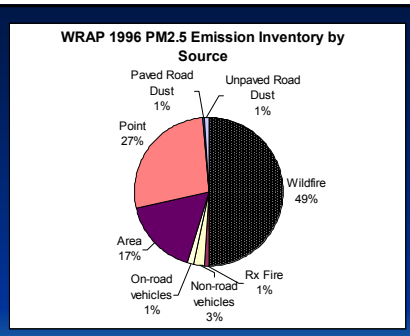
Total Wyoming SO2 = 153,049 tons

9



Total Wyoming PM10 = 137,091 Tons

10



Total Wyoming PM2.5 = 71,859 tons

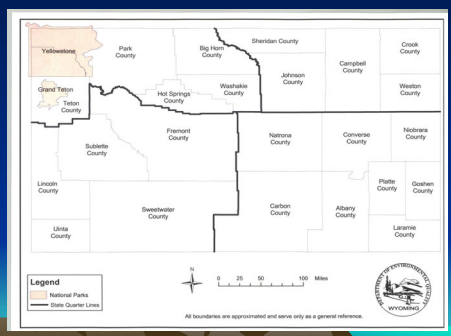
11

AIRS Database Actual Emission Inventory

- Submissions from Title V major sources (100 TPY of one regulated pollutant or 10 TPY of individual HAP or 25 TPY combined HAPs)
- Annual collection started in 1991
- WDEQ-AQD analyzed NO_x, PM_{10}, SO_2, CO and VOCs from 1991-2001 in this report

12

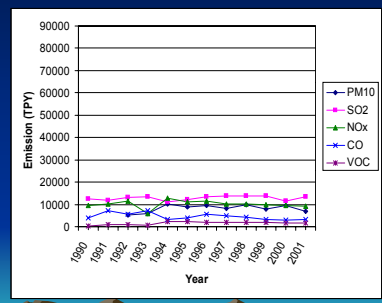
Wyoming State Quadrant Map



13

AIRS Actual Emission Inventory for NE Wyoming

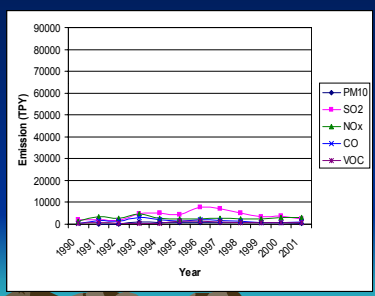
- No significant changes in emissions



14

AIRS Actual Emission Inventory for NW Wyoming

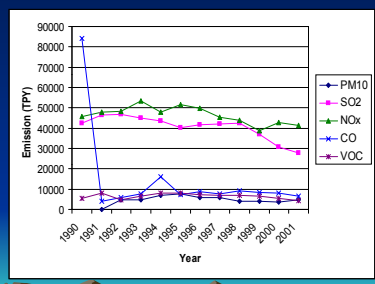
- No significant changes in emissions



15

AIRS Actual Emission Inventory for SE Wyoming

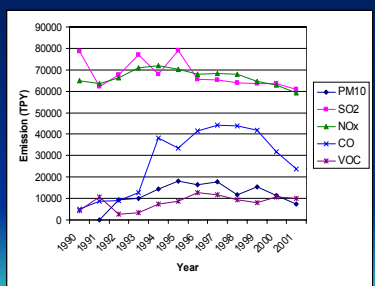
- ***SO₂ Reduction***: Power generation modifications and refinery modifications
- ***CO Reduction:*** In 1991, CO emission were tested from two refineries and were found to be much lower than previously estimated by emission factors



16

AIRS Actual Emission Inventory for SW Wyoming

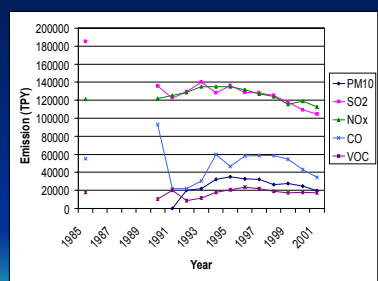
- ***CO Reduction:*** Soda Ash plant modifications



17

AIRS Actual Emission Inventory for Wyoming

- ***SO₂ Reductions:*** Power generation SO₂ reduction program for 1985-1991
- ***Other Reductions:*** Other reductions already mentioned reflected in graph

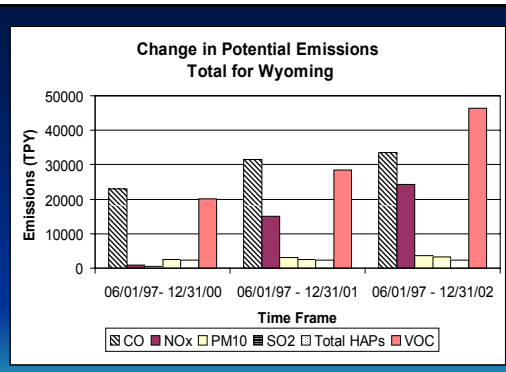


18

AQDS Potential Emission

- Database developed in 1997 by WDEQ-AQD for the New Source Review, Operating and Compliance programs.
- AQDS tracks changes in potential emissions for new or modified, major and minor sources going through the permitting process
- Graphs show changes from 2000 to 2002 for CO, NOx, SO_2, PM_{10}, VOCs and HAPs

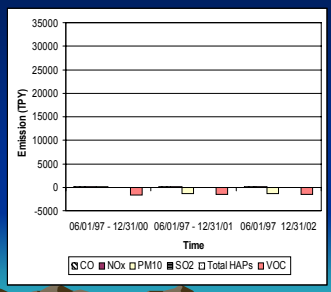
19



20

Changes in Potential Emissions in NW WY

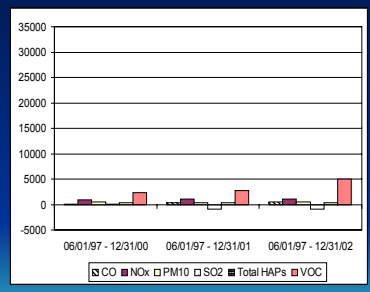
- No significant changes in permitted potential emissions



21

Changes in Potential Emissions in SE WY

- ***VOC Increase***: Oil and Gas production increase in Carbon County
- ***SO2 Reduction:*** Refinery modifications



22

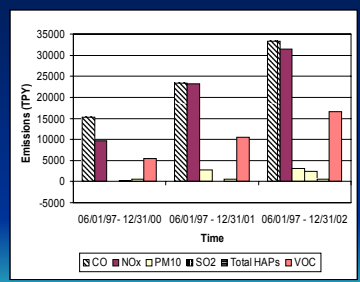
Coalbed Methane Development in Wyoming

- Coalbed Methane:
  - Requires compression after extraction from well, so it can be transported through pipeline for use
  - Compressor engines emit CO, NOx and VOC
  - Development concentrated in the northeast quadrant and options for development are being pursued in southern Wyoming

23

Changes in Potential Emissions in NE WY

- ***CO Increase:*** Coalbed methane and power generation
- ***NOx Increase:*** Coalbed methane, power generation and coal mining permits
- ***PM_{10} Increase:*** Coal mining permit
- ***SO_2 Increase:*** Power generation
- ***VOC Increase:*** Coalbed methane



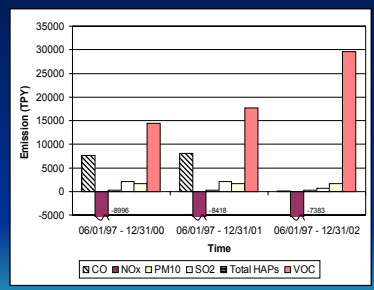
24

Oil and Gas Development in Wyoming

- Oil and Gas:
  - Starting in 1995, the Division initiated a program to ensure oil & gas production units were permitted, resulting in the Oil & Gas Guidance
  - Rise in permitted VOC emissions from permit applications for already constructed sources as well as new sources
  - Oil & Gas development in southwest and southeast quadrants

Changes in Potential Emissions in SW WY

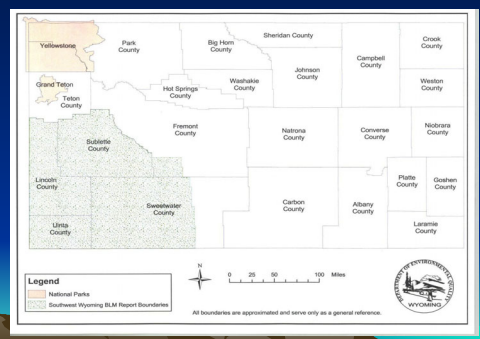
- ***CO and SO_2 Reductions:*** Gas plant modifications
- ***VOC Increase:*** Oil and Gas production
- ***NOx Reduction (1999):*** Power generation modifications

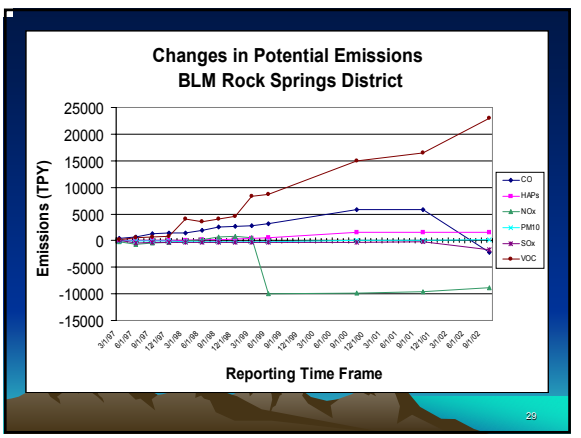


Potential Emissions for BLM Rock Springs District

- Reports generated annually by WDEQ-AQD for BLM to track emissions in the BLM Rock Springs district
- Reports are potential emissions from the AQDS

BLM Rock Springs District

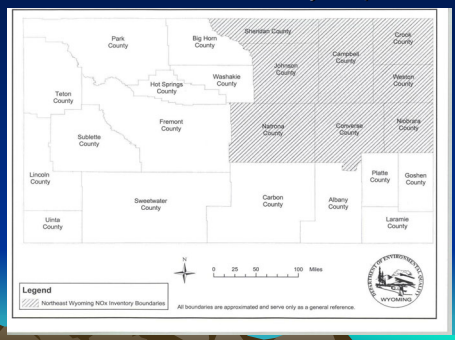




Northeast Wyoming NO_x Inventory

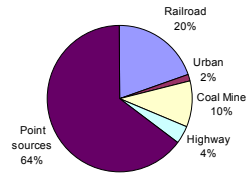
- Inventory by WDEQ-AQD for 2000 actual and/or 2001 potential NO_x emissions
- Inventoried 5 source categories:
  - Railroad (actual)
  - Coal mine (potential)
  - Urban (actual)
  - Highway (actual)
  - Point (potential)

NE WY NOx Inventory Map



31

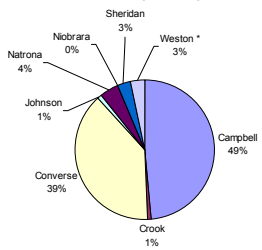
NOx emissions in NE Wyoming for 2000 by Source Category



Total NOx Emissions = 111,668 tons

32

Potential NOx Point Source Emissions in 2001 by County



Total Potential NOx Emissions = 72,180 tons

33

Emission Inventory Data Summary

- Actual emissions from major sources are steady, with a gradual reduction in SO_2
- NO_x and SO_2 actual emissions from major sources are approximately equal, however visibility impacts from sulfate outweigh those of nitrate
- Emission reductions from major sources and minor source growth are reflected in the AQDS

34

Emission Inventory Data Summary

- The increase in potential NO_x, CO, and VOC emissions in the NE quadrant are primarily due to the rise in coalbed methane activity
- The increase in potential VOC emissions in the SW quadrant primarily due to the increased permitting of existing and new oil and gas production sites

35

Emission Inventory Data Summary

- In addition to the continuous data system inventories, the Division has continued to participate in inventories that arise from a need to assess a specific source category or point in time.

36