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United States Government Accountability Office
Washington, DC 20548

July 27, 2009

Congressional Addressees

Subject: *Air Pollution: Air Quality, Visibility, and the Potential Impacts of Coal-Fired Power Plants on Great Basin National Park, Nevada*

Great Basin National Park encompasses over 77,000 acres of White Pine County in east-central Nevada and is home to diverse geologic, topographic, and wildlife resources—including ancient bristlecone pines, the world’s longest living tree species. The park was created to preserve a representative segment of the Great Basin Region and receives about 80,000 visitors annually. The park features numerous scenic areas with views of the surrounding landscape, which includes both deserts and mountains. The National Park Service (NPS), within the Department of the Interior, is responsible for managing the park, and the park’s management plan lists both air quality and visibility as outstanding resources. This plan identifies threats to air quality and visibility—including air pollution from the possible development of coal-fired power plants in the region—and states that even slight increases in air pollution could cause major decreases in visibility.

In 2004 and 2006, two companies each initiated the process to build new coal-fired power plants about 55 miles northwest of Great Basin National Park, near the city of Ely, Nevada.¹ While the development of these new power plants would provide jobs, needed electric power, and other benefits, they have also drawn attention to the possibility of adversely affecting air quality and visibility in and around the park. However, in early 2009, both companies publicly stated they have indefinitely postponed development of their plants due to environmental, regulatory, and economic uncertainties.

Under the Clean Air Act, to protect human health and welfare, the Environmental Protection Agency (EPA) establishes national air quality standards for six pollutants that specify the allowable level of each pollutant in the ambient air. The six pollutants, also known as criteria pollutants, are carbon monoxide, nitrogen oxides,

¹Both companies proposed to build one coal-fired power plant with multiple coal-fired electricity-generating units. A coal-fired power plant includes one or more electricity-generating units, in addition to land and auxiliary equipment—such as boilers, turbines, heat exchangers, condensers, fabric filters, and other equipment.

sulfur dioxide, particulate matter, lead, and ozone.² Coal-fired power plants are major sources of several of these criteria pollutants (i.e., nitrogen oxides, sulfur dioxide, and particulate matter). In addition, nitrogen oxides combine with other chemicals in the air and sunlight to form ozone.³ EPA increased the stringency of its primary standard for ozone in 2008, changing it from 84 parts per billion to 75 parts per billion.

In addition to the Clean Air Act, the two proposed coal-fired power plants are also subject to requirements of the National Environmental Policy Act of 1969 (NEPA) because the companies proposed to build their plants on federal land administered by the Bureau of Land Management (BLM). BLM is authorized to issue rights-of-way on federal land for the construction of the plants and, subsequently, to arrange for the sale of the land to the companies.⁴ NEPA requires BLM to evaluate the likely effects of the issuance of the rights-of-way using an environmental assessment or, if the environmental effects are likely to be significant, using a more detailed environmental impact statement (EIS).⁵

This report responds to a congressional directive in the Joint Explanatory Statement accompanying the Consolidated Appropriations Act for fiscal year 2008. The report describes (1) current air quality and visibility in and around Great Basin National Park and (2) stakeholders' views about the potential impacts of the proposed coal-fired power plants on air quality and visibility in and around the park.

To respond to these objectives, we reviewed relevant rules and policies to provide background information on federal air quality requirements overall and as they relate to national parks. We also obtained and analyzed data from air quality and visibility monitoring networks. We determined that the data were sufficiently reliable for the purposes of this report. Additionally, we interviewed relevant agency officials, stakeholders, and organizations about the potential individual and cumulative impacts of proposed new coal-fired power plants on the park. Because BLM's Record of Decision on the EIS for one of the proposed plants that fell under our review is the subject of an administrative appeal, we did not assess the permit applications, the quality of the modeling conducted by the applicant, or the quality of the data used to conduct the modeling analysis. Finally, we visited Great Basin National Park, where

²Ozone is a gas that occurs both in the earth's upper atmosphere and at ground level. In the upper atmosphere, ozone occurs naturally and protects life on earth from the sun's harmful rays. In the lower atmosphere, ground-level ozone is caused by, among other things, motor vehicle exhaust, industrial emissions, gasoline vapors, as well as natural sources that emit nitrogen oxides and volatile organic compounds.

³Nitrogen oxides, sulfur dioxide, particulate matter, and ozone can travel for many miles and may create compounds which decrease the distance we can see, as well as degrade the color, clarity, and contrast of scenic vistas.

⁴A right-of-way is an easement, lease, permit, or license to occupy, use or traverse public lands for a specified purpose.

⁵An environmental assessment generally includes a brief discussion of the need for the proposal, alternatives to the proposal, the environmental impacts of the proposed action and alternatives, and a listing of agencies and persons consulted. A more detailed EIS should include a discussion of the purpose of and the need for the proposed action, alternatives to the proposed action, the affected environment, and the environmental consequences of the proposed action, among other things.

we observed air quality monitoring equipment and air quality and visibility in and around the park. We conducted our work from September 2008 to July 2009 in accordance with all sections of GAO's Quality Assurance Framework that are relevant to our objectives. The framework requires that we plan and perform the engagement to obtain sufficient and appropriate evidence to meet our stated objectives and to discuss any limitations in our work. We believe that the information and data obtained, and the analysis conducted, provide a reasonable basis for any findings and conclusions in this product. (See enclosure I for a more detailed description of our scope and methodology.)

Summary

According to data collected from federal agencies, Great Basin National Park and the surrounding area currently have some of the best air quality and visibility in the United States. The park has an extensive monitoring network that is used to track air pollutants and weather information. Current data show the park and surrounding areas meet national air quality standards for all six criteria pollutants. Nonetheless, ozone levels at the park have remained relatively constant over the past 15 years and have exceeded the new air quality standard once, despite data that show recent notable declines in ozone for most of the United States. Visibility at the park, however, has improved over the last 10 years. Monitoring data for 2007 show average visibility of over 130 miles—the best visibility in the continental United States and well above visibility in other national parks. For context, visibility averages about 98 miles at Yosemite National Park in California and about 35 miles at the Great Smoky Mountains National Park in Tennessee and North Carolina. Additionally, both high visibility and the remote location of the park contribute to some of the best nighttime views of the Milky Way in the country.

Stakeholders' views differ on the potential impacts on air quality and visibility of building two coal-fired power plants near Great Basin National Park. Several groups thought the likely benefits from the plants would outweigh any negative impacts on the park. The companies that proposed the two power plants have each conducted modeling of the potential air quality and visibility impacts of the proposed plants on the park. According to company officials, the potential air quality impacts are within federal limits—the companies examined the potential impacts and reported no adverse impacts on Great Basin National Park. In addition, BLM's final EIS for one of the plants found that they would cause no adverse impacts on the park. This EIS is now the subject of administrative appeal, and BLM has not issued a final EIS for the other plant. Further, some local government leaders and residents consider the proposed plants necessary for economic development and told us that federal and state air quality and visibility standards are sufficient to protect the park and the surrounding area. Moreover, these stakeholders, as well as officials at the Public Utilities Commission of Nevada, said that the plants would help meet electricity demands in Nevada and the West. Other stakeholders have concerns about the potential impacts of the proposed plants. For example, the NPS—which conducted its own modeling analysis—reported potentially severe impacts from even one proposed plant on air quality, visibility, and dark night skies. NPS officials also disagree with BLM's EIS analysis. In addition, some residents living close to the park, three regional Indian tribes, various local and national environmental groups, and

other stakeholders are concerned that the proposed plants could, among other things, adversely impact air quality, visibility, human health, and the Great Basin ecosystem.

Background

Under the Clean Air Act, Great Basin National Park, which was created in 1986, is designated a Class II area, as are most other areas in the country. Parks that encompass more than 6,000 acres and were in existence when the Clean Air Act Amendments of 1977 were enacted, such as the Grand Canyon and Great Smoky Mountains National Park, are designated as Class I areas.⁶ These areas have the most restrictive limits on maximum allowable increases in nitrogen oxides, sulfur dioxide, and particulate matter, which affect both air quality and visibility.⁷ Class I areas are areas of environmental concern in which little or no growth could occur, while Class II areas were designed to allow for orderly, well-controlled growth. Additionally, Class II areas are areas that have less restrictive limits on allowable increases in nitrogen oxides, sulfur dioxide, and particulate matter (as shown in enclosure II, table 1), and states are not required to develop and implement control strategies to protect visibility in Class II areas.

The Clean Air Act also established the New Source Review Program to address the construction of new sources of air pollution. EPA has delegated authority to the Nevada Division of Environmental Protection (NDEP) to implement this program, thereby allowing NDEP to review applications for permits to build and operate proposed power plants, establish emissions limits for the plants, and ensure that the plants use appropriate air pollution control technologies. In areas that meet federal air quality standards, the Clean Air Act permitting process includes a Prevention of Significant Deterioration review to ensure that the emissions from a new plant will not exceed maximum allowable increases for three of the criteria pollutants—nitrogen oxides, sulfur dioxide, and particulate matter. Additionally, under New Source Review, applicants estimate through modeling the maximum potential impacts of new sources of air pollution for all six of the criteria pollutants. The models used to estimate future air quality impacts of power plants are highly dependent on the relationships they model, the assumptions and data used, and how the results are interpreted.

⁶These parks are known as mandatory Class I federal areas.

⁷As they deem appropriate, states may submit proposals to the EPA Administrator to have any area, including a national park, redesignated as Class I. Before submitting a proposal, states must (1) consult with the elected local government officials in the area proposed to be redesignated; (2) prepare a publicly available description and analysis of the health, environmental, social, and energy effects of redesignation; (3) hold at least one public hearing on the proposed redesignation; (4) notify other states and Indian tribes whose lands may be affected by the redesignation at least 30 days before the public hearing; and (5) provide the appropriate federal land manager, if applicable, with written notice and allow the federal land manager adequate opportunity, but not more than 60 days, to respond to the proposal with comments or recommendations. If the federal land manager responds, the state must publish a list of any inconsistencies between the redesignation and the federal land manager's response, together with the reasons for making the redesignation against the recommendation of the federal land manager. The EPA Administrator may disapprove a state's proposed redesignation only if the state fails to follow these procedural requirements or has proposed redesignating certain areas as Class III.

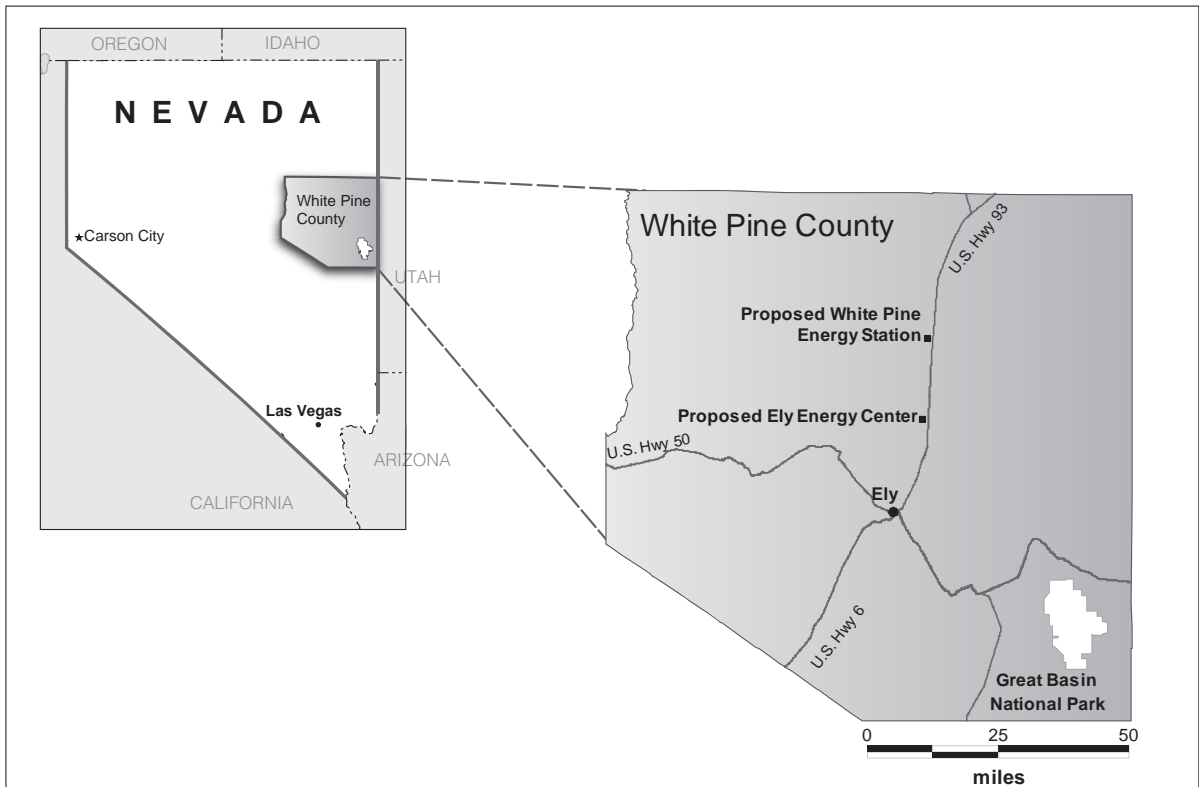
In the electricity industry, utility companies and regulators make judgments about demand for electric power well into the future because new power plants can cost hundreds of millions of dollars and projections of future electricity demand can affect the financial viability of a new plant. The Department of Energy predicts that demand for electricity will increase nationally by 26 percent between 2007 and 2030. In 2008, Nevada's public utilities projected their peak summer electricity demand would increase 49 percent over the next 20 years. However, long-range projections of electricity demand are inherently uncertain and their accuracy depends on, among other things, unforeseeable changes in economic conditions and related fluctuations in demand for electricity. For example, the recent economic downturn prompted the Department of Energy and the Nevada Public Utilities Commission to revise their energy projections.

Great Basin National Park and Surrounding Areas Currently Meet Federal Air Quality Standards and Have Excellent Visibility

According to data collected from federal agencies, Great Basin National Park and the area around it have some of the cleanest air and best visibility in the country. The park is part of the Department of the Interior's NPS network of air quality and weather monitoring systems. Through agreements with other federal agencies, such as EPA, BLM, and the Department of Commerce's National Oceanic and Atmospheric Administration, the NPS uses these systems to collect air quality data to establish baseline concentrations of air pollution, assess trends in air quality, and determine compliance with national ambient air quality standards.⁸ Figure 1 shows a map of the area.

⁸The monitoring systems at Great Basin National Park are the National Atmospheric Deposition Program/National Trend Network, Clean Air Status and Trends Network, and Interagency Monitoring of Protected Visual Environments. The weather data networks at Great Basin National Park are the National Oceanic and Atmospheric Administration's National Weather Service and Climate Reference Network, the U.S. Geological Survey's High Elevation Precipitation Network, two Remote Automatic Weather Stations managed by BLM for the National Interagency Fire Center, and the Natural Resources Conservation Service's Snow Course Program.

Figure 1: Map of Nevada and White Pine County



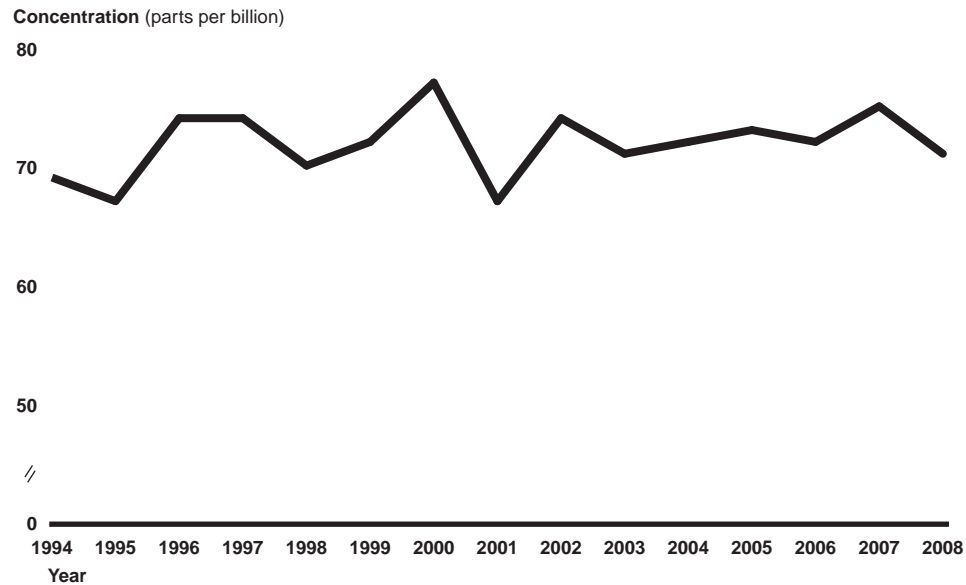
Sources: Map Info and Map Resources (maps).

According to EPA, the park and surrounding areas currently meet the standards for the six criteria pollutants—carbon monoxide, nitrogen oxides, sulfur dioxide, particulate matter, lead, and ozone. Although the park meets the standards for the criteria pollutants, ozone levels are close to reaching the newly revised EPA standard. Ozone is a gas that is usually not emitted directly into the air, but rather is created by a reaction between nitrogen oxides and volatile organic compounds in the presence of sunlight. According to EPA, when ozone is located close to the earth (ground-level ozone) at concentrations above the EPA standard, it can trigger a variety of human health problems, including chest pain, congestion, and coughing. Breathing ozone can also worsen bronchitis and asthma and has been shown to reduce lung function and inflame the lining of the lungs. Motor vehicle exhaust and industrial emissions, including emissions from power plants, contain chemicals that can contribute to the formation of ozone, which is the primary component of smog. Many urban areas tend to have high levels of ground-level ozone, but even remote areas such as Great Basin National Park are subject to increased ozone levels because wind can carry ozone and the pollutants involved in its formation miles from their original sources. Coal-fired power plants also emit particulate matter, one of the criteria pollutants regulated by EPA. According to EPA, numerous scientific studies have linked particulate pollution exposure to a variety of health problems including increases in respiratory symptoms such as irritation of the airways or difficulty breathing, aggravated asthma, irregular heartbeat, heart attacks, and premature death.

Nationally, average ozone levels declined in the 1980s, leveled off in the 1990s, and declined steeply after 2002. Nonetheless, over the past 15 years, ozone levels at Great Basin National Park have remained relatively constant. Specifically, over the past

few years, ozone concentrations at the park have been consistently high and are close to reaching the revised air quality standard. For example, according to data collected by NPS, on one day in 2008, the highest 8-hour average ozone level at the park was 76 parts per billion, which exceeds the new 8-hour ozone standard set by EPA of 75 parts per billion.⁹ NPS officials told us the ozone levels at the park are surprising, considering the remoteness of the park. Compared with other national parks, Great Basin National Park is one of the best for visibility, yet near the middle for ozone concentrations. Figure 2 shows the annual fourth-highest daily maximum 8-hour ozone concentrations at Great Basin National Park over the last 15 years.

Figure 2: Annual Fourth-Highest 8-Hour Ground-Level Ozone Concentrations at Great Basin National Park, 1994 to 2008



Source: GAO analysis of NPS data.

Despite the relatively high ozone levels at the park, visibility at the park is excellent and has improved over the last 10 years. According to visibility monitoring data for 2007, the best visibility in the continental United States exists in an area centered around Great Basin National Park—where visibility averages range seasonally between about 60 and 200 miles, with summer having the haziest conditions. Figure 3 shows photographs of a high-visibility day at the park and a reduced-visibility day—a day with low visibility due to haze.

⁹The national 8-hour air quality standard for ozone is 0.075 parts per million, daily maximum 8-hour average. The standard is met at a monitoring site when the 3-year average of the annual fourth-highest daily maximum 8-hour average ozone concentration is less than or equal to 0.075 parts per million (0.075 parts per million is the same as 75 parts per billion).

Figure 3: Observed High- and Reduced-Visibility Days at Great Basin National Park



Great Basin National Park, day with high visibility

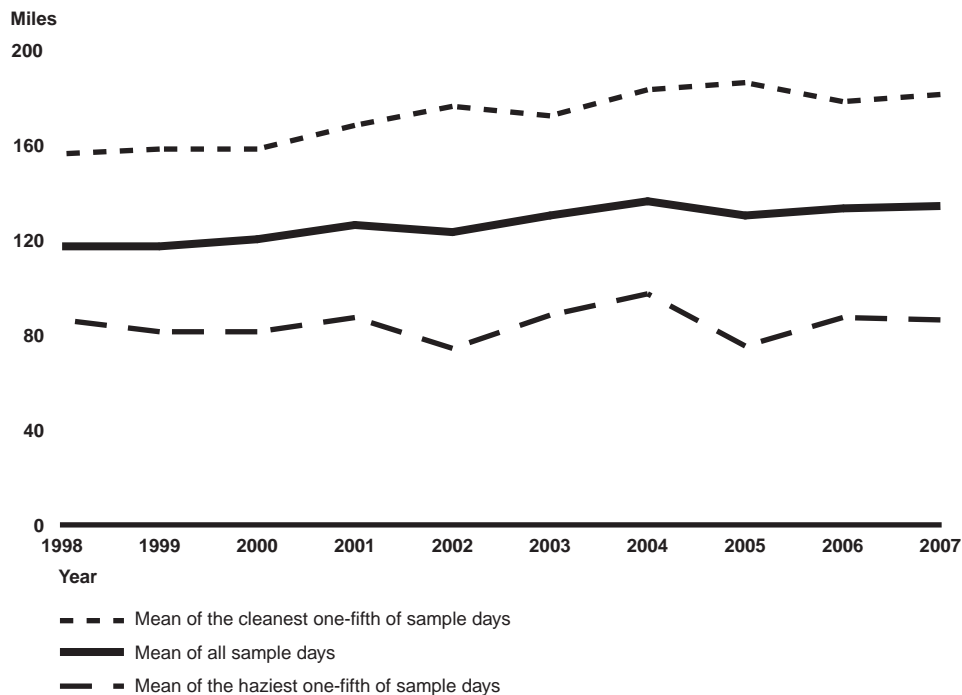
Great Basin National Park, day with reduced visibility

Source: NPS.

Note: These pictures represent a spectrum series of regional haze visibility conditions observed at Great Basin National Park for the selected monitoring time period, 1986 to 1995.

On several of the clearest days in 2007, views of up to 180 miles were possible at Great Basin National Park—and on a day in October 2007, visibility was about 214 miles. In contrast, on several of the haziest days in 2007, views of only about 60 miles were possible. See figure 4 for annual visibility trends at the park for the past 10 years.

Figure 4: Annual Visibility Trends at Great Basin National Park, 1998 to 2007

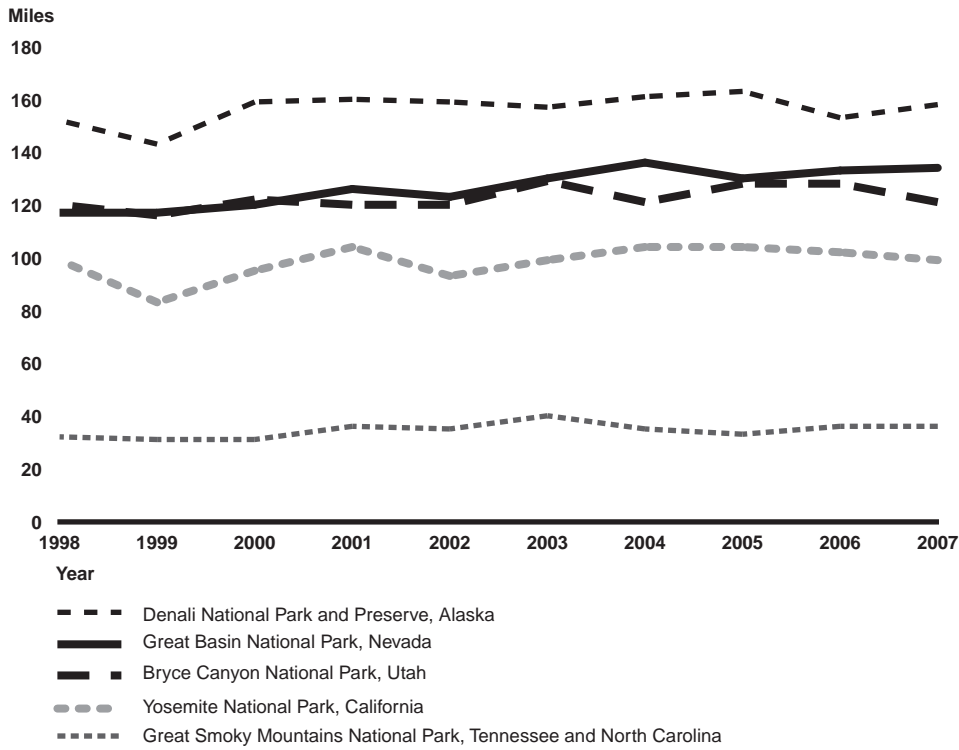


Source: GAO analysis of NPS data.

For context, average visibility (the mean of all sample days) at Great Basin National Park in 2007 was 133 miles, compared to 98 miles on average in Yosemite National

Park in California and 35 miles on average at the Great Smoky Mountains National Park in Tennessee and North Carolina. For a multiyear comparison of mean visibility trends at Great Basin National Park and other national parks, see figure 5.¹⁰

Figure 5: Mean Annual Visibility Trends at Selected National Parks, 1998 to 2007



Source: GAO analysis of NPS data.

The high visibility at Great Basin National Park, as well as its remote location—away from large sources of artificial nighttime lighting—contributes to clear views of the night sky. However, light pollution has increased in many national parks. According to the NPS Night Sky Team,¹¹ light pollution—defined as the illumination of the night sky caused by artificial light—has been growing over the years because of the increased use of artificial lighting to, for example, light facilities, roads, and homes. Light pollution affects not only humans, but also nocturnal animals, which depend on the darkness to hunt, conceal their location, and reproduce. The Night Sky Team visited the park from 2004 to 2006 and collected baseline data to determine the darkness of the night skies. The team found that the park’s night skies are among the nation’s darkest—these near-pristine nighttime conditions provide one of the best nighttime views of the Milky Way in the country.

¹⁰Visibility conditions in the eastern and western United States are inherently different because of factors such as climate conditions and concentrations of air pollution.

¹¹The NPS Night Sky Team works in parks across the country to document the effects of light pollution. Great Basin National Park is one of 67 NPS units where baseline data have been collected or data collection is under-way.

Stakeholders' Views Differ on the Extent to Which Two Proposed Coal-Fired Power Plants Could Affect Air Quality and Visibility in and around the Park

Stakeholders' views differ on the potential impacts of proposed coal-fired power plants on Great Basin National Park. In particular, several stakeholder groups told us that the likely benefits from the proposed plants would outweigh any negative impacts on the park. The two companies that proposed building power plants near the park each conducted modeling to determine potential air quality and visibility impacts of the plants, as required by NDEP.¹² According to company officials, their modeling showed the plants' air quality impacts would be within allowable federal limits. Additionally, NDEP completed its independent technical evaluation for each proposed plant and determined that all potential air quality and visibility impacts would be within allowable state and federal limits. NDEP made available for public review and comment draft permits and supporting technical review documents that provided the basis for its determination that the proposed plants would comply with all applicable state and federal air quality requirements. Although states are not required to develop and implement control strategies to protect visibility in Class II areas such as Great Basin National Park, according to the modeling conducted by these companies, visibility at the park would not be adversely impacted by the addition of two new power plants.

The companies proposing the two power plants postponed their projects in early 2009 due to environmental, regulatory, and economic uncertainties.¹³ In response to the companies' announcements, NDEP suspended its review of each project. NDEP officials said if the companies decide to resume plans to develop their proposals, NDEP would require significant revisions to each permit application—such as updating models with more recent data, changing analyses to reflect any regulatory changes that have occurred in the intervening time period, or revising the proposals to reflect updated technologies incorporated into the design of each plant.

To satisfy NEPA requirements, BLM completed an EIS for one of the power plants and issued its Record of Decision in late 2008 authorizing the issuance of the right-of-way and eventual sale of land to the company. However, BLM's decision is the subject of an administrative appeal by a coalition of environmental advocacy and other groups. BLM was in the process of developing an EIS for the second plant when, in early 2009, both companies publicly stated they have indefinitely postponed development of these plants.

In the final EIS for one of the proposed plants, BLM summarized the findings of the modeling conducted by the company and contributed its own analysis. BLM assessed the potential impacts of one of the proposed plants on air quality and visibility in and

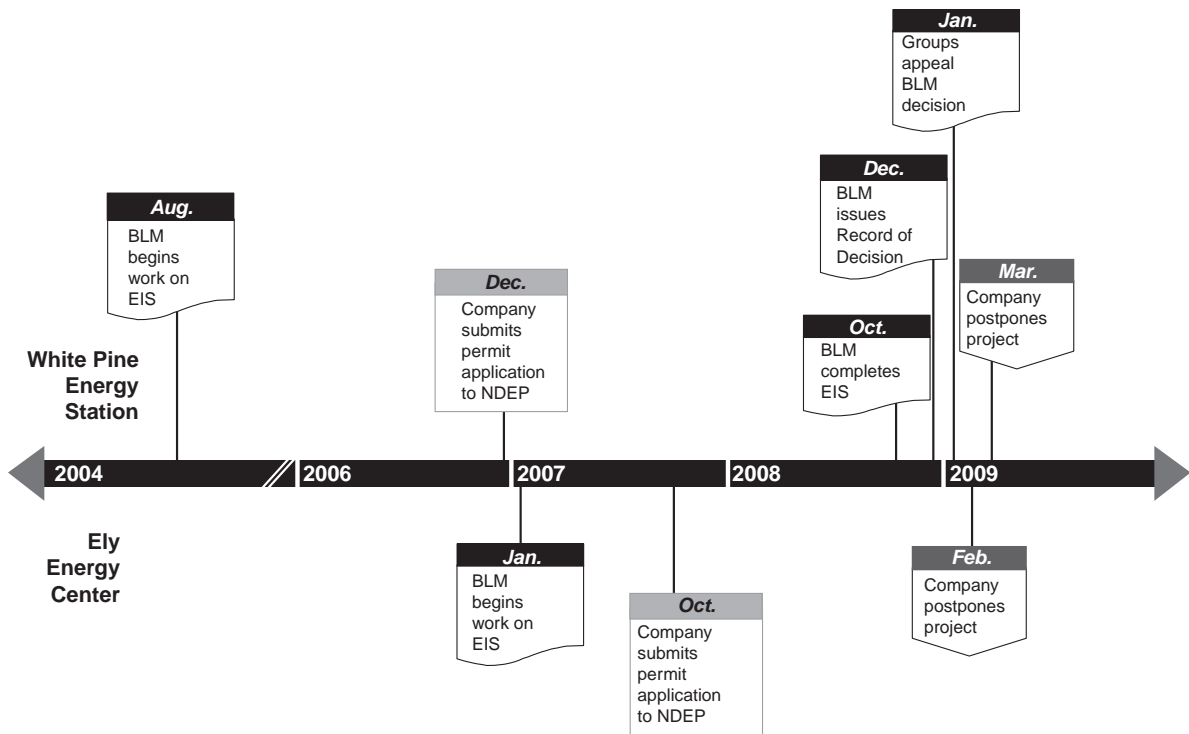
¹²White Pine Energy Associates, LLC (an affiliate of LS Power Development, LLC) proposed the White Pine Energy Station, and Sierra Pacific Resources (now NV Energy, or NVE) proposed the Ely Energy Center.

¹³Since announcing the indefinite postponement of their power plants, each company has moved forward with plans to develop a north-south electricity transmission line in Eastern Nevada. Both transmission lines would provide a first-time connection between the northern and southern Nevada service areas and deliver renewable energy to market. Additionally, one of the companies would have upgraded the existing Nevada Northern Railway to accommodate coal trains into the area and restored access for future freight traffic in White Pine and surrounding counties.

around the park. BLM’s analysis also involved a cumulative analysis that included the second plant, because at that point, BLM described the second plant as a reasonably foreseeable future action. According to the final EIS, results show that predicted impacts are less than national air quality standards and, therefore, are not expected to result in adverse impacts to human health or the environment. The final EIS’ cumulative analysis also stated that the area is not expected to experience significant deterioration in air quality and the impacts from the cumulative emissions are less than the limits established to protect against decreased visibility. Nevertheless, BLM’s Record of Decision required the company to incorporate best practices into the design and operation of the plant to mitigate the plant’s potential visibility impacts, as well as lighting requirements to limit impacts to dark night skies, and to provide for future sequestration of carbon emissions.

In January 2009, a coalition of environmental advocacy and other groups appealed this Record of Decision on several grounds, including that BLM’s air quality analysis did not satisfy the requirements of NEPA, in part because BLM did not independently analyze potential air quality impacts. Additionally, the appeal states that visibility impacts are likely to be greater than BLM’s analysis showed. For the second plant, BLM was in the process of developing an EIS; however, the company postponed plans to develop its plant, and BLM has since stopped working on the EIS. If the company decides to continue pursuing the plant as proposed, BLM would then resume work on an EIS—and could require the company to reinitiate the entire EIS process. A timeline of the development process for each plant is shown in figure 6.

Figure 6: Timeline for Proposed Coal-Fired Power Plants near Ely, Nevada



Source: GAO.

Further, some local government leaders, as well as residents, told us and as reflected in public comments that the proposed plants are necessary for economic development and that the Great Basin Region is sufficiently protected by federal and state air quality and visibility standards. Local government leaders and one local Indian tribe support building the power plants as a way to provide jobs to area residents, increase the local tax base, and diversify the local economy. For example, according to a local government official, area job opportunities are generally limited to the mining industry, a maximum security prison, and other public sector jobs, and the local tax base is weak. According to officials of both companies, the plants would provide both temporary and permanent job opportunities. Each company projected to offer over 1,000 temporary positions during the roughly 5-year construction period and estimated approximately 150 permanent jobs once the plants are completed. City officials told us they are especially interested in the permanent positions associated with the projects, and other local government leaders view the industry as a way to keep young residents within the community. Additionally, in the final EIS, BLM analyzed possible socioeconomic benefits—projecting the proposed plant would generate over \$129 million in tax revenue during its 5-year construction period and an average of more than \$16.5 million in tax revenue during each of its first 5 years of operation—all of which would be a major fiscal benefit to the state and local government agencies, particularly those in White Pine County.¹⁴

In addition, these stakeholders and officials from the Public Utilities Commission of Nevada said the plants are needed to help meet the expected growth in electricity demand in Nevada and the West in general. According to the companies, the combined electric generation capacity of the two proposed plants would be about 3,000 megawatts.¹⁵ Such additional capacity could increase Nevada's electricity generation capability by about 31 percent from its 2007 level, contributing significantly to the state utilities' expected demand growth of 49 percent from 2008 to 2028. However, long-range projections of electricity demand are inherently uncertain and their accuracy depends on, among other things, unforeseeable changes in economic conditions and related fluctuations in demand for electricity. For example, the recent economic downturn prompted the Department of Energy and the Nevada Public Utilities Commission to revise their projections.

Other stakeholders, including the NPS, some residents living near the park, local and national environmental groups, and three regional Indian tribes, have concerns about the impacts of the proposed plants on air quality and visibility. For example, the officials of the NPS are concerned about the potential air quality impacts of ozone, as well as emissions of nitrogen oxides, sulfur dioxide, and mercury on the park and surrounding areas. In enclosure II, tables 2 and 3 list top major sources of nitrogen oxides and sulfur dioxide emissions within approximately 200 miles of Great Basin National Park, including the potential emissions of the two proposed power plants. According to the NPS's modeling, emissions from even one of the new plants could

¹⁴BLM's socioeconomic analysis in the EIS cited figures in 2006 dollars.

¹⁵A watt is the basic unit used to measure electric power. A kilowatt (kW) equals 1,000 watts, and a megawatt (MW) equals 1,000 kW or 1 million watts. Electricity production and consumption are measured in kilowatt-hours, while generating capacity is measured in kilowatts or megawatts. An average U.S. household consumes roughly 10,000 kWh a year.

have significant negative impacts on air quality in the park and the surrounding area, and both plants would have a more severe impact.

Regarding visibility, stakeholders differ on their interpretation of modeling results. While EPA's Regional Haze Rule requires states to develop plans to prevent future or remedy existing visibility impairment in mandatory Class I federal areas, neither states nor EPA are required to develop and implement control strategies to protect visibility in Class II areas such as Great Basin National Park. However, NPS officials identified the park as a sensitive area and requested the companies and BLM to analyze potential visibility impacts of the proposed coal-fired power plants on the park in the same way that they would analyze visibility impacts on Class I areas. The NPS also conducted its own visibility analysis based on Federal Land Managers' guidelines, which includes modeling and analyses to assess whether a major new source of air pollution would have an adverse impact on air quality and visibility of Class I areas.¹⁶ According to these guidelines, the federal land manager determines adverse impact findings on a project-specific basis, based on reviews of the frequency, magnitude, duration, and location of projected impacts.¹⁷

The NPS's analysis showed that operating the two plants would cause visibility to deteriorate to the extent that if the park were a Class I area, NPS officials would have encouraged a finding of adverse impact on air quality and visibility. However, since Great Basin National Park is a Class II area, they could not make this adverse impact finding. Specifically, its analysis showed that annually, one of the plants would cause noticeable changes in visibility at the park for about 20 percent of days and the two plants combined would cause noticeable visibility changes for about 32 percent of days. This screening analysis was based on the federal land managers' guidance for mandatory Class I federal areas, assuming "natural" background and visibility conditions and seasonal average relative humidity values.¹⁸ NPS officials also said the plants—individually or combined—would severely impact dark night skies because air pollution particles from the plants would increase the scattering of new and existing light in the atmosphere and decrease nighttime visibility. NPS officials said their analysis and the analysis conducted by one of the companies both indicate that visibility impacts from the proposed coal-fired power plants would

¹⁶These Federal Land Managers' Air Quality Related Values Workgroup (FLAG) guidelines are only guidance and not regulations and do not provide a universal formula for evaluating impacts. Federal land managers that use FLAG guidelines include the NPS and the Fish and Wildlife Service in the Department of the Interior and the Forest Service in the Department of Agriculture. BLM does not participate in FLAG, but rather addresses Prevention of Significant Deterioration permit applications on a case-by-case basis.

¹⁷The federal land manager for lands administered by the Department of the Interior, which NPS is a part of, is the Department's Assistant Secretary for Fish and Wildlife and Parks.

¹⁸If a single emission source is predicted to exceed a 5 percent change in conditions, or a group of two or more sources are predicted to exceed a 10 percent change in conditions, FLAG guidance states: "then the federal land manager will consider the magnitude, frequency, duration, and other factors to assess the impact, but is likely to object to the issuance of the permit." The BLM analysis identified that up to 66 days per year (18 percent of the days from all sources combined) could have a "just noticeable change" in visibility at Great Basin National Park. However, the Final EIS stated: "Because of the highly conservative nature of the assumptions used for this assessment, the actual number of days when perceptible cumulative visibility impacts would occur would be considerably lower than these figures."

be the most severe NPS officials have ever encountered from a proposed new source of air pollution on a protected area. In addition, NPS officials disagree with both BLM's interpretation of the companies' analysis and BLM's own analysis—that is, NPS considers BLM to have understated the severity and magnitude of potential impacts on Great Basin National Park. NPS officials told us they disagreed with how BLM conducted its analysis and the conclusions BLM officials reached about visibility impacts of one of the proposed power plants. For example, while BLM's analysis described moderate visibility changes at Great Basin National Park, NPS officials say the impacts on the park would be unacceptable. According to BLM, this lack of consensus between NPS and BLM results, in part, from the choice of analysis methods and assumptions used by each agency. For example, in interpreting modeling guidance for federal land managers, BLM and NPS relied on meteorological data from different years and differed in their interpretations of the degree to which projected visibility impairments would result from weather conditions versus pollution from the plants.

Finally, some people living near the park, three regional Indian tribes, several local and national environmental groups, and other stakeholders have concerns that the emissions of the proposed plants could, among other things, adversely affect air quality, visibility, human health, and the Great Basin ecosystem. For example, in public comments on the proposed plants, environmental advocacy groups said that criteria pollutants and mercury emissions from the plants could lead to adverse health effects in people and animals. Three regional Indian tribes echoed these concerns, stating that air pollution from the plants would worsen high asthma rates and harm native wildlife and traditional foods throughout the region.

These and other stakeholders are concerned that air pollution from the plants could harm sensitive aquatic ecosystems in and around the park and could jeopardize populations of cutthroat trout, which has been identified as a federally threatened species. In addition, local stakeholders told us that tourists come to the area to visit the park, fish in local lakes, watch birds, and hunt. According to NPS, in 2007 the park generated \$5.4 million in direct and secondary economic benefits to White Pine County. Additionally, a local Indian tribe and a national environmental group told us that Nevada has a high potential for developing renewable energy sources, and the state should explore these options.

We provided a summary of the findings of this report to representatives from the Environmental Protection Agency, the Bureau of Land Management, the National Park Service, the Nevada Division of Environmental Protection, and to representatives from the proposed plants, and incorporated their technical comments, as appropriate. We are sending copies of this report to appropriate congressional committees and other interested parties. In addition, this report will be available at no charge on the GAO Web site at <http://www.gao.gov>.

If you or your staffs have any questions about this report, please contact me at (202) 512-3841 or stephensonj@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. Key contributors to this report include Michael Hix (Assistant Director), Summer Lingard, Heather Chartier, Nancy Crothers, Philip Farah, Cindy Gilbert, Jeanette Soares, Karen Keegan, Kirk Menard, and Kristin Hughes.

A handwritten signature in black ink, reading "John B. Stephenson". The signature is written in a cursive style with a long horizontal flourish at the end.

John B. Stephenson
Director, Natural Resources
and Environment

List of Congressional Addressees

The Honorable Dianne Feinstein
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Chairman
The Honorable Michael K. Simpson
Ranking Member
Subcommittee on Interior, Environment,
and Related Agencies
Committee on Appropriations
House of Representatives

The Honorable Harry Reid
United States Senate

Enclosure I: Scope and Methodology

To answer the first objective, we reviewed relevant rules and policies on federal air quality requirements overall and as they relate to national parks. We obtained and analyzed data from air quality and visibility monitoring networks. To assess the data reliability of the National Park Service's Interagency Monitoring of Protected Visual Environments (IMPROVE) data, we (1) performed electronic testing of required data elements, (2) reviewed existing information about the data and the system that produces them, and (3) interviewed agency officials knowledgeable about the data. We determined that the data were sufficiently reliable for the purposes of this report. Additionally, we interviewed relevant agency officials at the Environmental Protection Agency, the National Park Service, the Bureau of Land Management, and the Nevada Division of Environmental Protection regarding current air quality and visibility in the park.

To answer the second objective and describe stakeholders' views about the potential impacts of two proposed coal-fired power plants on air quality and visibility in and around the park, we interviewed relevant agency officials, stakeholders, and organizations about individual and cumulative impacts of two proposed coal-fired power plants on the park. We also reviewed public comments and resolutions and reported stakeholder analysis. We did not independently review the analysis done by stakeholders.

Some stakeholders we interviewed are members of different organizations, including local and national environmental groups, local and regional Indian tribes, members of the community surrounding the park, representatives of city and county government, and members of the Chamber of Commerce. Some of these individuals are members of multiple organizations and submitted comments or spoke with GAO on behalf of other groups. Additionally, we interviewed all stakeholders when both companies were actively pursuing construction and operating permits from the Nevada Division of Environmental Protection and rights-of-way on the Bureau of Land Management's land.

Our policy is to avoid taking a position on or addressing matters that are pending in litigation. Due to the pending administrative appeal of the Bureau of Land Management's Record of Decision on the Environmental Impact Statement, GAO did not independently quantify or assess how the new plants, if built, could contribute to air quality changes; but rather, we reviewed and reported on available information on such impacts from the proposed coal-fired power plant permits, and analysis conducted by other stakeholders. We did not assess the permit applications, the quality of the modeling conducted by the applicant, or the quality of the data used to conduct the modeling analysis due to the pending appeal. Additionally, we did not solicit the views of stakeholders on the appeal or offer opinions on the reliability of any air quality modeling performed.

To gain a better understanding of how coal-fired power plants work, we visited a power plant in Maryland and discussed with company officials how their coal plant operated. Finally, we visited Great Basin National Park, where we observed air quality monitoring equipment and air quality and visibility in and around the park, and met with local stakeholders. We conducted our work from September 2008 to

July 2009 in accordance with all sections of GAO's Quality Assurance Framework that are relevant to our objectives. The framework requires that we plan and perform the engagement to obtain sufficient and appropriate evidence to meet our stated objectives and to discuss any limitations in our work. We believe that the information and data obtained, and the analysis conducted, provide a reasonable basis for any findings and conclusions in this product.

Enclosure II: Additional Tables

As shown in table 1, Class II areas have less restrictive limits on allowable increases in nitrogen dioxide, sulfur dioxide, and particulate matter.

Table 1: Prevention of Significant Deterioration Increments for Class I and Class II Areas

Pollutant	Measurement ^a	Class I ^b	Class II ^b
Particulate matter (PM10)	Annual arithmetic mean	4	17
	24-hour maximum	8	30
Sulfur dioxide (SO ₂)	Annual arithmetic mean	2	20
	24-hour maximum	5	91
	3-hour maximum	25	512
Nitrogen dioxide (NO ₂) ^c	Annual arithmetic mean	2.5	25

Source: Clean Air Act.

^aFor any period other than an annual period, the applicable maximum allowable increase may be exceeded during one such period per year at any one location.

^bMaximum allowable increase (micrograms per cubic meter— $\mu\text{g}/\text{m}^3$).

^cNitrogen dioxide is one of a group of highly reactive gasses known as “oxides of nitrogen,” or “nitrogen oxides.” While EPA’s National Ambient Air Quality Standard covers the entire group of nitrogen oxides, nitrogen dioxide is the component of greatest interest and the indicator for the larger group of nitrogen oxides.

Top major sources of nitrogen oxides and sulfur dioxide emissions within approximately 200 miles of Great Basin National Park, including the potential emissions of the two proposed power plants, are shown in tables 2 and 3.

Table 2: Top 15 Major Sources of Nitrogen Oxides Emissions within Approximately 200 Miles of Great Basin National Park

Source	Location	Distance (miles)	Tons of nitrogen oxides emitted per year
Navajo Generating Station	Page, Ariz.	210	33,221
Intermountain Power	Delta, Utah	97	25,098
Hunter Power Plant	Castledale, Utah	173	18,247
Huntington Power Plant	Huntington, Utah	172	10,180
Sierra Pacific Power	Valmy, Nev.	204	9,380
Nevada Power Company	Moapa, Nev.	159	9,015
Nevada Power Company	Las Vegas, Nev.	202	5,735
As Proposed: Ely Energy Center^a	Ely, Nev.	48	4,853
As Proposed: White Pine Energy Station^a	Ely, Nev.	61	4,812
Bingham Canyon Mine	Bingham Canyon, Utah	156	3,750
Carbon Power Plant	Helper, Utah	189	3,409
Power Plant and Lab	Magna, Utah	166	2,067
Graymont Western U.S.	Shafter, Nev.	130	1,730
Sierra Pacific Power	Sparks, Nev.	204	1,578
Chemical Lime Company	Las Vegas, Nev.	182	1,566
McCarran International Airport	Las Vegas, Nev.	204	1,474
Holcim Devil's Slide Plant	Morgan, Utah	205	1,353

Source: GAO analysis of EPA 2005 National Emissions Inventory Data.

^aThese figures represent the potential emissions modeled by the companies in their permit applications.

Table 3: Top 15 Major Sources of Sulfur Dioxide Emissions within Approximately 200 Miles of Great Basin National Park

Source	Location	Distance (miles)	Tons of sulfur dioxide emitted per year
Huntington Power Plant	Huntington, Utah	172	17,364
Sierra Pacific Power	Valmy, Nev.	204	9,607
Hunter Power Plant	Castledale, Utah	173	6,278
As Proposed: White Pine Energy Station^a	Ely, Nev.	61	6,071
Carbon Power Plant	Helper, Utah	189	5,411
As Proposed: Ely Energy Center^a	Ely, Nev.	48	4,628
Navajo Generating Station	Page, Ariz.	210	3,944
Intermountain Power	Delta, Utah	97	3,597
Power Plant and Lab	Magna, Utah	166	3,009
Chevron USA Products	Salt Lake City, Utah	179	2,201
Nevada Power Company	Moapa, Nev.	159	2,094
Sunnyside Cogeneration Facility	Sunnyside, Utah	210	933
BP Amoco Refinery	Salt Lake City, Utah	178	880
Smelter & Refinery	Magna, Utah	164	777
Holly Corporation Refinery	Woods Cross, Utah	183	574
Big West Oil Company Flying J Refinery	North Salt Lake, Utah	182	361
Graymont Western U.S.	Shafter, Nev.	130	251

Source: GAO analysis of EPA 2005 National Emissions Inventory Data.

^aThese figures represent the potential emissions modeled by the companies in their permit applications.

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