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Proposed Permit Application, Black Mesa-Kayenta Mine, Navajo and Hopi Indian Reservations, Arizona

Volume 1 - Report

Final
Environmental Impact
Statement OSM-EIS-25

U.S. Department of the Interior
Office of Surface Mining Reclamation and Enforcement





Mission: As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally-owned public lands and natural and cultural resources. This includes fostering wise use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interests of all our people. The Department also promotes the goals of the Take Pride in America campaign by encouraging stewardship and citizen responsibility for the public lands and promoting citizen participation in their care. The Department also has a major responsibility for American Indian reservation communities and for people who live in Island Territories under U.S. Administration.

Cover Photo: Three dimensional perspective view of the Black Mesa looking southwest. Created from 6 one degree U.S. Geological Survey digital elevation models merged and displayed using the OSM Technical Information Processing System (TIPS), Interactive Volume Modeling software. Topographic relief is exaggerated 30 times. Topography is clipped to the region within the ground water cumulative impact area.



United States Department of the Interior

OFFICE OF SURFACE MINING
RECLAMATION AND ENFORCEMENT
BROOKS TOWERS
1020 15TH STREET
DENVER, COLORADO 80202

May 17, 1990



In Reply Refer To:

To All Interested Parties:

Enclosed is the Office of Surface Mining Reclamation and Enforcement (OSM) final environmental impact statement (EIS) for Peabody Coal Company's (PCC) Black Mesa-Kayenta mine. The EIS consists of two volumes and an envelope with map plates. Volume 1 consists of the EIS text, revised in response to comments on the draft EIS distributed in June 1989. Volume 2 consists of the letters received during the public comment period on the draft EIS, the transcripts of the public hearings held in August 1989, and OSM's responses to these written and oral comments.

After publication of this EIS, OSM must decide to approve with conditions or to disapprove PCC's proposed permit application package (PAP), and issue a Federal permit to conduct surface coal mining and reclamation operations. The Bureau of Land Management (BLM) must make a decision to approve or disapprove PCC's proposed life-of-mine mining plan. These decisions can be made no sooner than 30 days after the Environmental Protection Agency (EPA) publishes its *Federal Register* notice of availability of the final EIS.

For additional copies of the final EIS or for further information, please contact Jerry Gavette at the OSM address given above, or by telephone at (303) 844-2938.

Sincerely,

Peter A. Rutledge, Chief
Federal Programs Division

Enclosures



Proposed Permit Application, Black Mesa-Kayenta Mine, Navajo and Hopi Indian Reservations, Arizona

Volume 1 - Report

**Final Environmental Impact Statement
OSM-EIS-25**

June 1990

Type of Action: Administrative

**Prepared by the
U.S. Office of Surface Mining Reclamation and Enforcement**

Director

COVER SHEET

Proposed actions:

Approval with conditions of a life-of-mine mining plan, permit application package, and the issuance of a Federal permit to conduct surface coal mining and reclamation operations for Peabody Coal Company's Black Mesa-Kayenta mine.

Type of statement:

Final environmental impact statement (EIS)

Lead agency:

Office of Surface Mining Reclamation and Enforcement (OSM)

Cooperating Federal agencies:

Bureau of Indian Affairs (BIA)

Bureau of Land Management (BLM)

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Abstract:

The Black Mesa-Kayenta mine, located approximately 125 miles northeast of Flagstaff, Arizona, and 10 miles southwest of Kayenta, Arizona, consists of two separate but adjacent mining operations--the Black Mesa mine, which produces approximately 5 million tons of coal per year, and the Kayenta mine, which produces approximately 7 million tons of coal per year. Peabody Coal Company (PCC) proposes to encompass all PCC-owned and operated mining and mining-related activities within a single operating unit. The proposed permit area would cover 62,753.34 acres of Hopi and Navajo tribal lands. PCC plans to produce 292 million tons of coal from the new disturbance area between 1986 and 2011. Mining and reclamation related activities would continue through 2023 (the proposed life of the mine).

OSM has previously issued PCC two permits to mine coal at the mining complex. Between 1970 and December 31, 1985, mining activities disturbed approximately 6,444 acres within these two permit areas. The proposed Federal permit would (1) combine the previously issued permits under one permit, (2) authorize PCC to disturb an additional 13,787.4 acres through the remaining life of the mine, and (3) authorize PCC to upgrade a number of existing mining-related facilities to meet current Federal performance standards.

The following two actions would occur. The BLM Arizona State Director (or his designee), in consultation with the BIA and Navajo and Hopi Tribes, would approve the life-of-mine mining plan. The OSM Director (or his designee), in consultation with the Bureau of Indian Affairs (BIA) and the Hopi and Navajo Tribes, would approve PCC's permit application package (PAP) and issue a Federal permit to conduct surface coal mining and reclamation operations, with conditions, as necessary, to comply with applicable Federal laws and regulations.

The impact of PCC's proposal on certain aspects of the environmental resources of vegetation, wildlife habitat, and socioeconomics would be major. The impact on certain aspects of the environmental resources of air quality, cultural resources, land use, and socioeconomics has the potential to become major. Other impacts would be moderate, minor, or negligible.

SUMMARY

The alternative Federal actions analyzed in this final environmental impact statement (EIS) are approval with conditions or disapproval of the (1) proposed permit application package (PAP), and (2) life-of-mine mining plan for Peabody Coal Company's (PCC) Black Mesa-Kayenta mine. Pursuant to the Surface Mining Control and Reclamation Act of 1977 (SMCRA), the Office of Surface Mining Reclamation and Enforcement (OSM) has received an administratively complete PAP from PCC. The PAP includes a proposed life-of-mine mining plan, information for a Federal permit to conduct surface coal mining and reclamation operations and for compliance with other Federal laws, and delineation of the proposed permit area for PCC's Black Mesa-Kayenta mine.

Under Alternative 1, the OSM Director (or his designee) would, in consultation with the Bureau of Indian Affairs (BIA) and the Hopi and Navajo Tribes, approve PCC's permit application and issue a Federal permit to conduct surface coal mining and reclamation operations with conditions necessary to meet the requirements of SMCRA and all other applicable Federal laws. (The Federal permit to mine coal would be for a 5-year term, which could be renewed at 5-year intervals after review by OSM for the proposed permit area.) The BLM Arizona State Director (or his designee) would, in consultation with the Bureau of Indian Affairs (BIA) and the Hopi and Navajo Tribes, approve the proposed life-of-mine mining plan. Authority for OSM and BLM to take these actions is found in 30 CFR 750.6 and 25 CFR Chapter 1, respectively. Consultation responsibilities with BIA are defined under 30 CFR 750.6 and 25 CFR Part 216.

Under Alternative 2, the proposed life-of-mine mining plan and PAP would be disapproved, or the Federal permit to conduct surface coal mining and reclamation operations would not be issued. Alternative 1 is OSM's preferred alternative.

Pursuant to Section 404 of the Clean Water Act of 1977, PCC has applied to the U.S. Army Corps of Engineers (COE) for approval of a Section 404 permit for its Black Mesa-Kayenta mine. The COE participated as a cooperating agency during the preparation of the draft EIS, released to the public on June 5, 1989. COE has determined (February 7, 1990, letter to OSM) that the activities at the mine involving the discharge of dredged or fill material into waters of the United States qualified under the Section 404 Nationwide Permit, as defined by 33 U.S.C. 1344. The COE thereby has taken its Federal action and is no longer participating as a cooperating agency in the Black Mesa-Kayenta mine EIS.

BRIEF DESCRIPTION OF THE PROPOSAL

PCC, the applicant, seeks approval of its life-of-mine mining plan and the PAP and the issuance of a Federal permit to conduct surface coal mining and reclamation operations for the Black Mesa-Kayenta mine, a surface coal mining complex located approximately 125 miles northeast of Flagstaff, Arizona, and 10 miles southwest of Kayenta, Arizona. PCC holds active OSM permits to mine coal at the Black Mesa-Kayenta mining complex. PCC has operated this complex from 1970 to the present and has complete coal removal, coal preparation, and transportation systems already in place. The mining complex consists of two mining operations--the Black Mesa mine, which provides approximately 5 million tons of coal per year to the Mohave Generating Station near Bullhead City, Arizona, and the Kayenta mine, which provides approximately 7 million tons of coal per year to the Navajo Generating Station near Page, Arizona.

In its PAP, PCC proposes to encompass all the PCC-owned and operated mining and mining-related activities within a single operating unit. The proposed permit area would cover 62,753.34 acres of Hopi and Navajo tribal lands, 99 percent of which overlies Indian coal and 1 percent of which involves off-lease rights-of-way for a powerline and conveyor system.

OSM has issued two permits to PCC to mine coal at the mining complex. Permit AZ-0001 was issued for a 5-year period in February 1982. Permit AZ-0002A was issued for a 5-year period in December 1984 and was renewed for an additional 5-year period in December 1989. Both permits have been modified to allow for changes in the operation. Between 1970 and December 31, 1985, mining activities disturbed approximately 6,444 acres within these two permit areas. (See Appendix D.)

The proposed Federal permit would (1) combine the 1982 and 1984 permits under one permit, (2) authorize PCC to disturb an additional 13,787.4 acres through the remaining life of the mine, and (3) authorize PCC to upgrade a number of existing mining-related facilities to meet current Federal performance standards.

In its PAP, PCC proposes to disturb and eventually reclaim a total of 13,787.4 acres within the new proposed permit area for new mining and mining-related activity and to upgrade a number of existing mine facilities owned by PCC to meet current Federal performance standards. PCC plans to produce 292 million tons of coal from the new disturbance area between the

years 1986 and 2011. Mine-related activities would continue through 2023 (the proposed life of the mine). This would include an additional 2 years for reclamation activities and an additional 10 years for final bond release for a total of 38 years from 1986.

PCC employs more than 1,000 people at the Black Mesa-Kayenta mine, 90 percent of whom are Native Americans. Employment is projected to remain stable throughout the remaining life of the mine.

Coal would continue to be extracted by both dragline and truck-and-shovel open-pit methods and processed using existing in-place facilities owned and operated by PCC within the new proposed permit area. Processed coal would be transported from the Black Mesa mine to the Mohave Generating Station via an existing slurry pipeline, owned and operated by the Black Mesa Pipeline Company. Processed coal would be transported from the Kayenta mine to the Navajo Generating Station via the existing Black Mesa and Lake Powell Railroad, owned and operated by the Salt River Project Agriculture Improvement and Power District.

PURPOSE AND NEED FOR A FEDERAL DECISION

PCC has submitted to OSM an administratively complete permit application package (PAP); therefore, Federal law requires action by the BLM Arizona State Director and the OSM Director or their designees on whether to approve the mining plan and PAP and issue a Federal permit to conduct surface coal mining and reclamation operations. This EIS analyzes the environmental consequences of the alternative decisions, or actions, available to OSM and BLM.

The first alternative available to these Federal agencies (Alternative 1) is approval of PCC's proposed life-of-mine mining plan and PAP and issuance of a Federal permit to conduct surface coal mining and reclamation operations for the Black Mesa-Kayenta mine, with conditions as necessary to meet the requirements of SMCRA and all other applicable Federal laws. OSM has chosen this alternative as its "preferred alternative."

The second alternative available to these Federal agencies (Alternative 2) is disapproval of the proposed life-of-mine mining plan, the PAP and the Federal permit to mine coal for the Black Mesa-Kayenta mine.

COMPARISON OF ALTERNATIVES

The scope of the Black Mesa-Kayenta mine EIS was established after OSM and participating agencies and tribes had reviewed PCC's various proposals and considered all public comments received during the

scheduled scoping activities. Potential impacts to the human environment that could result from the implementation of alternatives 1 and 2 were then identified on site-specific and cumulative bases.

On the basis of information provided by the Hopi and Navajo Tribes, PCC, and BLM, mining of additional coal reserves within the existing lease boundaries and proposed permit area could occur sometime in the "reasonably foreseeable future," as defined by Council on Environmental Quality regulations (CEQ) (40 CFR 1508.7). On December 14, 1987, the Secretary of the Interior approved three new lease amendments for the removal of an additional 270 million tons of coal from the existing lease area. These coal reserves would be an addition to the 400 million tons of coal authorized for removal under the lease agreements signed by both tribes and PCC in 1964 and 1966. Therefore, development of these reserves is identified as activity relevant to the proposed action and is addressed in the cumulative analysis pursuant to 40 CFR 1508.25(a).

As a result of public comment on the draft EIS for the Black Mesa-Kayenta mine, a number of commenters requested that OSM analyze alternative means of transporting coal from the Black Mesa mine to the Mohave Generating Station. Coal is currently transported by the Black Mesa Pipeline Company by way of a coal slurry pipeline. (See Appendix D.) OSM has concluded that alternatives to the existing coal slurry pipeline and water source are outside the scope of this EIS, and that, at this time, there are no reasonable alternatives to the use of the pipeline or water source. This issue is addressed in response to comments in volume 2 and in chapter II of volume 1.

To perform an analysis of impacts of the alternative actions to surface- and ground-water resources, OSM conducted a "cumulative hydrologic impact assessment" (CHIA). The analysis is contained in OSM's CHIA document and is summarized in this EIS. The findings of the CHIA and the hydrology analysis in this EIS are based upon the available data at this time from both tribes and PCC, and surface- and ground-water monitoring performed in cooperation with the U.S. Geological Survey (USGS). As a condition of the permit, PCC would be required to provide periodic monitoring data which would be evaluated by OSM annually, at midterm permit review (every 2 1/2 years), and at permit renewal (every 5 years).

In addition to PCC's monitoring data submitted to OSM, the 1987 amended lease agreements between PCC and both tribes require PCC and the tribes to conduct an analysis of the long-term impacts of water withdrawal from the N-aquifer for the coal slurry pipeline. The findings of OSM's CHIA and EIS would not preclude or negate any results of the long-term

water study conducted pursuant to the lease amendments.

On the basis of analysis of both site-specific and cumulative impacts under Alternative 1 (approval with conditions of the life-of-mine mining plan, PAP, and Federal permit to mine coal), OSM concludes that:

- Major impacts would be expected to occur to vegetation diversity and wildlife habitat over the short term from the conversion of 9,046 acres of pinyon-juniper woodland and 4,485 acres of shrubland to grassland. Major socioeconomic impacts would occur to the (1) Hopi Tribe's fiscal status and ability to provide human services over the long-term; (2) the population, employment, and personal income contributed by the mine to the town of Kayenta; and (3) personal income generated by the mine to the Navajo Tribe and to residents of the proposed permit area.
- Impacts that have the potential to become major include those to (1) local residents subject to increases in fugitive dust during high windspeed days and those residents subject to relocation by PCC; (2) the grazingland (long term), residential, and cultural land uses of the proposed permit area; (3) undiscovered prehistoric and historic cultural resources; (4) employment, income, fiscal balance, and human services in certain affected jurisdictions; (5) social well-being of local residents using Navajo traditional grazing practices as their primary means of subsistence; (6) loss of revenues from not mining recoverable coal reserves or loss of coal during mining; and (7) unmitigated or unlocated sacred and ceremonial resources.
- Moderate impacts would be expected to occur to (1) air quality in and around the active mining areas; (2) raptors from the elimination of outcrop features and pinyon-juniper habitat; (3) the pinyon-juniper woodland vegetation community and its forestry use; (4) wildlife from the loss of vegetation cover and diversity and increased harassment from local travelers within the proposed permit area; (5) the short-term loss of grazingland during mining operations; (6) prehistoric and historic cultural resources, and sacred and ceremonial resources, the impacts of which have been successfully mitigated or that can have the potential impacts successfully mitigated; and (7) visual resources.

- Minor impacts would be expected to occur to (1) soils and vegetation from exposure to toxic and acid-forming material and to soil and vegetation productivity; (2) family garden plots within the proposed permit area; (3) air quality and visibility outside the proposed permit area; (4) topographic diversity and surface stability; (5) geology and mineral resources; (6) surface and ground water quantity and quality from mining and mining related pumping of the N-aquifer; (7) key wildlife habitat areas, aquatic wildlife, and certain threatened and endangered species; (8) the population base of the Hopi and Navajo Reservations and socioeconomics of jurisdictions not directly affected by the mine; (9) the regional transportation network; and (10) recreational resources.

Under Alternative 2 (disapproval of the proposed life-of-mine mining plan and the PAP), the majority of impacts identified under Alternative 1 would not occur because the 13,787.4-acre area proposed for disturbance would not be mined. Negligible to minor impacts would occur from reclamation of the existing disturbed areas. In addition, the following impacts under Alternative 2 differ in timing and/or magnitude from those under Alternative 1:

- Major socioeconomic impacts on Kayenta would occur from early closure of the mine.
- Major fiscal and human service impacts on the Hopi Tribe would occur from the loss of mine-generated revenues.
- The potential for major impacts on wildlife would occur from not constructing ponds proposed under Alternative 1 and from reclaiming existing mine-related ponds.
- The potential for major impacts would occur on grazingland, in that the land proposed for mining and reclamation under Alternative 1 would not be disturbed; hence, the productivity of these lands would not be increased.
- The potential for major socioeconomic impacts would occur on the Navajo Tribe's fiscal and employment base, Tuba City, and Page from early closure of the mine.
- The potential for major impacts would occur from reclamation of existing mine-related roads, affecting future access to residences and grazingland.

PREFACE

Pursuant to the Surface Mining Control and Reclamation Act of 1977 (SMCRA), the Office of Surface Mining Reclamation and Enforcement (OSM) has received an administratively complete permit application package (PAP) from Peabody Coal Company (PCC) for the Black Mesa-Kayenta mine. The PAP includes a proposed life-of-mine mining plan, information for a Federal permit to conduct surface coal mining and reclamation operations for compliance with other Federal laws, and delineation of the proposed permit area for PCC's Black Mesa-Kayenta mine. Federal law requires that action be taken by the Bureau of Land Management (BLM) Arizona State Director and the OSM Director, or their designees, on PCC's proposed (1) life-of-mine mining plan, (2) PAP, and (3) Federal permit to conduct surface mining operations. This final environmental impact statement (EIS) identifies and analyzes the probable impacts to the human environment that would result from surface coal mining and reclamation operations at the mine, should the life-of-mine mining plan be approved by BLM, the PAP be approved, and the Federal permit to conduct such operations be issued by OSM (the proposed Federal actions).

This EIS consists of two volumes. Volume 1 contains seven chapters. Chapter I describes the proposed Federal actions and the purpose of and need for these actions, scope of the analysis, PCC's proposal, relationships of the proposal to other regional developments, scoping issues and concerns, and geographical limits of the analysis.

Chapter II describes and compares the range of alternative decisions available to BLM and OSM regarding the proposed life-of-mine mining plan and PAP for the Black Mesa-Kayenta mine. It also describes those alternatives that were considered but eliminated from detailed analysis. The available alternatives are (1) approval of PCC's proposals and issuance of a Federal permit to conduct surface coal

mining and reclamation operations at the Black Mesa-Kayenta mine, with conditions necessary to meet the requirements of SMCRA and all other applicable Federal laws, (Alternative 1), and (2) disapproval of the proposed life-of-mine mining plan and PAP, in which case the Federal permit to mine coal for the Black Mesa-Kayenta mine would not be issued (Alternative 2). Alternative 1 is OSM's preferred alternative.

Chapter III describes the existing environment that would be affected by the proposed action, and chapter IV describes and analyzes the environmental impacts of each alternative action. A comparison of impacts of each alternative is found both in the "Summary" and in chapter II of this EIS. Impacts are displayed in a matrix (table II-1), which is supplemented by narrative description where appropriate.

Chapter V describes the consultation and coordination with the public, Indian tribes, government agencies, and private organizations that occurred during preparation of the EIS and lists those from whom comments were solicited. It also describes the issues that were identified in the scoping process but that were not further analyzed by OSM in chapter IV. Chapter VI lists, with their qualifications, the individuals who prepared this document and/or the environmental analyses contained in it. Chapter VII lists selected references used in the preparation of this document.

Appendices have been included to provide supplemental information on specific aspects of the Black Mesa-Kayenta mine, detailed descriptions of the two alternatives, cumulative development in the region, wildlife, socioeconomics, and air quality.

Written comments and oral testimony on the draft EIS and responses to these comments are contained in volume 2.

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CHAPTER I

INTRODUCTION

The alternative Federal actions analyzed in this final environmental impact statement (EIS) are either approval with conditions or disapproval of the (1) proposed permit application package (PAP), and (2) mining plan for Peabody Coal Company's (PCC) Black Mesa-Kayenta mine. Pursuant to the Surface Mining Control and Reclamation Act of 1977 (SMCRA) and in response to 30 CFR Part 750, "Requirements for Surface Coal Mining and Reclamation Operations on Indian Lands," the Office of Surface Mining Reclamation and Enforcement (OSM) has received an administratively complete PAP from PCC. The PAP includes a proposed life-of-mine mining plan, information for a Federal permit to conduct surface coal mining and reclamation operations and on compliance with other Federal laws, and delineation of the proposed permit area for PCC's Black Mesa-Kayenta mine.

Under Alternative 1, the OSM Director (or his designee), in consultation with the Bureau of Indian Affairs (BIA) and the Hopi and Navajo Tribes [30 CFR 750.6(d)], would approve PCC's permit application and issue a Federal permit to conduct surface coal mining and reclamation operations with conditions necessary to meet the requirements of SMCRA and all other applicable Federal laws. These conditions are analyzed as part of Alternative 1 and are listed in Appendix B. (The Federal permit to mine coal would be for a 5-year term, which could be renewed at 5-year intervals after review by OSM for the life of the mine.) The BLM Arizona State Director (or his designee) would approve the proposed life-of-mine mining plan in consultation with BIA and the tribes. Authority for OSM and BLM to take these actions is found at 30 CFR 750.6 and 25 CFR Chapter 1, respectively. Consultation responsibilities with BIA are defined under 30 CFR 750.6 and 25 CFR Part 216.

For PCC to continue surface coal mining and reclamation operations at the Black Mesa-Kayenta mine, approvals from BLM and OSM, as listed under Alternative 1, must be obtained.

Under Alternative 2, the proposed life-of-mine mining plan and PAP would be disapproved, or the Federal permit to conduct surface coal mining and reclamation operations would not be issued.

Copies of PCC's PAP can be reviewed by the public at OSM's Western Field Operations, Brooks Towers, 1020 - 15th Street, Denver, Colorado; the

OSM Albuquerque Field Office, 625 Silver Avenue, S.W., Suite 310, Albuquerque, New Mexico; the Navajo Tribe, Department of Surface Mining, Fort Defiance, Arizona; and the Hopi Tribe, Division of Mining and Reclamation Enforcement, Kykotsmovi, Arizona.

A. NEED FOR FEDERAL DECISION

PCC has filed a complete PAP with OSM; therefore, Federal law requires action by the BLM Arizona State Director and the OSM Director, or their designees, on whether to approve the mining plan and PAP and issue a Federal permit to conduct surface coal mining and reclamation operations. This EIS analyzes the environmental consequences of the alternative decisions, or actions, available to OSM and BLM.

SMCRA, with certain exceptions, authorizes OSM to issue Federal permits for a term of 5 years. PCC has applied to OSM for approval of a proposed permit area. This proposed permit area covers 62,753.34 acres and is, for the most part, contiguous with the lease boundaries. (See figure I-2.) The total acreage proposed to be disturbed through the life of the mine is 13,787.40 acres. Operations conducted by PCC within the proposed permit area during the original 5-year permit term would be limited to those specified by OSM in the permit. Likewise, operations conducted by PCC during any subsequent renewals would be limited to those specified by OSM in the permit renewal.

PCC holds active OSM permits to mine coal at the Black Mesa-Kayenta mining complex. It has operated this complex from 1970 to the present and has a complete coal removal, preparation, and transportation system already in place. This existing operation is described in detail in Appendix D as part of the cumulative development in the Black Mesa area.

The proposed permit area, as defined by PCC's PAP, would encompass all disturbances associated with mining since 1970 and, in addition, would include all areas where surface mining and reclamation operations, and the area disturbed by associated surface facilities and haul roads, would occur through the remaining life of the mine.

B. SCOPE OF THE ANALYSIS

OSM has prepared this EIS to identify and analyze the probable impacts on the quality of the human environment that would result from implementing the proposed Federal action. The technical proposal on which this analysis is based is contained in the PAP. Discussion of the impacts focuses on the proposed permit area and includes direct impacts from mining, offsite impacts caused by mining, such as changes in hydrologic conditions and air quality, and other impacts, primarily social and economic, resulting from increased employment and economic activity.

For the purposes of this EIS, the decision to approve the life-of-mine mining plan and the PAP, and to issue a Federal permit for the Black Mesa-Kayenta mine, would be effective January 1, 1986. This date was selected based upon PCC's submittal of the PAP to OSM in December 1985. Activities occurring prior to this date are considered part of the existing environment. PCC's proposed activities occurring from January 1, 1986, through December 31, 2023, are considered in the analysis as part of the proposed action. Impacts of the proposed action are measured against 1985 conditions; however, where information is available and the issue warrants otherwise (for example, ground-water hydrology), changes to the environment are related to premining conditions. A complete list of analysis assumptions is provided in chapter IV.

According to information provided by the Hopi and Navajo Tribes, PCC, and BLM, mining of additional coal reserves within the existing lease boundaries and proposed permit area could occur sometime in the "reasonably foreseeable future," as defined by Council on Environmental Quality regulations (CEQ) [CEQ regulation, 1508.7]. Therefore, development of these reserves is identified as an activity relevant to the proposed actions and is addressed in the cumulative analysis pursuant to CEQ regulation 1508.25(a). (See Appendix D.)

On December 14, 1987, the Secretary of the Interior approved three lease amendments providing for the option of removal of an additional 270 million tons of coal from the existing lease area. (See plate 1.) These coal reserves would be an addition to the 400 million tons of coal authorized for removal under the lease agreements signed by both tribes and PCC in 1964 and 1966. The lease amendments also provide for increased coal and water royalties to be paid to both tribes, which are discussed in chapters III and IV, section K, of this EIS.

In order to conduct the analyses of the potential future mining of the additional 270 million tons of coal, OSM developed certain assumptions regarding the timing and method of mining that could be applied to these reserves. These assumptions are explained in Appendix D of this EIS. The analysis presented in this EIS extends beyond PCC's life-of-mine mining plan, as currently proposed in its PAP, to areas where mining may occur, insofar as information pertaining to this larger area is available. However, owing to a lack of site-specific data, a detailed analysis of mining additional coal reserves cannot be performed at this time. For mining to extend beyond the areas currently designated for disturbance by PCC in its 1985 PAP, PCC would have to submit a mining plan to BLM for mining the additional reserves and submit a PAP to OSM for review and approval. Each agency would conduct a detailed analysis consistent with its authority for each action, and each agency decision on mining the additional reserves would be subject to National Environmental Policy Act (NEPA) compliance.

The potential need for leasing and development of coal resources is not addressed in this EIS. The Federal decision to approve the leasing of these coal reserves for future development already has been made and is considered part of the existing environment. Since PCC holds active Indian leases for the coal resources at the Black Mesa-Kayenta minesite, leasing and coal development alternatives are not analyzed further.

C. APPLICANT'S PROPOSAL

PCC, the applicant, seeks approval of a life-of-mine mining plan, the PAP, and the issuance of a Federal permit to conduct surface coal mining and reclamation operations for the Black Mesa-Kayenta mine, a surface coal mining complex located approximately 125 miles northeast of Flagstaff, Arizona, and 10 miles southwest of Kayenta, Arizona. (See figure I-1.) PCC holds active OSM permits to mine coal at the Black Mesa-Kayenta mining complex. PCC has operated this complex from 1970 to the present and has complete coal removal, preparation, and transportation systems already in place. The mining complex consists of two mining operations--the Black Mesa mine, which provides approximately 5 million tons of coal per year to the Mohave Generating Station near Bullhead City, Arizona, and the Kayenta mine, which provides approximately 7 million tons of coal per year to the Navajo Generating Station near Page, Arizona. The existing operation is described in detail in Appendix D. (See table I-1.)

In its PAP, PCC proposes to encompass all its mining and mining-related activities within a single operating unit. The proposed permit area would cover 62,753.34 acres of Hopi and Navajo tribal lands, 99 percent of which overlies Indian coal (Navajo coal mining lease No. 14-20-0603-8580 and coal mining lease Nos. 14-20-0450-5743 and 14-20-0603-9910 for the former Joint Use Area) and 1 percent of which involves off-lease rights-of-way for a powerline and conveyor system. (See figure I-2.)

OSM has issued PCC two permits to mine coal at the mining complex. Permit AZ-0001 was issued for a 5-year period in February 1982. Permit AZ-0002A was issued for a 5-year period in December 1984 and renewed for an additional 5-year period in December 1989. Both permits have been modified to allow for changes in the operation. (See Appendix D.) Between 1970 and December 31, 1985, mining activities had disturbed approximately 6,444 acres

within these two permit areas. (See Appendix D for more details.)

The proposed Federal permit would (1) combine the 1982 and 1984 permits under one permit, (2) authorize the applicant to disturb an additional 13,787.4 acres through the remaining life of the mine, and (3) upgrade a number of existing mining-related facilities to meet current Federal performance standards. For analysis purposes, the remaining life of the mine that would be authorized for mining within the proposed permit area is defined as January 1, 1986, to December 31, 2023.

In its PAP, PCC proposes to disturb and eventually reclaim a total of 13,787.4 acres within the proposed permit area for new mining and mining-related activity and to upgrade a number of existing mine facilities owned by PCC to meet current Federal performance standards. Although the

Table I-1.--Data for the Black Mesa-Kayenta mine

	Acres involved
The proposed permit area -----	62,753.34
Coal lease area -----	64,858.00
Disturbed area since beginning of mining in 1970 to January 1, 1986, Black Mesa-Kayenta mine -----	8,238.00
Approximate reclaimed area prior to January 1, 1986 -----	6,000.00*
Proposed disturbed area from January 1, 1986 to end of mine life (2011) -----	13,787.40
Surface ownership in the lease area:	
Navajo -----	56,616.34
Hopi -----	6,137.00
Coal ownership in the lease area:	
Acres in Navajo lease No. 14-20-0603-8580 -----	24,858.00
Acres in lease No. 14-20-0450-5743 and No. 14-20-0603-9910 for former Joint Use Area -----	40,000.00
Life-of-mine -----	38 years
Duration of mining:	
Black Mesa mine -----	1986-2006
Kayenta mine -----	1986-2011
Final reclamation: -----	2011-2013
Final bond release -----	2023

* The remaining 2,258 acres consist of areas to be graded in the future, surface facilities and spoil ridges adjacent to current mining operations that cannot be graded until mining advances further into the pit.

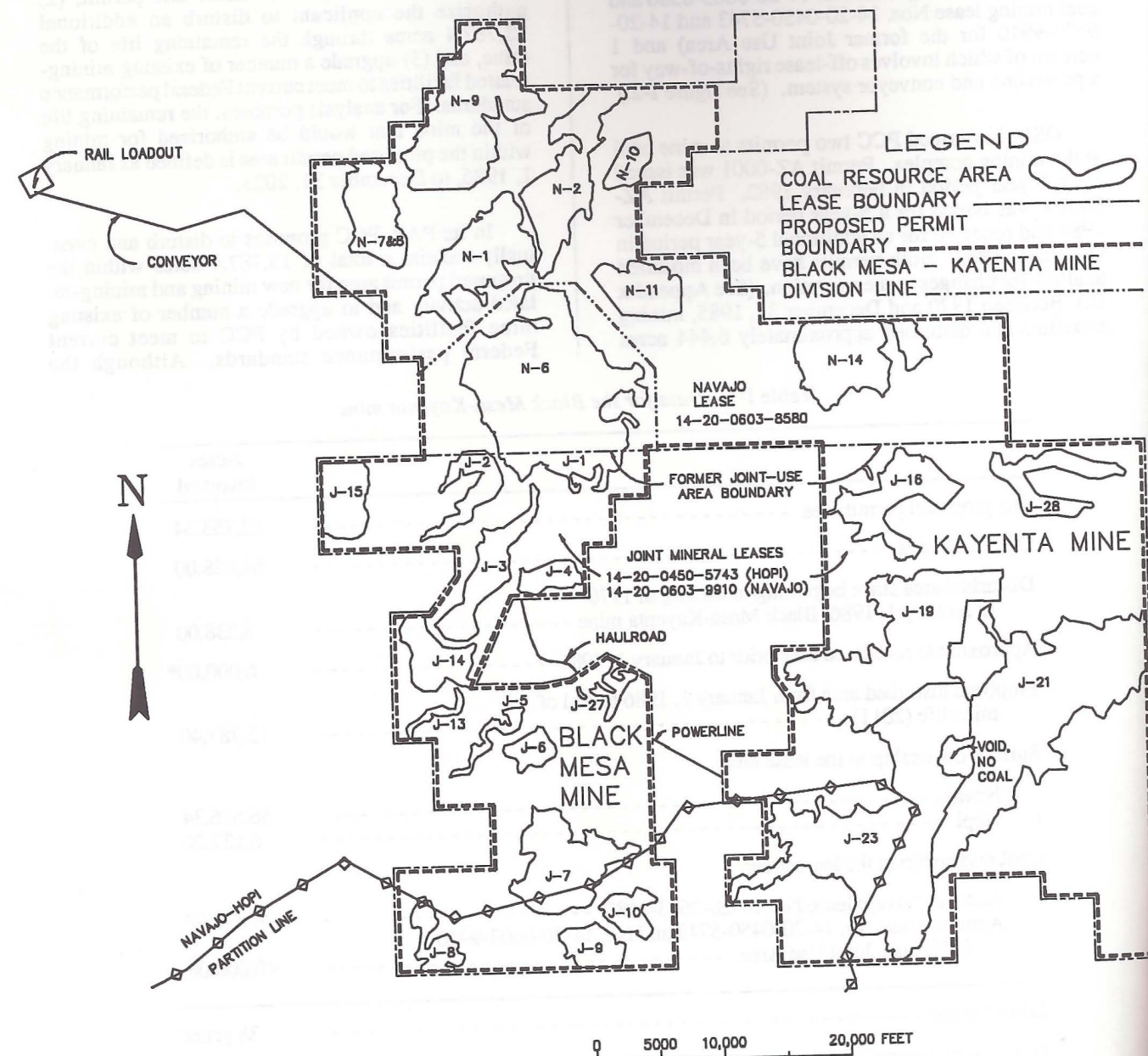


Figure I-2.--Black Mesa-Kayenta mine proposed permit area.

Table I-2.--Status of the Black Mesa-Kayenta mine coal resource areas, 1970-2011
[See plate 1 for location]

Black Mesa mine	
Disturbed coal resource areas 1970-85	Disturbed coal resource areas 1985-2005
J-1 -- mined out	J-7
J-3 -- mined out	N-6
J-27 -- mined out	
N-6 -- partially mined	
J-7 -- partially mined	
Kayenta mine	
Disturbed coal resource areas 1973-85	Disturbed coal resource areas 1985-2011
N-1 -- mined out	N-10
N-2 -- mined out	N-11 -- new
N-7/8 -- mined out	N-14
N-10 -- partially mined	J-16
N-14 -- partially mined	J-19 -- new
J-16 -- partially mined	J-21
J-21 -- partially mined	

planned disturbance through the remaining life of the mine is 13,787.4 acres, the new proposed permit area covers 62,753.34 acres. The new proposed permit area is basically parallel to the coal lease area authorized in 1964 and 1966 by the Hopi and Navajo Tribes. PCC plans to ship 292 million tons of coal from the new disturbance area between the years 1986 and 2011. Mine-related activities would continue through 2023 (the proposed life of the mine). This would include an additional 2 years for reclamation activities and an additional 10 years for final bond release for a total of 38 years from 1986. (See tables I-1, I-2, and I-3 for data on the Black Mesa-Kayenta mine.)

PCC employs at the Black Mesa-Kayenta mine more than 1,000 people, 90 percent of whom are Native Americans. Employment is projected to remain stable throughout the remaining life of the mine, as shown in table I-4.

Coal would continue to be extracted, using both dragline and truck-and-shovel open-pit methods, and processed, using existing facilities owned and

operated by PCC within the new proposed permit area. Processed coal would be transported from the Black Mesa mine to the Mohave Generating Station via an existing slurry pipeline owned and operated by the Black Mesa Pipeline Company. Processed coal would be transported from the Kayenta mine to the Navajo Generating Station via the existing Black Mesa and Lake Powell Railroad owned and operated by the Salt River Project Agriculture Improvement and Power District.

Details of the proposal are included in Appendix A of this EIS.

D. RELATION TO OTHER DEVELOPMENT

There are a number of existing or proposed projects in the area and region that are related to the Black Mesa-Kayenta mine or may contribute to the cumulative environment. The primary projects related to the mine that contribute to the cumulative analyses are as follows:

Table I-3.--*Proposed disturbance area*
[Data are in acres. Source: PCC, PAP, Volume 11, Table 1, Chapter 20]

Mining year	Coal resource area							
	J-7	N-6	N-10	N-11	N-14	J-16	J-19	J-21
1986	19.4	121.5	----	----	76.0	122.4	----	236.9
1987	41.8	140.4	----	----	77.0	155.6	----	177.9
1988	28.1	96.0	----	----	83.4	135.4	----	132.7
1989	31.9	100.5	----	----	153.5	67.2	----	106.4
1990	25.3	96.0	----	----	85.4	69.0	----	106.9
1991-95	151.6	424.0	----	252.7	220.7	401.1	556.5	736.9
1996-2000	170.9	517.2	----	482.3	----	----	883.1	878.2
2001-05	----	----	183.3	----	----	----	741.3	885.0
2001-06	----	731.4	----	75.8	----	----	----	----
2006-11	----	----	152.4	----	----	----	1,005.9	758.7
Life-of-pit total	469.0	2,227.0	335.7	810.8	696.0	950.7	3,186.8	4,019.6
J-3 airstrip	----	184	----	----	----	----	----	----
Scoria pits	320.7	246.0	----	----	----	21.0	----	151.0
Haul roads	----	----	----	14.0	----	98.1	15.0	42.0
Total disturbance	789.7	2,657.0	335.7	824.8	696.0	1,069.8	3,201.8	4,212.6
Grand total	13,787.4							

Power Generation Plants

The Salt River Project Agriculture Improvement and Power District operates the Navajo Generating Station near Page, Arizona. The station consumes approximately 7 million to 8 million tons of coal annually from PCC's Kayenta mine.

The Southern California Edison Company operates the Mohave Generating Station near Bullhead City, Arizona. The station consumes approximately 4 million to 5 million tons of coal annually from PCC's Black Mesa mine.

Utilities

The Black Mesa Pipeline Company operates a slurry pipeline that transports coal a distance of 275

miles from PCC's Black Mesa mine to the Mohave Generating Station near Bullhead City, Arizona.

The Salt River Project Agriculture Improvement and Power District operates the Black Mesa and Lake Powell Railroad, an electric railroad that transports coal a distance of 83 miles from PCC's Kayenta mine to the Navajo Generating Station near Page, Arizona.

Projects and/or regional developments that are not directly related to the mine but currently contribute to the cumulative environment and/or are proposed for the future include:

1. Tuba City Uranium Mill Tailings Site, owned and operated by the Rare Metals Corporation, abandoned in 1966, currently undergoing reclamation by the Department of Energy (DOE) under the Uranium Mill Tailings Radiation Control Act of 1978.

Table 1-4.--*Black Mesa-Kayenta mine employment assumptions*

Year	Black Mesa mine	Kayenta mine	Kayenta warehouse	Flagstaff Division*	Total
1986	362	524	19	149	1,054
1987	362	524	19	149	1,054
1988	362	524	19	149	1,054
1989	362	524	19	149	1,054
1990	362	524	19	149	1,054
2000	362	524	19	149	1,054
2001	362	524	19	149	1,054
2002	362	524	19	149	1,054
2003	362	524	19	149	1,054
2004	362	524	19	149	1,054
2005	362	524	19	149	1,054
2006	**362	524	19	149	1,054
2007	362	524	19	149	1,054
2008	***362	524	19	149	712
2009	20	524	19	149	712
2010	20	524	19	149	712
2011	20	**524	19	149	712
2012	20	524	19	149	712
2013	20	***524	19	149	712
2014	20	30	0	75	125
2015	20	30	0	75	125
2016	20	30	0	75	125
2017	20	30	0	75	125
2018	20	30	0	75	125
2019	0	30	0	75	105
2020	0	30	0	75	105
2021	0	30	0	75	105
2022	0	30	0	75	105
2023	0	30	0	75	105
2024	0	0	0	0	0

* Black Mesa mine-related employment. Approximately 74 people perform Black Mesa mine work only, whereas 75 people perform Black Mesa mine work in addition to other work related to other PCC operations.

** End of coal production.

*** Reclamation completed.

2. Study area population growth and economic development projections for the future. (See chapter IV, section K, "Socioeconomics.")

In addition, in December 1987 the Secretary of the Interior approved lease agreements between the Hopi and Navajo Tribes and PCC providing for the option to mine an additional 270 million tons of coal reserves within the existing lease boundaries; therefore, development of these reserves is addressed in the cumulative analysis as an activity relevant to the analysis of the proposed action [CEQ 1508.7, 1508.25].

These projects are identified in figure I-1. Details of the above-listed projects are included in Appendix D.

E. SCOPING ISSUES AND CONCERNS

OSM began the formal scoping process in 1985 with notification to the general public of OSM's intent to prepare the EIS. Comments on PCC's proposal were received at public meetings and through written correspondence to OSM. (See chapter V for additional details.) In addition, the PAP was distributed to the cooperating agencies and the Hopi and Navajo Tribes for review and comments whereby the agencies' concerns were identified along with those concerns raised by the OSM interdisciplinary team. OSM utilized these public comments and agency concerns in its scoping process.

More than two hundred individual issues and concerns were raised during the scoping process. Public issues generally included (1) potential impacts of the proposed action on springs and wells in the surrounding area, and (2) potential impacts of the proposed action on the social and economic well-being of residents in the surrounding area. OSM considered each issue and concern in terms of its relevance to the proposed action. Table I-5 enumerates the issues and concerns evaluated by OSM in chapter IV. Topics identified through scoping but not further analyzed by OSM are presented in chapter V.

On June 15, 1989, OSM made available to the public the draft EIS for the Black Mesa-Kayenta mine. The public comment period for the draft EIS was extended from August 18, 1989, to September 15, 1989. During the public comment period, a number of issues and concerns were identified, primarily centering on: (1) the impact of the proposed mining operation on the N-aquifer; (2) consideration of alternatives to the Black Mesa Pipeline Company's coal slurry pipeline; (3) impacts to local residents;

and (4) potential impacts to sacred and ceremonial resources located within the proposed permit area.

Chapter V provides the details of the public participation process for the draft EIS. Volume 2 of this final EIS provides a summary of the substantive comments received on the draft EIS, including those mentioned above, and OSM's response to these comments.

F. GEOGRAPHICAL LIMITS

The EIS primarily considers impacts in that part of central Navajo County occupied by the 62,753-acre proposed Black Mesa-Kayenta permit area. However, impacts to areas beyond the permit boundary are also considered, to the extent that pertinent data are available and the resulting potential impacts would be relevant to the mining operation. For several disciplines, larger or smaller geographical limits have been established to allow for the required analysis and assessment of all impacts, including those impacts contributed by the cumulative developments listed in the preceding section. Geographical limits used in this EIS analysis are as follows:

1. Socioeconomic limits encompass locations of primary and secondary importance relative to the effects of the Black Mesa-Kayenta mine:

- The geographic extent of the socioeconomic analysis is dictated by the specific characteristics of both the Black Mesa-Kayenta mining complex and the region in which it is located. (See figure I-1.) Primary socioeconomic impacts would be generated at several communities both on and off the Hopi and Navajo Reservations within 75 to 100 miles of the Black Mesa-Kayenta mine. These places would variously exhibit impacts due to residence of PCC employees, secondary economic effects, effects on public services and community infrastructure, fiscal effects, and effects on social organization, values, attitudes, and perceptions.
- Selected places of primary importance are Kayenta, Tuba City, Moenkopi, and the part of northern Black Mesa that includes the PCC leasehold and its immediate environs. There is no established political jurisdiction which corresponds to that part of Black Mesa. However, it can be roughly defined as those Navajo Nation Chapters within which the leasehold falls or which are immediately adjacent to the leasehold. The chapters are Chichinbeto, Forest Lake, Shonto, Kayenta, Pinon, and Hard Rock.

- Selected places of secondary importance--that is, those outside reservation boundaries but having links to the mining complex--are Flagstaff and Page. A place-specific analysis was conducted for these locations.

- The fiscal impacts of the Black Mesa-Kayenta mine would be much more widely distributed, in terms of affected land area and population. Because of PCC's contribution to the fiscal position of both Hopi and Navajo tribal governments, the economic and social impacts are distributed throughout both reservations. Consequently, the socioeconomic analysis of these fiscal impacts was reservationwide. (The Navajo Reservation consists of the reservation proper, the eastern Navajo Agency boundary, and the satellites of Alamo, Ramah, and Canoncito. The Hopi Reservation consists of District 6, the Hopi partitioned lands of the former Joint Use Area (FJUA), and the approximately 925-acre Moenkopi administrative area.)

2. Fish and wildlife impact analyses would be generally limited to the proposed permit area plus any adjacent area where impacts would be expected.

3. The surface-water hydrology study area is the entire drainage areas of Moenkopi and Dinnebito Washes to their confluence with the Little Colorado River basin. (See figures I-3 and III-3.) The groundwater hydrology study area encompasses a major part of the Black Mesa hydrologic basin and includes

4,800 square miles of the 5,000-square-mile hydrologic basin. The area is bounded on the south and southwest by the outcrops of the Navajo Sandstone (approximately the southern boundary of the Navajo Reservation). The northwestern boundary is delineated by the hydrologic divide between the Kaiparowits and Black Mesa hydrologic basins (extending to Tuba City). The northern boundary is delineated by the hydrologic divide between the Black Mesa and Henry hydrologic basins (extending to Kayenta), and to the east through the pinchout of the N-aquifer (paralleling the Chinle Valley).

4. The air resources study area constitutes--for climatology--the Black Mesa region of northeastern Arizona, including the town of Kayenta and the minesite. For air quality and visibility, the boundaries would range from the minesite and the Hopi and Navajo Indian Reservations to the sensitive recreation and visual resource areas, such as Navajo National Monument, Monument Valley, and Grand Canyon National Park. (See figure I-1.)

G. CHRONOLOGY OF EVENTS

Activities related to the Black Mesa-Kayenta mine have been continuous since the mid-1960's when the leases for coal mining were granted to PCC by the Navajo and Hopi Tribes. Table I-6 presents a summary of the major events and developments related to the operation of the mine and associated facilities. Key events are also included leading to the preparation of the draft and final EIS, as well as related permit activities.

Table I-5.--Black Mesa-Kayenta mine scoping issues raised by public comments and Government agencies

Topography
Changes in topography and topographic diversity from backfilling and grading operations.
Geology and Mineral Resources
Impacts on the environment from exposure of uranium deposits.
Impacts on geologic formations and lithology.
Impacts on coal reserves.
Hydrology
Impacts on surface-water quality and quantity from increased runoff, alteration of drainage patterns, sedimentation, streamflow alterations, and discharges.
Impacts on downstream land uses and water rights from permanent surface impoundments.
Impacts on the water quality and quantity in Moenkopi Wash and Dinnebito Wash.
Impacts on wells and springs within the Hopi Reservation.
Impacts on wells and springs within the proposed permit area and outlying Navajo Reservation communities.
Impacts on water quantity and quality of the N-aquifer.
Impacts on water quantity and quality of the Wepo aquifer.
Impacts on water quantity and quality of the Dakota aquifer.
Impacts on water quantity and quality of the alluvial aquifer.
Impacts on water quantity and quality of the Coconino aquifer.
Impacts of increase in cost of pumping from the N-aquifer.
Climate
Impacts on the macroclimate and microclimates from mining.

Air quality
Impacts from mining on local air quality, including the Hopi and Navajo Reservations and residents within the proposed permit area.
Impacts from wind erosion of disturbed lands and airborne coal dust on area residents.
Impacts of mine-related particulates and cumulative air quality impacts on recreational vistas, Grand Canyon National Park, the Navajo National Monument, Monument Valley, and Hubbell's Trading Post.
Cumulative impacts of background particulate sources and mine-related particulates on local area visibility.
Cumulative impacts of powerplant emissions within the region on local area visibility.
Soils
Impacts from exposure of acid and toxic overburden.
Impacts on soil productivity from increased erosion, runoff, and alteration of drainage patterns.
Impacts from the use of substitute soil materials.
Impacts on farmlands.
Vegetation
Impacts on culturally important plants, threatened or endangered plant species.
Impacts on onsite and offsite crop productivity.
Impacts on grazinglands.
Impacts on pinyon nut and wood products harvest.
Impacts on vegetation from increased erosion, runoff, and alteration of drainage patterns.
Impacts on vegetation from toxic overburden.
Impacts on vegetation diversity.
Impacts on sage-grassland and pinyon-juniper ecosystems.
Wildlife
Impacts on aquatic species.

Table I-5.--Black Mesa-Kayenta mine scoping issues raised by public comments and Government agencies--Continued

Impacts on threatened and endangered species and bird species of high Federal interest and of importance to the Navajo and Hopi Tribes.
Impacts on wildlife from increased human population accessing the mine areas.
Impacts on wildlife from loss of pinyon-juniper habitat.
Impacts on raptors from loss of habitat.
Impacts on small mammals, reptiles, and amphibians.
Impacts from removal of impoundments.
Land use
Impacts of changes to existing land uses on area residents.
Impacts on farmlots.
Impacts on cultural land uses.
Impacts on wildlife habitat.
Impacts on grazingland.
Impacts on forestry.
Cultural/historic resources
Impacts on identified historical and archeological sites.
Impacts on undiscovered historical and archeological sites.
Impacts on sacred and ceremonial resources, including eagle gathering sites, sacred wells and springs, land features, and plant gathering areas.
Impacts on cultural resources from increased vandalism.
Impacts on burial sites.

Socioeconomics
Impacts on population growth, employment, and income (Hopi and Navajo Reservations and affected local communities).
Impacts on the fiscal and economic base of the study area jurisdictions.
Impacts on public services and facilities.
Impacts on the sociocultural characteristics and social well-being of the Hopi and Navajo Tribes and affected local communities.
Impacts on land uses in affected jurisdictions.
Impacts on the Hopi and Navajo traditional view of their land.
Impacts of relocation of residents.
Impacts on local residents from mining-related noise and dust.
Esthetics
Impacts from changes in topography, vegetation, and other visual resources.
Impacts from mining-related noise on the area's esthetic resources.
Transportation
Impacts on local residents and other land users from changes in the road network within the permit area.
Impacts on the transportation network outside the permit area.
Recreation
Impacts on regional recreational areas.
Impacts on community recreational areas.

Table I-6.--Summary chronology for Black Mesa-Kayenta mine.

02/01/64	Coal mining lease No. 14-20-0603-8580 effective with Navajo Tribe.	07/21/75	USGS approved permit for J-7 Mining Area.
06/06/66	Coal mining lease No. 14-20-0450-5743 for former Joint Mineral Use Area effective with Hopi Tribe.	08/03/77	The Congress passed the Surface Mining Control and Reclamation Act.
06/06/66	Coal mining lease No. 14-20-0603-9910 for former Joint Mineral Use Area effective with Navajo Tribe.	01/13/81	Office of Surface Mining Reclamation and Enforcement (OSM) approved Leg 25 of overland conveyor from Kayenta mine.
06/01/67	Construction began on Mohave Power Generating Station.	05/08/81	OSM approved Phase 1 of overland conveyor and coal preparation facilities.
04/--/69	Black Mesa Pipeline, Inc. began construction on Black Mesa Pipeline and associated facilities.	01/29/82	OSM issued Permit AZ-0001.
12/10/69	Secretary of the Interior, with consent of the Navajo Tribe, granted right-of-way easement for overland conveyor, railroad corridor and coal loading site located outside Peabody Coal Company (PCC) lease area.	08/28/84	OSM issued Permit AZ-0002.
03/25/70	U. S. Geological Survey (USGS) approved permit for J-3 Mining Area.	09/28/84	Federal program for Indian lands promulgated.
04/--/70	Construction began on Navajo Power Generating Station.	10/31/84	PCC filed a permit application pursuant to the requirements of the Indian Lands Program.
04/21/70	USGS approved permit for J-27 Mining Area.	12/21/84	OSM issued Permit AZ-0002A for J-21 North Area.
11/--/70	Black Mesa Pipeline began operation.	02/19/85 and 02/20/85	OSM held preliminary meetings with Hopi and Navajo Tribes, BIA and BLM on EIS scoping issues.
04/01/71	Mohave Power Generating Station began operation.	04/17/85	Settlement Agreement between OSM and Hopi Tribe agreeing that an EIS would be prepared for Black Mesa-Kayenta mine.
04/--/71	Construction began on Black Mesa and Lake Powell Railroad.	12/16/85	PCC submitted a Permit Application Package (PAP) for continued mining under the Indian Lands Program.
02/04/72	Bureau of Reclamation issued EIS for Navajo Power Generating Station; EIS also covered the Black Mesa-Kayenta mine.	12/26/85	OSM invited BIA, BLM and Corps of Engineers to be cooperating agencies for the EIS.
07/13/72	USGS approved permits for J-1, N-5, and N-6 Mining Areas.	02/18/86 through 02/20/86	OSM held public meetings in Flagstaff, Window Rock, and Kayenta, Arizona, to receive oral comments on scope of EIS.
01/03/74	USGS approved permit for N-1 Mining Area.	03/18/86 and 03/19/86	OSM held public meetings in Shungopovi and Moenkopi, Arizona, to receive oral comments on scope of EIS.
03/15/74	Black Mesa and Lake Powell Railroad began operation.	05/30/86	OSM approved revision to Permit AZ-0001 for the construction of the Wild Ram Valley Dam and a new airport.
06/01/74	Navajo Power Generating Station began operation.		
07/16/74	USGS approved permits for N-2, N-7, N-10, J-5, J-6, J-11, J-12, J-13, and J-14 Mining Areas.		

Table I-6.--Summary chronology for Black Mesa-Kayenta mine--Continued.

07/31/86	OSM met with Hopi and Navajo Tribes, PCC, USGS, and BIA to discuss N-aquifer modeling for cumulative hydrologic impact assessment (CHIA).	01/12/88	OSM approved revision to Permit AZ-0001 for construction of concrete ford at Yellow Water Canyon.
10/29/86	OSM met with Hopi and Navajo Tribes and PCC to finalize assumptions on new ground-water modeling effort.	03/28/88	OSM met with Hopi and Navajo Tribes and PCC to discuss socioeconomic report and sacred and ceremonial sites.
10/31/86	OSM granted an administrative delay to PCC for continued operation under Permit AZ-0001.	04/13/88	OSM approved revision to Permit AZ-0001 and AZ-0002A for construction of temporary sedimentation pond structures and relocation of stockpiles.
02/24/87	OSM found PAP administratively complete.	07/15/88	Black Mesa Pipeline, Inc., submitted PAP to OSM for its preparation plant.
04/09/87	OSM approved PCC's request to extend mining in the J-21 Area south of the disturbance line.	10/31/88	OSM met with cooperating agencies, Hopi and Navajo Tribes, and PCC to discuss the preliminary draft EIS.
08/01/87	OSM submitted draft CHIA to Hopi and Navajo Tribes.	02/09/89	OSM approved revision to Permit AZ-0002A adjusting the disturbance line in J-21 North Area.
08/17/87	OSM met with Navajo Tribe and BIA on wildlife mitigation options.	04/--/89	OSM issued final CHIA.
08/25/87	OSM distributed draft Socioeconomic Technical Report to cooperating agencies, PCC, and the Hopi and Navajo Tribes.	06/05/89	OSM distributed draft EIS to the general public.
08/26/87	OSM met with Hopi and Navajo Tribes, Environmental Protection Agency, BIA, USGS, and PCC to discuss CHIA.	07/05/89	OSM approved revision to Permit AZ-0001 for construction of sediment control structures.
12/14/87	Secretary of the Interior approved amendments to the existing coal leases between PCC and the Hopi and Navajo Tribes for the option to mine an additional 270 million tons of coal.	08/07/89 through 08/10/89	OSM held public meetings in Flagstaff, Moenkopi, Kykotsmobi and Kayenta, Arizona, to receive oral comments on draft EIS.
		12/21/89	OSM approved renewal of Permit AZ-0002A.
		02/20/90	OSM briefed the Hopi and Navajo Tribes, EPA, BLM and BIA on preliminary final EIS.