

MINING AND RECLAMATION PLAN
BLACK MESA AND KAYENTA MINES

INDEX

Chapter	Title	Volume
15 (Cont.)	Attachment 11 - Alluvial Well Lithologic Logs	10
	Attachment 12 - Alluvial Well Hydrograph Analyses	10
	Attachment 13 - Alluvial Cross Sections Using Seismic Refraction Technique	10
	Attachment 14 - Alluvial Aquifer Test Data and Results	10
	Attachment 15 - Alluvial Aquifer Water Quality Data	10
	Attachment 16 - Permanent Internal Impoundment Water Quality	10
	Attachment 17 - Water Quality of Springs	10
	Attachment 18 - Plots of Single Well Recovery Tests, Navajo Well No. 1	10
	Attachment 19 - Navajo Wells - Construction and Completion Details	10
	Attachment 20 - Navajo Wells - Lithologic Logs	10
	Attachment 21 - Plots of Time Drawdown Tests for Navajo Wells	10
	Attachment 22 - Navajo Wells - Drawdown History	10
	Attachment 23 - Navajo Wells - Water Quality	10
	Attachment 24 - USGS Annual Reports - Black Mesa Monitoring Program	10
	Attachment 25 - Updated Information Since 1985 Pertinent to the Navajo Aquifer	10
16	Hydrologic Monitoring Program	11
17	Protection of the Hydrologic Balance	11
18	Probable Hydrologic Consequences	11
19	Hydrologic Reclamation Plan	11
20	Reclamation Schedule	11
21	Backfilling and Grading	11
22	Minesoil Reconstruction	11
23	Revegetation Plan	11
24	Bonding	11A

MINING AND RECLAMATION PLAN
BLACK MESA AND KAYENTA MINES

INDEX

Chapter	Title	Volume
25	Signs, Markers, Maps, Plans, and Cross Sections	11A
26	Surface Stabilization Plan	28
Appendix A	Soils Resources of the Black Mesa Lease Area	11A
Appendix A-1	2003 Soil Survey Report Life of Mine Coal Resource Areas Black Mesa Mining Complex	11A
Appendix B	Lithologic, Chemical, and Physical Analyses of Overburden for the Black Mesa and Kayenta Mines	12
Appendix C	Solid Waste (Non-Coal) Disposal Plan	12
---	Permit Drawings, Plans, and Cross Sections (see Chapter 25, Table 1 or the following three pages)	13 to 23
Appendix D	Final Interpretative Archaeological Report	24-26
Appendix E	Water, Waste, and Land (WWL) Study	27
---	Estimated Postmining Topographic Map (Drawing No. 85352)	29

MINING AND RECLAMATION PLAN
BLACK MESA AND KAYENTA MINES
INDEX OF DRAWINGS, PLANS, AND CROSS SECTIONS

Drawing Number	Title	Volume
85100	Land Use Map	13
85110	Black Mesa Leases, Right-of-Ways, and Permit Area	13
85120	Anasazi Sites with Mining Areas	13
85121	Historic Sites with Mining Areas	13
85122	Anasazi Sites with Compliance Status, Mining Areas, and Excavated Sites	13
J-7 Area	Typical Geologic Cross Section	13
J-19 Area	Typical Geologic Cross Section	13
J-21 Area	Typical Geologic Cross Section	13
N-6 Area	Typical Geologic Cross Section	13
N-11 Area	Typical Geologic Cross Section	13
J-2 Area	Typical Geologic Cross Section	14
J-4 Area	Typical Geologic Cross Section	14
J-6 Area	Typical Geologic Cross Section	14
J-8 Area	Typical Geologic Cross Section	14
J-9 Area	Typical Geologic Cross Section	14
J-10 Area	Typical Geologic Cross Section	14
J-14 Area	Typical Geologic Cross Section	14
J-15 Area	Typical Geologic Cross Section	15
J-23 Area	Typical Geologic Cross Section	15
J-28 Area	Typical Geologic Cross Section	15
N-9 Area	Typical Geologic Cross Section	15
N-10 Area	Typical Geologic Cross Section	15
N-12 Area	Typical Geologic Cross Section	15
N-99 Area	Typical Geologic Cross Section	15
85210	Mine Plan Map	18
85300	Order 3 and 4 Soil Survey	18
85305A	Order 1 and 2 Soil Survey	19
85305B	Topsoil Salvage Map	19
85305C	Soil Type and Topsoil Salvage Map	19A

MINING AND RECLAMATION PLAN
BLACK MESA AND KAYENTA MINES
INDEX OF DRAWINGS, PLANS, AND CROSS SECTIONS

Drawing Number	Title	Volume
85310	Geobotanical Study Map	20
85320	Vegetation and Wildlife Habitat Map	20
85320A	Mixed Conifer Woodland Habitat Map	20
85320B	Great Horned Owl and Red-Tailed Hawk Breeding Sites	20
85322	Pre-Existing Livestock and Wildlife Watering Sources	20
85324	Postmining Livestock and Wildlife Watering Sources	20
85351	Drill Hole Collar Location Map	20
85352	Estimated Postmining Topographic Map (1"=400')	29
85354	Generic Watershed	28
85360	Jurisdictional Permit and Affected Lands Map	20B
85400	Drainage Area and Facilities Map (1" = 400')	21
85402	MSHA Dam Location Map	22
85405	Sediment and Water Control Structures Map (1"=2000')	22
85406	Siltation & Impoundment Structure Data	22
85408	Impoundments Hazard Map	22
85410	J2-A Dam	22
85412	J-7 Dam	22
85414	J16-A Dam	22
85414A	J16-A Dam	22
85416	J16-L Dam	22
85416A	J16-L Dam Remedial Plan	22
85416B	J16-L Dam As-Built	22
85418	KM-FW Pond	22
85420	N14-D Dam	22
85422	N14-E Dam	22
85424	N14-F Dam	22
85426	N14-G Dam	22
85428	N14-H Dam	22
85430	Typical Road Sections	22
85432	Typical Intermittent or Perennial Stream Ancillary Road Crossing	22
85440	J-19 Haul Road	22
85442	J-19 Deadhead/Haul Road Spur	22
85445	Permanent Roads Map	22
85450	N7-D Sedimentation Structure Grading Plan	22

MINING AND RECLAMATION PLAN
BLACK MESA AND KAYENTA MINES
INDEX OF DRAWINGS, PLANS, AND CROSS SECTIONS

Drawing Number	Title	Volume
85460 and 85460A	J2-A Dam, J-3 Airstrip	22A
85462	J-3 Airstrip (As-Built)	22A
85466	J-3/N-6 Access Road Design	22A
85466A	J-3/N-6 Access As-Built Road Plans	22A
85480	Black Mesa Mine Facilities (Sheet 1A)	22A
85480	Kayenta N7/8 Facilities (Sheet 2A)	22A
85480	Central Warehouse and Operations Facilities (Sheet 3A)	22A
85480	Reclamation and J-3/N-6 Facilities (Sheets 4A, 4B, 4C, & 4D)	22A
85480	Kayenta N-14 Facilities (Sheet 5A)	22A
85480	Kayenta Mine Facilities (Sheet 6A)	22A
85480	Kayenta Transfer 22/23 and Temporary Facilities (Sheet 7A)	22A
85482A	N-11 Truck Dump/Facilities Site Plan	22A
85484	N-11 Haul Road Spurs	22A
85486	J-19 R46-R60 Deadhead Road	22A
85488	J-19 West: South Primary Road Design	22A
85490 and 85490A	Concrete Ford of Yellow Water Canyon Wash	22A
85494	Proposed N-11 Extension North Primary Road Design	22A
85495	Proposed N-11 Extension South Primary Road Design	22A
85600	Historical Environmental Monitoring Sites	23
85610	Wepo Aquifer Water Level Contours	23
85611	2003 Wepo Aquifer Water Level Contours	23
85613	Overburden and Impact Core Location Map	23
85613A	Overburden and Impact Core Location Map (2003 Core Data)	23
85620	Alluvial Aquifer Water Level Contours	23
85630	Regional and Local USGS Hydrological Monitoring Sites	23
85635	Local USGS Hydrological Monitoring Sites	23
85640	Periodic Wet Reaches Map	23
85642	Stream Buffer Zone Map	23
85642A	At-Grade Road Crossing/Stream Buffer Zone Map	23
85646	J-3 Landfill Grading Plan	23
85700	Moenkopi SEDIMOT II Subwatershed Boundaries	23
85710R	Coal Mine SEDIMOT II Subwatershed Boundaries	23
85720R	Coal Mine Wash SEDIMOT II Postmining Watershed Boundaries 7, 8, & 9	23

CHAPTER 2

GENERAL DESCRIPTION OF THE MINING LOCATION AND ACTIVITIES

Location

The Black Mesa and Kayenta Mines are located on the Black Mesa in Navajo County, Arizona on lands leased from the Navajo and Hopi Tribes. The Black Mesa is a massive highland in Northeastern Arizona covering approximately 2.1 million acres. Along its northern boundary, the Mesa rises abruptly in a 1,200 to 2,000-foot high uneven wall then descends gently downward in a plane of rolling hills to the Little Colorado River. The maximum elevation at the northern rim of the Mesa is approximately 8,200 feet. Near the northern rim and in some of the canyons there are fairly dense stands of pinyon and juniper trees, a characteristic from which the Mesa has derived its name. Most of the Mesa, however, is rolling country covered primarily by a sagebrush shrubland. The Peabody leasehold covers 64,858 acres on the northern part of the Mesa just south of Kayenta, Arizona (Figure 1) with an additional Grant of Easement Right-of-Way for 360.94 acres.

The areas on the Black Mesa leased by Peabody consist of approximately 24,858 acres of land where the surface and mineral interests are held exclusively by the Navajo Tribe (i.e. "N" areas) and approximately 40,000 acres of land in the former Navajo-Hopi Joint Use Surface Lease Area (i.e., "J" areas). The tribes have joint and equal interests in the minerals, which underlie the former Joint Use Area; however, the surface has been partitioned. That portion of the leasehold, which lies in the former Joint Use Area, consists of approximately 33,863 acres partitioned to the Navajo Nation and 6,137 acres partitioned to the Hopi Tribe (Figure 2). No surface coal mining is planned in that portion of the leasehold, which lies within the Hopi Reservation.

Peabody Western Coal Company (PWCC) also obtained a Grant of Easement in August 1996 for various facilities at Kayenta and Black Mesa Mines. For Kayenta Mine, two parcels representing 77.49 acres were included for the overland conveyor, overland conveyor maintenance roads, overland conveyor transfer on "B" and "C" facilities, 69 kV transmission line, seven sedimentation ponds, and access roads to pond areas. For Black Mesa Mine, two parcels containing 283.45 acres were included for haul roads (Navajo Route 41), 69 kV transmission line, water and telephone lines, utilities access roads, two sedimentation ponds, rock borrow area, and an access road to Navajo Water Well #4.

The Kayenta Mine is located on the Navajo lease area and the east portion of the former Joint Use Area (Figure 3). Coal produced at the Kayenta Mine is transported approximately 83 miles via an electric railroad to the Navajo Generating Station near Page, Arizona (Figure 4). The Navajo Generating Station is operated by the Salt River Project and consumes seven to eight million tons of coal per year.

The Black Mesa Mine consists of the west side of the former Joint Use Area and a small portion of the exclusive Navajo lease area (Figure 3). The coal produced at the Black Mesa Mine is transported via slurry pipeline approximately 273 miles to the Mohave Generating Station near Bullhead City, Arizona (Figure 4). The Mohave Generating Station is operated by the Southern California Edison Company and consumes up to six million tons of coal annually.

Mining Activities

Coal on the Black Mesa is mined by conventional strip mining methods. Overburden material covering the coal is removed primarily by draglines using a furrowing technique. The overburden is removed by digging a furrow or elongated pit to the first coal seam. The overburden is placed alongside the excavation. The coal is removed by shovels or front-end loaders and transported by haulage trucks to coal preparation facilities. Material between coal seams is removed by draglines, shovels, or other excavation equipment and placed within or alongside the excavation or pit. When all the coal is removed, overburden from the next pit is placed in the parallel, open pit. This process is continued until all the coal has been removed from the given coal resource area (Figure 5).

At the preparation facilities, coal is dumped by the haulage trucks into hoppers. The coal is then sized and stored or shipped, depending on customer demand or coal quality requirements. There are three coal preparation areas at the Kayenta Mine and one preparation facility at the Black Mesa Mine (Figure 6). At the Kayenta Mine, after sizing, the coal is transported by conveyor up to 15 miles from the preparation facilities over the northwest face of the Mesa to storage silos located on the Black Mesa and Lake Powell Railroad. Coal is loaded from the silos into unit trains for transport to the Navajo Generating Station. At the Black Mesa Mine, prepared coal is transported by conveyor a short distance to the Black Mesa Pipeline Company's slurry preparation plant. After processing, the coal is shipped in slurry form to the Mohave Generating Station.