

MINING AND RECLAMATION PLAN

BLACK MESA AND KAYENTA MINES

Arizona Division  
Peabody Coal Company

December, 1985

**PEABODY COAL COMPANY**  
Arizona Division

1300 South Yale  
Flagstaff, Arizona 86001  
(602) 774-5253

December 16, 1985

Mr. Allen D. Klein, Administrator  
Western Technical Center  
Office of Surface Mining  
Brooks Towers, 1020 15th Street  
Denver, CO. 80202



Dear Mr. Klein:

On September 28, 1984 the Office of Surface Mining promulgated regulations at 49FR38482 which set forth certain requirements for surface coal mining and reclamation operations on Indian lands. These regulations mandated operators expecting to conduct surface coal mining and reclamation operations on Indian lands eight months after the effective date of the regulations to apply for a permit within two months of the effective date.

On October 31, 1984, Peabody Coal Company's Arizona Division filed an application for a permit and requested that OSM incorporate into the application data concerning the operations already filed with OSM. Peabody agreed to supplement the application as necessary to completely fulfill regulatory requirements should OSM identify deficiencies. OSM approved Peabody's request on November 17, 1984.

Attached is a mining and reclamation plan for the Black Mesa and Kayenta Mines. The purpose of this plan is to consolidate and update information regarding the surface coal mining and reclamation activities conducted by Peabody on the Black Mesa. This plan supports Peabody's October 31, 1984 permit application.

It is Peabody's intent that, upon approval by OSM, the information in this document regarding surface mining and reclamation plans and procedures will supercede any such information previously filed with OSM by Peabody for the Black Mesa operations. Peabody technical staff are prepared to assist the Office of Surface Mining in its review and evaluation of the enclosed plan. If you have any questions or wish to discuss this matter, please contact me.

Respectfully,

*Gary L. Melvin*  
Gary L. Melvin  
Senior Manager,  
Environmental Quality

GLM:bd

Attachments

Klein  
December 16, 1985

Page 2

cc w/attachments

Bureau of Indian Affairs  
Phoenix Area Office  
Phoenix, AZ

Bureau of Indian Affairs  
Navajo Area Office  
Window Rock, AZ

Bureau of Indian Affairs  
Western Navajo Agency  
Tuba City, AZ

Bureau of Indian Affairs  
Hopi Agency  
Keams Canyon, AZ

Bureau of Land Management  
Phoenix District Office  
Phoenix, AZ

Navajo Coal Mining Commission  
Navajo Nation  
Fort Defiance, AZ

The Hopi Tribe  
Kykotsmovi, AZ

Office of Surface Mining  
Albuquerque, N.M.

MINING AND RECLAMATION PLAN

KAYENTA MINE

INDEX

Chapter	Title	Volume
1	Introduction	1
2	General Description of the Mining Location and Activities	1
3	Legal, Financial, and Compliance Information	1
4	Geology	1
5	Coal Recovery and Protection Plan	1
6	Facilities	1
	Attachment A - Methodology for Analysis of Existing Diversions	1
	Attachment B - Five Existing Diversions	1
	Attachment C - Proposed Diversion-Reed Valley Diversion Channel	2
	Attachment D - "General Report", Geotechnic, Hydrologic, and Hydraulic Evaluation of Sediment Structures	2
	Attachment E - Impoundment Inspection Report Forms	2
	Attachment F - Precipitation Maps	2
	Attachment G - Curve Numbers	2
	Attachment H - Sedimentation and Impoundment Structures - Inspection and Design Reports	2-7
	Attachment I - Typical SEDIMOT II Inputs for Life-of-Mine Sedimentation Ponds	7
	Attachment J - "Review Report - MSHA Sedimentation Structure, N14-F"	7
	Attachment K - 1985 Peabody Inspection of MSHA Sized Dams	7
	Attachment L - Dam Break Analyses for Sedimentation Ponds J28-B, J28-C, J28-D, and J28-G	7
	Attachment M - Roadside Ditch Capacity Charts	7
	Attachment N - Geotechnical Inspection Report - Haul Roads and Conveyors	7
	Attachment N-1 Condition #15 Response of 12/28/90	7

MINING AND RECLAMATION PLAN

KAYENTA MINE

INDEX

Chapter	Title	Volume
6 (Cont.)	Facilities	
	Attachment O - Typical SEDIMOT II Inputs for Drainage Control Structures	7
	Attachment P - Dodson and Associates Hydraulic Programs	7
	Attachment Q - Existing and Proposed Culvert Inventory	7
	Attachment R - Kayenta Freshwater Reservoir and J-7 Dam Design Reports	7
	Attachment S - Sedimentation Pond's SEDIMOT II Input and SEDCAD <sup>+</sup> Input	7
	Attachment T - Water Persistence Worksheet Calculations	7
	Attachment U - N-11 Truck Dump/Facilities Ditch Calculation	7
	Attachment V - Primary Roads As-Built Certified Letter	7
	Attachment W - Impoundments Hazard Map, Drawing No. 85408 (Resident List)	7
	Attachment X - Typical Water Bar and Road Swale Detail	7
	Attachment Y - Temporary Sedimentation Pond N14-T Permit Information	7
	Attachment Z - Black Mesa Haul Road - Ephemeral Channel Diversion Design Report	7
	Attachment AA - N-14 East - Ephemeral Reclaimed Channel Diversion Design Report	7
	Attachment AE - J21-J Temporary Diversion	7
	Attachment AF - Impoundment Spillway Design Evaluation Report	7
	Attachment AG - Monthly MSHA Dam Inspection Justification	7
	Attachment AH - Notification of Proposed Geotechnical Investigation for the J7-JR Dam	7
	Attachment AI - J7-Jr MSHA Dam Design Report	7
	Attachment AJ - BTCA Plan for Conveyor	7
	Attachment AK - J-19, J-21, & J7-Jr MSHA Dam Construction Project Support Facilities	7
	Attachment AL - N-11 & N-14 Support Facilities	7
	Sedimentation Pond As-Built Drawings	7A-7F

MINING AND RECLAMATION PLAN

KAYENTA MINE

INDEX

Chapter	Title	Volume
7	Blasting	8
8	Soils Resources and Overburden	8
9	Vegetation Resources	8
10	Fish and Wildlife Resources	8
11	Climate	8
12	Air Quality	8
13	Cultural, Historic, Religious, and Ceremonial Resources	8
14	Land Use	8
15	Hydrologic Description	9
	Attachment 1 - Channel Cross Sections Near Stream Monitoring Sites	9
	Attachment 2 - USGS Flow Data at Moenkopi, Chinle, and Laguna Wash	9
	Attachment 3 - Hydraulic Radius Versus Velocity and Discharge and Velocity Versus Discharge Plots	9
	Attachment 4 - Suspended Sediment Concentrations and Discharges, Moenkopi, Arizona	9
	Attachment 5 - Selected Surface-Water Quality Data for Stream Monitoring Sites	9
	Attachment 6 - USGS Water Quality Data-Periodic Surface Water Stations	9
	Attachment 7 - Wepo Well Hydrograph Analyses	9
	Attachment 8 - Wepo Well Lithologic Logs	9
	Attachment 9 - Wepo Aquifer Test Data and Results	9
	Attachment 10 - Wepo Well Water Quality Data for Wepo Aquifer Monitoring Sites	10

MINING AND RECLAMATION PLAN

KAYENTA MINE

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

KAYENTA MINE

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  
 KAYENTA MINE  
 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-21W 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  
KAYENTA MINE  
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  
KAYENTA MINE  
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

MINING AND RECLAMATION PLAN  
KAYENTA MINE  
INDEX OF DRAWINGS, PLANS, AND CROSS SECTIONS

<u>Drawing Number</u>	<u>Title</u>	<u>Volume</u>
89800	Bonding Map	23
93500	Current Environmental Monitoring Sites	23
94700	Blast Monitoring Map	23
94720	Pre-Blast Survey Site Map	23