CHAPTER 5

COAL RECOVERY AND PROTECTION PLAN

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CHAPTER 5
INDEX

LIST OF FIGURES

LIST OF TABLES

LIST OF ATTACHMENTS

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COAL RECOVERY AND PROTECTION PLAN

Engineering Methods

Throughout the mine planning process, from exploration to coal production, proper engineering control and methodologies are employed. Various engineering disciplines such as geological, chemical, civil, mining, mechanical, and electrical engineering are involved in developing and scheduling the tasks necessary to acquire, interpret, analyze, and utilize various coal resource and mining engineering data and develop an economically and physically feasible mine plan.

Topographic mapping is essential for mine plan development. United States Geological Survey products are often used. However, where greater detail or updated maps are required, a technically competent mapping service is used to produce the needed products in accordance with national mapping standards. Engineering surveys provide control for map development.

Quality assurance drilling to refine coal location, quantity, and quality information is also supported by engineering surveys. Geologists and mining engineers interpret, analyze, and correlate the physical and chemical properties of the coal and overburden to define economically recoverable reserves. Accepted standard laboratory and field procedures are employed.

The computer is heavily relied upon as a mine-planning tool. The basic mine plan development process involves entering drill hole information into a data base, correlating coal seams, creating a surface topography data base, modeling the coal reserve, and validating the model. Stratagraphic, lithologic, and quality data are obtained and stored for each drill hole. This drill hole data base enables the geologist and mine planner to identify and correlate the various seams. This process is particularly complex for the Black Mesa coal field because of the large number of seams and the tendency of seams to split and rejoin. A graphic display of the drill holes in cross section is one of several useful tools to assist in this process.

The collection of drill holes with seam codes properly assigned to the coal intervals forms the basis for generating a mathematical model of each coal resource area. In the early computer modeling years, Peabody Western Coal Company (PWCC) used a Control Data Corporation gridded seam model called SEAM SYSTEM (SEAMSYS). Today software developed in-house to create the model called (SLIC) is used. Once the model is created, its accuracy is verified. Once calibrated, the model produces volumetric and coal seam quality data from composited and interpolated surface topography and drill hole data. The model also outputs the mining sequence when information such as direction of mining, equipment characteristics, and target production values are supplied.

Aerial photogrammetric techniques, Global Positioning Survey (GPS) equipment and computer software are used to develop production statistics such as overburden and parting removed, coal produced, coal in pits, and coal in stockpiles. Surveyed ground control panels provide ground truthing capabilities. Production and volume reports are computer generated using the digital data from the various surveying sources.

Mining Methods and Equipment

The Kayenta Complex that includes former mines separately designated as Kayenta Mine and Black Mesa Mine practice a conventional form of strip mining called area mining wherein the overburden above the coal is removed in parallel strips across the coal field until the area is mined. Black Mesa Mine was idled in December 2005. Draglines excavate the overburden by creating wide trenches or cuts and piling the spoil along the side of the cut. When mining in a coalfield begins, the first cut is called a box cut and the dirt and rock material from the cut is called box cut spoil. This spoil differs from other spoil in that it is placed outside and adjacent to the cut being mined onto lands that have not been mined. The other spoil, internal spoil, results from cuts created after the initial box cut and is placed directly into the adjacent, previously mined cut (Figure 1).

Draglines are the primary excavators for overburden material. They will also remove partings as parting thickness and field conditions indicate. Equipment such as trucks and backhoes or loaders and scrapers may also be used to assist with overburden or parting removal. When trucks and backhoes or scrapers are utilized, excavated material remains in the cut or pit area. A bulldozer is continually assigned to each dragline to perform bench leveling, access road preparation, trailing cable relocation and miscellaneous duties. The major equipment utilized at Kayenta Complex is shown in Table. Specific information for draglines and backhoes may be found in Figures 2, 3, 4, and 5.

The overburden excavation process begins with the digging of a narrow slot, or key cut, down to the coal seam to establish the highwall (Figure 6). The location of the key cut and the spoil establishes the width of the pit. The dragline positions itself above the area to be excavated and in line with the direction the cut is progressing. The dragline bucket is lowered to the material to be excavated, drawn toward the dragline, lifted, and swung to the side, at which point it dumps or spoils the excavated material into a previously mined cut or along the side of the cut onto unmined ground. This process is repeated until the entire area in front of the dragline has been excavated. The dragline then repositions itself and begins another key cut and starts the process again. This procedure is followed until the operational limits of the machine are achieved or pit boundaries are reached. At this point, the dragline walks, or deadheads, to where the next cut is to begin. The entire process starts again with each successive cut being excavated parallel to the previously mined cut and continues until excavation activities are complete within the pit.

An alternative to the highwall-side overburden excavation process is to level a bench on the spoil-side and position the dragline on the spoil-side to excavate the overburden and pull back the spoil over the coal seam (Figure 7). The main advantage of this method is to enable a dragline which has a limited operating radius to handle overburden covers of greater depth than would normally be contemplated. Other advantages of this overburden excavation process include better coal recovery in deeper overburden, reduced auxiliary equipment required for overburden excavation, increased spoil stability, reduced material rehandle, and maintaining an adequate pit width. The disadvantages include the need to prepare a spoil side bench, sequencing the spoil-side benching operation with the pit operations, and increased dragline cycle times.

Typically, at the Kayenta Complex in deeper overburden, the upper coal seams may be uncovered on the highwall side and the lower seams uncovered on the spoil side. The positioning of the overburden removal equipment will be determined on a pit by pit basis to allow the most efficient coal recovery.

Partings at the Kayenta Complex vary radically due to the Deltaic deposition process that formed the coal beds. The partings may vary in thickness from six inches to more than fifty feet in the length of one cut (pit). Therefore, parting removal must be accomplished with a variety of equipment, which includes draglines, backhoes, bulldozers, and sometimes truck and backhoe operations. The selection of parting removal equipment is dependent upon the operational requirements within each pit. A dragline will generally remove partings in excess of 15 feet; however, it may occasionally remove partings as thin as 5 feet. Backhoes and front-end loaders are utilized to remove partings that range in thickness from 3 to 15 feet. Occasionally, end dump trucks are used in conjunction with a backhoe or front-end loader to remove partings within a pit. Bulldozers may remove partings that are less than three feet thick by first ripping the parting and afterwards pushing it off the coal seam to be removed. The dozers may also assist in removing thicker overburden and interburdens by pushing material into the previously mined pit where applicable.

Once the overburden or parting has been removed from above the coal seam, any remaining overburden material is cleared from the top of the coal seam utilizing rubber-tired or track-type dozers. The coal seam is then drilled and blasted using the same procedures that are followed to fragment overburden parting (see Chapter 7). Rubber-tired front-end loaders are primarily used to load the coal into haulage trucks for transportation to preparation areas. Hydraulic Backhoes are occasionally used as needed. Rubber-tired front-end loaders are used to load coal on thinner seams and in areas where mobility of the loader is required.

Haulage from the pits to preparation areas is accomplished by bottom dump trucks ranging in capacity from 150 to 250 tons. Occasionally, 150-ton end dumps or smaller equipment may also be used. Haulage trucks are routed to pits as necessary to meet production and coal quality requirements.

Coal Leases

The mining leases, which PWCC has signed with the Navajo and Hopi Tribes, are described in Chapter 3. The leases, shown in Figure 8, provide that PWCC may produce up to 290 million tons from the exclusive Navajo Lease Area (Contract 14-20-0603-8580) and up to 380 million tons from the Hopi and Navajo Joint Mineral Ownership Lease Area (Contracts 14-20-0603-9910 and 14-20-0450-5743) for a combined total of 670 million tons. The current lease specifies that the first 400 million tons should be produced at approximately a 1:1 ratio from each lease and the additional 270 millions tons should be produced at a 2:1 ratio of Joint : Navajo Lease reserves. Thus, the total leased reserve base equals 380 million Joint Lease tons and 290 million Navajo Lease tons.

Coal Supply Agreements

PWCC has a signed coal supply agreement and is presently negotiating an extension to supply coal to the Navajo Generating Station. The coal supply agreement with the Mojave generating Station expired 12/31/05 and subsequently the MGS was shut down and Black Mesa Mine was idled. The participants and operating agents for the Navajo Generating stations are shown in Table 2. As of January 1, 2012, approximately 376 million tons of potentially economical coal reserves are available within the existing coal leases and permit boundary. As of January 1, 2012 approximately 431 million of the 670 million tons, currently under lease, have been mined.

Historical Coal Production

Peabody Coal Company began mining operations on the Black Mesa at the Black Mesa Mine in 1970. Coal resource areas that have been completely mined since that time include J-1, J-3, J-7, J-27, and N-6. As of January 1, 2012, approximately 149,597,300 tons of coal were produced at idled Black Mesa Mine and approximately 6,990 acres of land was disturbed by mining activities. Tables 4 and 5 summarize the historical annual coal sales and production at the idled Black Mesa Mine.

Mining operations began at the Kayenta Mine in 1973. Since then, the N-1, N-2, N-7/8, N-11, J-16, and N-14 resource areas have been completely mined. Active mining operations are currently ongoing in the N-09, J-19, and J-21 coal resource areas. Mining in the N-10 coal area began in 1979. The pit was temporarily closed in 1981 due to poor coal quality. As of January 1, 2012, approximately 279,656,834 tons of coal were produced at Kayenta Mine and approximately 18,446 acres of land have been disturbed by mining activities. Tables 3 and 4 summarize the historical annual coal sales and production at the Kayenta Mine.

Future Coal Production

PWCC is proposing a life-of-mine (LOM) mining plan for the Kayenta Complex, which includes producing approximately 239 million tons between 2012, and the end of the proposed life-of-mine (LOM) mining plan (2041). The LOM Mining Plan has been prepared so as to show the planned sequence of mining by year through the proposed permit term (2014-2018) and thereafter for the remainder of the operation. Mining reserve areas beyond 2018 have been identified on drawing 85210.

A total of 670 million tons of coal reserves were leased from the tribes. The proposed permit assumption is that cessation of mining activities will occur when the 670 million tons of coal reserves have been produced. Given these assumptions, coal production at the Kayenta Complex will continue through 2041. There are also approximately 137 million tons of additional coal reserves within the lease boundary that may be leased at some future date.

The mining sequence is shown in Drawing 85210. Future coal production for Kayenta Complex is summarized in Table 5. Similar data for each active and future reserve area is given in Tables 6 through 12. The dragline utilization sequence for each mine is shown in Figure 9. The quality, strike, and dip of each coal seam to be mined are given in Table 13. A summary of coal production by coal seam and mining area is given in Table 14. Coal reserve and recovery information may be found in Table 15. Typical cross sections of mining areas may be found in Chapter 25. The location of the cross sections may be found on the Mine Plan Map, Drawing 85210. Following are discussions briefly outlining anticipated mining operations in each coal resource area.

Kayenta Complex. Mining in the J-21 coal resource area began in 1985. The current mining area is located approximately 4.2 miles south of the J-28 preparation facilities on the east tract of the Joint Mineral Ownership Leases. The mining began along the north coal cropline and continued to the south with cuts extending to the southwest along the north and east sides until the entire north half of the reserve was mined out. Currently, the south and west portion of the reserve is being developed with short pits, pending approval of the J21 extension. The Violet, Green, Blue, Red, Yellow, Brown, and Orange coal seams will be removed. Current plans utilize the M8750#2 dragline for overburden and interburden removal. As of 1/1/2012, it is estimated that J21 has 61.5 million tons of recoverable coal available to market.

The J21 West resource area is located adjacent to the J21 resource area immediately to the west. It is a logical extension of the current short pits. Merging the J-21 and J-21 West pits will enhance future coal recovery. The J21 West area is entirely on Hopi surface ownership with the coal royalties being shared jointly between the Navajo and Hopi tribes. As of 1/1/2012, it is estimated that 55.9 million tons of recoverable coal are available in the J21 West resource area.

The J-19 coal resource area is located approximately two miles southwest of the J-28 preparation facilities on the east tract of the Joint Mineral Ownership Leases. Mining began in 1993 on the northern side of the resource area and progressed southward until 1997 when there was an "L" shape pit in the east-west and north-south direction. This pit configuration has minimized disturbance, increased the pit length, and improved mining efficiency, and haulage access. The current proximity of the J19 and J21 coal resource areas will provide better opportunities for mining equipment to be used more efficiently and economically between these two pits based on pit conditions, production rates, market conditions, and economics. The Violet, Green, Blue, Red, Yellow, Brown, and Orange coal seams will be extracted. The affected lands are shown on the Jurisdictional Permit and Affected Lands Map, Drawing No. 85360. The primary overburden excavator in J-19 has been the Bucyrus-Erie 2570 dragline. In early 2004, the Marion 8200 dragline mined out of the N-11 resource area and deadheaded to J-19 to commence mining in the western most portion of the J-19 resource area. The M8200 mined out the J19 West Extension in 2011 and is currently being utilized in reclamation efforts. It may periodically be called upon for future coal excavation. As of 1/1/2012, it is estimated that the J-19 resource area has approximately 43.8 million tons of recoverable coal available to market.

The N-9 Coal resource area is located approximately 3 miles north of the N8 preparation facilities on the Navajo lease area. Mining began in this pit in 2007. Mining will advance from the SE to the NW side of this pit. The Red, Yellow, Brown, and Orange coal seams will be extracted. Primary overburden removal will be performed by a Marion 8750#1 and O&K backhoes throughout the life of the pit. As of 1/1/2012, it is estimated that the N09 resource area has approximately 25.5 million tons of recoverable coal available to market.

The N-10 Coal resource area is located approximately 4.2 miles northeast of the N8 preparation facilities on the Navajo lease area. Mining is estimated to begin in this pit in 2026. Mining will advance from the SE to the SW side of this pit. The Red, Yellow, Brown, and Orange coal seams will be extracted. Primary overburden removal will be performed by Marion 8750 and O&K backhoes throughout the life of the pit. As of 1/1/2012, it is estimated that the N10 resource area has approximately 22.4 million tons of recoverable coal available to market.

The N11 Extension (N-99) coal resource area is adjacent to the mined out N-11 coal resource area and is an extension of the N-11 reserve. Mining is estimated to begin in this pit in 2035. Mining will advance from the SW to the NE side of this pit. The Red, Yellow, Brown and Orange seams are defined to be recoverable in the N-11 Extension area. As of 1/1/2012, it is estimated that the N11 Extension resource area has approximately 73.0 million tons of recoverable coal available to market.

The J28 Coal resource area is located approximately .5 mile NE of the J28 preparation facilities. As of 1//1/2012, it is estimated that 19.2 million tons of recoverable coal are available in the J28 resource area.

Coal Resource Protection

Mining on the Black Mesa involves extraction of nonconcentrated, multiple coal seams having varying overburden depths and interburden thicknesses. This situation is clearly discernable by examining the cross sections found in Chapter 25. Coal seams split, change to burned coal, and pinch out in very short distances. The initial choice of mining equipment type and size was based upon the type of mining conditions (i.e., area mining in an area with highly changing surface elevations), production requirements, the life of the mining operation, types and thicknesses of overburden and parting, local and regional dip, and thickness of coal seams. Experience in mining on the Black Mesa has resulted in the current mix of major excavators and support equipment and in highly efficient and effective coal removal. Auxiliary equipment has been carefully matched to primary excavators and their capabilities. Mining activities are conducted to maximize the recovery of coal while maintaining environmental integrity. Based upon geological conditions and the current mix of excavation equipment used at Kayenta Complex, PWCC has defined the maximum recovery depth to be 180 feet. In some conditions, it may be economical to extend the maximum recovery depth to approximately 220 feet; however, this is evaluated by PWCC's engineering department on a site-by-site basis.

During reserve development, all the coal encountered during bore hole drilling is recorded. The correlatable and estimated mineable seams are cored and analyzed regardless of seam thickness. These data are utilized to finally determine mineable reserves. The quality of thin seams as well as their occurrence in the geologic column is considered when determining whether the seam is mineable or nonmineable. Because of the varying conditions encountered on the Black Mesa, and the drillhole spacing, it is impossible to specify precise criteria relating to coal recovery in all mining areas. The coal thickness, parting thickness, and coal quality may vary between drillholes. The Bureau of Land Management (BLM) receives copies of PWCC's new drilling data after the drilling is completed. In addition, BLM receives an Annual Mining Activities Report each year, summarizing the mining activities for each mine.

Experience in mining the Black Mesa coal seams has allowed PWCC to formulate certain general guidelines regarding coal recovery. In general, when a single thin seam is first to occur below the surface, the guideline PWCC uses is that the seam must average at least three feet in thickness to be considered mineable. If a thin seam occurs lower in the mining zone, then the seam must average at least two feet in thickness and have a maximum interburden to coal ratio of 3:1 to be considered mineable. Thin seams, which have high ash or sulfur content, may be considered nonmineable due to contract quality constraints. Prior to mining, this criteria is verified in the pit. The outermost mineable limit is shown on the Mine Plan Map (Drawing No. 85210, Sheets 1, 2, 3, and 4 of 4). PWCC will utilize surface mining methods to maximize the utilization and conservation of the coal, while utilizing the best appropriate technology currently available to maintain environmental integrity so that reaffecting the land in the future through surface coal mining operations is minimized. As PWCC’s mining professionals receive and evaluate exploration drilling and geological data, they determine the geologic limit of the coal reserves.

Once the geologic limit of the coal resources area is determined, they must develop a mine plan that applies the economical, market, operational, environmental, and regulatory constraints to the geologic limits to obtain the mineable limits. In some areas, the geologic limit may match the mineable limits, in other areas, the mineable limit may be inside the geologic limit of the coal resource area. The mining limits, (i.e. seam crops and recoveries) will be provided to BLM for all areas within the 5 year mine plan. The mining professionals continually evaluate the above constraints as they receive new information and they evaluate the coal recovery guidelines to determine the current mineable limits for each coal resource area. Following are some examples of conditions, which may cause a revision to the mining limits of a coal resource area:

- More exploration drilling has been completed and geological data has been reviewed since the previous mine plan and PWCC has better defined the mineable coal reserves.
- PWCC's coal quality and thickness data varies from the drillhole and geological model information.
- PWCC has refined the mineable limits giving consideration to environmental constraints such as sediment control, buffer zones, topsoil stockpiles, and support facility locations.
- PWCC has reconfigured some of the pits for operational reasons (i.e., greater pit length, balanced ratios and haulage distances, and/or a revised equipment mix or mining technique, etc.).
- The coal market has changed due to the Clean Air Act, electrical deregulation, and competition from other sources of electrical generation, and other market and regulatory conditions, causing re-evaluation of what is marketable coal.

It is important that a strong line of communication be maintained between PWCC, BLM, the Navajo Nation, and the Hopi Tribe concerning coal recovery at the Kayenta Complex. If PWCC's mining professionals encounter constraints or receive new information which may cause a significant revision to the mining limits of a coal resource area, PWCC shall notify BLM of that fact by telephone within 48 hours.

In conclusion, none of these changes has isolated coal from future recovery as economics and/or technology may continue to change and the coal recovery is maximized. The resulting outermost mineable limit is shown on the Mine Plan Map, Drawing No. 85210. The mineable limits may be revised on Drawing No. 85210 with the submittal and approval of a PWCC permit revision by the appropriate federal and tribal agencies.

During overburden removal, the width of the pits is designed based upon the machine performing the excavation. This prevents pits from becoming too wide resulting in spoil material being placed on uncovered coal. Sloughing of spoil material onto uncovered coal occurs infrequently because of the nature of the overburden and parting material and lack of moisture at the Kayenta Complex. If sloughing does occur, auxiliary equipment is utilized to remove the spoil material so that the coal can be removed and coal fenders are minimized. Negligible amounts of coal are lost during the Black Mesa operations because of either of these two conditions. Further, it is in the

operator's best interest to recover the maximum amount of coal possible once the overburden has been removed and the coal seam exposed.

The number of tons of coal produced per acre-foot (TPAF) can measure the efficiency of the mining operations. Based on drill hole data regarding seam thickness and extent and laboratory analysis of specific gravity (1.30), in place reserves are estimated to be 1,743 tons per acre foot. Actual production is calculated monthly using scale measurements and stockpile fluctuations. This production is applied through the use of monthly aerial and GPS surveys to the area where coal was actually removed to produce the TPAF recovered for each month. The historical average recovery for the Black Mesa and Kayenta Mines is approximately 86 and 88 percent, respectively, for surface mining methods. Mined tonnage is, therefore, estimated at 1,568 TPAF. These recoveries are well within industry standards (Workman, 1994). For estimating purposes, the mine plan assumed an optimistic 90 percent average coal recovery (see Table 15).

The "Coal Loss During Mining" given in Table 15 was estimated using the historical average recovery factors discussed above. Coal loss can occur due to a dragline or auxiliary equipment removing some coal while uncovering the seams, removal of some coal during coal cleaning prior to coal loading, coal loss at the bottom of the seam, sloughing of spoil, mining inside curves, and placement of spoil on coal during mining which form ribs or fenders. Each of these losses is factored into the recovery factors. These losses appear more significant in multi-seam operations due to the fact that there are several coal seams to uncover and clean before loading. Peabody will continue to minimize such loss through efficient stripping and loading operations.

In accordance with the requirements of 816.57 and 816.59, PWCC obtained approval to recover coal to the coal cropline in the J-19 coal reserve area in the Red Peak Valley Wash stream buffer zone area and to allow surface mining activities in the Red Peak Valley Wash to the limits shown on Drawing 85360, (SE Sheet), and Drawing 85642A, (SE Sheet). This allowed the maximum recovery of coal as required in 816.59 while obtaining the specific approval required in 816.57. The thin alluvium in this section of Red Peak Valley Wash is normally dry except during a precipitation-induced runoff event based on 20 years of hydrologic monitoring. The scoured channel bottom with little perennial vegetation displays characteristics associated with high intensity-short duration thunderstorms or runoff from significant snowfall events. There are no sections within this reach wherein steam baseflow occurs. Vegetation in the channel is characteristic of upland sagebrush and pinyon-juniper habitats that predominate adjacent to either side of the wash. Threatened and endangered (T & E) species for the J-19 West area including Red Peak Valley Wash were addressed in an attachment to the February 19, 2002 transmittal letter. A site-specific reconnaissance of Red Peak Valley Wash on July 25, 2002 confirmed the earlier results that no T & E species were found nor was suitable habitat present. The J7-Jr MSHA Dam captures, contains, and controls all surface water runoff, including entrained sediment, from upper Red Peak Valley Wash. Therefore, this surface mining activity did not cause or contribute to the violations of applicable Federal water quality standards, and did not adversely affect the water quantity and quality or other environmental resources of

this section of Red Peak Valley Wash.

Chapter 22, Minesoil Reconstruction, presented in Volume 11, provides for the placement of plant growth media over material determined to be unsuitable for the establishment of vegetation. This process will also protect coal seams exposed in the upper portion of reclaimed highwalls and assure all acid-forming, toxic-forming, and combustible materials exposed, used, or produced during mining will be adequately covered. All non-coal mine waste material will be disposed of in accordance with the Solid Waste Disposal Plan in Chapter 6.

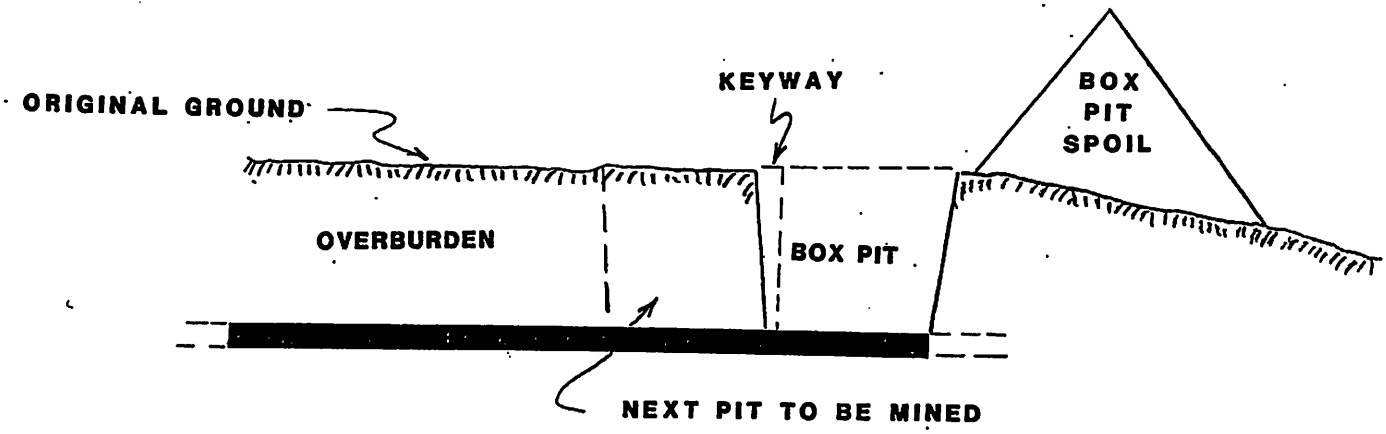
When exposed coal seams occur in the lower portion of the final highwall, backfill material at the seam locations will be of noncombustible material placed in a manner to provide at least four feet of covering. Reclaimed highwalls shall be monitored visually on a quarterly basis to identify any evidence of burning coal. Should evidence indicate coal seams are burning, PWCC shall excavate, extinguish, and backfill to the extent practicable, the burning portion of the coal seam.

Coal fires may also occur in the mined cut and adjacent spoil, and at coal handling facilities. It is in PWCC's best interest to control fires and prevent loss of the coal resource. Burning coal in these areas will be extinguished under the supervision of a qualified and certified MSHA “Green Card” Surface Certified Supervisor in accordance with 30 CFR, 816.87, by removing and mixing the burning material with noncombustible material to the extent practicable or burial with at least four feet of noncombustible material, if appropriate. Water may be utilized to extinguish coal fires near coal handling facilities where the burning coal can be isolated. Fires, which occur in nonrecoverable coal seams, which are exposed in the highwall, will be extinguished as described above if the seam is reachable by support equipment in the pit. If not reachable, the fire will be extinguished in the overburden removal process.

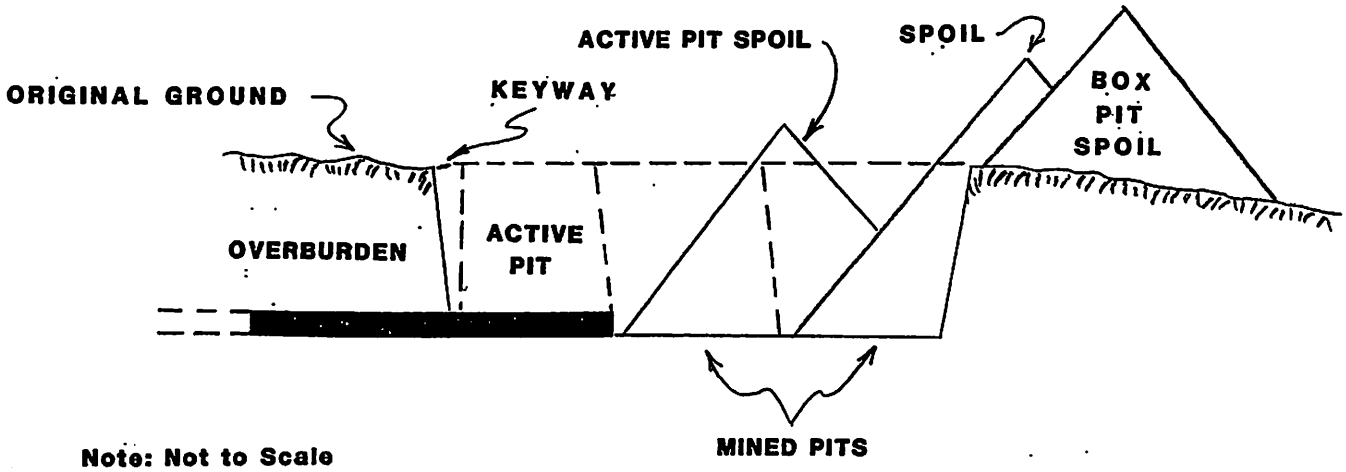
Within 48 hours of its discovery, PWCC shall commence efforts to extinguish any coal-related fire that could affect the amount of recoverable coal. If the fire is not extinguished within 96 hours after its discovery, PWCC shall notify BLM of that fact by telephone within that period. Within 48 hours of such telephone notice, PWCC shall submit to BLM a written report describing the extent of the fire, its exact location, the amount of recoverable coal affected, and any other relevant information.

Within 48 hours of any extraordinary or unusual event other than those specified in the preceding paragraph that causes a loss of recoverable coal (e.g., highwall failure), PWCC shall notify BLM of that event by telephone. Within 48 hours of such telephone notice, PWCC shall submit to BLM a written report describing the event, its exact location, the amount of recoverable coal affected, and any other relevant information.

INITIAL BOX PIT (END CUT METHOD)



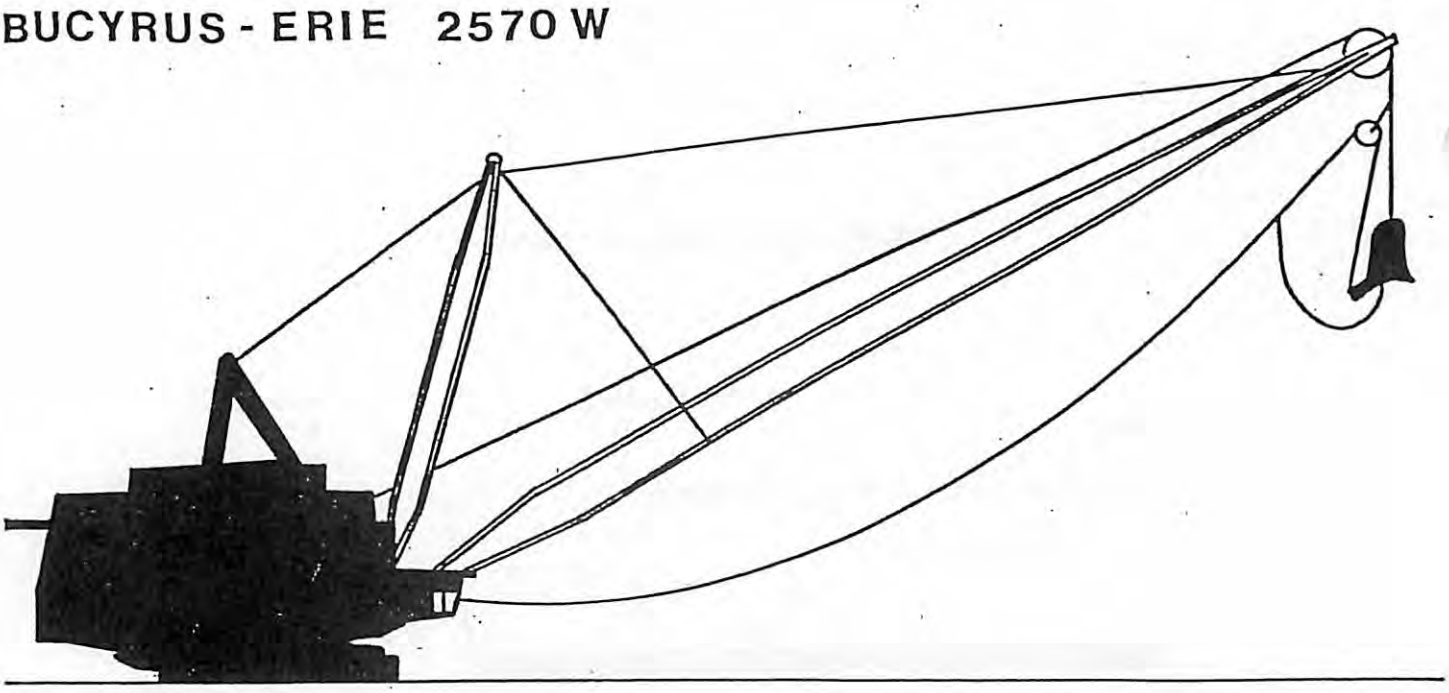
SUBSEQUENT PITS



Note: Not to Scale

FIGURE 1
TYPICAL PIT CROSS SECTIONS

BUCYRUS - ERIE 2570 W



2570 WALKING DRAGLINE
SPECIFICATIONS

WEIGHTS:

NET WEIGHT*, DOMESTIC, APPROX. (WITH BUCKET + 80' BASE) LBS.....	10,430,000
WORKING WEIGHT, APPROX. (WITH BUCKET) LBS.....	11,180,000
BALLAST WEIGHT (FURNISHED BY PURCHASER) LBS.....	750,000

* ADD 90,000 LBS. FOR BLOCKING ON CARS WHEN ESTIMATING DOMESTIC FREIGHT.

ELECTRICAL EQUIPMENT:

HOIST MOTORS (BLOWN).....	EIGHT 500 HP
DRAG MOTORS (BLOWN).....	SIX 500 HP
SWING MOTORS (BLOWN).....	FOUR 625/1250 HP
WALKING MOTORS (BLOWN).....	FOUR 500/1000 HP

ALL ABOVE MOTORS RATED AT 75° CONTINUOUS AND AT 230/460V.
MT SET DRIVES: FOUR 2,500 HP SYNCHRONOUS MOTORS

WORKING DIMENSIONS

A	CLEARANCE RADIUS, FT.-IN.....	80-0
B	OPERATING RADIUS, FT.....	329
C	BOOM FOOT RADIUS, FT.-IN.....	30-0
D	CLEARANCE HEIGHT, FT.-IN.....	14-0
E	BOOM FOOT HEIGHT, FT.-IN.....	16-0
F	DUMPING CLEARANCE, FT.-IN.....	72
G	BOOM POINT HEIGHT, FT.....	204
H	DIGGING DEPTH, FT.....	160
J	POINT SHEAVE PITCH DIAMETER, IN.....	144
	BUCKET SIZE.....	90 C.Y.
	BOOM LENGTH, FT.....	366'
	BOOM ANGLE.....	35°
	MAX. SUSPENDED LOAD (TONS).....	225

BASE:

OUTSIDE DIAMETER, FT.-IN.....	80-0
BEARING AREA, SQ. FT.....	5026
CIRCLE RAIL DIAMETER, FT.-IN.....	54-0

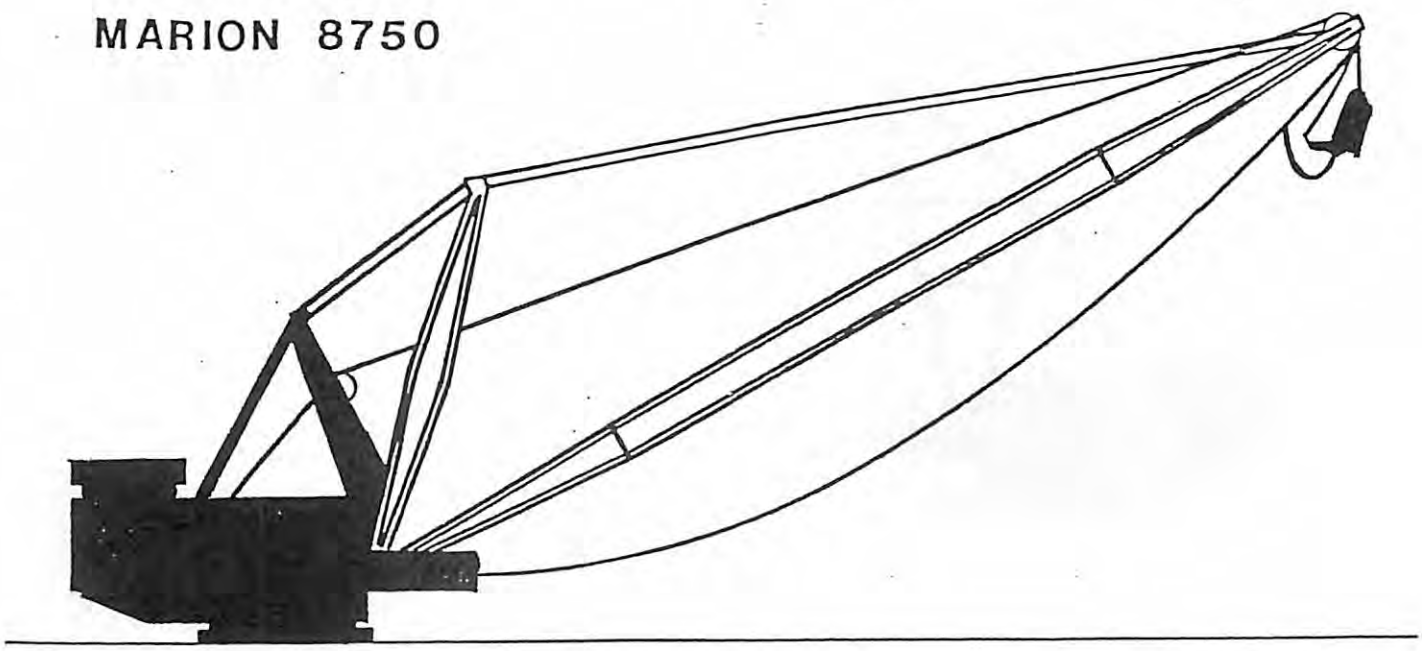
WALKING MOUNTING:

SHOE WIDTH AND LENGTH, FT.....	14X72
COMBINED BEARING AREA, SQ. FT.....	2016
OVERALL WIDTH OVER SHOES, FT.-IN.....	110-6
LENGTH OF STEP, APPROX. FT.-IN.....	8-6
WALKING SPEED, APPROX. MPH.....	0.15

FIGURE 2

BUCYRUS-ERIE 2570 W

MARION 8750



8750 WALKING DRAGLINE
SPECIFICATIONS

WEIGHTS

DOMESTIC SHIPPING WEIGHT (INC. BUCKET) LBS.	9,200,000
WORKING WEIGHTS, LBS.	9,800,000
BALLAST (FURNISHED BY PURCHASER), LBS.	600,000

DIMENSIONS

BOOM LENGTH.	301'-0"
A - BOOM ANGLE, APPROX.	36-1/2°
B - DUMPING RADIUS.	265'-4"
C - DUMPING HEIGHT.	107'-0"
D - DEPTH.	150'-0"
MAXIMUM ALLOWABLE LOAD, LBS.	427,000
BUCKET SIZE.	84 CU. YD.

BASE

E - OUTSIDE DIAMETER - NOMINAL.	70'-0"
BEARING AREA - EFFECTIVE, SQ. FT.	3,848
RAIL CIRCLE - MEAN DIA.	55'-0"

ELECTRICAL EQUIPMENT

HOIST MOTORS, EIGHT, 1000 HP EACH @ 460 V, TOTAL HP.	8,000
DRAG MOTORS, SIX, 1000 HP EACH @ 460 V. , TOTAL HP.	6,000
SWING MOTORS, FOUR, 1000 HP EACH @ 460 V., TOTAL HP.	4,000
PROPEL MOTORS, FOUR, 600 HP EACH @ 460 V., TOTAL HP.	2,400
AC DRIVING MOTORS, TOTAL HP.	10,250

ROTATING FRAME

J - WIDTH @ REAR END.	80'-0"
K - LENGTH.	109'-0"
L - CLEARANCE RADIUS - REAR END.	77'-0"
M - CLEARANCE UNDER FRAME.	15'-10"
N - CENTER ROTATION TO BOOM FOOT.	24'-0"
P - GROUND TO BOOM FOOT.	21'-4"

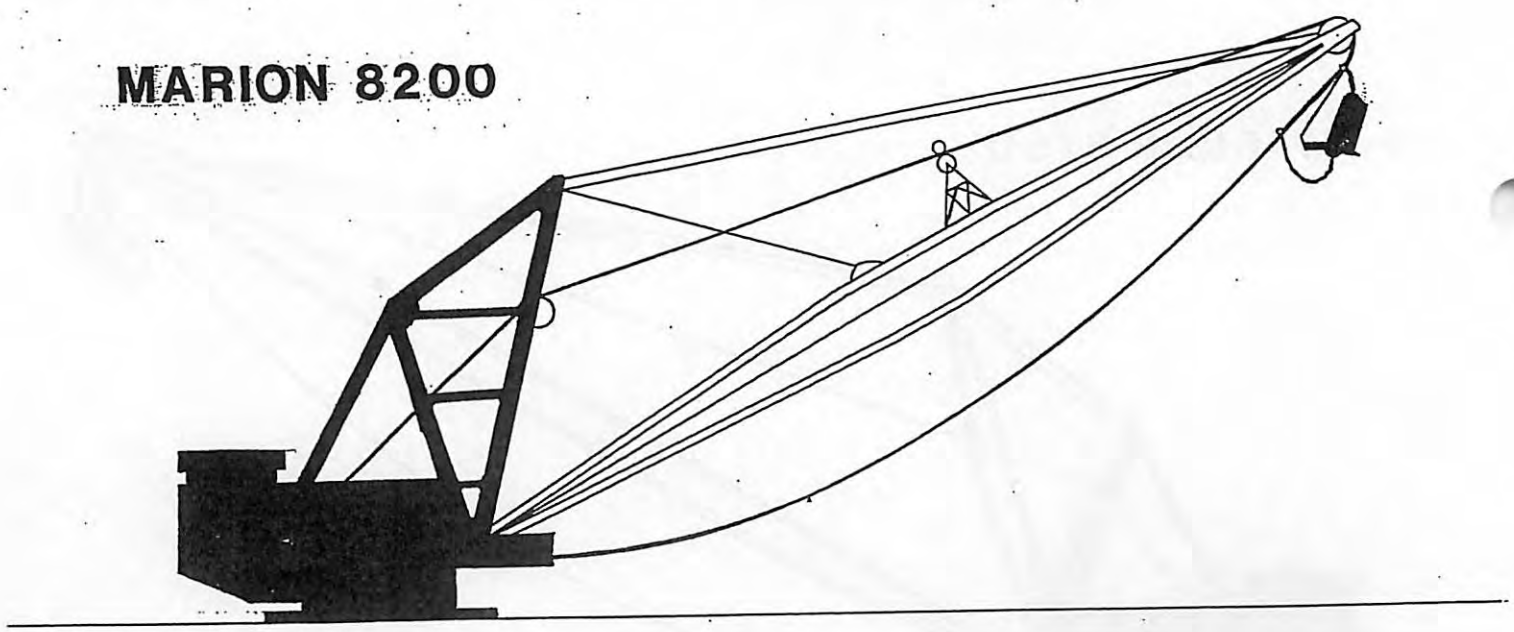
WALKING TRACTION

F - WIDTH OF SHOE.	13'-6"
G - LENGTH OF SHOE.	65'-0"
H - WIDTH OVER BOTH SHOES.	101'-0"
BEARING AREA OF BOTH SHOES, SQ. FT.	1,750
LENGTH OF STEP - APPROX.	7'-0"
WALKING SPEED - APPROX.,MPH.	0.14

FIGURE 3

MARION 8750

MARION 8200



8200 WALKLING DRAGLINE SPECIFICATIONS

DIMENSIONS

Boom Length	331'-0"
Boom Point Sheave, Pitch Diameter	120"
Boom Angle, Approx.	34°
Dumping Radius	296'-0"
Dumping Height	126'-0"
Depth	160'-0"
Maximum Allowable Load, lbs	360,000

BASE

Outside Diameter - Nominal	68'-0"
Bearing Area - Effective, sq. ft.	3630
Bearing Pressure, psi	15.9
Rail Circle - Mean Diameter	46'-6"

WALKING TRACTION

Width of Shoe	13'-6"
Length of Shoe	68'-0"
Width Over Both Shoes	98'-0"
Bearing Area of Both Shoes, sq. ft.	1690
Length of Step - Approx.	6'-0"

ROTATING FRAME

Width @ Rear End	67'-4"
Length	91'-0"
Clearance Radius - Rear End	68'-0"
Clearance Under Frame	11'-0"
Center Rotation to Boom Foot	21'-6"
Ground to Boom Foot	15'-1"

ELECTRICAL EQUIPMENT

Hoist Motors, Four, 1300 hp each @ 475 V. Total hp	5200
Drag Motors, Four, 1300 hp each @ 475 V. Total hp	5200
Swing Motors, Standard, Four, 800 hp each @ 475 V. Total hp.	3200
Propel Motors, Two, 1045 hp each @ 475 V. Total hp	2090
AC Driving Motors, Total hp	7000

WEIGHTS

Domestic Shipping Weight, (inc. Bucket), lbs	6,600,000
Working Weight, lbs	7,750,000
Ballast (Furnished by Purchaser), lbs	1,150,000

FIGURE 4

MARION 8200

Hydraulic Mining Excavator

General Data

Operating weight

Face shovel	283 t	*312 sht*
Backhoe	285 t	*314 sht*

Engine output SAE J 1995

Caterpillar	1,044 kW	*1,400 HP*
Cummins	1,008 kW	*1,350 HP*

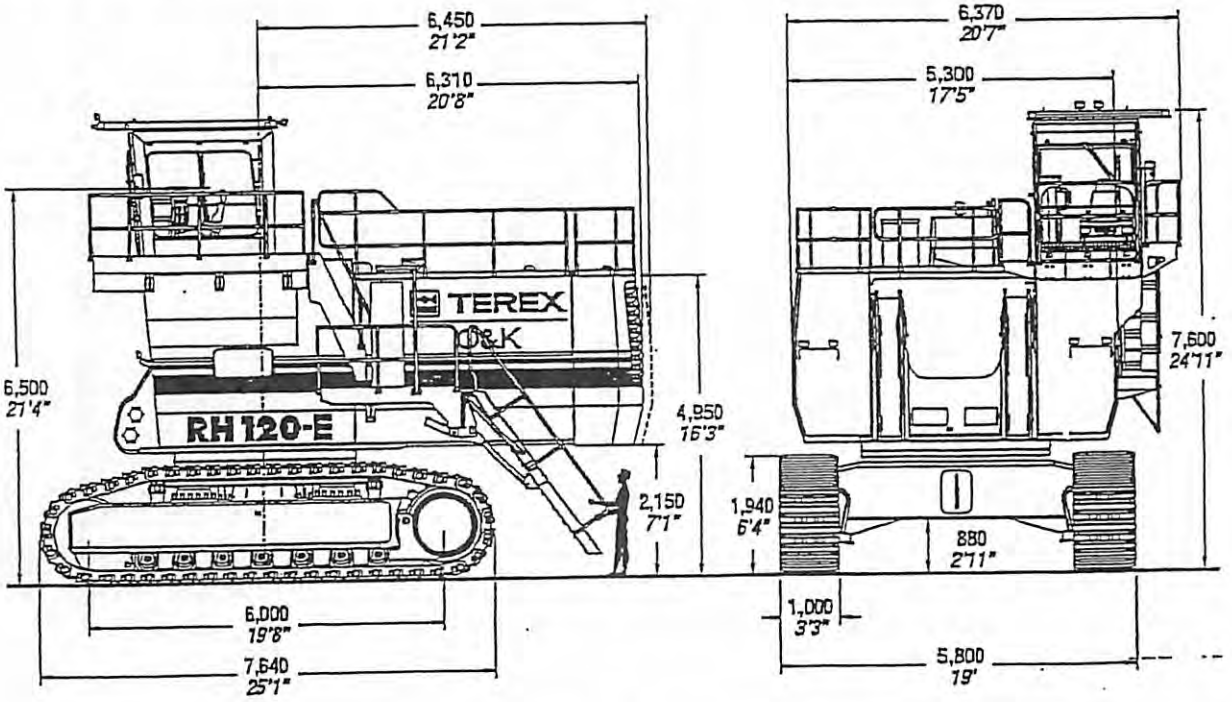
Standard bucket capacity

Face shovel (SAE 2:1)	15.0 m³	*19.6 yd³*
Backhoe (SAE 1:1)	15.0 m³	*19.6 yd³*

Features

- TriPower shovel attachment
- Independent oil cooling system
- Spacious walk-through machine house
- 5-circuit-hydraulic system
- Electronic-hydraulic servo control
- Board Control System (BCS)
- Torque control in closed-loop swing circuit
- Automatic central lubrication system
- Xenon working lights

General Dimensions



Operating Weight – Shovel

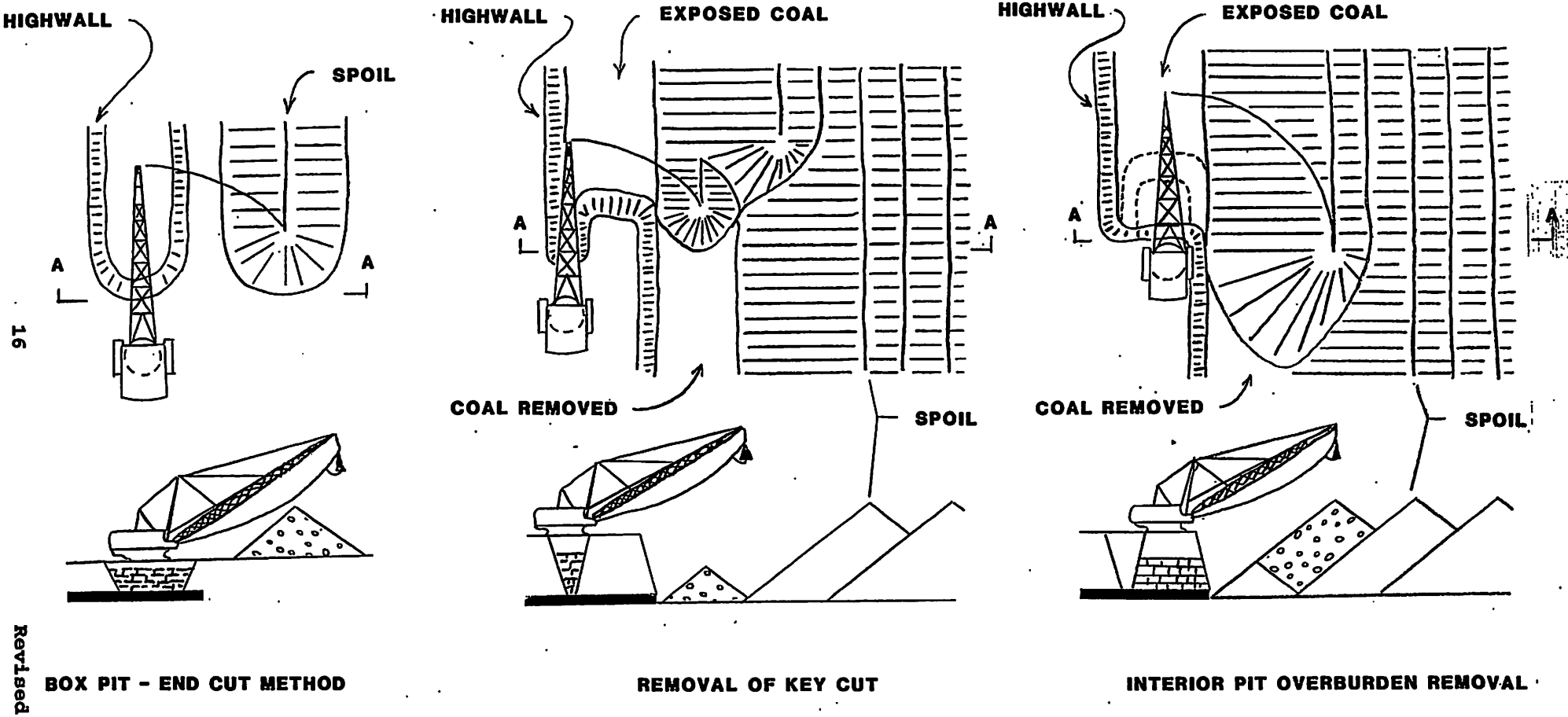
Standard track pads	1,000 mm	*3'3"*
Operating weight	283,000 kg	*623,900 lbs*
Ground pressure	21.2 N/cm²	*30.7 psi*
Further track pads on request		

Operating Weight – Backhoe

Standard track pads	1,000 mm	*3'3"*
Operating weight	285,000 kg	*628,310 lbs*
Ground pressure	21.3 N/cm²	*30.9 psi*
Further track pads on request		

FIGURE 5
Terex/O&K 120-E Backhoe

Revised 02/24/12



BOX PIT - END CUT METHOD

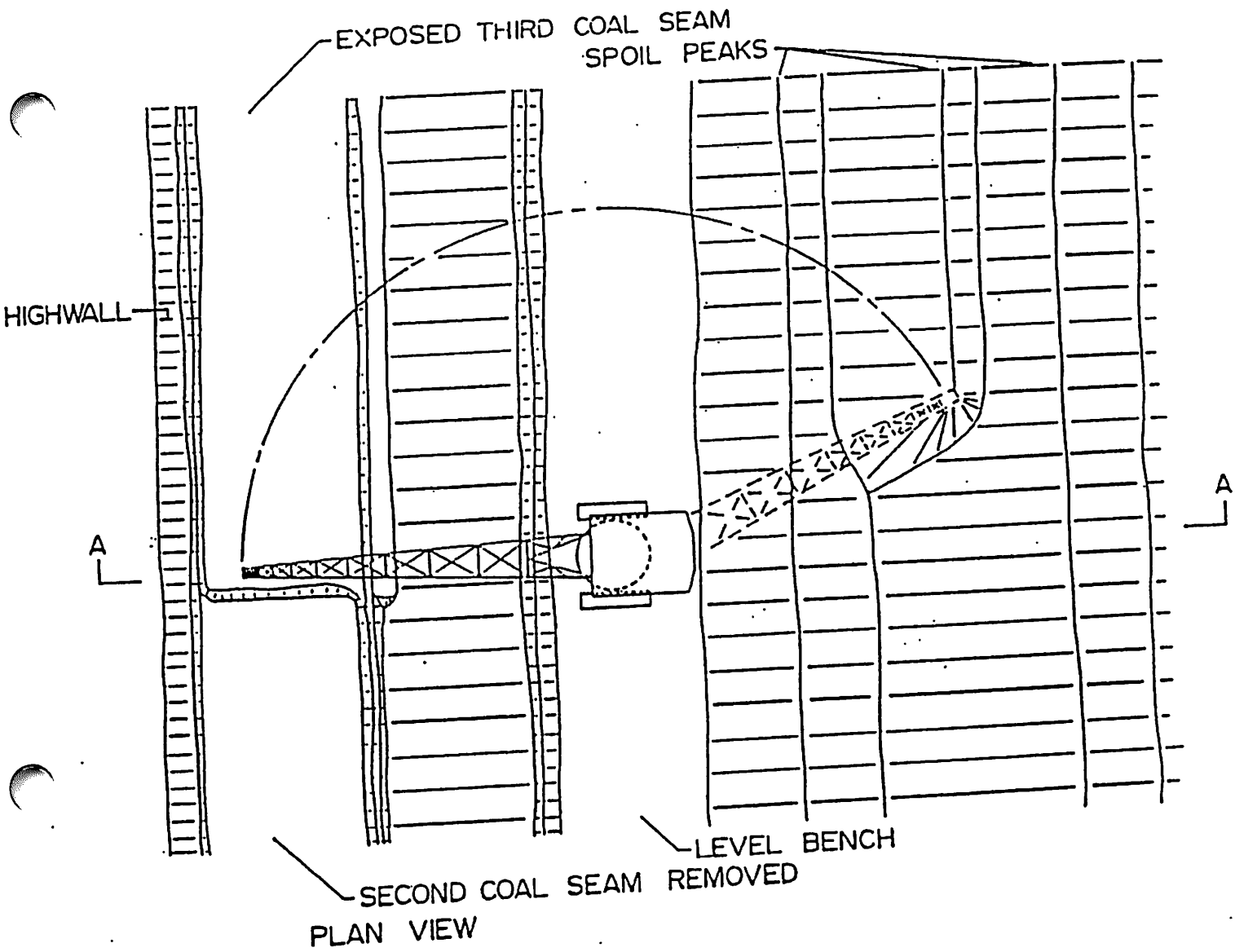
REMOVAL OF KEY CUT

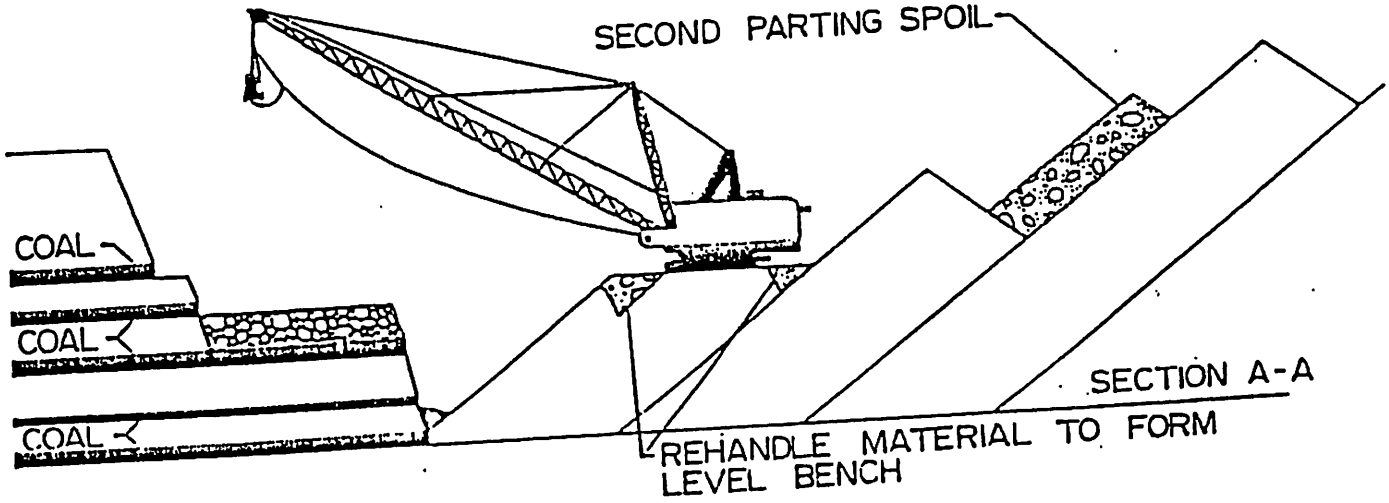
INTERIOR PIT OVERBURDEN REMOVAL

FIGURE 6

TYPICAL PIT CROSS SECTION SHOWING INITIAL BOX PIT AND SUBSEQUENT PITS

FIGURE 7





PLAN AND CROSS SECTIONAL VIEW
SPOIL-SIDE OVERBURDEN STRIPPING

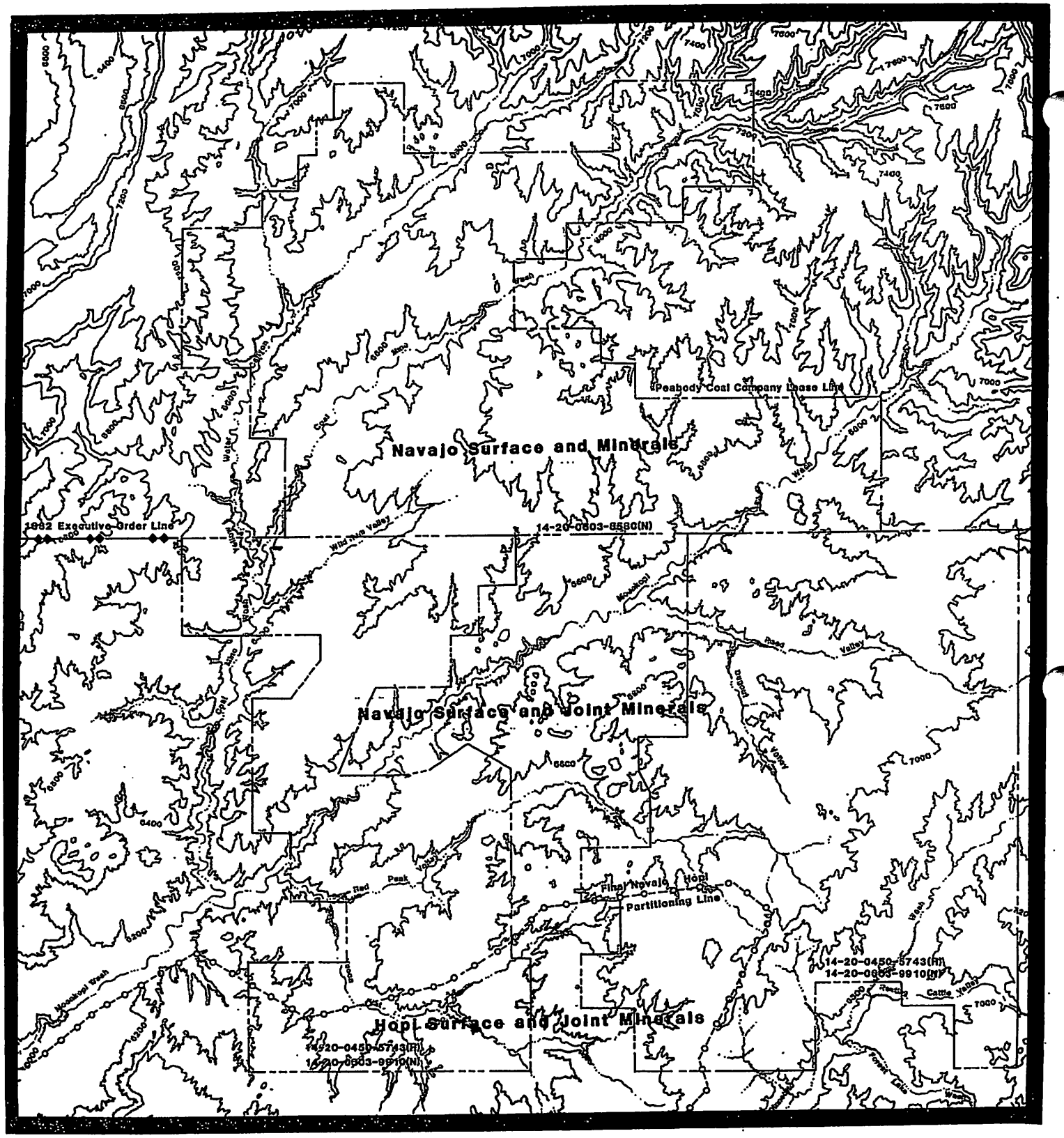
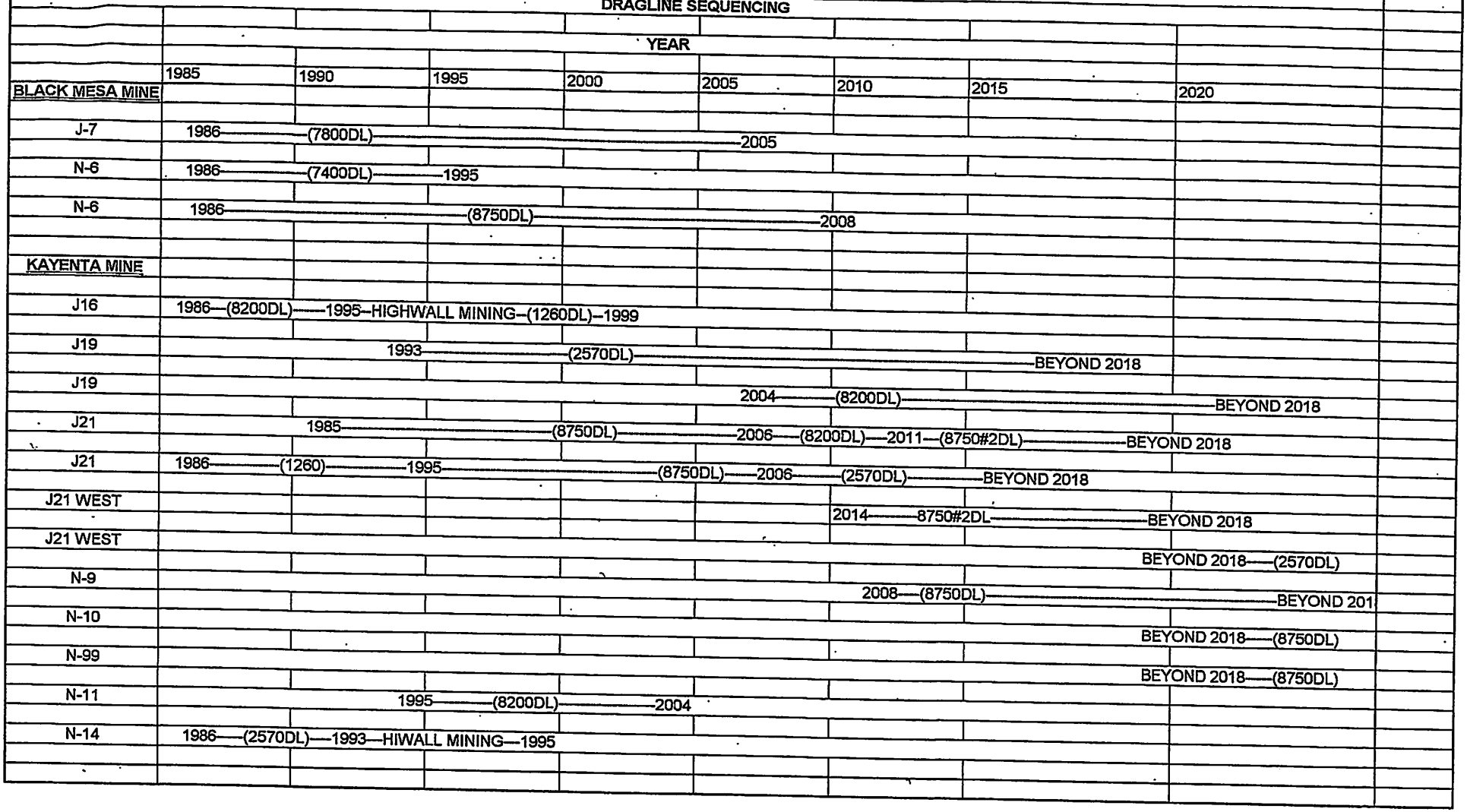


FIGURE 8

BLACK MESA LEASES
PEABODY COAL COMPANY

FIGURE 9

DRAGLINE SEQUENCING



19

Revised 02/24/12

Revised 2/24/12

TABLE 1

Major Equipment List for Kayenta Complex*

Primary Excavation Equipment

Draglines:	Bucyrus-Erie, (1) Model 2570-W
	Marion, (2) Model 8750, (1) Model 8200
Hydraulic Backhoes:	Terex/O&K (2) 120-E Backhoes

Major Support Equipment

Blasthole Drills:	(1) Ingersoll-Rand DM30, (1) Ingersoll-Rand 270SPC
	(1) Ingersoll-Rand DML, (1) Drill Tech D245S
	(1) Atlas Copco PV275, (2) Atlas Copco PV271
Haulage Trucks:	Caterpillar 789, (8) 250-tons, bottom-dump
	Caterpillar 785, (7) 150-ton end-dump
Dozers:	Caterpillar, (1) Model 690, (1) Model 854K, (2) Model D6
	Caterpillar (7) Model D10, Caterpillar (11) Model D11
Scrapers:	Caterpillar, (3) Model 631
Loaders:	Caterpillar, (6) Model 992, (3) Model IT14G
	Caterpillar, (1) Model 950H
Motor Graders:	Caterpillar, (3) Model 16
Water Trucks:	Caterpillar, (3) Off-Highway Water Trucks, Model 777
	Caterpillar, (1) Model 651E

* As of January 1, 2012

TABLE 2

Participants in the Navajo Generating Station

Navajo Generating Station Participants

24.3%	United States Bureau of Reclamation
21.7%	Salt River Project Agricultural Improvement and Power District (The Operating Agent)
21.2%	Department of Water and Power of the City of Los Angeles
14.0%	Arizona Public Service Company
11.3%	Nevada Power Company
7.5%	Tucson Gas and Electric Company

TABLE 3
HISTORICAL SALES SUMMARY - BY MINE AND LEASE
BLACK MESA AND KAYENTA MINES

YEAR	BLACK MESA MINE (MOHAVE STATION) NAVAJO	BLACK MESA MINE (MOHAVE STATION) JOINT	KAYENTA MINE (NAVAJO STATION) NAVAJO	KAYENTA MINE (NAVAJO STATION) JOINT	COMBINED TOTAL NAVAJO	COMBINED TOTAL JOINT	COMBINED TOTAL BOTH
1970	0	132,222	0	0	0	132,222	132,222
1971	0	1,145,508	0	0	0	1,145,508	1,145,508
1972	41,919	2,911,735	0	0	41,919	2,911,735	2,953,654
1973	663,063	2,583,437	0	0	663,063	2,583,437	3,246,500
1974	123,993	3,809,500	2,514,917	0	2,638,910	3,809,500	6,448,410
1975	0	4,167,549	2,960,244	0	2,960,244	4,167,549	7,127,793
1976	61,460	5,610,089	4,748,330	0	4,809,790	5,610,089	10,419,879
1977	65,124	4,455,101	6,898,246	0	6,963,370	4,455,101	11,418,471
1978	543,869	1,692,356	6,118,843	698,913	6,662,712	2,391,269	9,053,981
1979	1,012,828	2,322,255	7,359,278	657,367	8,372,106	2,979,622	11,351,728
1980	1,245,720	2,403,506	7,020,859	209,608	8,266,579	2,613,114	10,879,693
1981	1,331,397	2,634,874	7,689,357	74,787	9,020,754	2,709,661	11,730,415
1982	2,231,997	2,690,247	7,167,326	366,647	9,399,323	3,056,894	12,456,217
1983	2,775,590	1,731,098	5,372,044	1,506,052	8,147,634	3,237,150	11,384,784
1984	2,508,402	2,049,980	5,627,973	1,700,137	8,136,375	3,750,117	11,886,492
1985	1,695,812	640,393	2,650,692	4,596,775	4,346,504	5,237,168	9,583,672
1986	3,623,939	1,239,432	1,944,292	4,804,880	5,568,231	6,044,312	11,612,543
1987	3,236,807	1,136,086	1,366,655	5,817,449	4,603,462	6,953,535	11,556,997
1988	3,798,699	1,308,939	2,004,612	5,303,685	5,803,311	6,612,624	12,415,935
1989	3,113,729	1,110,012	2,086,432	5,810,577	5,200,161	6,920,589	12,120,750
1990	3,283,637	990,104	2,084,146	5,290,366	5,367,783	6,280,470	11,648,253
1991	3,914,523	1,264,628	2,041,250	6,000,999	5,955,773	7,265,627	13,221,400
1992	3,795,493	1,306,743	2,349,755	5,334,894	6,145,248	6,641,637	12,786,885
1993	3,691,311	993,570	2,235,411	5,534,541	5,926,722	6,528,111	12,454,833
1994	3,415,481	1,106,329	439,164	7,306,392	3,854,645	8,412,721	12,267,366
1995	3,659,259	1,280,769	296,923	6,812,706	3,956,182	8,093,475	12,049,657
1996	3,069,647	1,500,793	1,025,449	5,643,393	4,095,096	7,144,186	11,239,282
1997	3,051,218	1,456,325	1,545,223	5,301,567	4,596,441	6,757,892	11,354,333
1998	3,366,621	1,245,457	2,031,356	5,868,845	5,397,977	7,114,302	12,512,279
1999	3,559,816	1,057,717	1,714,565	6,615,333	5,274,381	7,673,050	12,947,431
2000	3,732,082	1,110,140	1,816,238	6,648,254	5,548,320	7,758,394	13,306,714
2001	4,116,975	951,301	1,621,228	6,771,636	5,738,203	7,722,937	13,461,140
2002	3,965,734	804,317	1,870,008	6,609,406	5,835,742	7,413,723	13,249,465
2003	3,840,451	727,744	1,766,723	6,124,026	5,607,174	6,851,770	12,458,944
2004	3,937,045	857,081	1,347,755	7,344,146	5,284,800	8,201,227	13,486,027
2005	4,208,210	488,097	72,222	8,454,557	4,280,432	8,942,654	13,223,086
2006	0	0	1,140,793	7,145,271	1,140,793	7,145,271	8,286,064
2007	0	0	2,521,774	5,615,967	2,521,774	5,615,967	8,137,741
2008	0	0	3,469,815	4,740,585	3,469,815	4,740,585	8,210,400
2009	0	0	1,875,487	5,933,813	1,875,487	5,933,813	7,809,300
2010	0	0	2,025,522	6,012,953	2,025,522	6,012,953	8,038,475
2011	0	0	2,190,649	5,988,751	2,190,649	5,988,751	8,179,400
TOTAL	86,681,851	62,915,434	111,011,556	168,645,278	197,693,407	231,560,712	429,254,119

NOTE: The total coal reserves leased by Peabody is 670,000,000 tons.

Revised 2/24/12

TABLE 4
ANNUAL PRODUCTION SUMMARY
BLACK MESA AND KAYENTA MINES

YEAR	BLACK MESA MINE (MOHAVE STATION) NAVAJO	BLACK MESA MINE (MOHAVE STATION) JOINT	KAYENTA MINE (NAVAJO STATION) NAVAJO	KAYENTA MINE (NAVAJO STATION) JOINT	COMBINED TOTAL NAVAJO	COMBINED TOTAL JOINT	COMBINED TOTAL BOTH
1970	0	284,046	0	0	0	284,046	284,046
1971	0	1,098,410	0	0	0	1,098,410	1,098,410
1972	41,919	2,964,373	0	0	41,919	2,964,373	3,006,292
1973	663,063	2,655,709	13,727	0	676,790	2,655,709	3,332,499
1974	123,993	3,633,448	2,520,411	0	2,644,404	3,633,448	6,277,852
1975	0	4,185,514	3,013,422	0	3,013,422	4,185,514	7,198,936
1976	67,516	5,664,063	4,704,387	0	4,771,903	5,664,063	10,435,966
1977	59,068	4,370,256	6,886,140	0	6,945,208	4,370,256	11,315,464
1978	543,869	2,021,926	6,107,115	698,913	6,650,984	2,720,839	9,371,823
1979	1,012,828	2,450,503	7,388,360	657,367	8,401,188	3,107,870	11,509,058
1980	1,245,720	2,499,321	7,072,114	209,608	8,317,834	2,708,929	11,026,763
1981	1,331,397	2,691,841	7,674,729	74,787	9,006,126	2,766,628	11,772,754
1982	2,231,997	2,707,195	7,262,051	366,647	9,494,048	3,073,842	12,567,890
1983	2,775,590	1,799,653	5,482,162	1,506,052	8,257,752	3,305,705	11,563,457
1984	2,995,393	1,399,566	5,470,734	1,822,958	8,466,127	3,222,524	11,688,651
1985	1,634,664	770,218	2,619,600	4,781,184	4,254,264	5,551,402	9,805,666
1986	3,626,054	1,220,645	1,956,993	4,961,389	5,583,047	6,182,034	11,765,081
1987	3,302,802	1,072,937	1,421,391	5,725,266	4,724,193	6,798,203	11,522,396
1988	3,858,234	1,348,884	2,009,197	5,416,651	5,867,431	6,765,535	12,632,966
1989	3,152,884	1,082,859	2,143,070	5,739,711	5,295,954	6,822,570	12,118,524
1990	3,449,436	1,065,242	2,048,160	5,498,773	5,497,596	6,564,015	12,061,611
1991	4,083,156	1,381,113	2,194,404	6,012,371	6,277,560	7,393,484	13,671,044
1992	3,685,086	1,186,042	2,418,724	5,527,319	6,103,810	6,713,361	12,817,171
1993	3,591,195	937,969	2,101,367	5,767,873	5,692,562	6,705,842	12,398,404
1994	3,444,372	1,173,280	180,141	7,963,320	3,624,513	9,136,600	12,761,113
1995	3,608,819	1,292,627	585,306	6,691,821	4,194,125	7,984,448	12,178,573
1996	2,853,455	1,445,844	1,038,620	5,366,976	3,892,075	6,812,820	10,704,895
1997	3,247,683	1,500,950	1,757,132	5,547,550	5,004,815	7,048,500	12,053,315
1998	3,295,879	1,140,316	1,878,747	5,345,469	5,174,626	6,485,785	11,660,411
1999	3,587,031	1,064,696	1,401,509	6,026,107	4,988,540	7,090,803	12,079,343
2000	3,626,601	1,127,622	1,908,233	6,779,629	5,534,834	7,907,251	13,442,085
2001	4,156,870	900,035	1,703,402	6,962,324	5,860,272	7,862,359	13,722,631
2002	3,901,947	798,402	1,815,002	6,593,191	5,716,949	7,391,593	13,108,542
2003	3,798,965	706,283	1,917,471	6,119,908	5,716,436	6,826,191	12,542,627
2004	4,115,196	851,748	1,080,687	7,402,832	5,195,883	8,254,580	13,450,463
2005	3,600,057	398,570	27,160	8,454,889	3,627,217	8,853,459	12,480,676
2006	0	0	1,497,420	6,988,349	1,497,420	6,988,349	8,485,769
2007	0	0	2,728,078	5,466,251	2,728,078	5,466,251	8,194,329
2008	0	0	3,225,534	5,059,371	3,225,534	5,059,371	8,284,905
2009	0	0	1,830,491	5,957,860	1,830,491	5,957,860	7,788,351
2010	0	0	2,015,512	6,019,816	2,015,512	6,019,816	8,035,328
2011	0	0	2,288,296	6,126,417	2,288,296	6,126,417	8,414,713
TOTAL	86,712,739	62,892,106	111,386,999	169,638,949	198,099,738	232,531,055	430,630,793

NOTE: The total coal reserves leased by Peabody is 670,000,000 tons.

Revised 2/24/12

TABLE 5
PRODUCTION SUMMARY
KAYENTA MINE TOTAL

Year	Coal * Acres (Mined)	Recovered Tons (1000)	Virgin Yardage (1000)	Virgin Ratio
2012	914.4	8,102.3	43,079	5.3
2013	969.9	8,106.6	42,131	5.2
2012 - 2013	1,884.3	16,208.9	85,210.2	5.3
2014	741.5	8,070.8	40,852	5.1
2015	819.8	7,871.4	35,565	4.5
2016	893.5	7,952.2	37,531	4.7
2017	920.3	7,877.3	37,042	4.7
2018	931.8	8,097.9	34,267	4.2
2014 - 2018	4,306.9	39,869.6	185,257.6	4.6
Beyond 2018	22,087.0	223,689.5	1,205,010.5	5.4
Grand Total	28,278.2	279,768.0	1,475,478.3	5.3

NOTE: * Coal acres is the traditional industry standard for calculating the aerial extent of each coal seam. In multi-seam coal operations with multi-benches, surface acres have overlap from seam mined. For surface acres, see Drawing No. 85210.

TABLE 6
PRODUCTION SUMMARY
J19 Coal Resource Area

Year	Coal Acres	Tons (1000)	Coal Thk	Yards (1000)	Avg. Thk. Ovb. / Int.	Virgin Ratio
2012	318.4	3,145.4	6.4	14,812	28.8	4.7
2013	333.5	3,180.5	6.2	14,639	27.2	4.6
2012-2013	651.9	6,325.9	6.3	29,450.7	28.0	4.7
2014	318.8	3,121.7	6.3	14,156	27.5	4.5
2015	271.5	2,683.8	6.4	12,314	28.1	4.6
2016	314.7	3,224.0	6.6	14,003	27.6	4.3
2017	327.1	3,351.0	6.6	14,458	27.4	4.3
2018	308.3	3,143.9	6.6	13,462	27.1	4.3
2014-2018	1,540.5	15,524.4	6.5	68,392.6	27.5	4.4
Beyond 2018	1,876.6	21,908.0	6.3	108,856.6	36.0	5.0
Grand Total	4,069.0	43,758.3	6.9	206,699.9	31.5	4.7

TABLE 7
PRODUCTION SUMMARY
J21 Coal Resource Area

Year	Coal Acres	Tons (1000)	Coal Thk	Yards (1000)	Avg. Thk. Ovb. / Int.	Virgin Ratio
2012	359.1	2,760.3	4.9	14,448	24.9	5.2
2013	356.8	2,719.9	4.9	14,026	24.4	5.2
2012-2013	715.9	5,480.2	4.9	28,473.8	24.7	5.2
2014	182.4	1,570.1	5.5	8,724	29.6	5.6
2015	134.4	1,114.7	4.7	6,285	29.0	5.6
2016	96.0	941.3	6.3	4,583	29.6	4.9
2017	92.8	900.8	6.3	4,187	28.0	4.6
2018	95.5	937.4	6.3	4,281	27.8	4.6
2014-2018	601.0	5,464.3	5.9	28,059.7	28.9	5.1
Beyond 2018	4,891.9	50,576.3	6.7	254,681.2	32.3	5.0
Grand Total	6,208.8	61,520.8	6.4	311,214.7	31.1	5.1

TABLE 8
PRODUCTION SUMMARY
J21 West Coal Resource Area

Year	Coal Acres	Tons (1000)	Coal Thk	Yards (1000)	Avg. Thk. Ovb. / Int.	Virgin Ratio
2014	96.7	874.2	5.8	3,126	20.0	3.6
2015	225.5	2,039.8	5.8	7,294	20.0	3.6
2016	181.6	1,723.0	6.1	5,839	19.9	3.4
2017	143.9	1,441.1	6.5	4,908	21.1	3.4
2018	248.0	2,575.9	6.7	8,681	21.7	3.4
2014-2018	895.7	8,654.0	6.2	29,847.8	20.7	3.4
Beyond 2018	4,405.4	47,223.9	6.9	192,606.9	27.1	4.1
Grand Total	5,301.1	55,877.9	6.8	222,454.7	26.0	4.0

TABLE 9
PRODUCTION SUMMARY
J28 Coal Resource Area

Year	Coal Acres	Tons (1000)	Coal Thk	Yards (1000)	Avg. Thk. Ovb. / Int.	Virgin Ratio
Beyond 2018	2,108.20	19,173.2	5.7	144,696	59.10	7.5
Grand Total	2,108.20	19,173.2	5.7	144,696	59.10	7.5

TABLE 10
PRODUCTION SUMMARY
N09 Coal Resource Area

Year	Coal Acres	Tons (1000)	Coal Thk	Yards (1000)	Avg. Thk. Ovb. / Int.	Virgin Ratio
2012	236.6	2,197.0	5.9	13,820	36.2	6.3
2013	279.8	2,206.2	5.1	13,467	29.8	6.1
2012-2013	516.3	4,403.2	5.5	27,286.1	32.8	6.2
2014	363.9	2,505.2	4.4	13,115	22.3	5.2
2015	307.4	2,033.3	4.3	11,404	23.0	5.6
2016	307.3	2,063.7	4.3	13,108	26.4	6.4
2017	318.8	2,184.4	4.4	13,489	26.2	6.2
2018	205.4	1,441.1	4.5	7,843	23.7	5.4
2014-2018	1,502.8	8,920.7	3.8	62,112.6	25.6	7.0
Beyond 2018	1,326.6	13,302.1		89,421.3	41.8	6.7
Grand Total	3,345.7	25,549.3	4.9	181,202.3	33.6	7.1

TABLE 11
PRODUCTION SUMMARY
N10 Coal Resource Area

Year	Coal Acres	Tons (1000)	Coal Thk	Yards (1000)	Avg. Thk. Ovb. / Int.	Virgin Ratio
Beyond 2018	2,094.1	22,346.3	6.7	199,369.3	59.0	8.9
Grand Total	2,094.1	22,346.3	6.7	199,369.3	59.0	8.9

TABLE 12
PRODUCTION SUMMARY
N11 Extension Coal Resource Area

Year	Coal Acres	Tons (1000)	Coal Thk	Yards (1000)	Avg. Thk. Ovb. / Int.	Virgin Ratio
Beyond 2018	7,899.0	73,033.5	5.8	735,362.3	57.7	10.1
Grand Total	7,899.0	73,033.5	5.8	735,362.3	57.7	10.1

TABLE 13
SUMMARY OF COAL QUALITY, STRIKE, AND DIP
BY COAL RESOURCE AREA AND SEAM

AREA	HORIZON	% ASH	% SULFUR	BTU	STRIKE (DEGREES)	DIP (DEGREES)
J-19	Violet	10.12	0.51	11,889	N50W	2.5W
	Green	5.04	0.60	12,866	N22W	2.2W
	Blue	6.77	0.56	12,592	N17W	2.0W
	Red	5.01	0.57	12,961	N27E	2.1W
	Yellow	7.73	0.85	12,596	N59E	1.3E
	Brown	9.35	0.78	12,407	N57W	1.8W
	Orange	7.06	0.48	12,823	N40E	1.6E
J-21	Violet	8.72	0.59	12,336	N35E	2.9W
	Green	10.94	0.48	12,030	N71W	2.1W
	Blue	6.72	0.62	12,728	N21W	2.0W
	Red	6.14	0.49	12,807	N27E	2.1W
	Yellow	9.71	1.00	12,404	N59E	1.3E
	Brown	9.14	0.66	12,458	N57W	1.8W
	Orange	4.96	0.42	13,066	N48W	2.2W
N-10	Brown	10.94	1.06	12,164	N9E	4.4W
	Orange	8.28	0.79	12,614	N4E	5.2W
N-11 EXT	Red	5.45	1.00	12,851	N19W	1.5W
	Brown	7.50	0.67	12,705	N28W	0.8W
	Yellow	9.77	1.69	12,262	N20W	1.1W
	Orange	6.79	0.48	12,883	N32W	1.2W
J-21 WEST	Green	9.21	0.66	12,279	N63E	1.4W
	Blue	8.97	0.55	12,362	N83E	0.6W
	Red	6.8	0.62	12,724	N82E	0.5W
	Yellow	8.8	0.74	12,483	N40W	0.3W
	Brown	9.79	0.59	12,364	N66W	0.2E
N-9	Red	7.53	0.85	11879	N88W	1.4W
	Yellow	5.91	0.89	12797	N76E	1.6E
	Brown	9.41	0.95	12397	N74E	1.8E
	Orange	6.21	0.52	12887	N72E	1.8E
J-28	Brown	6.48	1.05	12,867	N30W	1.0W
	Orange	6.77	0.62	12,805	N9W	1.0W

TABLE 14
COAL PRODUCTION BY SEAM MINED
Kayenta Complex

2012 - 2013

J-19		J-21		J-21-WEST		N-09		
COAL SEAM	COAL ACRES	TONS	COAL ACRES	TONS	COAL ACRES	TONS	COAL ACRES	TONS	TOTAL TONS
Violet			6.0	29.5					29.5
Green									0.0
Blue	3.8	24.9	43.2	212.7					237.6
Red	68.3	626.0	182.1	1,689.2			71.2	578.6	2,893.8
Yellow	196.0	1,019.1	220.6	1,506.1			134.3	772.2	3,297.4
Brown	121.2	1,786.6	121.9	1,145.3			191.6	2,250.0	5,181.9
Orange	262.6	2,869.4	142.1	897.4			119.3	802.4	4,569.2
TOTALS	652.0	6,326.0	715.9	5,480.2	0.0	0.0	516.3	4,403.2	16,209.4

2014 - 2018

J-19		J-21		J-21-WEST		N-09		
COAL SEAM	COAL ACRES	TONS	COAL ACRES	TONS	COAL ACRES	TONS	COAL ACRES	TONS	TOTAL TONS
Violet			1.0	4.6					4.6
Green			0.3	2.3	6.0	44.5			46.8
Blue	11.9	79.0	18.9	89.2	58.9	337.5			505.7
Red	120.1	1,762.2	112.9	1,506.5	113.4	1,378.9	142.9	872.7	5,520.3
Yellow	510.4	2,964.1	215.3	1,552.4	436.1	3,928.0	492.6	2,670.2	11,114.7
Brown	275.9	4,232.6	103.3	1,199.1	253.0	2,773.3	519.9	4,700.4	12,905.4
Orange	622.2	6,486.5	149.4	1,110.1	28.3	191.8	347.4	1,984.5	9,772.9
TOTALS	1,540.4	15,524.4	601.0	5,464.2	895.7	8,654.0	1,502.8	10,227.8	39,870.4

Revised 02/24/12

TABLE 15

COAL RECOVERY STATISTICS (2012-END)

	MINING AREA						
	N-09	N-11-EXT	N-10	J-19	J-21	J-28	J-21-WEST
TONS PRODUCED	25,549.3	73,033.5	22,346.3	43,758.3	61,520.8	19,173.2	55,877.9
COAL LOSS DURING MINING (1)	2,838.8	8,114.8	2,482.9	4,862.0	6,835.6	2,130.4	6,208.7
TOTAL IN PLACE GEOLOGIC RESERVES (2)	28,388.1	81,148.3	24,829.2	48,620.3	68,356.4	21,303.6	62,086.6

NOTES:

(1) Coal lost during mining operations, e.g., during coal cleaning & loading.

(2) In-place reserves are calculated from the surface to lowest surface mineable seam.

Literature Cited

Wood, G.H., et al. "Coal Resource Classification System of the U.S. Geological Survey". U.S. Geological Survey Circular 891, pp. 28-29. 1983.

Workman, J.L. and Calder, P.N. 1994. "Effective Operation of Mines Using Draglines". Calder & Workman, Inc. Washburn, North Dakota.

ATTACHMENT A

J21 PROTECTED HISTORICAL AND BURIAL SITES BYPASS COAL AREAS

ATTACHMENT A

J21 PROTECTED HISTORICAL AND BURIAL SITES BYPASS COAL AREAS

A protected historic site, The J21 Offering Site, and two burial sites, the J21 Williams Site, and the J21 Russell Site exist in the J-21 coal resource area within the life of mine disturbance boundary. In accordance with 30CFR761.11(g), the Native American Grave Protection and Repatriation Act of 1990 (NAGPRA), the Navajo Nation Policy for the Protection of Jishchaa: Grave Sites, Human Remains and Funerary Items (1996), the American Indian Religious Freedom Act (AIRFA), and/or the Navajo Nation Policy to Protect Traditional Cultural Properties (1991), the Navajo Nation Historic Preservation Department (NNHPD) has made the determination that these three Sites must be avoided by all mining activities. PWCC will by-pass the sites maintaining an adequate distance to insure no disturbance to the sites. A minimum radius of 100 feet will be maintained in addition to distances required for ingress and egress around the perimeter of the sites. Past practice and experience illustrates that in addition to the required 100' radius buffer, we will be unable to recover the coal within a minimum additional 100' radius. Also included (attached) is blasting criteria prepared for PWCC by Matheson Mining Consultants, Inc. addressing blasting procedures near identified historical sites. The report enlists modifications to present blasting methods for prevention of flyrock.

J21 OFFERING SITE

A historic site whose centered coordinate location is approximately E59,979, N-46,701 has been identified and mining plans have been altered to excavate around this site (Mine Plan – Drawing No. 85210, Sheet SE). The historic site will necessitate bypassing multiple coal seams totaling approximately 24.5 coal acres or 208,000 tons of coal. The area being bypassed was determined using dragline operating parameters, spoil maintenance, geometry, and accepted regrading and drainage protocol. The surface acreage measures approximately 4.1 acres and the seams involved are the Blue, Red, Yellow, and Brown. Blasting techniques will be utilized in the surrounding area to eliminate flyrock contamination within a 100 foot radius of the historic site centroids. A typical range diagram has been included with this attachment to illustrate mining methods to be employed at the site.

J21 WILLIAMS SITE

A burial site whose centered coordinate location is approximately E56,487, N-48,747, has been identified and mining plans have been altered to excavate around this site (Mine Plan – Drawing No. 85210, Sheet SE). The burial site will necessitate bypassing multiple coal seams totaling approximately 26.2 coal acres or 245,300 tons of coal. The area being bypassed was determined using dragline operating parameters, spoil maintenance, geometry, and accepted regrading and drainage protocol. The surface acreage measures approximately 2.9 acres and the seams involved are the Blue, Red, Yellow, Brown, and Orange. Blasting techniques will be utilized in the surrounding area to eliminate flyrock contamination within a 100 foot radius of the burial site centroid. A typical range diagram has been included with this attachment to illustrate mining methods to be employed at the site.

J21 RUSSELL SITE

A burial site whose centered coordinate location is approximately E54,044, N-52,103, has been identified and mining plans have been altered to excavate around this site (Mine Plan – Drawing No. 85210, Sheet SE). The burial site will necessitate bypassing multiple coal seams totaling approximately 20.2 coal acres or 215,000 tons of coal. The area being bypassed was determined using dragline operating parameters, spoil maintenance, geometry, and accepted regrading and drainage protocol. The surface acreage measures approximately 2.9 acres and the seams involved are the Blue, Red, Yellow, Brown, and Orange. Blasting techniques will be utilized in the surrounding area to eliminate flyrock contamination within a 100 foot radius of the burial site centroid. A typical range diagram has been included with this attachment to illustrate mining methods to be employed at the site.

CONCLUSION

Per 30CFR761.11(g), PWCC is committed to maintaining no disturbance within a 100 foot radius of each historic site. To aid in the compliance of this "no disturbance zone" a fence will be erected and berm created around the site using the 100 foot radius as the perimeter. In addition to fencing, mining and blasting procedures have been altered to prohibit the spoiling of waste material and flyrock contamination within the site radius.

Maximum economic coal recovery in the area encompassing the site will be achieved pursuant to 30CFR816. Backfilling and grading will incorporate the general requirements per 30CFR816.102.

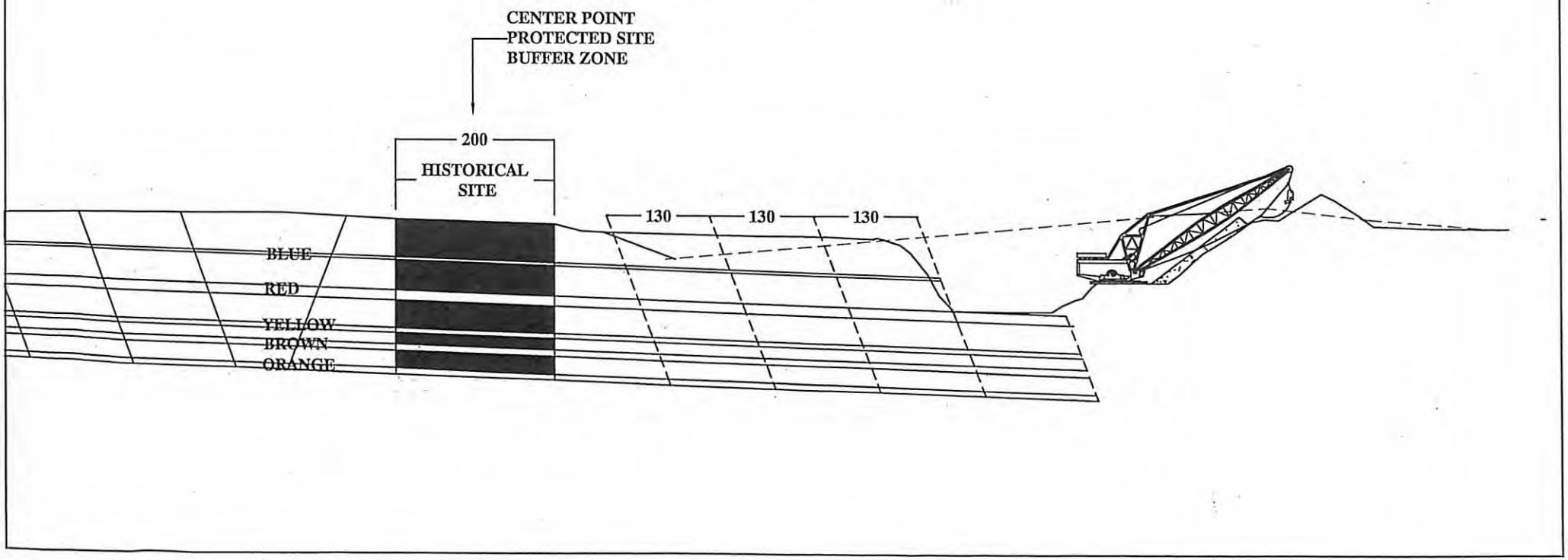
PEABODY WESTERN

KAYENTA COMPLEX

J21 PIT AREA
J21 PROTECTED SITE - TYPICAL RANGE DIAGRAM

DRAWN BY: K. PASTRICK	DATE 2/24/12			
CHECKED BY: K. PASTRICK		SIZE	JOB NO.:	DWG FILENAME: J21_PROTECTED_SITE_RD.dwg
DESIGN BY: G. ALTSISI		SCALE: N.T.S.		SHEET 1 OF 1

REV



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Memorandum

To: Peabody Western Coal Company-Kayenta Mine

From: Colin Matheson-Matheson Mining Consultants, Inc.

Date: September 24, 2001

Re: Blasting near burial sites

Matheson Mining Consultants, Inc. has reviewed the normal blasting procedures used at Kayenta Mine and found some modifications will be necessary to prevent flyrock within 750 feet of points of concern. The following are methods that will prevent flyrock from encroaching on the burial sites located in the two Kayenta Mine pits when blasting is within 750 feet.

Special care must be taken when blasting is within 750 feet of the burial sites in J-19 and J-21. The overburden typical thickness in the area of Ramp 41 in Pit J-19 is 81 feet. Normal shoot-to-stand or cast blasting loads and stemming will be appropriate to prevent flyrock from being a hazard to the burial sites. The nature of highwall shots and the amount of relief available to the blaster virtually eliminates any potential flyrock hazard at the burial sites. Highwall faces should be laser profile surveyed to prevent excessive toes that result in high confinement of the explosive and the potential for flyrock. Coal and parting shooting will require modifications to the current procedures. The result of these modifications will be a hard top that will require additional ripping to facilitate excavation.

Coal seams less than five feet thick should be ripped, not blasted. Coal seams between five and eight feet thick should be drilled with the smallest available drill (5-7/8 inch diameter). Coal seams in the range of five to eight feet are typically shot using a powder factor of 0.4 – 0.5 pounds of explosive per cubic yard of coal (ratios of 2.5 – 2.0), within 750 feet of the burial sites coal 5-8 feet thick should be shot with lower powder factors (higher shooting ratios) of 0.25 or less. This can be accomplished by reducing the pattern burden and spacing from 15' x 15' to 14' x 14' and increasing the stemming. The lower powder factor will result in a hard top to the coal and will often require ripping of the coal after blasting. Care must be taken to not decrease burden and spacing to the point that loading and service trucks cannot drive between holes resulting in excessive

backfilling of drilled holes. All coal should be shot on an echelon-timing pattern to assure unilateral movement away from the point of concern.

Parting (intraburden) less than five feet thick should be ripped, not blasted. Parting greater than five feet thick is typically drilled with a 9" diameter bit. Powder factors will need to be decreased from the typical range of 0.40 – 0.50 pounds of explosive per cubic yard of material to 0.33 or less. Extreme care should be taken when blasting parting between five and nine feet thick. Decreasing burden and spacing while increasing stemming height best reduces powder factor. Care must be taken to not decrease burden and spacing to the point that loading and service trucks cannot drive between holes resulting in excessive backfilling of drilled holes. Gradual reduction in powder factor within 750 feet and qualitative judgment by the blaster is essential in preventing excessive flyrock. Should decreasing the powder factor not completely prevent excessive flyrock at the 750-foot distance crushed rock should be utilized as stemming material to assist in confining the explosive energy. Parting should be shot on an echelon-timing pattern to assure unilateral movement away from the point of concern.

Gradual reduction in powder factors, increasing the shooting ratios, as distance to the burial sites decreases will control flyrock. Timing the blasts to pull the material away from the burial site through the application of echelon patterns will control the movement and prevent flyrock. Blasting of coal and parting greater than five feet thick can be safely accomplished within 100 feet of the burial sites without flyrock if the above precautions are implemented.

Sincerely,

Colin M. Matheson

Colin M. Matheson,
President, Mining Engineer