El Segundo Coal Company
A Division of Peabody Natural Resources Company
P. O. Box 757
Grants, New Mexico 87020
Phone: 505-285-4651 Fax: 505-285-4650

October 10, 2024

James Smith, Coal Program Manager
Mining and Minerals Division
1220 South Saint Francis Drive
Santa Fe NM 87505

Peabody Natural Resources Company (PNRC), El Segundo Mine (ESM), Permit No. 2020-01, Revision for the Method of Mining to adopt the use of Highwall-Mining

Dear Mr. Smith:

El Segundo Mine (ESM) is requesting approval to conduct highwall mining within Permit 2020-01. Pursuant to section 19.8.13.1301.A.(1)(b) of the New Mexico Administrative Code (NMAC): a revision to a permit shall be obtained for changes in the surface coal mining or reclamation operations described in the original application and approved under the original permit, when such changes constitute a significant departure from the methods of conducting mining or reclamation operations contemplated by the original permit; significant departures as used herein include, but are not limited to changes in the method of extracting coal from the earth (e.g. change from surface to underground mine). Per section 19.8.10.1007.A and 19.8.10.1007.B NMAC: this section applies to any person who conducts or intends to conduct surface coal mining and reclamation operations utilizing augering operations. Any application for a permit for operations covered by this section shall contain, in the mining and reclamation plan, a description of the augering methods to be used and the measures to be used to comply with 19.8.22 NMAC and demonstrate to the director that auger mining is the best method to recover the maximum coal resource.

A highwall miner will bore horizontally into the coal seams from the pits established by our strip-mining operations. This coal has already been approved for extraction under Permit 2020-01 and all mining will occur within the existing permit boundary. Approval of this extraction method will allow El Segundo to maximize the recovery of the coal reserve while also avoiding the surface disturbance that would normally take place with our Truck/Shovel or Dragline Operations, thus allowing for ESM to mine through 2025 with no additional surface disturbance.

Included as per the Revision Submittal are the following documents

1. Plate 903-1 – Area to be Mined
2. Figure 900-5 Highwall Miner
3. Table 900-1 Tons Mined
4. Table 900-2 List of Major Equipment
5. Text 900 – Highwall Mining
6. Subpart 903 B, (15)
7. Exhibit 900-1 Holland Gaddy (Coal Strength)
8. Exhibit 900-2 Niosh ARMPS-HWM (Web Pillar)
9. TOC-Exhibit
10. TOC-Figure
11. Public Notice

12. Sample Letter to Entities involved with ESM Facility

If you have any questions or comments, please contact me at (505) 285-3067.

Sincerely,

Chad Gaines
Tech Services Supervisor
Peabody Natural Resources

SETH A. PULS
NEW MEXICO
24154
PROFESSIONAL ENGINEER
10-21-2024

TITLE 19 NATURAL RESOURCES AND WILDLIFE
PART 9 PERMIT APPLICATIONS – MINIMUM REQUIREMENTS FOR RECLAMATION AND OPERATIONS PLAN
Section 900

TITLE 19 NATURAL RESOURCES AND WILDLIFE
PART 9 PERMIT APPLICATIONS – MINIMUM REQUIREMENTS FOR RECLAMATION AND OPERATIONS PLAN

900. OPERATION PLAN: GENERAL REQUIREMENTS

900.A. Description of Mining Procedures

El Segundo Mine is a multiple seam surface coal mining operation located in McKinley County, New Mexico. Mining activities will be conducted in multiple pit areas at a given time, as shown on PLATE 900-1 (PLATE 900-1.dwg). Mining rates and sequencing are dependent upon many variables. The most significant being coal quality and customer demand. Coal shipments will vary monthly and are totally controlled by customers. The possibility of spot sales could increase demand and production at unanticipated times, intervals or durations. These factors will influence the anticipated production and reclamation schedules. The mining sequence consists of topdressing removal, drilling and blasting of overburden/interburden, excavation of overburden/interburden, and coal recovery. Topdressing will be removed from designated areas using the shovel/truck and loader/truck methods, and scrapers. Overburden/interburden materials may be drilled and blasted to facilitate stripping operations. A combination of the shovel/truck, loader/truck, and dozer push mining methods will be utilized for overburden and interburden removal.

The shovel/truck operation is a terraced, advancing open-pit system. Terraces or benches approximately 15' to 60' in height and 125' to 500' in width are excavated by electric-powered shovels. Bench heights are dependent upon the thickness of the overburden and interburden. The bench widths are designed to provide sufficient operating room for the equipment used in overburden, interburden, and coal removal. Advancement of the mine cuts will typically occur in a direction parallel to the previous benches. The shovels and haul trucks will operate on the same bench during loading operations. Haul trucks and auxiliary equipment will use the benches as roads within the pits. Auxiliary equipment used in support of the shovel/truck operation includes front-end loaders, motor graders, bulldozers, scrapers, and water trucks. The typical pit layout for the shovel/truck operation is shown in cross section on FIGURE 900-1 (FIGURE 900-1.dwg).

Dragline stripping of overburden/interburden will be accomplished using the simple sidecast, extended bench, and spoil-side handling methods. The simple sidecast method involves preparing a bench for the dragline on the highwall-side of the pit. Operating from this bench, the dragline is able to excavate overburden/interburden and spoil the materials into a previously mined-out cut. Extended bench operations consist of using fill materials to extend the dragline bench toward the spoils. Utilization of an extended bench is designed to enable placement of spoils further away from the dragline in a mined-out pit, which provides additional spoil room in subsequent cuts. Spoil-side handling involves creating a dragline bench in the spoils from the previous cut. Removing overburden from the spoil-side of the pit is most commonly used in deeper cover areas. These three dragline mining methods will be utilized interchangeably, as geologic conditions dictate. The number of dragline benches developed in a particular cut will be dependent upon the number of minable coal seams and interburden thickness. Individual dragline pits will range from approximately 125' to 175' in width. The dragline pits will be designed to provide adequate operating room for the equipment used in interburden and coal removal and to maintain spoil and highwall stability.

A typical range diagram showing the simple sidecast method with the normal high ridge placement of materials is presented on FIGURE 900-2. Typical range diagrams showing the extended bench and spoil-side handling methods are presented on FIGURE 900-3 and FIGURE 900-4, respectively.

Highwall mining is planned in the Pit 3 and Pit 7 areas where strip mining has exposed the coal seams, and it has become uneconomical to mine from the surface (see Plate 903-1 Highwall Mining Areas). Highwall mining will be contracted out to a third party that specializes is this type of extraction. Mining will be completed by driving a series of parallel entries into the coal seam exposed at the highwall. This series of parallel cuts will be supported by web pillars of coal that are left intact between the cuts to support the works as well as coal barrier pillars that isolate the sections or panels of the miner cuts. The coal will be removed from 1 to 2 seams where the coal strength can support the overburden above.

Paramount to Highwall Mining is the design and layout of the web and barrier pillars as they provide highwall stability during mining. The design parameters are determined by the width of the highwall miner hole, the mining height, overburden depth, pillar strength, the applied stress on the pillar, and the pillar stability factor. To find the In-Situ coal strength ESM will use the Holland – Gaddy formula (Exhibit 900-1) and site specific Geotech data for the coal. The NIOSH ARMPS-HWM empirical program will then be utilized to design the web and barrier pillars and confirm that the Safety Factor of the pillar system exceeds 2.0. A discussion of the methods employed by the NIOSH – ARMPS-HWM program is provided in (Exhibit 900-2).

Exhibit 900-5a and 900-5b provide examples of a typical Web and Barrier Pillar Layouts for a panel with 10 holes and a panel with 20 holes utilizing ESM site specific coal strength, overburden depth, and coal seam height. ESM will employ no less than 10 holes per panel. The maximum depth of the highwall penetrations (or holes) will be dependent upon the machine's capability, the presence of critical structures on the surface, and the permit boundary. ESM will not mine outside of the permit.

To ensure protection of critical structures on the surface, mining will not occur within the zone of influence of the structure. Power poles are the only critical structures present in the vicinity of highwall mining. Exhibit 900-5c provides an estimation for the zone of influence based on the geological model of bedrock and unconsolidated strata thickness. Exhibit 900-5d demonstrates how the maximum hole depths may vary based on the radius of influence for these structures.

Highwall mining operations will only be conducted in the open pits after surface mining is completed and prior to the initiation of backfilling and grading operations. Following the completion of highwall mining, the area will be backfilled and graded to eliminate highwalls and achieve the approved postmining contours. Soil materials will be redistributed as appropriate, and the area restored to the appropriate postmining land uses.

The configuration of the mining pits will be adjusted as needed to accommodate the geologic conditions encountered in a particular area and coal demand by customers.

Coal will be recovered from 1 to 9 seams. The minable coal seams range from 1 foot to 17 feet in thickness. Equipment used for coal removal, and haulage includes front-end loaders, scrapers, bulldozers, motor graders, haul trucks, and water trucks. Anticipated peak annual coal production is expected to be about 8.6 million tons, depending upon coal sales. The estimated total coal production for the life of the mine is 128.91 million tons. Estimated annual and total coal production over the life-of-mine are presented in TABLE 900-1 (TABLE 900-1.doc).

Standard engineering techniques have been utilized in development of the operation and reclamation plans for El Segundo Mine. The operation plan is designed to maximize recovery of the coal resource, provide safe and healthy working conditions, and minimize potential negative environmental impacts. Information derived from exploratory drilling was utilized to define the recoverable coal seams. Additional drilling will be performed ahead of the operation to refine the mining limits. The mining sequence developed for the mine was based upon optimization of several factors, including the economics of stripping ratio, coal haulage distances, coal quality, and backfilling requirements. Anticipated production and reclamation schedules were considered in the development of the mining sequence, selection of equipment and the design of the facilities. A list of the major equipment being used at the mine is presented in TABLE 900-2 (TABLE 900-2.doc).

900.B. Facilities Description

900.B.(1). Dams, Embankments and Impoundments

Impoundments will be constructed and certified by a PE as being constructed as designed prior to mining disturbances. Temporary impoundments and sediment ponds with less than 10 acre feet capacity will have spillways capable of passing the 25-year 6-hour event or contain the runoff from a 100-year, 6-hour precipitation event. A combination of excavated sediment ponds and embankment type temporary impoundments may be constructed in future mine areas to receive water that accumulates in the pits to and contain runoff from disturbed areas. The typical design of the temporary excavated impoundments is shown on FIGURE 909-1 (FIGURE 909-1.dwg).

No permanent impoundments at the mine are contemplated in this plan. However, spillways of any future permanent impoundments, which may be constructed, will meet the 50-year, 6-hour event for the spillway. A description of the 5-year surface water control system is presented in Subpart 907. Detailed design plans and locations for possible future impoundments will be submitted to the Director for review and approval prior to construction. Additionally, permanent livestock watering ponds which may be planned in the future for final reclamation, will be designed in accordance with Subpart 19.8.20.2017.

All sediment ponds will be capable of safely containing or treating a 10-year/24 hr event as required by Subparts 2009.D(1), 2010.A(1), 2010.B(1), 2014.C. The ponds will be designed and constructed in accordance with Subparts 2015 and 2017.

The temporary impoundments will be removed in accordance with Subpart 2014.K.

Diversion channels and dikes will be used to direct overland flow and runoff in ephemeral arroyos from undisturbed areas around or through disturbed areas. Temporary diversions/dikes which keep undisturbed area water from going into the pit will be designed, constructed and maintained to safely pass the peak runoff from a 2-year 24-hour precipitation event. Any future permanent diversions/dikes will be designed, constructed, and maintained to safely pass the peak runoff from the 10-year, 24-hour precipitation events. A typical design for the channel type diversions is presented on FIGURE 911-1 (FIGURE 911-1.dwg). The typical design of a dike is shown on FIGURE 911-2 (FIGURE 911-2.dwg). Detailed design plans and locations for future diversions and dikes will be submitted to the Director for review and approval prior to construction.

PLATE 903-2 (PLATE 903-2.dwg), Post Mining Topography, shows the approximate location of the final drainage systems.

Ditches and berms will be utilized to convey runoff from disturbed areas into impoundments and for sediment control. The ditches and berms used to transport water into impoundments will be capable of safely passing the peak runoff from the 10-year, 24-hour precipitation event. A combination of ditches, berms, riprap, contour furrows, straw dikes, dugout ponds, earthfill or rock check dams and other effective methods will be used to reduce overland flow velocities, decrease runoff volume, or retain sediment within disturbed areas. These sediment control measures will be installed in appropriate locations using standard accepted methods.

No coal processing waste banks, dams, or embankments are planned to be constructed within the permit area.

900.B.(2). Overburden and Topdressing Handling and Storage

A combination of the shovel/truck, loader/truck, dragline and dozer push mining methods will be used to handle overburden and interburden materials. Overburden and interburden are usually blasted to facilitate the stripping operation. The majority of the overburden/interburden removed during mining will be utilized to backfill the pits. The overburden handling and storage an area for materials that will be used as backfill correspond to the mine cuts shown on PLATE 900-1(PLATE 900-1.dwg). Overburden/interburden materials removed from the initial cuts will be placed in initial overburden stockpiles. These stockpiles will be blended into the backfill spoil to create the post-mining topography. The locations of the initial overburden stockpiles planned within the permit area are shown on PLATE 903-1 (PLATE 903-1.dwg).

900.B.(3). Coal Removal, Handling, Storage, Cleaning and Transportation

Coal will be recovered from 1 to 9 seams using front-end loaders, hydraulic shovels, and scrapers. Bulldozers, motor graders, front-end loaders and scrapers will be utilized for cleaning and ripping coal prior to removal, as needed. Blasting of the coal seams may be performed to facilitate removal. The coal removal areas correspond to the mine cuts shown on PLATE 900-1(PLATE 900-1.dwg). Coal will be loaded into haul trucks and transported to the truck dump or coal stockpile area shown on PLATE 903-1 (PLATE 903-1.dwg). The truck dump consists of a hopper and feeder/breaker system and a secondary crusher. A conveyor system moves the crushed coal to one of three stacking tubes. Stacking tubes are connected to the train loadout with a conveyor. Enclosures, water sprays, and/or atomizers are used to control fugitive dust emissions from the coal handling facilities. Unit trains are used for coal shipments to customers, and will utilize the existing rail loop for coal loading. All of the planned coal handling, storage, and transportation facilities are shown on PLATE 903-1 (PLATE 903-1.dwg). These facilities will be routinely maintained to ensure proper functioning and safe and healthy working conditions. The coal handling and storage facilities will be removed at the conclusion of mining. Coal remaining on the surface will either be covered with an adequate thickness of suitable materials or removed to the depth where suitable materials are encountered. The disturbance will then be graded, topdressed, and revegetated in accordance with the reclamation plan.

900.B.(4). Spoil, Coal Processing Waste, and Non-Coal Waste Facilities

The removal and handling of overburden/interburden materials will be accomplished using the shovel/truck, loader/truck, dragline and dozer push mining methods. Spoils will be transported to designated fill areas by haul trucks or directly sidecast into a previous pit by the dragline. The mine cuts shown on PLATE 900-1(PLATE 900-1.dwg) represent the removal, handling, transportation and storage areas for the majority of the spoil materials.

Excavated overburden/interburden materials from the initial cut areas will be stockpiled adjacent to the initial pits. The location of the initial overburden stockpiles planned to be developed within the permit area is shown on PLATE 903-1 (PLATE 903-1.dwg). Site preparation will involve removing soil and vegetation from the fill area. Temporary overburden stockpiles will be constructed and maintained to maximize stability of the fill. The fill materials will be hauled and placed in horizontal lifts in a controlled manner that encourages compaction, and graded along the contour. Berms will be installed around the base and top of the stockpiles to minimize erosion. The stockpiles will be blended into the spoil that is backfilled into the initial pits to become part of the permanent post mining topography.

A refuse disposal plan will be implemented for non-coal waste generated at the mine. The non-coal waste materials will be collected and stored in appropriate containers prior to disposal. Covered dumpsters located at the mine office, coal lab, and near the shop/warehouse complex are to be used to temporarily hold non-coal wastes such as glass, wood, paper, boxes, metal, plastic, rubber, etc. These non-coal waste materials are to be disposed in the backfill of the pits at least twenty feet below the final surface. The relatively small quantity of this material, combined with the advancing nature of the backfill, minimizes the amount in a particular area. Used lubrication and cleaning fluids will be collected in drums or in above-ground, steel storage tanks with impermeable secondary containments located at the shop/warehouse complex. Additionally, non-coal waste such as shop rags, paint, oil filters, gasoline filters, fluorescent light tubes, and pressurized paint cans, will be containerized. The contents of the drums and containers will be periodically removed by a transporter and delivered to a recycling company or permitted waste disposal site.

Soil or overburden contaminated with petroleum products caused by spills or leaks will be land farmed on site. The land farm area will be bermed and capable of containing the precipitation from a 100 yr/24 hr event. No run-on or runoff water will be allowed. Contaminated soils will be spread within the landfarm in approximately 6 inch lifts. Soils will be disked and watered as necessary to enhance biodegradation and control blowing dust. The land farm site is shown on PLATE 903-1 (PLATE 903-1.dwg).

Land farmed material will be considered remediated and ready to be disposed of in the backfill when total petroleum hydrocarbons (TPH) are below 1000 mg/kg, BTEX is below 50 ppm, and benzene is less than 10 ppm. A field soil vapor headspace measurement of 100 ppm (highest peak reading) may be substituted for a laboratory analysis of the benzene and BTEX concentration limits when a PID or FID organic vapor meter (OVM) is used. The OVM will be calibrated to assume a benzene response factor. TPH levels, and a copy of the results will be sent to the Director. The land farm is located on the facilities map, PLATE 903-1 (PLATE 903-1.dwg).

Hazardous waste (paints, cleaning solvents, etc.) will be recycled or disposed of off-site in compliance with EPA's hazardous waste regulations.

900.B.(5). Mine Facilities

All of the mine facilities planned within the permit area are shown on PLATE 903-1 (PLATE 903-1.dwg). The mine facilities are designed and constructed to accommodate the anticipated production schedule and minimize potential negative environmental impacts. Routine maintenance activities are conducted to provide safe and healthy working conditions. At the conclusion of mining, the facilities will be removed and the associated disturbance graded, topdressed and revegetated in accordance with the reclamation plan.

The haul roads are designed and will be constructed in accordance with Subpart 916. Ramps into the pits will be advanced as mining progresses. Water trucks and motor graders will be used to maintain the primary and ancillary roads within the permit area. Locations for the entrance road and haul road are shown on PLATE 903-1 (PLATE 903-1.dwg). Roads not retained for use under the approved post-mining land use will be reclaimed when no longer needed for mining and reclamation.

A 115 KV transmission line will be installed within the permit area to provide power to the dragline. The planned transmission line will originate at the substation in the SE4 of Section 5, T16N, R9W and travel in a northeasterly direction to a substation in the dragline mining area. The transmission lines and substations for the electric shovels and dragline will be relocated as the pits advance. The electrical distribution system for the mine is periodically inspected and maintenance activities performed as required. Transmission lines and substations will be removed following mining and the disturbance reclaimed.

900.B.(6). Water and Air Pollution Control Facilities

Impoundments, diversions, dikes, and sediment control measures are utilized at the mine for water pollution control. The locations for impoundments, diversions, and sediment ponds are presented on; PLATE 903-1 (PLATE 903-1.dwg) EXHIBIT 911-1 (EXHIBIT 911-1.dwg) and EXHIBIT 909-1 (EXHIBIT 909-1.dwg). Sediment control measures are used within the permit area to reduce overland flow velocities, decrease runoff volume, or trap sediment. Ditches and berms will be installed as needed in graded spoils to maintain suitable pit conditions and retain sediment within disturbed areas. A combination of ditches, berms, riprap, earthfill or rock check dams, straw dikes, erosion-control fabric, dugout ponds and other effective methods will be used in areas that have been topdressed to minimize erosion and reduce overland flow velocities until seeding and mulching have been completed.

Topdressed areas will be seeded with the permanent seed mixture and mulched during the first normal period for favorable planting conditions after final preparation.

Interseeding may be conducted without mulch depending upon conditions. Any permanent impoundments which may be installed in reclaimed areas as a source of water for livestock would provide an added measure of sediment control following reclamation.

Air pollution control will be accomplished at the coal handling facilities through the use of enclosures, water sprays, and/or atomizers. Water trucks and routine maintenance activities will be used to control dust emissions from the haul roads and active mine areas. Dust control devices are installed on the drills utilized for preparing blast holes. Revegetation of disturbed areas that have been topdressed will stabilize the soil surface and reduce dust emission.

900. BIBLIOGRAPHY

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USDC-NOAA. 1973. Precipitation-Frequency Map of the Western united States, Volume IV – New Mexico, NOAA Atlas 2.

SCS. 1985. Peak Rates of Discharge for Small Watersheds, Chapter 2 (revised for New Mexico) (updated 1985), Engineering Field Manual for Conservation Practices.

Warner, Schwab. 1992. SEDCAD + 3, hydrology and sedimentology software, Civil Software Design

OPERATION PLAN: MAPS AND PLANS
Section 903

903. OPERATION PLAN: MAPS AND PLANS

A. Underground Mining Activities

There are no known underground mines or plans for underground mines in the Permit area.

B.(1) Buildings, Utility Corridors, And Facilities

Maps and plans for buildings, utility corridors, and facilities to be used are provided in PLATE 903-1 (PLATE 903-1.dwg). Road designs are presented in EXHIBIT 916-2A-C (EXHIBIT 916-2A-C.dwg) and EXHIBIT 916-3A-E.

B.(2) Area Of Land To Be Affected

The area of land to be affected within the permit area by sequence of mining and reclamation is shown in PLATE 903-1 (PLATE 903-1.dwg) and PLATE 906-1 (PLATE 906-1.dwg).

B.(3) Performance Bond Areas

Land areas for which a performance bond will be posted are indicated on PLATE 903-1 (PLATE 903-1.dwg).

B.(4) Coal Storage, Cleaning, And Loading Areas

Coal storage and loading areas are indicated on PLATE 903-1 (PLATE 903-1.dwg). No coal cleaning areas are planned.

B.(5) Topdressing, Spoil, Coal Waste, And Non Coal Waste Areas

Each topdressing, spoil, coal waste, and non-coal waste storage area is indicated on PLATE 903-1 (PLATE 903-1.dwg).

B.(6) Drainage Facilities

Each water diversion, collection, conveyance, treatment, storage, and discharge facility to be used is indicated on PLATE 903-1 (PLATE 903-1.dwg) EXHIBIT 911-1 (EXHIBIT

911-1.dwg), EXHIBIT 916-1 (EHXIBIT 916-1.dwg), and EXHIBIT 909-1 (EXHIBIT 909-1.dwg).

B.(7) Air Pollution Collection And Control Facilities

Air pollution monitoring facilities are shown on PLATE 903-1 (PLATE 903-1.dwg).

B.(8) Waste Sources And Facilities

No coal processing will be conducted in association with the mine. Sources of waste in the permit area are identified with petroleum storage, ANFO storage, and the mine shop on PLATE 903-1 (PLATE 903-1.dwg). Secondary containment and/or storm water runoff ponds are provided as pollution controls. A spill prevention control and countermeasure plan, in accordance with the Federal Oil Pollution Act, exists for the petroleum storage areas.

B.(9) Fish And Wildlife Enhancement Facilities

No fish and wildlife enhancement facilities are planned.

B.(10) Explosive Storage And Handling Facilities

The explosive storage and handling facility is indicated on PLATE 903-1 (PLATE 903-1.dwg).

B.(11) Sedimentation And Permanent Impoundment Facilities

The location of each sedimentation pond in accordance with 19.8.9.909 NMAC, are shown on PLATE 903-1 (PLATE 903-1.dwg). No coal processing waste banks, coal processing waste dams and embankments, or fill areas for disposal of excess spoil are planned. No permanent impoundments are planned.

B.(12) Final Surface Configuration

Post mining topography is shown on PLATE 903-2

(C:\Users\i57966\AppData\Local\Microsoft\Windows\INetCache\Content.Outlook\PLATES\Plate 903-3.dwgPLATE 903-2.dwg).

B.(13) Groundwater And Surface Water Monitoring Points

The locations of each groundwater and surface water monitoring point are indicated on PLATE 903-1 (PLATE 903-1.dwg).

B.(14) Facilities To Remain After Permit Area Reclamation

Following reclamation in El Segundo permit area, facilities to remain are the railroad loop and production well South Hospah No. 1, as identified on PLATE 903-1 (PLATE 903-1.dwg). PNRC-ES will reclaim the mine access road, unless the land owner formally requests its retention and it is approved by MMD.

B.(15) Subsidence Monitoring Points

Subsidence is not anticipated for the Highwall Mining Operations, given ESM's intention to adhere to appropriate Highwall Mining Safety Factors. In the event that an unplanned subsidence should occur, the subsided area will be corrected. Treatment may include the addition of soil materials, field tillage such as land leveling or ploughing, field drainage such as tiling or ditching, or other appropriate measures to correct the area.

903. BIBLIOGRAPHY

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USDC-NOAA. 1973. Precipitation-Frequency Map of the Western United States, Volume IV – New Mexico, NOAA Atlas 2.

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TABLE 900-1
EL SEGUNDO MINE
ESTIMATED ANNUAL AND TOTAL COAL PRODUCTION

TABLE 900-1
EL SEGUNDO MINE
ESTIMATED ANNUAL AND TOTAL COAL PRODUCTION
(tons)

Year	Tons Mined	Cumulative Tons Mined
2008	3,284,084	3,284,084
2009	5,045,332	8,329,416
2010	6,639,386	14,968,802
2011	8,040,725	23,009,527
2012	8,566,612	31,576,139
2013	8,676,275	40,252,414
2014	8,440,886	48,693,300
2015	7,476,237	56,169,537
2016	4,902,937	61,072,474
2017	4,855,010	65,927,484
2018	5,546,495	71,473,979
2019	5,495,524	76,969,503
2020	4,554,536	81,182,705
2021	3,658,666	85,182,705
2022	3,668,569	88,851,274
2023	3,390,115	92,241,389
2024	1,285,265	93,526,654
2025	605,000	94,131,654
2026		
2027		
2028		
2029		
2030		
2031		
2032		
2033		
2034		
2035		
2036		
TOTAL	94,131,654	

TABLE 900-2
El Segundo List of Equipment

Table 900-2 List of Major Equipment

Year	Make	Equipment Type	Equipment Model
1979	CAT	Scraper	1979 CAT 637E SCRAPER
1989	CAT		TIRE HANDLER
1990	BUCY	Drag	87 CU YD DRAGLINE
1990	NAVISTAR INTERNATIONAL		Fire Truck 4x4 NAVISTAR INTERNATIONAL
1991	CAT	Scraper	31 CU YD SCRAPER- EL SEGUNDO
1997	CAT	16	MOTOR GRADER
1998	CAT	D-10	613HP 144KLBS TRACK DOZER
1999	UNIT RI	HG	300 TON BELLY DUMP
1999	UNIT RI	HG	300 TON BELLY DUMP
1999	UNIT RI	HG	300 TON BELLY DUMP
1999	FORD		1999 FORD F376 AMBULANCE
1999	CAT	Motivator	MOTIVATOR
2000	UNIT RI	HG	300 TON 1800HP BELLY DUMP
2001	BUCY	S104	56 CU YD 495BII SHOVEL
2001	CAT	D-11	936 HP TRACK DOZER
2001	CAT	D-10	TRACK DOZER D10R-CASHMAN
2001	CAT	D-11	936 HP TRACK DOZER
2001	CAT	D-11	TRACK DOZER
2001	CAT	D-11	D11T TRACK DOZER
2001	CAT	D-11	D11T TRACK DOZER
2001	CAT	D7	CAT D7R DOZER
2001	UNIT RI	HG	300 TON 1800HP BELLY DUMP
2001	UNIT RI	HG	BD-270 COAL TRK EL SEGUNDO
2001	RIMPULL	250T	RIMPULL BD-250T COAL HAULER EL SEGUNDO
2001	RIMPULL	250T	RIMPULL BD-250T COAL HAULER EL SEGUNDO
2001	PEABODY		SHOP COSTS
2001	KOMATSU	WABCO170	170 TON 1600HP (Tow Haul)
2001	VOLVO		VOLVO A40 ARTICULATING TRUCK
2001	IR	Drill	DRILL*PROD CABALLO
2001	CAT		13,000 GAL FUEL TRUCK
2001	CAT	WT	CAT 777F WATER TRUCK
2001	CAT	WT	CAT 777F WATER TRUCK
2001	CAT	Scraper	SCRAPER- EL SEGUNDO
2001	CAT		7 CU YD 375 HP CABLE HAND

Year	Make	Equipment Type	Equipment Model
2001	CAT	Load	13 CU YD 690 HP LOADER
2001	CAT	Load	CAT LOADER 994H EL SEGUNDO
2001	CAT	16	275 HP MOTOR GRADER
2001	CAT	16	275HP MOTOR GRADER
2001	CAT	16	2012 16M CAT MOTOR GRADER
2001	FORD		ENGINEERING
2001	CAT	RT	690D TIGER DOZER KAYENTA LOANER
2001	FORD		PRODUCTION / POWDER TRUCK
2001	FORD		FORD F250 ELEC TRUCK JEFF / BRIAN
2001	FORD		FORD F250 PRODUCTION TRUCK B/D
2001	FORD		ELEC FORD F-250 TRUCK
2001	FORD		FORD F250 TRUCK
2001	FORD		PROD FORD F250 TRUCK
2001	FORD		PROD FORD F250 TRUCK
2001	FORD		PROD FORD F250 TRUCK
2001	DODGE RAM		MAINT DODGE RAM 2500 TRUCK B/D
2001	DODGE RAM		PROD DODGE RAM 2500 TRUCK A/C
2001	FORD		ELEC TRUCK F-250
2001	FORD		ELEC FORD F250 TRUCK
2001	CAT		CAT SKIDSTEER LOADER
2001	FORD		ELEC FORD F250 TRUCK
2001	FORD		F-250
2001	FORD		F-250
2001	FORD		FORD F550 MAINTENANCE TRUCK DIESEL
2001	FORD		FORD F550 MAINTENANCE TRUCK V-10 GASOLIN
2001	FORD		FORD F550 MAINTENANCE TRUCK DIESEL
2001	FORD		F550 MAINTENANCE TRUCK
2001			ALLMAND LIGHT PLANT
2001			ALLMAND LIGHT PLANT
2001			ALLMAND LIGHT PLANT
2001			ALLMAND LIGHT PLANT
2001			Light plants
2001			Light plants
2001			Light plants

Year	Make	Equipment Type	Equipment Model
2001			Light plants
2001			Light plants
2001			Light plants
2001	GM		FIRE PUMPER TRK
2001	UNIT RIG		AC 260 TRUCK
2001	UNIT RIG	Truck	AC 260 TRUCK
2001	UNIT RIG	Truck	AC 260 TRUCK
2001	UNIT RIG	Truck	AC 260 TRUCK
2001	UNIT RIG	Truck	AC 260 TRUCK
2001	UNIT RIG	Truck	AC 260 TRUCK
2001	IR	Drill	IRDMM2 72,000LB-600HP
2001	KENWORTH		2012 Kenworth T270 Mobile Drill
2001	GODWIN		PUMP GODWIN 6" DIESEL
2001	THOMAS		BUS PRODUCTION
2001	GODWIN		2013 GODWIN Water Pump
2001			MQ MULTIQUIP LIGHT PLANT
2001			3750 KVA Sub 34.5V/7200V LR Only
2001	DRILL TECH		D55SP DRILLTECH DRILL
2001	GENIE		MANLIFT
2001	FORD		PLANT UTILITY
2001	FORD		ENVIRONMENTAL F250 EL SEGUNDO ENVIROMENT
2001	FORD		ELEC 4X4 TRUCK
2001	FORD		SURVEY 4X4 TRUCK
2001	FORD		ENVIRONMENTAL F250 EL SEGUNDO
2001	AMIDA		5 LIGHT TOWER- LRCC
2001	FORD		Power Washer Truck
2001			LR FREIGHTLINER SRVCE TRUCK
2001	FORD		ELEC F-250
2001	FORD		LR MAINT F-250
2001			TRAILER ROAD BOSS
2001	FORD		LR PROD TRUCK
2001	IR		150CFM SHOP COMPRESSOR
2001	IR		150CFM SHOP COMPRESSOR
2001	IR		IR AIR COMPRESSOR P185WIR

Year	Make	Equipment Type	Equipment Model
2001	PETERBUILT		PTRB LUBE TRUCK
2001	MULTITN		STACKER POWER LIFT STRADDLE
2001	DEERE		1.3 YD BACKHOE
2001			7 1/2 HP 480 V Weld Fan
2001	FORD		AMBULANCE F-350
2001	FORD		MAINT SERVICE TRUCK
2001	FORD		SNOW PLOW
2001			25KW GENERATOR
2001	GORMAN		GORMAN-RUPP 4" PUMP MODEL 04B3 (F-300)
2001	GROVE		MAN LIFT 66FT
2001	CAT		CAT BACKHOE 4 x 4 KAYENTA TRANSFER
2001	WIGGLFT		25K TIRE HANDLER
2001	GENIE		SCISSOR LIFT 2006
2001	LINE		34.5KV / 7200V
2001	POLARIS		4X4 ROUGH TERRAIN SAMPLE BUGGY POLARIS (Lee Ranch)
2001	FORD		AMBULANCE 1 TON DIESEL
2001	WIGGLFT		48000 LBS FORKLIFT
2001	GROVE		35 TON (Crane)
2001	HYSTER		6,000 LB HYSTER FORKLIFT
2001	CAT		FORKLIFT
2001	MACK ECONODYME		MACK TRUCK MOTIVATOR HAULER
2001	CAT	D-11	936 HP TRACK DOZER
2001	CAT	D-11	936 HP TRACK DOZER
2001	UNIT RIG	Truck	DC 260 TRUCK
2001	UNIT RIG	Truck	DC 260 TRUCK
2001	UNIT RIG		DC 260 TRUCK
2001	UNIT RIG	Truck	DC 260 TRUCK
2001	UNIT RIG	Truck	DC 260 TRUCK
2001	IR	Drill	IRDMM2 1900CFM/700HP
2001	TENNANT		TENNANT SHOP SWEEPER 2001
2001	KOMATSU		TOOL CARRIER
2001	LINE		115K TO 7200V SHOVEL SUB
2002	CAT	D-11	DOZER TRACK
2003	CAT	D-11	DOZER TRACK

Year	Make	Equipment Type	Equipment Model
2003	UNIT RI	Truck	AC 260 TRUCK
2003	DEERE		J DEERE FARM TRACTOR 4450
2004	CAT	D-10	TRACK DOZER-D10R 679HP
2004	CAT	Load	CAT 988G FRONT END LOADER
2004	CAT		CAT TOOL CARRIER
2004	UNIT RI	Truck	AC 260 TRUCK
2004	FORD		PUMPER TRUCK-BLAST
2004	INTERNATIONAL		BUCKET TRUCK
2004	GORMAN		4"PUMP EL SEGUNDO
2004	LINC EL		WELDER LINCOLN VANTAG 500
2004	LINC EL		WELDER LINCOLN VANTAG 500 (Plants)
2004	LINC EL		WELDER LINCOLN VANTAG 500
2004	LINC EL		WELDER LINCOLN VANTAG 500
2004	CATERPILLAR		CAT BACKHOE
2006	CAT	385	CAT 385 EXCAVATOR PURCHASED FROM WRS
2006	TAYLOR MACHINE		52000 LBS FORKLIFT
2006	GORMAN		GORMAN-RUPP 4" PUMP MODEL 04B3 (F-300)
2006	GORMAN		GORMAN-RUPP 4" PUMP MODEL 04B3 (F-300)
2006	KOMATSU		TOOLHANDLER/LOADER
2007	GENIE		MANLIFT
2007	JLG		MANLIFT
2008	PEABODY		SHOP COSTS
2008	UNIT RIG	Truck	AC 260 TRUCK
2008	TEREX		LIGHT PLANT - EL SEGUNDO
2008	STERLNG		PURCELL TIRE TRUCK DiegoTrucks
2008	FORD V-10 ECONOLINE 450		FORD PASSENGER TRANSIT VAN PRODUCTION
2008	FORD E-450		FORD PASSENGER VAN
2008	FORD		FORD PASSENGER TRANSIT VAN
2008	FORD		FORD PASSENGER TRANSIT VAN
2009	CAT	Load	CAT LOADER 994F EL SEGUNDO BISTI FUELS
2009	IR		P185 CFM IR AIR COMPRESSOR LUBE TRAILER
2009	FORD		FORD F250 TRUCK
2009	INTERMOUNTAIN ELECTRONICS		7.5MVA, 22,500KV/7.5V PORTABLE SUB
2011	CAT	D-10	D10T TRACK DOZER

Year	Make	Equipment Type	Equipment Model
2011	FORD		Ford Crew Cab 4x4 Rec.
2011	ATLAS COPCO	Drill	ATLAS COPCO DRILL
2011			MQ MULTIQUIP LIGHT PLANT
2011	FORD		POWDER CREW 4X4 TRUCK-Blast
2011	FORD		MAINT F250 EL SEGUNDO
2011	FORD		Light Plant - Lee Ranch
2011	FREIGHTLINER		FREIGHTLINER MECH SRVCE TRUCK
2012	CAT	Load	CAT LOADER 994H EL SEGUNDO
2012	FORD		2012 Ford F250 STD Cab Warehouse
2012	ALLMAND		ALLMAND LIGHT PLANT
2012	BIG TEX TRAILER		BIG TEX GOOSENECK TRAILER 22GN
2012	FREIGHTLINER		FREIGHTLINER MECH SRVCE TRUCK
2012	FORD		PARTS RUNNER FORD F250 EL SEGUNDO
2012	FORD		PLANT TRUCK
2012	FORD		PRODUCTION / SHOVEL OILER
2012	FORD		PRODUCTION / DRAGLINE TRUCK
2012	FORD		MAINTENANCE PM CREW F250 EL SEGUNDO
2012	FORD		PROD F-250-Drilling
2012	FORD		ENVIRONMENTAL F250 TRUCK
2012	FORD		PLANT TRUCK
2012	FORD		Ford F550 Maintenance Truck Diesel
2012	FORD		MAINTENANCE F250
2012	HAUL RITE		HAUL RITE LUBE TRAILER PINTLE PULL
2012	CHEVROLET		CHEVY ELKHART BUS
2012	CAT		CAT TELEHANDLER FORKLIFT
2013	FORD		MAINT FORD F250 TRUCK JOHNNY/ RALPH
2013	FORD		PROD VAN / AIRPORT
2014	FORD		FORD F250 ELEC TRUCK
2014	CAT		CAT SKIDSTEER LOADER
2015	FORD		FORD F-250 ELEC TRUCK
2015	FORD		F550 DRAGLINE TRUCK
2015	CAT		CAT FORLIFT 7000 LBS
2017	HOTSY		POWER STEAM CLEANER
2018	FORD		FORD F250 TRUCK

Year	Make	Equipment Type	Equipment Model
2018	FORD		FORD F250 PRODUCTION TRUCK ROSS HALL
2018	FORD		FORD F250 PRODUCTION TRUCK A/C
2018	FORD		FORD F250 ENGINEER TRUCK
2019	JOHN DEERE		JOHN DEERE GATOR (El Segundo)
2021	FORD		MAINT FORD F250 TRUCK JUAN TENA
2021	FORD		PROD FORD F250 TRUCK
2021	FORD		FORD F550 MAINTENANCE TRUCK GASOLINE
2021	FORD		FORD F550 MAINTENANCE TRUCK GASOLINE
2021	FORD		FORD F550 MAINTENANCE TRUCK GASOLINE
2021	FORD		FORD F550 MAINTENANCE TRUCK GASOLINE
2021	FORD		FORD F550 MAINTENANCE TRUCK GASOLINE
2022	DODGE RAM		MAINT DODGE RAM 2500 TRUCK A/C
2022	DODGE RAM		PROD DODGE RAM 2500 TRUCK B/D
2023	DODGE RAM		PROD DODGE RAM 2500 TRUCK
2023	DODGE RAM		ELEC DODGE RAM 2500 TRUCK
2024	FORD		F-250
2024	FORD		F-250
2024	FORD		F-250
	P/H	S105	4100 SHOVEL
	CAT	D-11	936 HP TRACK DOZER
	KOMATSU	WABCO85	LOWBOY/TRACTOR
	RIMPULL		LOWBOY
	CAT	WT	CAT 777F WATER TRUCK
	CAT	24	24H Motor Grader - Used
	CAT	RT	992 / 690D RT DOZER
	FORD		DOZER PUSH TRUCK
	ALLMAND		ALLMAND LIGHT PLANT
	ALLMAND		ALLMAND LIGHT PLANT
	ALLMAND		ALLMAND LIGHT PLANT
	ALLMAND		ALLMAND LIGHT PLANT
	ALLMAND		ALLMAND LIGHT PLANT
			MQ MULTIQUIP LIGHT PLANT
	GORMAN RUPP		GORMAN-RUPP 4" PUMP

Year	Make	Equipment Type	Equipment Model
			MQ MULTIQUIP LIGHT PLANT
			MQ MULTIQUIP LIGHT PLANT
			Nato YellowTop Compressor
			MQ MULTIQUIP LIGHT PLANT
			MQ MULTIQUIP LIGHT PLANT
			MQ MULTIQUIP LIGHT PLANT
	LINKBELT	100 Crane	100 TON CRANE
	LINE POWER		7.5 MVA SUB
	LINE POWER		15 MVA SUB
	HAULRITE		MAINT UTILITY TRAILER
	FREIGHTLINER		FREIGHTLINER MECH SRVCE TRUCK
			FREIGHTLINER MECH SRVCE TRUCK
	FORD		MAINT PLANNER NICK TAFOYA
	FORD		FORD F550 MAINT TRUCK
	CEN ELE		115/22.9 KV SUB
	CUMM		275 KW GEN SET EL SEGUNDO
	IR		IR AIR COMPRESSOR PLANT
	IR		IR AIR COMPRESSOR PLANT
	LINCOLN		LINCOLN WELDER
	Ford		MAINT F800 2-1/2 TON Service Truck
			??
	MILLER		MILLER WELDER
	CIW TRAILERS		CIW TRAILER BLAST CREW TRAILER
	BIG TEX TRAILER		BIG TEX TRAILER
	BIG TEX TRAILER		BIG TEX TRAILER / BLAST CREW
	LIEBHER		HYDRAULIC LIFT
	VOLVO		DUMP TRUCK
	LINE		7500KVA
	LINE		10,000KVA
	PEABODY		MAINT TRAILER, SV TOWING
			AMIDA LIGHT TOWER
	AMIDA		Amida light tower
			Gar-den efd99b compressor
	GARDNER DENVER		gar-den efd99b compressor

Year	Make	Equipment Type	Equipment Model
	ABB ARIZONA ELECTRICAL APPARAT		115/22.9 KV SUB 10KVA
	HYSTER		FORKLIFT ELECTRIC POWER
	STERLING		PURCELL TIRE TRUCK #3
			Dodge RAM 5500 Purcell Tire Truck
			CAST LOCATION
			2030 99999 Catch All Inactive/delFlag

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701-3	Warranty Deed of Surface Ownership for Peabody Natural Resources	EXHIBIT 701-3 WAR DEED OF SURF OWNER FOR PNRC.pdf
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701-5	Warranty Deed of Surface Ownership for Gallo Finance Company	EXHIBIT 701-5 WAR DEED OF SURF OWNER FOR GALLO.pdf
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916-3J	Haul Road Culvert Designs Culverts T17N R10W S27-1, T17N R10W S28-1, T17N R10W S34-1, AND T17N R10W S34-2	EXHIBIT 916-3J.pdf
916-3K	Haul Road Culvert Designs Culverts T17N R10W S35-3 AND T17N R10W S35-4	EXHIBIT 916-3K.pdf
916-3L	Haul Road Culvert Designs Culverts T17N R10W S35-5,T17N R10W S35-6, T17N R10W S35-7, and T17N R10W S35-8	EXHIBIT 916-3L.pdf
916-3M	Haul Road Culvert Designs Culverts T17N R10W S35-9,T17N R10W S35-10, T17N R10W S36-1, and T17N R10W S35-1 (Culvert 2)	Exhibit 916-3M.pdf
916-3N	Haul Road Culvert Designs Culverts T16N R9W S4-1, T16N R9W S4-2 and T16N R9W S5-1	Exhibit 916-3N.pdf

Exhibit No.	Title	File
916-4-1-35	Equipment Access Road Designs	Exhibit 916-4-1-35.dwg
916-6	Access Road to rail siding	EXHIBIT 916-6.dwg
916-7	Haul Road T 16N R10W S6-1	EXHIBIT 916-7.dwg
916-8	Haul Road T16N R10W S6-2	**EXHIBIT 916-8.dwg**
916-9	Haul Road T16N R10W S5-1	**EXHIBIT 916-9.dwg**
916-10	Haul Road T16N R10W S5-2	**EXHIBIT 916-10.dwg**
916-11	Haul Road T16N R10W S4-1	**EXHIBIT 916-7-11dwg**
916-12	Haul Road T16N R10W S4-2	**EXHIBIT 916-7-12.dwg**
916-13	Haul Road T16N R10W S1-1	**EXHIBIT 916-13.dwg**

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EL SEGUNDO MINE
MINE PLAN AND PERMIT APPLICATION - 2004
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FIGURES

Exhibit 900-1

Exhibit 900-1

In-situ Coal Strength from Lab Tested Strength
& Pillar Strength

Holland- Gaddy

Empirical formula used for estimation of in-situ coal strength from lab strength

Kc	$=\sigma_{lab}\sqrt{dia}$				
σ_{cc}	$= Kc/\sqrt{h}$	, if h<36 in.		σ_{cc}	$= Kc/\sqrt{36}$, if h>36 in.
σ_p	$= \sigma_{cc}\sqrt{(W_p/h)}$		W_p	= least width dimension	
SF	$= \sigma_p / S_p$				

σ_{lab} = uniaxial compressive strength, UCs- lab, psi
K_c= Constant characteristics of the coal,
dia= diameter of the lab test specimen, inches
h= mining height, inches
σ_{cc} = strength of critical size coal sample, psi (equivalent to in-situ coal strength (σ_1) in Mark-Bieniawski formula)
Wp= width of the pillar
σ_p = pillar Strength, psi
Sp= Pillar stress, psi
SF- safety factor

- Geotech hole data (coal strength) has been used from the all the available geotech holes (22 numbers) having coal strength tested in the laboratory across the various pits mined in the past. This also includes the two specific holes namely E32-712C and E33-708C (highlighted cells in top of the listed strengths in Table-1) available at the proposed highwall mining area at Pit-7.
- The average strength of coal from the entire area has been used to incorporate the variability in the coal strength.
- If the strength of the only two holes E32-712C and E33-708C are used, the average strength will be **819psi** (refer to Table 2) whereas the average strength incorporating all geotech holes is **698 psi** (refer to Table 1). Hence for a conservative web and barrier pillar design, lower coal strength used.
- **Holland- Gaddy formula used for only to estimate σ_{cc} , the equivalent to in-situ coal strength (σ_1) in Mark-Bieniawski formula) instead of using default value of 900 psi in HWM-ARMPS Program.**
- The site-specific means a local mine site instead of using default value (900 psi) which has been derived from several mine sites case studies data.

Blue Coal Seam for El Segundo mine

Table 1-Blue Seam Coal Strength, psi								
Sl No.	Geotech-hole	Depth from surface, ft	Diameter, inches	UCS, psi	Kc	σ_{cc} (psi)	Individual Hole Average σ_{cc} (psi)	Combined Average σ_{cc} (psi)
1	E32-712C	265.50	3.013	**3387**	5,879	980	986	**698**
	E32-712C	272.60	3.003	**3275**	5,675	946		
	E32-712C	274.80	2.992	**3583**	6,198	1,033		
2	E33-708C	273.80	3.002	**1824**	3,160	527	569	
	E33-708C	278.00	3.004	**2118**	3,671	612		
3	E33-250C	182.40	3.006	2821	4,891	815	815	
4	W27-719C	224.40	2.999	2660	4,606	768	768	
5	W21-511C	52.50	3.015	1654	2,872	479	479	
6	W21-452C	81.30	3.008	2858	4,957	826	550	
	W21-452C	85.80	3.016	1737	3,017	503		
	W21-452C	86.50	3.019	1108	1,925	321		
7	W21-511C	94.20	3.027	3232	5,623	937	937	
8	W36-250C	101.60	3.015	3871	6,722	1,120	1,120	
9	E34-540C	115.70	2.991	2817	4,872	812	812	
10	W28-700C	128.50	2.996	1149	1,989	331	331	
11	E32-250C	137.00	3.019	1381	2,400	400	400	
12	W28-700C	139.80	3.006	2718	4,712	785	785	
13	E34-591C	179.70	2.998	2879	4,985	831	831	
14	E33-251C	181.70	3.005	2250	3,900	650	650	
15	E34-591C	191.50	2.997	2711	4,693	782	782	
16	E34-598C	197.10	3.005	2580	4,472	745	745	
17	W26-614C	203.40	3.001	1134	1,964	327	327	
18	W27-719C	209.20	3.015	2672	4,640	773	773	
19	W26-614C	210.70	3.005	3717	6,443	1,074	1,074	
20	W27-719C	220.20	2.982	2250	3,885	648	552	
	W27-719C	229.40	3.021	1576	2,739	457		
21	E32-251C	235.20	2.991	2843	4,917	819	519	
	E32-251C	237.10	3.005	754	1,307	218		
22	W26-645C	247.50	2.998	1966	3,404	567	706	
	W26-645C	257.00	3.010	2921	5,068	845		

Blue Seam Coal Strength, psi	
Mean	**698**
Standard Error	44
Median	771
Mode	
Standard Deviation	241
Sample Variance	58308
Kurtosis	-0.768
Skewness	-0.257
Range	902
Minimum	218
Maximum	1120
Sum	20931
Count	30

Table 2-Blue Seam Coal Strength at Pit-7, psi								
Sl No.	Geotech-hole	Depth from surface, ft	Diameter, inches	UCS, psi	Kc	σ_{cc} (psi)	Individual Hole Average σ_{cc} (psi)	Combined Average σ_{cc} (psi)
1	E32-712C	265.50	3.013	**3387**	5,879	980	986	**819**
	E32-712C	272.60	3.003	**3275**	5,675	946		
	E32-712C	274.80	2.992	**3583**	6,198	1,033		
2	E33-708C	273.80	3.002	**1824**	3,160	527	569	
	E33-708C	278.00	3.004	**2118**	3,671	612		

Exhibit 900-2

Exhibit 900-2

In-situ Coal Strength from Lab Tested Strength & Pillar Strength

The web pillar and barrier pillars size are determined based on the coal strength. The empirical program (ARMPS-HWM) developed by NISOH suggests the following stability factor-

NIOSH- ARMPS-HWM

Mark/Bieniawski Pillar Strength Equation:				
$\sigma_\rho = \sigma_1 (0.64 + 0.54(w/H) – 0.18(w^2/hl))$				
Where:				
σ_ρ	= pillar strength (lb/in^2),			
σ_1	= in-situ coal strength (lb/in^2),			
σ_1	900	= NIOSH recomendations,		
w	= the least pillar dimension or width (feet),			
h	= the mining height (feet), and			
l	= the greatest pillar dimension or length (feet).			
SF	> 2.0 for long term stability			

Empirical formula used for estimation of pillar strength. NIOSH uses default value of 900 psi for in-situ strength. Here in-situ strength of coal used is **698 psi**

In Situ Coal Strength
The in situ coal strength is expressed in psi or MPa. The default value is 900 psi or 6.2 MPa. Recent research (Mark and Barton, 1996) has shown that 900 psi is a better approximation than can normally be obtained from coal testing. In general, the only valid reason to adjust the in situ coal strength is if back-analysis of site-specific case histories indicates that it is significantly different from 900 psi.

7.1 Design Procedures for ARMPS-HWM

Description:

The purpose of web and barrier pillar design is to prevent a major pillar collapse. Based on extensive research into instances of highwall mining pillar instability and pillar collapses in underground mines, the suggested ARMPS-HWM design procedure is as follows:

1. Select the number of holes between barrier pillars.
ARMPS-HWM suggests that, in general, no more than 20 holes should be mined before leaving a barrier pillar. Limiting the number of holes helps to limit the potential size of a web pillar collapse if one were to occur.

2. Select the web pillar size.
ARMPS-HWM suggests that the distance between the barrier pillars should determine the Stability Factor (SF) of the web pillars. When the span is less than about 200 ft (60 m), the SF on the individual web pillars can be as low as 1.3, because the barrier pillars will likely be able to prevent a collapse from initiating. When distance between the barriers is wider, then a higher SF of approximately 1.6 has been found to be appropriate. Also, it should be noted that very slender web pillars, with width-height ratios much less than 1.0, may be troublesome even if their SF appears to be adequate.

3. Select the barrier pillar size.
Barrier pillars are essential to preventing the initiation and propagation of web collapses. The suggested SF for barrier pillars depends upon the width-to-height ratio (w/h) of the barriers. Research conducted by Mark, Chase, and Zipf (1997) into coal pillar collapses concluded that pillars with w/h in excess of 4.0 were highly

unlikely to collapse. They suggested that such squat pillars need only maintain an SF of approximately 1.5. They also suggested that slender pillars, which might be subject to collapse, should employ a more conservative SF of about 2.0.

4. Check the overall SF. Once the web and barrier pillars have been sized, the overall SF for the entire pillar system is calculated automatically. The overall SF should exceed 2.0.

Table 1 summarizes the suggested SF for ARMPS-HWM:

7.2 Pillar Parameters

unlikely to collapse. They suggested that such squat pillars need only maintain an SF of approximately 1.5. They also suggested that slender pillars, which might be subject to collapse, should employ a more conservative SF of about 2.0.

4. Check the overall SF. Once the web and barrier pillars have been sized, the overall SF for the entire pillar system is calculated automatically. The overall SF should exceed 2.0.

Table 1 summarizes the suggested SF for ARMPS-HWM:

7.2 Pillar Parameters

Description:

Pillar Load Bearing Capacity
In ARMPS-HWM, the pillar strengths are converted to pillar load-bearing capacity in tons/ft of pillar (tonnes/m) by multiplying by the pillar width.

Mark-Bieniawski Pillar Strength Formula
The strength of an individual pillar (SP) is determined using the rectangular pillar strength formula (the Mark-Bieniawski formula) that considers the effect of pillar length:

$$SP = S1\ [0.64 + (0.54\ w/h - 0.18\ (w*w/hL))]$$

where S1 = in situ coal strength, assumed = 6.2 MPa (900 psi),

w = pillar width,
h = pillar height, and
L = pillar length.

For highwall mining pillars (both webs and barriers), the pillar length is infinite, and the equation becomes:

$$SP = S1\ [0.64 + (0.54\ w/h)$$

In ARMPS-HWM, the pillar strengths are converted to pillar load-bearing capacity in tons/ft of pillar (tonnes/m) by multiplying by the pillar width.

The strength of rectangular pillars can be significantly greater than square pillars, due to the greater confinement generated within them. The Mark-Bieniawski formula was derived from analyses of the pillar stress distributions implied by empirical pillar strength formulas. The formula is equivalent to the original Bieniawski formula when pillars are square. A complete discussion of the Mark-Bieniawski formula is included in Mark and Chase, 1997.

7.7 Analysis of MSHA Highwall Mining Ground Control Plans

Description:

MSHA recognizes the ground-control-related safety concerns associated with highwall mining and has required each portable auger or highwall mining operation to develop and follow "an appropriate highwall ground control plan, which addresses the web spacing and other measures necessary to safely conduct the high rates of recovery." (MSHA 2003) Various MSHA Coal Mine Safety and Health Districts provided NIOSH-PRL researchers with 40 highwall mining ground control plans. Most of the plans (80%) came from the central Appalachians in Kentucky and West Virginia, and most (again 80%) were dated 2002 through 2004. As expected, about half the plans specified use of a Superior Highwall Miner and the other half planned to use an Addcar system. The number of plans from MSHA is somewhat lower than the number of highwall miners in operation as estimated in Table 1; however, this minor shortfall does not detract from our conclusions.

From these 40 plans, 51 distinct cases were compiled from which to evaluate highwall mining designs. Figure 12a shows the distribution of maximum seam thicknesses and Figure 12b shows the maximum cover depths considered in the plans. In three-quarters of the planned highwall mining, maximum seam thickness is between 0.9 to 1.8 m (3 to 6 ft). Relatively few highwall miners (less than 12%) have planned mining heights greater than 2.1 m (7 ft). Most of these thicker seam operations are in the western U.S. in MSHA District 9. In most operations (about 82%), maximum depth of cover is less than 91 m (300 ft). The rest have a planned maximum depth of cover in the range 91 to 152 m (300 to 500 ft). At this time none appears to be operating under more than 152 m (500 ft) of cover, although this could change soon.

Maximum seam thickness and maximum depth of cover are the main inputs for geotechnical design of web pillar width. In about 15% of the plans examined, the ARMPS program (Vandergrift et al. 2004) was the analysis method. Over 25% used another form of a tributary area method for analysis. Past experience was the basis for many designs, but unfortunately, the analysis method could not be identified in most of the highwall mining ground control plans examined. As shown in Figure 13a, the minimum web width specified in the plans ranges from 0.9 to 2.1 m (3 to 7 ft) in over 82% of the cases. More important for stability is the width-to-height (W/H) ratio of these web pillars. Figure 13b shows that W/H is in the 1 to 1.25 range for about 50% of the cases, while it is between 0.5 and 1 in 25% and more than 1.25 in the remaining 25% of cases. In general, keeping the web pillar W/H ratio above 1 is desirable to maintain better web pillar integrity. Designs with W/H ratio less than 0.5 were not encountered.

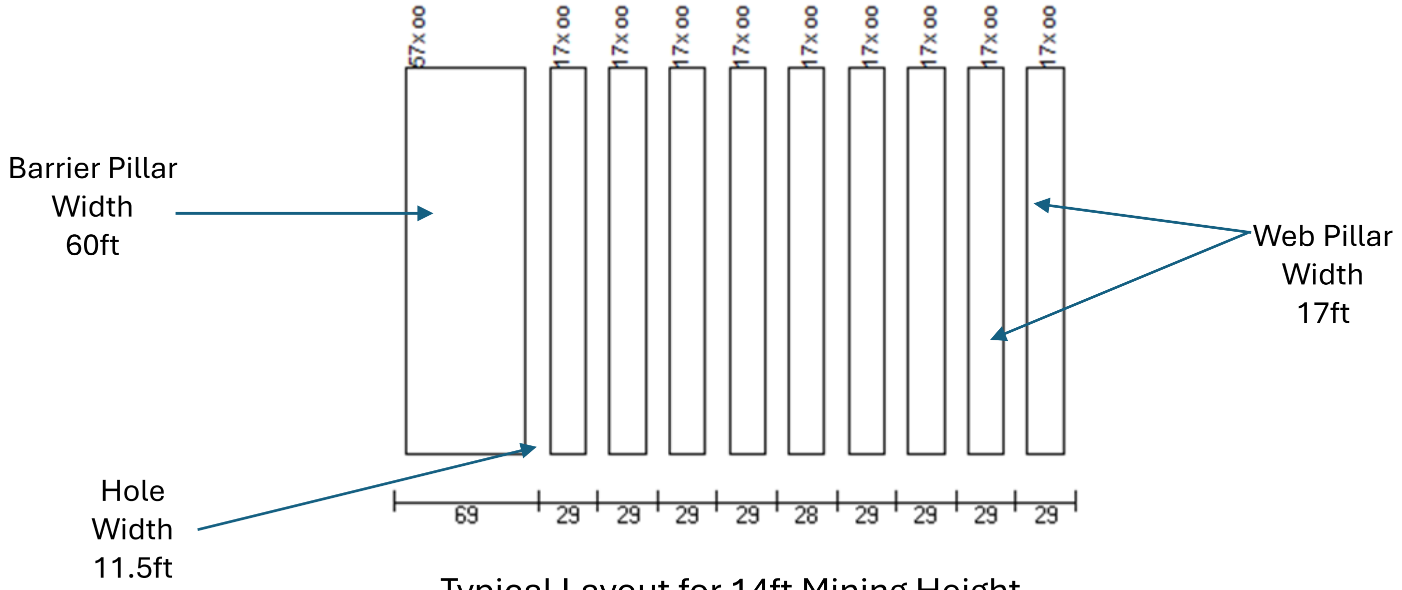
Figures
900-5a through 900-5d
Highwall Mining Layouts

Figure 900-5a

Web and Barrier Pillar Design For 10 Holes Per Panel

In-situ strength of coal, psi =	698	(ARMPS-HWM1.3 uses 900 psi as default value)
Average mining height, ft =	12	
Stability factor of web pillar=	1.6	Based on ARMPS_HWM recommendataion
stability factor of barrier pillar	1.5 or 2.0	

Depth, ft	Hole width (H_e), ft	Mining height (H),ft	Web pillar width (W), ft	W/H	No of holes in a panel	Barrier pillar width(BPW), ft	BPW/H	ARMPS-HWM stability factor (based on coal strength)			Panel width (excluding barrier), ft	% extraction	Panel width (including barrier), ft
								Web Pillar	Barrier pillar	overall			
300	11.5	10	**14.5**	1.45	10	**41**	4.1	1.6	1.6	2.19	245.5	40.14	286.5
300	11.5	12	**16.0**	1.33	10	**49**	4.1	1.6	1.8	2.25	259	37.34	308
300	11.5	14	**17.0**	1.21	10	**57**	4.1	1.6	1.9	2.29	268	35.38	325



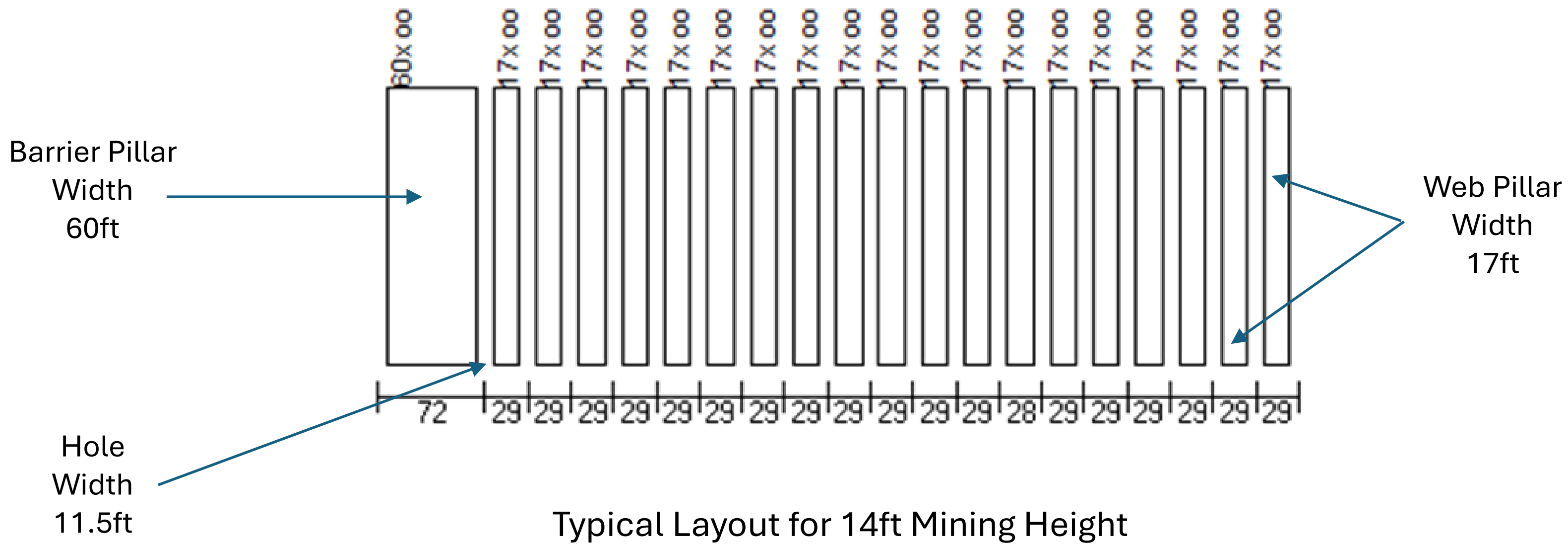
Typical Layout for 14ft Mining Height

Figure 900-5b

Web and Barrier Pillar Design For 20 Holes Per Panel

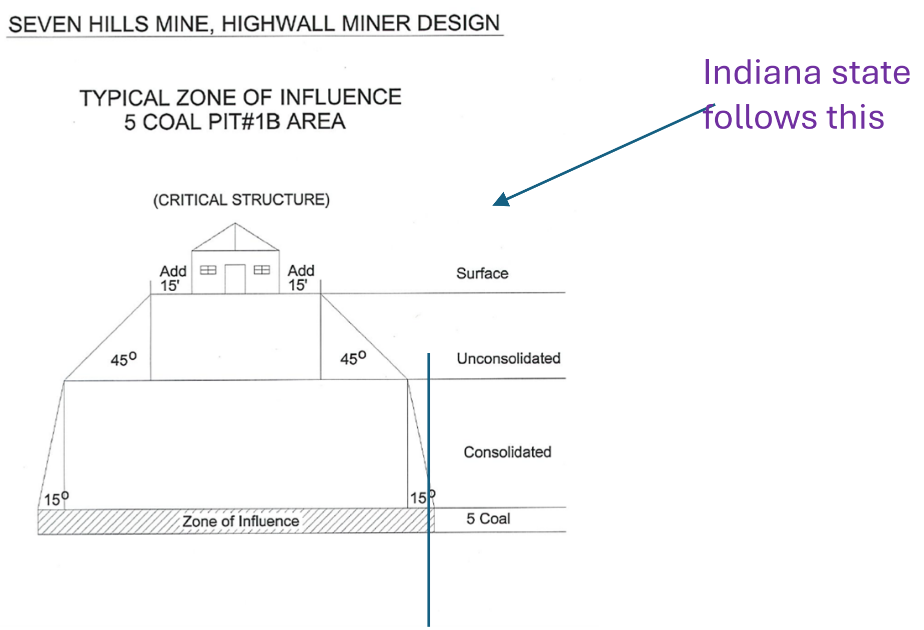
In-situ strength of coal, psi =	698	(ARMPS-HWM1.3 uses 900 psi as default value)	
Average mining height, ft =	12		
Stability factor of web pillar=	1.6	Based on ARMPS_HWM recommendataion	
stability factor of barrier pillar	1.5 or 2.0		

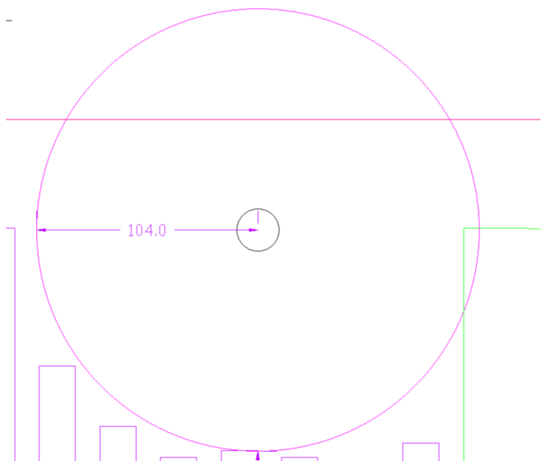
Depth, ft	Hole width (H_e), ft	Mining height (H),ft	Web pillar width (W), ft	W/H	No of holes in a panel	Barrier pillar width(BPW), ft	BPW/H	ARMPS-HWM stability factor (based on coal strength)			Panel width (excluding barrier), ft	% extraction	Panel width (including barrier), ft
								Web Pillar	Barrier pillar	overall			
300	11.5	10	**14.5**	1.45	20	**46**	4.6	1.6	1.8	2.01	505.5	41.7	551.5
300	11.5	12	**16.0**	1.33	20	**52**	4.3	1.6	1.9	2.01	534	39.25	586
300	11.5	14	**17.0**	1.21	20	**60**	4.3	1.6	2.1	2.01	553	37.52	613



Typical Layout for 14ft Mining Height

Figure 900-5c
Estimation of Zone of Influence For Critical Structures (Power Poles)





Rock type	Abutment Angle		Cover thickness, ft	Width, ft	Total width, ft	Total exclusion zone, ft	Average influence radius of critical structure, ft
Competent OB	15	0.267806947	285	76	106	213	**104**
Unconsolidated	45	0.99920399	15	15			
Competent OB	15	0.267806947	290	78	103	205	
Unconsolidated	45	0.99920399	10	10			

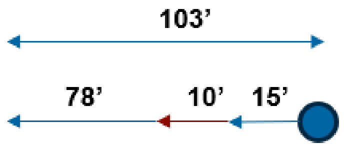
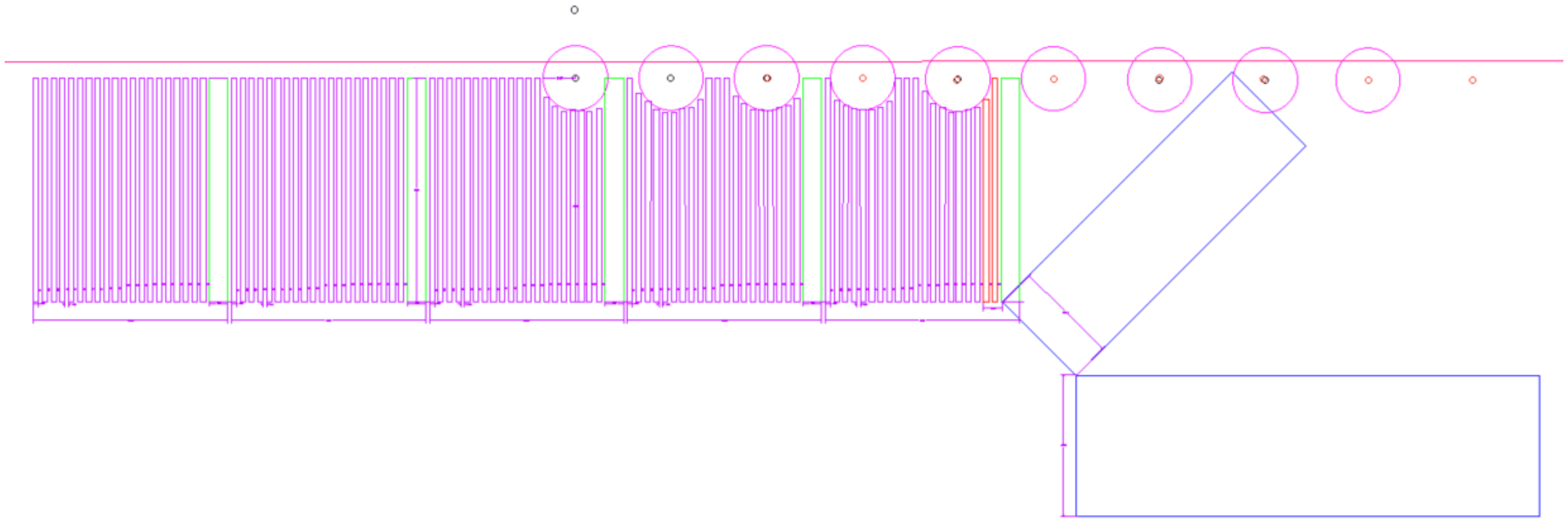


Figure 900-5d
Example of Critical Structure Offsets
Web and Barrier Pillar Layout For 20 Holes Per Panel With 14ft Mining Height

Depth, ft	Hole width (H_e), ft	Mining height (H),ft	Web pillar width (W), ft	W/H	No of holes in a panel	Barrier pillar width(BPW), ft	BPW/H	ARMPS-HWM stability factor (based on coal strength)			Panel width (excluding barrier), ft	% extraction	Panel width (including barrier), ft
								Web Pillar	Barrier pillar	overall			
300	11.5	10	**14.5**	1.45	20	**46**	4.6	1.6	1.8	2.01	505.5	41.7	551.5
300	11.5	12	**16.0**	1.33	20	**52**	4.3	1.6	1.9	2.01	534	39.25	586
300	11.5	14	**17.0**	1.21	20	**60**	4.3	1.6	2.1	2.01	553	37.52	613



Pit 7

Maximum length of hole- 725ft
Minimum length of hole- 620ft

Example Letter to Entities

El Segundo Mine
PO BOX 757
22 Miles N. on HWY 509
Grants, NM 87020
505-285-3000
505-285-3084

xxxxxxxxxxxxxx
0xxxxxxx
xxxxxxxx

October 11, 2024

Peabody Natural Resources Company (PNRC), El Segundo Mine (ESM), Permit No. 2020-01, Revision for the Method of Mining to adopt the use of Highwall-Mining

To whom it may concern:

Peabody Natural Resources Company (PNRC) has filed for a revision to El Segundo Mine, Permit No 2020-01, with the New Mexico Mining and Minerals Division of the New Mexico Energy, Minerals, and Natural Resource Department for the addition of a new mining method. Pursuant to Section 19.8.13.1301.A.(1)(b) of the New Mexico Administrative Code (NMAC): a revision to a permit shall be obtained for a change in the surface coal mining or reclamation operations described in the original application and approved under the original permit, when such changes constitute a significant departure from the method of conducting mining or reclamation operations contemplated by the original permit; significant departures as used herein include, but are not limited to changes in the method of extracting coal from the earth (e.g. change from surface to highwall mining).

PNRC will add highwall mining as another method to extract coal from the reserve already approved to be mined under Permit 2020-01. PNRC does not expect any changes to the approved performance bond or reclamation work as a result of extracting the coal from behind the existing highwalls. All reclamation activities will continue to be completed in accordance with the New Mexico Surface Mining Act (NMSA) and pursuant to Title 19 Chapter 8 of the NMAC.

The El Segundo Mine is located in McKinley County approximately 22 miles north on HWY 509, of Grants, NM on both sides of State Highway 509. Its mailing address is P.O. BOX 757, Grants, NM, 87020.

A copy of the revision application is available for public inspection at the following locations:

- County Clerk, McKinley County Courthouse, 207 W Hill Ave, Gallup, New Mexico, 87301.
- Grants Public Library, 1101 N First St., Grants, New Mexico, 87020.
- Mining and Minerals Division; 1220 South St. Francis Drive, Santa Fe, NM 87505; Contact Name: Erik Munroe
- https://www.emnrd.nm.gov/mmd/public-notices/

Within 30 days of the final publication of the public notice for this revision, written comments, objections, or requests for an informal conference must be submitted to the Director of New Mexico Mining and Minerals division or the Coal Mine Reclamation Program Manager at JamesR.Smith@emnrd.nm.gov, within. The publication can be found within the Gallup Independent and Cibola Beacon.

If you have any questions or comments, please contact me at (505) 285-3076, General Manager Seth Puls at (505) 285-3002, or MMD Coal Program Manager, Erik Munroe at (505) 670-9997.

Sincerely,

Chad Gaines
Tech Service Supervisor
Peabody Natural Resources - Lee Ranch Mine and El Segundo Mine

Public Notice

Public Notice

Peabody Natural Resources Company ("PNRC"), PO Box 757, Grants, NM 87020 gives notice that it has filed a revision for the El Segundo Mine, Permit No. 2020-01 with the Director of Mining and Minerals Division, New Mexico Energy, Minerals, and Natural Resources Department, pursuant to the regulations of 19.8.13.1301. A.(1)(b) of the New Mexico Administrative Code (NMAC): a revision to a permit shall be obtained for changes in the surface coal mining or reclamation operations described in the original application and approved under the original permit, when such changes constitute a significant departure from the methods of conducting mining or reclamation operations contemplated by the original permit; significant departures as used herein include, but are not limited to changes in the method of extracting coal from the earth (e.g. change from surface to underground mine). Per section 19.8.10.1007.A and 19.8.10.1007.B NMAC: This section applies to any person who conducts or intends to conduct surface coal mining and reclamation operations utilizing augering operations. Any application for a permit for operations covered by this section shall contain, in the mining and reclamation plan, a description of the augering methods to be used and the measures to be used to comply with 19.8.22 NMAC and demonstrate to the director that auger mining is the best method to recover the maximum coal resource.

The El Segundo Mine, approved as a "5-year term" permit on July 20, 2020 by the Energy and Minerals, and Natural Resources Department, Mining and Minerals Division (MMD), is located in McKinley County approximately 22 miles north on HWY 509, of Grants, NM on both sides of State Highway 509. The El Segundo Surface Coal Mine performance bond for permit 2020-01 is $62,223,740 to ensure the successful reclamation of disturbance within the 16,559-permit area, dated April 5, 2016. The permit area consists of 16,559 acres within T17N-R10W Sec. 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, & 36; T17N-R9W Sec. 30, 31, 32, 33, 34, 35, & 36; T16N-R10W Sec. 1, 2, 3, 11, & 12; T16N-R9W Sec. 2, 3, 4, 5, 6, 7, 8, & 18.

A copy of the revision application is available for public inspection at the following locations: McKinley County Courthouse, County Clerk's Office, 201 W. Hill, Gallup, New Mexico; the Grants Public Library, 1101 N First St., Grants, New Mexico; and on the New Mexico Mining Website at https://www.emnrd.nm.gov/mmd/public-notices/. Written comments or objections must be submitted to the Director of MMD or the Coal Mine Reclamation Program Manager at Erik_Munroe@emnrd.nm.gov, within 30 days after last publication of this notice. A formal public meeting hosted by the director and PNRC will be held on XXX, at 1PM at the Grants Public Library, 1101 N First St., Grants, New Mexico to address any concerns from the public.

Plate 903-1 Facility Map

LEE RANCH

P.O. Box 757
Grants, NM 87020

EL SEGUNDO MINE

PERMIT 2020-01
PLATE 903-1
Facilities Map
Revision HWM 2024

Seam: Varies Date: October 10, 2024 Drawn By: PCG	County(s): McKinley State: New Mexico USGS Quads: Laguna Castillo & Orphan Annie Rock
Latitude: 35° 37' 30" Longitude: 107° 51' 20" Contour Interval: Five (5) Feet	Topo/ Aerial Source: Drone in House July 2024
SCALE: 1" = 1000'	0' 1000' 2000' 3000'