El Segundo Mine
A DIVISION OF PEABODY NATURAL RESOURCES COMPANY

ENVIRONMENTAL ASSESSMENT
for
NEW SOURCE NPDES PERMIT

December 2019

Peabody Natural Resources Company
El Segundo Mine
P.O. Box 757
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ENVIRONMENTAL ASSESSMENT
ON THE PROPOSED ISSUANCE OF
A NEW SOURCE NPDES PERMIT TO THE
Peabody Natural Resources Company EL SEGUNDO MINE

1.0 GENERAL PROJECT INFORMATION

Peabody Natural Resources Company (PNRC) operates the El Segundo surface coal mine located approximately 35 miles north of the town of Milan, New Mexico in accordance with mining permit No. 2015-01 issued in September 2015 by the Mining and Minerals Division (MMD) of New Mexico's Energy, Minerals and Natural Resources Department. The permit area encompasses about 15,000 acres of State, Federal, and private surface and mineral ownership. Coal produced from the El Segundo Mine is transported via railroad to existing regional coal fired power plants to maintain current power production at each plant.

Temporary impoundments are the only treatment facilities currently used or planned in the future for surface and groundwater drainage from large areas disturbed by mining activities during the life of the El Segundo Mine. The impoundments have been designed and constructed to provide treatment of disturbed area runoff before discharging to receiving waters in order to meet applicable state and federal water quality laws and regulations and effluent limitations under both New Mexico and federal rules. PNRC acquired an individual new source NPDES point-source permit (Permit No. NM-0030996) from the U.S. EPA for the El Segundo Mine sediment ponds and facilities area sediment ponds that have the potential to discharge to receiving streams on January 18, 2016. The expiration date of the permit is October 31, 2019. PNRC submitted a application for a renewal of the El Segundo NPDES permit on July 25, 2019. This Environmental Assessment (EA) is prepared for the proposed action of renewing a new source NPDES permit for discharges of treated disturbed area runoff from temporary impoundments, many of which have already been constructed and some are planned for construction over the life of mining at the El Segundo Mine.

1.1 Purpose and Need for the Proposed Project.

The El Segundo Mine supplies coal to existing coal fired power plants under negotiated spot and contract sales to maintain production of electricity from each plant. Temporary impoundments are needed at the El Segundo Mine to treat disturbed area runoff and groundwater drainage in order to meet the requirements under subpart 2010 of New Mexico Administrative Code 19.8.20 (NMAC, 2008) and effluent limitations under NPDES regulations at 40 CFR Part 434. Discharges to receiving streams from point sources associated with temporary impoundments already constructed or planned for the El Segundo Mine have been determined to be new sources by the USEPA and will need to meet applicable state and federal water quality standards and effluent limitations in accordance with the terms and conditions of an individual NPDES permit.

1.2 Project Description.

The El Segundo Mine permit area encompasses about 15,000 acres of State, Federal and private surface and mineral ownership and is located approximately 35 miles north of Milan, New Mexico along State Route 509, McKinley County (T16N R10W, T17N R10W, T16N R9W, and T17N R9W). Surface mining activities are conducted in multiple pit areas by employing a dragline, truck and shovel operation. The subbituminous coal is mined from multiple seams found in the Basal Cleary Member of the Menefee Formation. Mineable coal seams range from 1 foot to 17 feet in thickness. Peak annual coal production is expected to be about 5 million tons, depending upon coal sales. The estimated total coal production for the life of the El Segundo Mine is 117 million tons over approximately 25 years. Coal is transported from the mine via a railroad loop owned by the Burlington Northern/Santa Fe Railroad.

Mining will disturb approximately 8,000 acres over the life of mining. Because mining and reclamation of disturbed areas at the El Segundo Mine will be performed contemporaneously, it is anticipated that less than 2000 acres will remain disturbed in any one year. The disturbed acres will be reclaimed to support post-mining land uses of rangeland grazing and wildlife habitat.

PNRC has developed specific mining and reclamation plans for the El Segundo Mine and has submitted these to the MMD in the form of a Permit Application Package (PAP). The plans address information required under Title 19, Natural Resources and Wildlife, Chapter 8, Coal Mining of the New Mexico Administrative Code. After review of the original PAP in 2004, MMD issued PNRC mining permit No. 2005-01 for the El Segundo Mine in September 2005. In 2015, El Segundo Mine submitted a permit renewal application to the MMD for mining permit No. 2015-01, and the renewed permit was approved in September 2015 as Permit No 2015-01. The PAP includes detailed information on plans to use appropriate mining and reclamation practices such as temporary sediment impoundments to meet the requirements specified at Subpart 2010 of NMAC 19.8.20 and effluent limitations for surface coal mining under NPDES regulations at 40 CFR Part 434. Discussions presented in Section 3.0, Affected Environments and Impacts, are based on detailed baseline and PAP information about the environment within and adjacent to the El Segundo Mine and assessments of impacts associated with the mining and reclamation plans provided in the El Segundo PAP, the MMD's Cumulative Hydrologic Impact Assessment (CHIA) and other decision documents and correspondence related to the El Segundo Mine.

1.3 Mining and Reclamation Activities

El Segundo is a terraced, advancing open pit mine (Attachment F). Coal would be recovered from up to nine seams, which range in thickness from 1 to 17 feet. Coal quality varies, requiring that coal be blended to produce a shippable product. To achieve appropriate blending, multiple areas of the mine are developed to assure that adequate quantities are available for blending and stockpiles are maintained. Approximately 8,000 acres will be disturbed by mining activities over the life of the mine.

The general mining sequence used at the mine includes the following steps, and is described in detail in the sections below for each mineable coal seam:

1. Removal of vegetation.
2. Topdressing removal.
3. Drilling and blasting of overburden/interburden.
4. Excavation of overburden/interburden.
5. Drilling and blasting of coal (if necessary).
6. Recovery of coal.

Major mining equipment used at the El Segundo mine is summarized in Table 1.3-1.

Table 1.3-1. Major Equipment Employed at the El Segundo Mine

Equipment	Number	Type
Dragline	1	Bucyrus Erie 1570-W
Dozers	7	CAT D11 Track Dozer
	4	CAT D10 Track Dozer
	3	Tiger 690 Rubber Tire Dozer
Trailers	1	170 Ton Wabco Lowboy
Dump Trucks	5	270 Ton Unit Rig Belly Dump Truck
	14	Terex 240 ton end dump truck
	2	250 Ton Unit Rig Belly Dump Truck
Haul Truck	3	Volvo 40 Ton Haul Truck
Water Trucks	1	Wabco 35K gallon water truck
	1	Wabco 20K gallon water truck
	1	Wabco 18K gallon water truck
	1	Rimpull WT30 water truck
Loaders	1	CAT 988G loader
	2	Letourneau L1100 loader
	1	Letourneau L1350 loader
	1	CAT 994H loader
Graders	3	CAT 16 Motor Grader
	1	CAT 24 Motor Grader
Drills	2	Ingersoll Rand DMM2 blast hole drill
	1	Ingersoll Rand D30 blast hole drill
	1	Atlas Copco PV275 Blast Hole Drill
	1	Drilltech D55 SP Blast Hole Drill
Scrapers	2	CAT 637 Scraper
	2	CAT 631 Scraper

Removal of Vegetation and Topdressing. Vegetation and topdressing (soil that has been identified as suitable plant growth medium) would be removed in advance of mining activities to protect topdressing from contamination during drilling, blasting, and excavation. Topdressing would be removed by scrapers or front-end loaders and moved using haul trucks either to stockpiles, where it is retained for use in future reclamation, or directly to areas being reclaimed. Topdressing stockpiles at the El Segundo Mine are located near active pits (Attachment F).

Drilling, Blasting, and Removal of Overburden and Interburden. Overburden is consolidated or unconsolidated rock that overlies the uppermost coal seam. Interburden is the material that lies between seams of coal. In areas where unconsolidated overburden or interburden exists, electric front shovel or loaders in combination with haul trucks would remove this loose material. Consolidated overburden and interburden materials are drilled and blasted and then removed using haul trucks, shovels, and front-end loaders. A dragline may also be used, typically when blasted overburden or interburden thickness exceeds 30 feet. The excavated overburden and interburden would be utilized to backfill the pits and to create the post-mining topography. The overburden handling and storage areas are shown on the Map in Attachment F.

Blasting operations consist of site preparation, laying out the blast hole pattern, drilling blast holes, loading blast holes with explosives, and then detonating the explosives. The primary blasting agents used at the mine are ammonium nitrate fuel oil (ANFO), heavy ANFO, and pre-packaged emulsion blends. The amount of blasting agent used could range from approximately 20 to 1,200 pounds per hole. The scaled distance formula would be applied to calculate the weight of explosives. In addition to conventional blasting methods, blast casting would be used. Blast casting involves adjusting the configuration of holes and blast timing to cast the overburden/interburden into the open pit at a low angle trajectory to confine the vertical displacement and minimize flyrock. Blasting would occur during daylight hours with the exception of emergencies that may threaten employees or equipment.

The use of blast monitoring equipment is not expected unless seismic information is needed to modify the scaled distance formula. Blasting schedules would be published in local newspapers and distributed to local governments, public utilities, and residents within one-half mile of the El Segundo Mine permit boundary. Entrances to the mine from public and private roads would be posted, and manned lookouts would monitor for livestock and unauthorized personnel in the blasting area. Mine personnel would be notified via mine radios and sirens. Details of blast warnings are given in Section 902 of the Mine Permit (PNRC 2015).

Coal Removal, Handling, and Transportation. Coal would be recovered from up to nine seams in using front-end loaders, hydraulic shovels, scrapers, and a dragline. Bulldozers, motor graders, front-end loaders, and scrapers would be utilized for cleaning and ripping coal prior to removal, as needed. Blasting could be used to break up coal seams and would occur as described above for overburden/interburden blasting. The anticipated annual production from the El Segundo Mine is shown in Table 1.3-2.

Table 1.3-2. Anticipated Annual Coal Production from the El Segundo Mine and Project Area

Year	Total El Segundo Mine

Year	Total El Segundo Mine
2008	3.28
2009	5.05
2010	6.64
2011	8.04
2012	8.57
2013	8.68
2014	8.44
2015	7.48
2016	4.90
2017	4.86
2018	5.55
2019	5.52
2020	5.00
2021	4.20
2022	4.20
2023	4.20
2024	4.20
2025	3.40
2026	3.25
2027	3.30
2028	3.40
2029	3.13
2030	1.19
TOTAL	116.48

Coal is loaded into haul trucks and transported to the truck dump or coal stockpile (Attachment F). The truck dump consists of a hopper and feeder/breaker system and a secondary crusher. A conveyor system would move the crushed coal to one of three coal stockpiles fed by stacking tubes that are connected to the train loadout and stockpile reclaimers. Enclosures, water sprays, and/or atomizers are used to control fugitive dust emissions from the coal-handling facilities. The rail loop would be used to transport coal shipments from the El Segundo Mine to customers. No new loading facilities or modifications to existing facilities are proposed.

1.3.1 Reclamation

PNRC is required to reclaim all areas disturbed during surface mining operations and to establish plant communities that are native to the area, which would support the designated post-mining land use of rangeland and wildlife habitat. A reclamation plan is included in PNRC's approved El Segundo Mine Permit and would be implemented on all disturbed areas after mining. The objectives of the reclamation plan are to minimize potential adverse environmental impacts, create a landscape configuration that is compatible with the post–mining land use and

surrounding terrain, return disturbed areas to the pre-mining land use of rangeland using seeds from native plants, reduce the likelihood of the persistence and dissemination of noxious weeds, and meet the revegetation standards for success specified in the El Segundo Mine Permit (PNRC 2015, Subpart 2065). Reclamation would be contemporaneous per MMD provisions. Reclamation would include the following steps described in more detail in the subsequent sections:

1. Backfilling, grading, and contouring.
2. Redistribution of topdressing.
3. Surface ripping.
4. Revegetation with native plants.
5. Reclamation monitoring.

An annual timetable for the major steps in the reclamation plan is presented in Table 1.3-3. The primary period for seeding permanent vegetation is late summer to early fall with a secondary period of October through December. These times are selected to maximize seed germination, which is strongly correlated with adequate moisture. The timing of the reclamation operations would be influenced by several factors—the most significant being modification of the operations plan to meet coal quality requirements and accommodate coal demand by customers. PNRC would conduct reclamation operations as contemporaneously as practicable with the mining operations.

Table 1.3-3. Anticipated Timing of Reclamation Activities

Activity	J	F	M	A	M	J	J	A	S	O	N	D
Topdressing Removal	P	P	S	S	S	S	S	S	P	P	P	P
Backfilling	P	P	P	P	P	P	P	P	P	P	P	P
Grading	P	P	P	P	P	P	P	P	P	P	P	P
Topdressing Placement	P	P	S	S	S	S	S	S	P	P	P	P
Soil Sampling	P	P	P	P	P	S	S	S	S	S	S	S
Revegetation:												
Permanent				P	P	P	P	P	P			
Temporary						P	S	P	P	P	P	S

P = primary; S = secondary.

Backfilling, Grading, and Contouring. Backfilling, grading, and contouring of the site would create a stable landscape compatible with the surrounding terrain and with the post-mining land use of rangeland. Post-mining topography would create stable slopes to maintain pre-mine drainage. Haul trucks would transport excavated overburden and interburden to be spread by bulldozers and motor graders.

Redistribution of Topdressing. Haul trucks or scrapers would deliver topdressing materials (topsoil and subsoil) to areas being reclaimed. When possible, topdressing materials would be

directly redistributed on graded spoils, but topdressing could be stockpiled. Topdressing depth would vary based on soil type, suitability of spoil material, and topography. Generally, topdressing would be applied in a manner that would mimic pre-mining distributions. This could include greater soil depths in valley bottoms, upland swales, and toe slopes and lesser depths on slopes. Berms may be installed around the perimeter of newly topdressed areas to decrease runoff and trap sediment. Berms would be installed around topdressing stockpiles to control erosion. Topdressing stockpiles that are expected to be undisturbed for over 3 years may be seeded with the permanent seed mixture or an approved modified seed mixture.

Surface Ripping. Following redistribution of topsoil, the topsoil and underlying surface spoil would be ripped to reduce compaction that may have occurred during backfilling and grading or topsoil redistribution. Ripping would be completed using either motor graders equipped with a ripping tool or ripping implements pulled by a large farm tractor or small dozer.

Revegetation. Topdressed areas would be seeded with the permanent seed mixture during the first favorable planting season that occurs after grading and seedbed preparation. The revegetation plan would be designed to establish a permanent vegetative cover of native plants that supports the post-mining land use of rangeland and wildlife habitat and reduces the presence of noxious weeds. Only native perennial grasses, shrubs, and forbs would be used for revegetation. In most circumstances, a core group of seeds would be used (Table 1.3-4). Seeds of other plants would be added to the mix or used as substitutes when they are available. Where necessary, areas would be tilled to prepare a suitable seedbed. The use of fertilizer is not anticipated because the native species are adapted to low fertility soils existing near the mine. Seeding could employ a drill, broadcast seeder, or hydroseeder—depending on circumstances. Vegetation from topdressing stockpiles or weed-free hay or straw could be used as mulch to reduce erosion. Irrigation of reclaimed lands is not anticipated.

Prior to and after mining, PNRC would survey and treat noxious weeds with herbicides. An invasive/noxious weed management plan has been developed for the mine and is available in Exhibit 906-1 of the El Segundo Mine Permit (PNRC 2015).

Table -1.3-4. Primary Species Used in Reclamation

Warm-season grasses
▪ blue grama (*Bouteloua gracilis*)
▪ Indian ricegrass (*Achnatherum hymenoides*)
▪ galleta (*Pleuraphis* spp)
▪ alkali sacaton (*Sporobolus airoides*)
Cool-season grasses
▪ bottlebrush squirreltail (*Elymus elymoides*)
▪ western wheatgrass (*Pascopyrum smithii*)

Shrubs ▪ fourwing saltbush (*Atriplex canescens*) ▪ shadscale (*Atriplex confertifolia*) ▪ winterfat (*Krascheninnikovia lanata*)
Forbs ▪ blue flax (*Linum perenne*) ▪ white prairie clover (*Dalea candida*) ▪ prairie coneflower (*Ratibida columnaris*) ▪ gooseberry-leaf globemallow (*Sphaeralcea grossulariifolia*)

Reclamation Monitoring. Once the area has been regraded, topdressed, and revegetated, PNRC would ensure that the area is successfully reclaimed. PNRC, in consultation with MMD, adopted success standards based on pre-mining vegetation sampling at and near the El Segundo Mine. Reaching or exceeding the target values for the four parameters shown in Table 1.3-5 would be used to ascertain success of reclamation.

Table 1.3-5. Revegetation Standards

Parameter	Standard
Perennial production	243.5 pounds/acre
Basal cover of all species	10.5% (determined by weighted mean)
Shrub diversity and cover	2 species at 5% cover each AND 436 stems/acre
Grass diversity and cover	2 warm season grasses, each with at least 5% cover AND 1 cool season grass with at least 1% cover

1.3.2 Resource Protection Design Features

PNRC is committed to a number of design features including plans and processes designed to minimize or eliminate potential adverse impacts to environmental, cultural, and human health and safety resources pursuant to regulatory requirements and mining and reclamation best practices. All of these plans and processes are included in the El Segundo Mine Permit as enforceable commitments (PNRC 2015). Design features are considered part of the Proposed Action. Table 1.3-6 lists these design requirements and the resources they would affect.

Table 1.3-6. El Segundo Mine Design Features

Resource Protection Design Features	Resources Affected
Air Pollution Control Plan (19.8.20.2050 NMAC)	Air Quality, Vegetation, Wildlife and Migratory Birds, Special Status Species, Public Health and Safety, Visual Resources
Signs and Markers (19.8.20.2000 NMAC)	Public and Workforce Health and Safety
PM_{10} Monitoring Plan (19.8.9.904 NMAC)	Air Quality, Public Health and Safety
Reclamation Plan (19.8.9.906 NMAC, all applicable Parts)	Vegetation, Soils, Land Use, Invasive/Noxious Weed

Resource Protection Design Features	Resources Affected
	Control, Air Quality, Visual, Wildlife and Migratory Birds, Special Status Species, Water, Public Health and Safety
Spill Prevention Control and Counter Measures Plan (Federal Water Pollution Control Act, Clean Water Act [CWA])	Soils, Water, Vegetation, Wildlife and Migratory Birds, Special Status Species, Regulated Waste, Public Health and Safety
NPDES Individual Permit (NM0030996), Multi-sector General Permit (CWA Sections 401 and 402)	Surface Water, Soils
Invasive/Noxious Weed Management Plan (19.8.20.2061 NMAC)	Invasive and Non-native Species, Vegetation, Wildlife and Migratory Birds, Special Status Species, Land Use
Protection of Public Parks, and Historic Places (19.8.9.912 NMAC)	Cultural Resources, Traditional Cultural Properties
Fish and Wildlife Protection Plan (19.9.9.905 NMAC)	Wildlife and Migratory Birds, Special Status Species Raptors
OSM regulations (30 CFR 761.14) *Procedures for relocating or closing a public road or waiving the prohibition on surface coal mining operations within the buffer zone of a public road*	Traffic and Transportation
Protection of the Hydrologic Balance (19.8.20.2009 NMAC, all applicable Parts)	Surface and Groundwater quality and quantity, Soils
Hydrologic Monitoring Plan (19.8.9.907 NMAC)	Surface and Groundwater quality and quantity
Storm Water Pollution Protection Plan (CWA Section 402) NMR053370	Surface Water, Soils
Blasting Plan (19.8.9.902 NMAC)	Public Health and Safety, Public Property, Air Quality, Noise

Note: CWA = Clean Water Act; CFR = Code of Federal Regulations NMAC = New Mexico Administrative Code

2.0 ALTERNATIVES

2.1 Alternatives Available to the EPA.

2.1.1 Approve the Project as Proposed

EPA can decide the proposed project impacts are not significant and renew the individual new source permit.

2.1.2 Approve a Modified Project

Information received during the EA process could result in the identification of significant adverse impacts that can be mitigated by modifying the proposed project. Modification of the project to mitigate the impacts may allow the EPA to find the modified project impacts are not significant and renew the individual new source permit.

2.1.3 No Action

EPA can determine that the project as proposed would result in significant adverse impacts to the environment that cannot be satisfactorily mitigated and withhold the individual permit. An Environmental Impact Statement (EIS) would be needed to evaluate the potentially significant impacts. The EIS process includes a scoping meeting to identify critical facts and issues, a Draft EIS, a public comment period on the Draft EIS, a public hearing on the Draft EIS, the Final EIS, a public comment period on the Final EIS, and a Record of Decision.

2.2 Alternatives Considered by the Applicant

Regulatory authorities and the coal industry alike generally agree the use of sediment impoundments is the best practicable control technology currently available (BPT) for treating alkaline mine drainage from areas affected by surface coal mining activities. During active mining, sediment impoundments provide for adequate treatment of alkaline mine drainage in order to achieve the required effluent limits at 40 CFR 434 Subpart D. In the western United States, sediment impoundments are also considered to be BPT for treating runoff from reclaimed surface coal mined lands under 40 CFR 434 Subpart E until bond release. Once vegetation becomes reestablished and other best management practices are implemented, recently promulgated effluent limitations at 40 CFR 434 Subpart H will allow removing the sediment impoundments if postmining sediment yields are demonstrated to be comparable to premining conditions.

The applicant considered several alternative runoff control plans involving sediment ponds and diversions before selecting the plan ultimately approved by MMD that resulted in the NPDES application that is the subject of this EA. Criteria considered by the applicant in the selection process included the amount of overall land disturbance, runoff treatment effectiveness, environmental impacts, logistics, cost, and feasibility.

2.2.1 Alternatives Rejected by the Applicant

One alternative considered but rejected was to construct a smaller number of very large impoundments at the furthest down-stream locations in the permit area. While this might minimize the number of impoundments, and therefore NPDES outfalls, it also results in removing the largest amount of drainage area from the watersheds. This alternative was rejected by the applicant because removing the largest amount of drainage from the watershed would have greater potential impacts on the downstream surface water system. Placing a larger number of smaller sediment impoundments as close as practicable to the disturbance areas in the upper portions of the watersheds would leave a greater portion of the major watersheds open.

The applicant also considered but rejected using diversions to divert as much runoff as possible back to the open coal recovery pits and construct sumps to collect the water. The applicant rejected this alternative because it would necessitate ongoing modification of the diversions and sumps as the pits advance and the previous pit is backfilled in order to conduct contemporaneous reclamation. Ongoing design changes and modification of the drainages and sumps is cost prohibitive and results in significant administrative effort to update the mining permit document. In addition, this alternative creates a high likelihood of water management problems on the pit floor that could result in operational problems for coal extraction.

2.2.2 Preferred Alternative

The applicant carefully reviewed design criteria before selecting the final design parameters for all temporary impoundments, including those proposed as NPDES outfalls in the permit renewal application that is subject to this EA. Two fundamental design configurations were examined, both of which involved using incised ponds without embankments and comply with the applicable MMD regulations pertaining to impoundment design at NMAC 19.8.20.2014. The first involved sizing the impoundments to treat the 10-year, 24-hour precipitation event combined with designed spillways to handle flow from a 25-year, 6-hour precipitation event. The second involved sizing the impoundments to contain the runoff from the 100-year, 6-hour precipitation event and using appropriately designed spillways for impoundments located upstream of the most downstream impoundments proposed as NPDES outfalls.

The latter design was chosen as the preferred alternative because it provides for more effective treatment of water (greater retention time to allow sediment to drop out of suspension), greater control of discharges (manual pumping), reduced risk of non-compliance discharges, and greater opportunity to store and utilize water for road dust suppression that would otherwise be obtained from groundwater. While this approach would result in greater construction costs, the applicant believes the costs will be offset by reduced long term maintenance costs.

In summary, the applicant developed a runoff control and treatment plan that results in using a minimal number of diversions combined with the use of sediment impoundments that will contain runoff from the 100-year, 6-hour precipitation event. This plan was selected because it results in the most effective water treatment scheme to minimize the potential for non-complaint

discharges, while minimizing impacts to the downstream surface water system and land disturbance during mining and reclamation.

3.0 AFFECTED ENVIRONMENTS AND IMPACTS

3.1 Land Resources.

The pre-mine land use on the El Segundo permit area is primarily rangeland. The area is also used by a variety of wildlife which is related to the rangeland character of the area. A secondary use is recreation and this is primarily related to hunting. Improvements within the permit area include powerlines, pipelines, stock water ponds, fences, ranch roads, erosion control structures, monitoring and production water wells, and a county road. State Road 509 bisects the permit area north to south in a right-of way that is 150 feet wide with mine permit boundaries 100 feet either side of the right-of-way. No buildings are within 1000 feet of the permit area. There are no cemeteries located on or within 100 feet of the permit area. There had been no previous mining in the El Segundo permit area.

The premining condition of the permit area was evaluated by comparing vegetation and soils baseline information with the best fit Natural Resources Conservation Service (NRCS) range site descriptions. The five identified vegetation types in the permit area correlated with seven range sites. Analysis of the baseline information with the range site descriptions indicates that the overall range condition is poor on the permit area.

The capability and productivity of the permit area were evaluated by comparing baseline information to the NRCS McKinley County Soil Survey information. All of the soil series within the El Segundo permit area are in Class VI to VIII. The Class VI and VII soils have extreme to very severe limitations that restrict their use to rangeland, watershed, recreation or wildlife. Class VIII soils include rock and barren areas. The productivity of the permit area is considerably less than what is estimated from either the soil survey interpretations (McKinley County Soil Survey) or the NRCS range site descriptions most relevant to the permit area. The calculated stocking rate from vegetation baseline studies is 9 acres/Animal Unit Month (AUM). NRCS estimates stocking rates under good range condition should be 4 to 5 acres/AUM.

3.1.1 Geology

The El Segundo Mine is located in the southeastern plains of the San Juan Basin, bordered by the uplands of Chacra Mesa to the northwest, Mt. Taylor volcanic area and San Mateo Dome to the southeast, and the Zuni Uplift and Rutria Monocline to the southwest. The tectonic setting is uncomplicated with the beds dipping gently to the northeast into the San Juan Basin at a rate slightly greater than one degree. Geologic formations present at El Segundo are the basal Mesa Verde Group, Point Lookout sandstones, and the Menefee Formation coals and shales. In this area of the San Juan Basin, the Menefee Formation is divided into the upper barren Allison Member and the basal, carboniferous Cleary Member.

The Cleary member of the Menefee formation contains the mineable coal seams. There are 1 to 9 seams, varying from 1 to 17 feet in thickness that could be recovered. The primary recoverable seams are the blue and green followed by the tan and brown seams. The upper overburden is mostly sandstone with some shale. Once the upper tan seam is encountered, interburden and

partings tend towards interbedded sandstones, siltstones, mudstone and shales to the lower recoverable green seam. The typical geologic column shows approximately 230 feet of overburden and interburden to the bottom of the lower recoverable green seam.

Paleontological resources noted during pre-mine inventories were limited to silicified fossil wood and leaf floras. The topography at the El Segundo Mine is described as low cuestas and shallow drainages. The permit area is bisected north to south by the Continental Divide. Sandstone outcrops are present within and adjacent to the permit area with cliff faces generally less than 100 feet in height.

3.1.2 Soils

Soils in the El Segundo permit area are typically formed from sandstone parent materials and minor inclusions of shale and siltstones. Many of the soils have developed from eolian deposits or dune formations. Some of the dune or eolian deposits are recent and have been reworked by wind action. The sandstone parent material and formations are the primary source for the eolian deposits and dunes. Alluvial soils derived from sandstones and shales are common in drainages, swales, and old lakebeds or playas. To a lesser degree, soils derived from colluvium may be present in the permit area. The extensive sandstone parent material has resulted in many of the soils having predominantly sandy textures. The soils derived from alluvial material or shales tend to be clayey with high pH levels or are sodium affected. There are sandstone escarpments, rock outcrops, and ridges scattered throughout the permit area. Major soil series include Marianolake, Shiprock, Skyvillage, Norkiki, Doak, and Penistaja.

3.1.3 Prime farmland soils

There are no prime farmland soils in the El Segundo permit area. The MMD has determined that no prime farmlands exist at El Segundo (MMD, 2015).

3.1.4 Impacts and Mitigation

Land Use. Land use and productivity of the permit area will be affected during mining operations and the early stages of reclamation. Reclamation procedures in the approved permit will restore vegetation cover and productivity in a relatively short time. Revegetation can improve vegetation composition and productivity similar to a range improvement project. Reclamation allows restoration and conservation of the identified land uses. Some premining structures and improvements will be restored or reestablished as a result of agreements and mitigation practices. Loss of land use and productivity will be short-term and the overall impacts will be minor or negligible.

Soils. As a part of the approval process for the El Segundo Mine permit application, the MMD performed a thorough administrative review and technical analysis. Impacts and mitigation for soils were considered in the analysis and the findings are presented in the July 2005 Technical Analysis Summary prepared by the MMD (MMD 2005). There were no negative findings

regarding soils resource information or the soil handling plan.

Mining and related activities, including facilities and roads, will affect the soil resources identified on the El Segundo permit area. Subpart 810 "Soil Resources Information" of the approved El Segundo PAP presents detailed soil survey information. Included in this section is a detailed analysis of the premine soils and their suitability for reclamation. This analysis identifies those soils suitable for reclamation and the volumes available for salvage. Subpart 906.B(4) of the approved El Segundo PAP provides a detailed plan for salvage, handling, redistribution and protection of the soil resource. The impact will be short-term with a minor and temporary loss of soil viability for stockpiled soils. Soil viability returns in a relatively short time. For soils that are live handled (salvaged and immediately applied on re-graded surfaces) the impact will be negligible and soil ecosystem function quickly reestablished.

Geology. Mining will affect about 230 feet of overburden and interburden on areas mined within the approximately 7,860 acre El Segundo disturbance area. The existing geology in the upper 230 feet of the mined areas, consisting of sedimentary rock lithology and gently sloping structure, would be disturbed permanently. The surface and shallow subsurface geology would be modified substantially by mining. Open pits are backfilled with unconsolidated spoil resulting from the removed strata. The spoil material is sampled for plant growth suitability as per MMD criteria and as described in Subpart 803 of the approved PAP. The strata above the bottom of the deepest recoverable coal seam largely exhibits unsaturated and discontinuous ground water characteristics and thus mining should result in minimal impacts.

The operation plan will be designed and implemented to maximize coal recovery and protect coal resources after mining. An estimated total of 117 million tons of coal is recoverable within the permit area. Some coal will be lost during mining due to normal stripping, quality issues, and seam thickness too thin for efficient recovery. This impact is considered normal given current mining technology and the strategraphic nature of the coal being mined. Oil and gas are produced in the region but any economic deposits of oil and gas present are in deep sedimentary formations under the permit area and thus would not be impacted. Exploration for these resources would be restricted during mining operations, but would remain for future exploration. No unique paleontological resources have been identified within the permit area, therefore impact on unique and important paleontological resources in the proposed mining area is not anticipated.

3.2 Water Resources

3.2.1 Surface Water

The El Segundo permit area straddles the continental divide. Surface water drainage on the west side of the divide flows into the San Juan basin, and drainage on the east side flows into the Rio Grande basin. Surface water within the permit area is confined to small ephemeral arroyos. The east portion of the permit area is drained by Inditos Draw (see El Segundo Mine Topography, Attachment F), a tributary of Vought Draw which flows into Arroyo Leon, a tributary of the Rio Puerco which flows into the Rio Grande. The west portion of the permit area is drained by an

unnamed arroyo, through Laguno Castillo before flowing into the Kim-me-ni-oli Valley, a tributary of the Chaco River which flows into the San Juan River, a tributary of the Colorado River.

3.2.1.1 Surface Water Quantity

Surface water within the permit area is primarily restricted to ephemeral arroyos that flow only in direct response to storm events or snow melt and have channel bottoms that are above the local water table. There are no springs or wetlands within or immediately adjacent to the El Segundo permit area. Surface water within the permit area is occasionally used by livestock and wildlife when the arroyos are flowing, but these flows are typically of short duration and commonly dissipate completely due to infiltration along the sand bed channels as they travel downstream. The watercourses throughout most of the area are broad, flat channels whose flow depths for the 10-year, 24-hour event are generally less than three feet, occasionally concentrating into channels approaching four feet in depth.

A USGS stream gauging station on Kim-me-ni-oli Wash (09367687) was maintained from October 1981 through September 1983. The drainage area at this monitoring station is 228 square miles. The maximum discharge during this time was 1,060 cubic feet/second (cfs), and minimum flows were represented by periods of no flow. The USGS maintained a continuous flow monitoring station on Arroyo Leon (08340500) just upstream of its confluence with the Rio Puerco from 1944 through October 1986, where extensive periods of no flow were observed during the monitoring period. The drainage is approximately 274 square miles at this station. The highest discharges commonly occurred between the beginning of July and the end of September as a result of intense, local precipitation in the drainage. A second period of elevated discharge was also observed between February and April, likely in response to spring snow melt or snow melt in combination with spring rains. The highest recorded peak flow was on September 12, 1972 with a flow of 15,200 cfs.

Since stream gauging data are not available for the drainages in the permit area, PNRC estimated peak flows and runoff volumes for pre-mining conditions at six surface water monitoring locations in the prominent arroyos within the permit area (see NPDES Site Map, Attachment F). The estimates were based on rainfall runoff relationships developed by the Soil Conservation Service (SCS, 1985) in combination with estimates of 24-hour rainfall amounts for the 2, 5, 10, 25, 50, and 100-year storms provided by the National Oceanic and Atmospheric Agency (NOAA, 1973). Pre-mining runoff rates ranged between about 70 cubic feet per second (cfs) to 560 cfs for the 2-year storm, and from about 485 cfs to almost 3,400 cfs for the 100-year event. Pre-mining runoff volumes ranged from under 10 acre-feet (af) to about 210 af for the 2-year storm, and from about 50 af to almost 1,300 af for the 100-year event. The variability in predicted peak flows and runoff volumes is principally related to differences in drainage area above each prediction point. Minimum discharge conditions and critical low flows for the arroyos within and adjacent to the permit area are zero, since all are ephemeral.

3.2.1.2 Surface Water Quality

A water quality sample collected at the Arroyo Leon monitoring site in 1978 exhibited a sodium sulfate water type with a calculated TDS of 1,460 mg/l. A water quality sample collected at the USGS monitoring site on Kim-me-ni-oli Wash also exhibited a sodium sulfate water type and a calculated TDS of 798 mg/l.

PNRC established six surface water monitoring stations within the permit area to collect naturally-occurring, background water quality data and to determine mining impacts on post-mining water quality. Each station consisted of a crest stage gauge for measuring flows and a pair of single stage sediment samplers. Four stations were established in arroyos on the western portion of the permit area, and two stations were established in arroyos on the eastern portion (see NPDES Site Map, Attachment F).

Water quality data collected at the El Segundo monitoring sites during September 2003 expressed as total dissolved solids (TDS) ranged from 160 to 890 mg/l. Bicarbonate is the dominant anion, and calcium is the dominant cation, although sodium occasionally replaces calcium. TSS values are variable among the arroyos monitored, as maximum values measured during 2003 ranged from 2,200 mg/L at SW-5 to a high of 20,000 mg/L at the most western monitoring site SW-1. These high TSS values are not uncommon in runoff that occurs as a result of precipitation in semi-arid regions. Values for arsenic, boron, cadmium, chromium, cobalt, copper, lead, zinc, total mercury, and total recoverable selenium were consistently below detection levels.

Water quality data collected through June 2019 at the six surface water sites showed similar water quality. Due to the increase in the number of samples collected since 2003, the overall ranges of TDS and TSS have changed, yet remain within or only slightly outside of the same orders of magnitude. For instance, from 2015 through 2019, TSS ranged between 745 and 77,100 mg/L at SW-2 along the western portion of El Segundo permit area. During this same period, Sites SW-4 and SW-6 located on arroyos on the central and eastern portion of the EL Segundo Mine permit area showed a range of TSS between 2310 and 9860 mg/L. TSS in naturally occurring runoff varies over several orders of magnitude in these ephemeral arroyos depending on the magnitude, duration and intensity of the precipitation that generates runoff. A review of surface water quality data collected through 2019 shows no apparent trends either temporally or spatially. The water quality data indicates that naturally-occurring surface water within the El Segundo permit area features high total suspended solids. The data also indicates the surface water quality was within New Mexico's Livestock Drinking Water standards. TDS (88 – 800 mg/L; mean: 233 mg/L), sulfate (<1 – 6.4 mg/L), and chloride (<1 – 39 mg/L) concentrations remained low throughout the monitoring period.

3.2.2 Ground Water

3.2.2.1 Ground Water Quantity

Detailed information on the quantity of groundwater and aquifer characteristics within and adjacent to the El Segundo permit area is presented in Section 804 of the El Segundo PAP and

the MMD's CHIA. Mining activities will be restricted to the Cleary Coal Member of the Menefee Formation where the majority of the lithologic units are in an unsaturated condition. Isolated saturation exists in some parts of the Cleary Member as perched groundwater in some sandstone lenses; however, the Menefee is not known to yield water to wells within the permit area, although several wells yield small supplies of water principally for stock watering north of the permit area. The stratum immediately below the lowest mineable coal seam is predominantly shale, which forms a barrier between the mining activities and the underlying Point Lookout Sandstone.

The Point Lookout Sandstone is laterally continuous throughout the permit area, partially saturated under water table conditions in the northern portion, and likely saturated under artesian conditions north of the permit area. The Point Lookout Sandstone will not be disturbed by mining activities. The Crevasse Canyon Formation and deeper Gallup Sandstone lie beneath the Point Lookout Sandstone and are also hydraulically isolated from the mining activities. Groundwater has not been encountered in the unconsolidated alluvial materials overlying the Menefee Formation within and adjacent to the permit area.

Aquifer testing performed in Menefee Formation and Point Lookout Sandstone monitoring wells established at the Lee Ranch mine, located about 15 miles southeast of the El Segundo Mine indicate low well yields, permeability and transmissivity in both formations. Aquifer tests performed in wells completed in the Point Lookout Sandstone by the New Mexico Bureau of Mines and Mineral Resources in the vicinity indicate similar low aquifer characteristics.

Well SJ-120, commonly referred to as South Hospah No. 1, is the production well for the El Segundo project and was completed in three aquifers below the Point Lookout Sandstone. These aquifers in descending order are the Dalton Sandstone, the Gallup Sandstone, and the Westwater Canyon Member of the Morrison Formation. The well was drilled in 1975 to a depth of 2,795 feet below ground surface. Information on the Dalton aquifer is not readily available because its not being laterally extensive and thus few wells are completed in this aquifer. The top of the Dalton Sandstone is at about 475 feet below ground surface in Well SJ-120, and the Gallup Sandstone lies about 1,105 feet below ground surface. The deepest contributing aquifer in SJ-120 is the Westwater Canyon Member of the Morrison Formation, and the top of this formation is found at about 2,445 feet below ground level. Water in the Westwater Canyon aquifer is under artesian pressure. Estimates of transmissivity of the aquifers screened in SJ-120 are relatively high, and range from 700 gallons per day per foot (gpd/ft) for the Gallup aquifer to about 2,000 gpd/ft in the Westwater Canyon aquifer. A declaration to appropriate and beneficially use 650 acre feet of groundwater per year for use at the mine was filed with the New Mexico State Engineer's Office in 1976.

In 2013, a new mine production well designated East Side Well RG-35275-POD 1 and 3 (see NPDES Site Map, Attachment F) was completed and put into production to supplement water from the existing production well SJ-120. This well was completed in the Gallup Sandstone Formation to a depth of 1490 feet below ground surface. A declaration to appropriate and

beneficially use 1500 acre feet of groundwater per year for use at the mine was filed with the New Mexico State Engineer's Office in February 2019.

3.2.2.2 Ground Water Quality

Groundwater quality in the Menefee Formation in the vicinity of the permit area is typically a sodium bicarbonate type, and often exhibits pH, TDS and sulfate concentrations outside the range or above the secondary drinking water standards for these constituents. Occasionally, fluoride in the Menefee Formation groundwater is above the primary drinking water standard. Overall water quality of the Menefee formation is variable, as the few wells completed in this unit are in lenticular sandstones that are generally poorly connected. The Menefee Formation in the vicinity of the El Segundo mine and in other wells in the region is only suitable for livestock consumption on a regular basis.

Two monitoring wells, KPL-5 and KPL-6, within the El Segundo permit area are completed in the Point Lookout formation. Former monitoring well KPL-4 was mined through and replaced by KPL-6 in 2017. The Orphan Annie Stock Well was also mined through as a part of the permitted mine progression and is no longer monitored. Samples collected from KPL-5 and KPL-6 through June 2019 exhibit a sodium sulfate bicarbonate type, and with few rare exceptions, analytical results are within New Mexico Domestic Water Supply standards. Samples collected from these wells through 2019 show pH above the New Mexico Domestic Water Supply standard at KPL-5 and TDS above the Domestic Water Supply standard at KPL-6. Accordingly, groundwater in the Point Lookout formation within and adjacent to the El Segundo permit area is suitable only for livestock consumption. Review of recent groundwater quality data indicates no appreciable trends are apparent.

Groundwater in the deeper aquifers including the Dalton Sandstone, Gallup Sandstone and Westwater Canyon Member can exhibit variable water quality. Water quality in the Dalton Sandstone is relatively consistent, and usually exhibits a sodium sulfate or sodium bicarbonate type, and sulfate and TDS values above the secondary New Mexico Domestic Water Supply standard. Groundwater in the Gallup Sandstone is predominately a sodium sulfate type, and is generally very hard with relatively high levels of calcium carbonate. Sulfate and TDS were typically near or just above the Domestic Water Supply standard. Groundwater from the Westwater Canyon Member typically exhibits sodium sulfate or bicarbonate water types. TDS in the Westwater Canyon Member is commonly below the secondary drinking water standard, and only occasionally exhibits concentrations of a few select constituents above the drinking water standards.

Recent groundwater quality data collected in wells completed in the Dalton and Gallup formations confirm similar water quality characteristics mentioned above for these formations. Samples collected from the production wells (SJ-120 Pod 1 and 3 and the East Side Well) exhibit similar water quality and show no appreciable trends.

3.2.3 Impacts and Mitigation.

The hydrologic impacts of mining activities proposed within the permit area at the El Segundo Mine are addressed in Section 907.C of the PAP (PNRC, 2015). These impacts were assessed through an evaluation of relevant pre-mining environmental resources information on surface water, groundwater, geology, soils, vegetation and climate data collected within and adjacent to the permit area. The impact assessments also considered plans and activities proposed during the life of mining at the El Segundo Mine. Predictions of post-mining conditions of the reclaimed mine areas were also provided. The rules established by the State of New Mexico under Title 9, Chapter 8, Part 11 for Coal Mining sets forth specific criteria the MMD must follow for reviewing permit renewals or permit revisions. Section 19.8.11.1106 prohibits the MMD from approving any permit renewal or revision unless a CHIA has been made by the MMD and the operations and activities proposed have been designed to prevent material damage to the hydrologic balance outside the permit area. The MMD prepared a Cumulative Hydrologic Impact Assessment (CHIA) in 2005 in concert with processing the original PAP for the El Segundo Mine. The CHIA assessed impacts to the surrounding hydrologic system outside of the El Segundo permit area by taking into account the impact projections contained in the El Segundo PAP and pertinent environmental and land use information outside of the permit area (MMD, 2015).

In 2015, El Segundo Mine submitted a permit renewal application to the MMD for mining permit No. 2015-01. During this process, the MMD reviewed the impact assessments in Section 907.C of the updated El Segundo PAP and the 2005 CHIA. Relevant hydrologic information reported both quarterly and annually to the MMD that were collected as part of the approved surface water and groundwater monitoring plans were also taken into account. Importantly, the MMD assessed activities conducted through 2015 and mining plans proposed for the period 2015 through 2020 at the El Segundo Mine, including the construction of temporary sediment ponds that are included in the July 25, 2019 NPDES Permit Renewal Application. The MMD approved the permit renewal application on September 15, 2010 (MMD, 2015) and issued a new mine permit to the El Segundo Mine (Permit No. 2015-01). In 2015, El Segundo Mine submitted a permit modification (Modification 2013-04) for updating designs for eleven temporary sediment ponds, all of which are included in the July 24, 2013 NPDES Permit Renewal Application, and this modification (permit revision) was approved by the MMD on April 30, 2013 (MMD, 2013). Both of these actions required review of the 2005 CHIA, which was deemed adequate by the MMD (see Attachment B for the MMD approval letters). The following information summarizes hydrologic impacts evaluated in PNRC's El Segundo PAP and the MMD's CHIA. A determination of the presence of alluvial valley floors has been conducted for the permit area by the New Mexico Bureau of Mines and Mineral Resources, as completed in 1980. Documentation of the determination shows that the permit area falls in the category of "lands clearly not alluvial valley floors", as provided in Section 804 of the PAP.

3.2.3.1 Surface Water Impacts and Mitigation

No significant adverse impacts are anticipated on the quantity or quality of surface water within the permit or adjacent areas due to the nature of the surface water system. Surface water within and adjacent to the permit area is restricted to ephemeral arroyos, as no intermittent or perennial

streams exist. Surface water in the arroyos occurs sporadically as a result of precipitation or snow-melt events, and typically exhibits high levels of TSS. Surface water is only casually used by livestock and wildlife due to the ephemeral nature of this seldom available resource.

During mining, control of sediment and runoff from disturbed areas will be accomplished by three types of temporary impoundments (see NPDES Site Map, Attachment F). Pit protection ponds (PPP) will be used to control runoff into the mine pits, mine sediment ponds (MSP) will be used to control and treat disturbed area runoff from active mining areas, and facilities area sediment ponds (SP) will be used to control runoff from facilities areas such as shops and coal preparation areas. All temporary impoundments have been designed to contain the 100-year, 6-hour event. This design and construction approach for temporary impoundments used at the El Segundo Mine will greatly minimize the potential for discharges of disturbed area runoff to receiving streams over the life of the mining operation. Accordingly, no discharges from any impoundment identified in the current El Segundo NPDES Permit has occurred through September of 2019, A limited number of temporary diversions and dikes will be used to direct overland flow and runoff in ephemeral arroyos from undisturbed areas around or through disturbed areas. The temporary ponds, diversions and dikes will remain in place and be removed only after reclamation has been completed and bond release is approved by the MMD. No permanent impoundments for stock watering are planned for the El Segundo Mine.

PNRC acquired an individual NPDES point-source permit (Permit No. NM-0030996) from the U.S. EPA for the El Segundo Mine sediment ponds and facilities area sediment ponds that have the potential to discharge to receiving streams on January 18, 2016. The expiration date of the permit is October 31, 2019. Additionally, the El Segundo Mine is covered under the NPDES Multi-Sector Storm Water General Permit and has developed a Storm Water Pollution Protection Plan (SWPPP) for wastewater discharges from small disturbed areas below which no temporary sediment ponds are constructed. These areas are limited to a few locations such as small areas along haul roads, access roads, and the railroad. PNRC has developed a Spill Prevention, Containment and Countermeasures Plan (SPCC) for the El Segundo Mine to minimize the impacts of spills of oil or petroleum-based products in surface water on receiving streams. Compliance with the terms and conditions of these permits and plans will minimize impacts to downstream surface water supplies primarily by reducing TSS and other chemical constituents by detention in the impoundments; and through the use of best management practices such as vegetation, silt fences, wattles, and check dams and by preventing, controlling, and mitigating spills.

The impoundments are expected to result in a minor reduction in the quantity of surface water within the ephemeral arroyos during mining and reclamation, and diversion of runoff from undisturbed areas away from or through disturbed areas during mining will minimize the potential for significantly altering the quantity of surface water within or adjacent to the permit area. Surface water quality is not expected to be appreciably affected by the mining operations, as the temporary impoundments and other BMP's installed for a limited number of small areas will minimize the potential for increases in TSS concentrations and other chemical constituents in receiving streams. The MMD has approved plans to monitor surface water in the vicinity of the El Segundo Mine permit area for determining peak discharge and surface water quality at

points where surface water enters or leaves the permit area (see NPDES Site Map, Attachment F). Data collected from the surface water monitors is submitted to the MMD on a quarterly basis, and will be evaluated in order to determine whether impacts are occurring and to modify mining plans to further minimize impacts if necessary.

Plans for reclaiming mine pits and other mining related facilities at the El Segundo Mine will involve re-grading mine spoils and other disturbed areas into an approved post-mining landscape that features slopes and watershed characteristics similar to the pre-mining landscape. Redistribution of topdressing soil materials with properties similar to the pre-mining soils and re-vegetation with plant species that naturally occur in the area will minimize changes in runoff volumes and TSS within and adjacent to the permit area. Previously referenced calculations of discharge and runoff volume at the same prediction points, taking into account conditions expected in the post-mining landscape, indicate discharges and runoff volumes may decrease between 5 and 27 percent. However, as the topdressing settles and vegetation becomes established infiltration rates, discharges and runoff volumes in the reclaimed landscape will approach pre-mining conditions, since precipitation will have the greatest influence on the amount of runoff from these areas. The impact is expected to be minimal, since no diversions of surface water in either drainage exists for several miles downstream, runoff in the ephemeral arroyos is often completely dissipated over several miles due to infiltration, and the use of the runoff water is only occasional by cattle and wildlife.

Localized increases in total dissolved solids (TDS) may occur as a result of using topdressing materials that have not been recently subjected to weathering to provide plant growth media on re-graded spoil prior to revegetation activities. The potential for significant TDS increases will be minimized by using soils salvaged from pit areas prior to mining as topdressing materials with properties similar to the pre-mining soils. Trace element concentrations are typically very low in the salvaged soils and overburden and inter-burden materials that comprise mine spoils. The alkaline or calcareous nature of these materials will further limit the potential for iron, manganese, and the other trace element constituents from exceeding the baseline conditions. Isolation of unsuitable overburden and inter-burden materials from the potential root zone of revegetated surfaces through sampling and handling plans will minimize the potential for contact with surface water and will effectively minimize the impacts from reclaimed area runoff on receiving stream water quality.

Calculations of erosion rates taking into account rainfall, soil erodibility, hillslope length and gradient, and vegetative cover are provided in Section 805 of the PAP. The calculations were performed for the pre-mining landscape and for the post-mining topography that will be reclaimed after mining at the El Segundo Mine. The calculations indicate reclamation of areas disturbed by mining activities will feature lower erosion rates (0.39 tons/acre/year) than the pre-mining landscape (0.43 tons/acre/year). The calculated post-mining erosion rate is well below the allowable rate of 3.0 tons/acre/year recommended for stable landscapes by the US Department of Agriculture (USDA-SCS, 1984), and provides evidence that runoff from reclaimed areas will not significantly impact receiving stream water quality as a result of increased TSS.

In summary, precipitation will be the dominant pre-mining and post-mining factor influencing the frequency, duration, and volume of runoff in the ephemeral arroyos within the permit and adjacent areas. Localized and temporary alterations in the quantity and quality of surface water are anticipated, but these will have little impact during mining due to plans such as sediment and water control required and approved by the MMD. Localized and temporary changes in the quantity and quality of surface water are not expected to persist following mining. The mining and reclamation methods and environmental protection measures that will be implemented by PNRC at the El Segundo Mine will minimize the potential for significant impacts on the surface water system.

3.2.3.2 Groundwater Impacts and Mitigation

Potential impacts of the El Segundo mining operation on the quantity and quality of ground water are expected to be minor. A combination of aquifer characteristics, climatic conditions, and the planned mining, reclamation, and protection methods will be the primary factors minimizing impacts.

Dewatering of the mine pits is expected to occur infrequently and will have only local effects on the Menefee Formation in the immediate vicinity of the permit area. This formation is largely unsaturated at El Segundo and significant ground water inflows have not been encountered in mine pits at the Lee Ranch Mine. Water levels in the wells outside the permit area are not expected to decline excessively due to the distance of these wells to the permit area. Water level declines in wells in the vicinity of the permit area were also accounted for in the El Segundo Mine permit issued by the State Engineer's Office in 1976 for groundwater use.

Excavation of the overburden and inter-burden materials and disruption of restrictive shale layers during mining are expected to increase the vertical permeability and porosity of the Cleary Formation spoils that will be re-graded to form the post-mining landscape. Permeability of the spoils will likely approach pre-mining conditions as settlement occurs. The quantity of water that percolates through the backfilled materials is expected to be limited by the high evapotranspiration rates characterizing the area. Recharge capacities of the pre-mining and post-mining areas are expected to be similar. Considering the size of the disturbance area within the Menefee Formation to be disturbed at El Segundo in relation to its total recharge area, any changes in recharge as a result of mining and re-grading spoils will not be significant relative to the total recharge volumes. Dewatering of the mine pits is expected to have only local effects on the Menefee Formation in the immediate vicinity of the permit area.

Drill holes in the Menefee Formation for coal exploration will be cased, sealed, or managed to prevent contamination of groundwater and to ensure the safety of people, livestock and wildlife. Mining is expected to result in the removal of eleven monitoring wells and the Orphan Annie Well within the permit area. Water wells uncovered or exposed by mining at El Segundo will be permanently plugged and sealed using methods approved by the MMD.

The low precipitation and high evapotranspiration rates characteristic of the permit area will minimize the quantity of water that contacts the spoils and enters the ground water system. Backfilling and grading of mine spoils followed by applying topdressing (salvaged soils) and re-vegetation as contemporaneously as practicable during mining at El Segundo will limit the time that the spoils are exposed to weathering and leaching. Trace element concentrations are not expected to increase significantly due to mining because pre-mining overburden and inter-burden samples collected within the permit area indicate that trace element concentrations are typically below water quality standards for drinking water and/or livestock water. The alkaline or calcareous nature of the overburden and inter-burden will decrease the solubility of many trace element parameters. Minor alterations in ground water chemistry will essentially be restricted to the permit area due to the discontinuous nature of the water-bearing units and the low aquifer characteristics reported for the Menefee Formation. The combined effects of dilution, dispersion, and adsorption will further minimize changes to ground water quality.

Mining activities will not impact the Point Lookout Sandstone, and will not occur in the major recharge area for the Point Lookout Sandstone south of the permit area. The quality of the ground water in the Point Lookout Sandstone is not expected to be impacted by the mining operations due to the presence of a barrier stratum of predominately shale below the lowest coal seam. The low vertical permeability in the Point Lookout Sandstone will also serve to prevent impacts from mining coal seams in the Menefee Formation.

Mining is expected to result in the removal of the Orphan Annie stock well. This well will be permanently plugged using methods approved by the MMD. An alternative source of water will be provided from the mine supply well SJ-120 to replace and mitigate the loss of this water source.

PNRC developed a superposition groundwater model to predict the impacts from pumping water for mine usage in the mine production well SJ-120. This well was screened in multiple aquifers; the Dalton Sandstone (Mesaverde Group), the Gallup Sandstone, and the Westwater Canyon Member of the Morrison Formation, and will be left intact to provide a source of water to support the post-mining land use of livestock grazing. To simulate withdrawals, the total pumping rate was proportioned among each aquifer based on the ratio of each aquifer's transmissivity to the total transmissivity for all three aquifers. Two pumping scenarios were used for simulation purposes. The first pumping scenario assumed annual pumping rates based on the tonnage of coal expected to be produced in a given year for 30 years. The second scenario assumed a more "worst-case" constant pumping rate equal to the 650 ac-ft/yr declared water right for well SJ-120. For the more practicable pumping scenario based on annual coal production, the model predicted a maximum incremental drawdown of 3.0 feet in the Mesa Verde Formation (Dalton) and Gallup Formations in year 38, and 1.4 feet of drawdown at year 42 in the Westwater Canyon Member to occur at Crownpoint, New Mexico some 16 miles west of the permit area. The model also predicted drawdown in other wells located in the vicinity at Chaco Canyon National Monument, Yah-tah-hey, and the Mt. Taylor Mine, but the greatest incremental drawdown was predicted at Crownpoint, New Mexico. The modeling results

indicated minimal drawdown will result in all three formations as a result of pumping Well SJ-120, and recovery will begin to occur between 8 and 12 years after pumping ceases.

The MMD used a more conservative Thies approach to calculate drawdown at the end of 30 years of pumping Well SJ-120 for mining related uses at the El Segundo Mine. The MMD's modeling results predicted drawdown for each unit at a distance of 10 miles from well SJ-120. Drawdown predicted for the Dalton Sandstone was 10 feet, and for the Gallup Sandstone 80 feet, for the Westwater Formation 35 feet.

Based on the modeling results, the MMD reviewed available New Mexico State Engineer and Navajo Tribal Utility Authority Records for wells that may be completed in any of the three aquifers within 10 miles of the El Segundo production well. In addition, the MMD evaluated available information on the available head in each aquifer in the vicinity in order to assess whether the predicted drawdown in each aquifer may be in excess of 25 percent of the available head. The 25 percent value of available head was established as material damage criteria by the MMD. The MMD concluded that pumping from well SJ-120 for 30 years using the most conservative assumptions would not result in material damage to surrounding aquifers or existing wells. The MMD also established material damage criteria for TDS to be 3.75 times background levels. The MMD considered background levels of TDS measured in both the Menefee and Point Lookout aquifers in the vicinity of the permit area. Based on information from the Lee Ranch Mine, the MMD determined increases in TDS in both aquifers above the material damage criteria is not likely to occur.

A review of USGS topographic maps surrounding the permit area by the MMD found no seeps or springs within at least five miles of well SJ-120 or the new production well (East Side Well), so it is unlikely pumping from the El Segundo Well SJ-120 or East Side Well will impact any seep or spring in the vicinity that is supported by discharges from any of the three aquifers.

The MMD has approved plans to monitor groundwater in the vicinity of the permit area for determining piezometric water levels and groundwater quality in monitoring wells constructed in the Point Lookout Sandstone (see NPDES Site Map, Attachment F). In addition, PNRC will monitor piezometric water levels in existing Dalton Sandstone, Gallup Sandstone, and Westwater Formation wells located adjacent to the permit area, and in two new monitoring wells completed in the Gallup Sandstone and Westwater Formation within the permit area. All data collected from the groundwater monitoring wells will be submitted to the MMD on a quarterly basis and included in an annual report. The information will be utilized to assess the accuracy of impact assessments and determine whether impacts are occurring during mining. At permit renewal time (5 years) water level data collected at the deeper aquifer monitoring wells will be used to evaluate how accurate model predictions are, and whether these predictions should be revised.

In summary, changes in the quantity and quality of groundwater that may occur due to mining activities will be limited to the Menefee Formation, and will be minimal due to the discontinuous nature of this formation, unsaturated conditions, and poor low aquifer characteristics. Potential impacts will be minimized during mining as a result of approved plans to sample and handle

overburden and inter-burden materials and properly seal drill holes and wells. Reclamation methods will maximize restoration of pre-mining recharge rates within the permit area. Mining activities will not impact deeper aquifers below the lowest coal seam mined due to the presence of a significant shale barrier. One pre-existing stock well will be removed, but this effect will be mitigated by providing a replacement source of water from Well SJ-120. The MMD has determined pumping of groundwater from deep aquifers for 30 years to supply water for mining uses will not result in material damage to the three aquifers that are screened in Well SJ-120. Increases in TDS in both the Menefee Formation above material damage criteria evaluated by the MMD as result of this pumping will not occur. Mining and reclamation methods and protection measures that will be implemented by PNRC at the El Segundo Mine will minimize the potential for significant impacts on the groundwater system.

3.3 Air and Climate Resources.

3.3.1 Air Quality

Under the Clean Air Act (CAA), national ambient air quality standards (NAAQS) establish the maximum allowable levels of certain pollutants in the ambient air in order to protect public health and welfare. Those "criteria pollutants" consist of particulate matter (PM), sulfur oxides (SO_x), nitrogen dioxide (NO_2), carbon monoxide (CO), ozone (O_3), and lead (Pb). However, because emissions from surface coal mining are predominantly particulate matter, current and projected ambient levels of PM are the primary focus of this analysis.

Ambient concentrations of particulate matter are currently expressed both in terms of particulate matter with a diameter between 2.5 and 10 micrometers (PM_{10}), and in terms of particulate matter with a diameter of 2.5 micrometers or less ($PM_{2.5}$). The particulate matter emissions from surface coal mining activities are predominately PM_{10}, which includes all $PM_{2.5}$. This analysis focuses on current and projected ambient concentrations of PM_{10} (see Appendix D for details). Sources of PM_{10} emissions from surface coal mining include blasting, overburden removal, coal extraction, coal preparation/handling/storage, and fugitive road dust from haul trucks. The vast majority of these emissions are fugitive.

Surface coal mining activities also emit Carbon Monoxide (CO), Sulfur Dioxide (SO_2), Nitrous Oxides (NO_x) and Volatile Organic Compounds (VOCs). Inventories of these emissions are given in Appendix D. The levels of these emissions will remain relatively constant because the project will not change the equipment or mining methods from that already in use. Gaseous emissions from surface mining activities are expected to remain well below levels that would approach a NNAQS for these categories of emissions at the existing El Segundo Mine (see Appendix A).

Existing ambient concentrations of a pollutant are most accurately characterized by actual measurements in close proximity to surface mining operations, as opposed to the alternative of predicting ambient concentrations with dispersion models. This principle is particularly true for characterizing ambient levels of PM_{10} that are due primarily to fugitive PM_{10} emissions from

coal mining activities. When the ambient concentration of a pollutant is lower than its maximum allowable level, that pollutant's concentration is said to be in "attainment." In determining the attainment status of a given criteria pollutant in a particular geographic area, USEPA policy focuses on evaluation of the most recent 3 years of ambient monitoring data that are considered to be representative of concentrations in that area.

In keeping with a requirement under SMCRA, PNRC has operated a network of on-site PM_{10} ambient air monitors at the El Segundo Mine since 2007. The purpose of the monitoring program is to assess the effectiveness of fugitive dust control measures at the El Segundo Mine in order to ensure continued compliance with NAAQS for PM_{10}. Currently, the El Segundo Mine monitoring network includes three PM_{10} samplers and one meteorological monitoring station (see map, Appendix D). PNRC operates its PM_{10} monitoring network in accordance with applicable USEPA requirements that includes a quality assurance program; although the network is designed primarily for the purpose of providing data MMD can use to evaluate the effectiveness of the fugitive dust control plan. Quarterly monitoring reports are submitted to the MMD. PNRC's monitoring sites were very reliable in the 3-year period from 2015 to 2019, collecting more than 90 percent of the required samples, well above the 75 percent required by Appendix K of 40 CFR 50—*National Primary and Secondary National Ambient Air Quality Standards*. For the purposes of this EA, the results of the air quality monitoring conducted at the mine are conservatively assumed to be representative of regional conditions to evaluate the impacts from mining Section 34 at the El Segundo Mine.

Short Term (24-hour) and Annual Ambient Air Concentrations. Table 3.3-1 shows the highest and second highest PM_{10} concentrations at each sampler for a 3-year period. These concentrations exclude any monitored values that were caused by "Exceptional Events." There were no sample results that were likely caused by mining activities but rather a climatic condition leading to off-site generation of wind-blown particulates. Although none of these measurements exceeded the PM_{10} 24-hour standard of 150 micrograms per cubic meter of air ($\mu g/m^3$) applicable during the 3-year period, they are representative of conditions at the mine. Despite the fact that El Segundo operates its fugitive dust control plan to suppress mining-generated emissions of PM_{10} throughout the El Segundo Mine, a climatic conditions may frequently transport off-site fugitive PM_{10} emissions into the mine boundary where their resultant impacts are monitored.

Table 3.3-1. El Segundo Mine PM_{10} 24-Hour Ambient Air Concentrations

Monitor Site	2016		2017		2018	
	First High	Second High	First High	Second High	First High	Second High
SH01	31	28	51	46	60	49
SH02	47	40	83	67	133	67
SH03	49	30	48	46	48	43

3.3.2 Climate

The Colorado Plateau region in northwestern New Mexico has a semiarid climate, characterized by wide variations in diurnal and annual temperature. This region defines the study area for purposes of the discussion of climate. El Segundo receives much of its precipitation during the summer months, when afternoon showers form due to moist air from the Gulf of Mexico moving over the area. Rainfall as high as 1.91 inches has been recorded in the area during a 24 hour period. Most snowfall on El Segundo is light and evaporates within a few days. However, single snowfalls as high as 8 inches have been recorded. Topographic features and changes in altitude influence the total amount of precipitation received at various locations on El Segundo.
Due to the elevation (ranging from 6,800 to 7,400 feet above mean sea level), El Segundo has mild summers and cold winter temperatures. The average annual temperature is about 50 degrees Fahrenheit (ºF). Summer temperatures generally range from the mid-50s to the mid-80s. Temperatures over 100ºF are rare.

Within the PNRC mine lease area, a climatological monitoring program has been operating since 2008. Temperature, wind speed, and precipitation data recorded at site MET-1 from January 2015 through December 2018 are summarized by Quarterly Data in Table 3.3-2. This meteorological data describes the recent climate variables important to atmospheric transport and dispersion across the El Segundo Mine.

Table 3.3-2. Seasonal Meteorological Conditions at the El Segundo Mine (2015-2018)

	Mean (°C)	Maximum (°C)	Minimum (°C)	Mean Daily Wind Speed (m/s)	Maximum Hourly Wind Speed (m/s)	Average Quarterly Precipitation (Inches)
1st Qtr (Jan-Mar) 2016-2018	4.1	15.9	-9.3	4.7	15.6	3.83
2nd Qtr (Apr-Jun) 2016-2018	15.7	27.5	-0.3	5	18	1.63
3rd Qtr (Jul-Sep) 2016-2018	20	25.9	9.1	4.1	11.7	4.39
4th Qtr (Oct-Dec) 2016-2018	6.7	17.3	-10.1	4.5	14.9	1.4

Note: degrees Fahrenheit = ºF

3.3.3 Climate Change

Climate is the composite of generally prevailing weather conditions of a particular region throughout the year, averaged over a series of years. Climate averages for 1981-2010, known as the current normal as defined by the World Meteorological Organization, are 30-year averages of temperature and precipitation for the previous 3 decades.

Certain gases cause heat to be retained in the atmosphere. Increases in these gases, known as greenhouse gases (GHGs), are caused by the burning of fossil fuels and are believed to be contributing to global scale impacts to climate (Intergovernmental Panel on Climate Change (IPCC) 2007). Ongoing scientific research has identified the potential impacts of GHG emissions including carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and several trace gases on global climate. Through complex interactions on a global scale, GHG emissions cause a net warming of the atmosphere, primarily by retaining heat energy that would otherwise be radiated by the earth back into space. Although GHG levels have varied for millennia (along with corresponding variations in climate), industrialization and burning of fossil carbon sources have caused GHG concentrations to increase measurably (IPCC 2007). Changes in climate due to increases in GHGs have the potential to influence renewable and nonrenewable resource management. However, the degree of change and specific effects from these changes cannot be quantified at the regional or local scale at this time (IPCC 2007).

Scientists have attempted to compare the global warming potential of each of these compounds. Because of this potential variability; these compounds are expressed in this EA in terms of CO_2 equivalent (CO_{2e}). Net CO_{2e} emissions from all anthropogenic emission sources in New Mexico were estimate to be approximately 62 million metric tons (MMt) in 2000 and projected to be more than 68 MMt by 2010—an 11 percent increase (NMED 2010). The New Mexico Greenhouse Gas Inventory and Reference Case projections for 1990-2020, which take into account all human emission sources within the state, report that New Mexicans emit about 45 tons of CO_{2e} per capita, 80 percent more than the national average, largely the result of its greenhouse gas (GHG)-intensive gas, oil, and electricity production industries (NMED 2010). The New Mexico GHG inventory specifically addressed CH_4 emissions from coal mining in the state. According to the inventory, these emissions were approximately 1.1 MMt in 2007, an estimated increase of 0.9 MMt CO_{2e} since 2000 (NMED 2010). This sharp increase resulted primarily from a former surface mine being developed as a new underground mine. Underground mine production rose from near 0 percent in 2000 to around 28 percent of total coal production from 2004-2008. This is due to ventilation and degasification at underground mines, resulting in higher CH_4 emissions per ton of coal produced (NMED 2010).

PNRC estimated its GHG emissions from all sources at the El Segundo Mine to be 112,000 metric ton total CO_{2e} in 2011 (PNRC 2011), or 0.16 percent of New Mexico's 2010 projection. This indicates the mine GHG impact is extremely small compared to all sources aggregated in the state.

Most sources acknowledge that current climate models are not able to predict with sufficient precession the localized climate impacts resulting from global climate changes, particularly in an area as small as the El Segundo Mine, nor can they accurately and reliably identify global impacts caused by individual projects. Based on a review of data from U.S. Geological Survey (USGS), the USDOI concluded that "[g]iven the nature of the complex and independent processes active in the atmosphere and the ocean acting on [GHG], the causal link simply cannot be made between emissions from a proposed action and specific effects on a listed species or its critical habitat. [A]ny observed climate change effect on a member of a particular listed species

or its critical habitat cannot be attributed to the emission from any particular source" (USDOI 2008).

Substantially greater uncertainty exists when trying to disaggregate or spatially downscale the global models into regional or local predictions—even among those who believe some climate change is likely (USBOR 2011). Although it warns about the uncertainties from spatial downscaling, the U.S. Bureau of Reclamation (USBOR) has attempted to forecast future changes in climate and hydrology in the Colorado River Basin.

The USBOR's findings apply to an area of approximately 250,000 square miles with varying terrain and habitat; therefore, the general predictions cannot be extrapolated to the El Segundo Mine. However, according to the USBOR climate modeling, the Colorado River Basin overall could face the following:

- On average, the Colorado River Basin temperature is projected to increase by 5 to 6°F during the 21st century, with slightly larger increases projected in the Upper Colorado Basin
- Precipitation is projected to increase by 2.1 percent in the upper basin while declining by 1.6 percent in the lower basin by 2050
- Mean annual runoff is projected to decrease by 8.5 percent by 2050
- Warmer conditions are projected to transition snowfall to rainfall, producing more December-March runoff and less April-July runoff
- Warmer conditions might result in increased stress on fisheries, shifts in species geographic ranges, increased water demand for in stream ecosystems and thermoelectric power production, increased power demands for municipal uses-including cooling-and increased likelihood of invasive species infestations

3.3.4 Air Quality and Climate Impacts and Mitigation

3.3.4.1 Air Quality

Air-quality impacts were assessed based on an emissions inventory of predominant criteria pollutant emissions from the El Segundo Mine operations and monitored concentrations of ambient air quality impacts by those emissions. The report is included as Appendix D. Previous air quality monitoring for mining operations for air permitting demonstrated compliance with the NAAQS when considering exceptional meteorological and climatic conditions. The magnitude of emissions estimated for El Segundo mining operations and their location relative to the permit boundary show that impacts will not threaten or exceed a NAAQS based on air quality monitoring during previous and current mining operations.

Mining will occur in eight pits located within the El Segundo permit boundary and total fugitive PM_{10} and $PM_{2.5}$ emissions from all pits will be consistent with the six to seven million tons per year coal produced in recent years. The PM_{10} annual and 24-hour NAAQS are 50 and 150 $\mu g/m^3$, respectively. The $PM_{2.5}$ annual and 24-hour NAAQS are 15 and 35 $\mu g/m^3$, respectively.

The current NAAQS for NO_2 is 188 µg/m^3 for the 1-hour averaging period and became effective on April 12, 2010. Compliance with the 1-hour standard is based on comparing the 98th percentile highest daily 1-hour concentration for each year (i.e., eighth highest) with the standard. This standard is in addition to the annual NO_2 NAAQS of 100 µg/m^3. Total oxides of nitrogen (NO_x) emissions estimated from mining equipment tailpipes and blasting range from 22.5 to 126.7 tons per year (tpy) for each mining year during the LOM. Since annual production would not increase as a result of the Proposed Action, no change to NO_x emissions would occur.

CO NAAQS are 40,000 and 10,000 µg^3 for the 1-hour and 8-hour averaging periods, respectively. SO_2 NAAQS are 196 µg/m^3 and 1,300 µg/m^3 for 1-hour and 3-hour averaging periods, respectively. The SO_2 1-hour NAAQS became effective on June 2, 2010 and compliance is based on comparing the 99th percentile highest daily 1-hour concentration for each year (i.e., fourth highest) with the standard. VOCs do not have applicable NAAQS, but are evaluated for their potential conversion to ozone and comparison to the ozone NAAQS of 0.08 ppm for an 8-hour averaging period.

Total CO emissions from tailpipe and blasting range from 23.3 to 146.6 tpy for each mining year during the life of mine. These emissions are similar to estimated NO_x emissions. However, the CO NAAQS are much higher than the 1-hour NO_2 NAAQS and would be expected to result in CO impacts considerably below the CO NAAQS.

Total SO_2 emissions from tailpipe and blasting range from only 2.17 to 11.92 tpy for each mining year. Estimated SO_2 emissions are only 10 percent of the estimated NO_x emissions. Therefore, compliance to the SO_2 NAAQS would be expected given source release characteristics of tailpipe and blast emissions.

Total VOC emissions range from only 1.15 to 6.47 tpy for each mining year. Additional ozone formed by the interaction of the small VOC and NO_x emissions from the proposed action would be not sufficient to significantly contribute to additional exceedances of regional ozone ambient air concentrations above the 8-hour averaged NAAQS of 0.08 ppm or 157 µg/m^3. The August 2009 report, “Air Quality Modeling Study for the Four Corners Region” (Environ, 2009), prepared for the New Mexico Environmental Department, noted regional ambient air ozone concentrations in northwest New Mexico are elevated and approaching the ozone NAAQS. A detailed analysis of regional emission sources potentially contributing to these elevated concentrations was presented in this report. This analysis indicated that coal mining and associated equipment are not significant sources of ozone precursors as confirmed by the low estimates of NO_x and VOC emissions from the proposed action. As with NO_X, the Proposed Action would not result in an increase annual production at the mine.

3.3.4.2 Climate Change

Methane is the predominant GHG emitted from surface coal mines. To date, estimates of CH_4 emissions from surface coal mines can only be roughly approximated based on crude estimates of the representative concentrations of methane in regional coal basins throughout the U.S. On

that basis, El Segundo Mine's total CH_4 emissions are roughly approximated to be in the range of 60,000 tpy (54,500 metric tons) CO_{2e}. Another estimated 62,300 tpy (56,600 metric tons) CO_{2e} are emitted by fuel combustion from mobile sources.

For Prevention of Significant Deterioration and Title V applicability purposes, USEPA's GHG Tailoring Rule has defined a "major stationary source" of GHG emissions to be one with a potential to emit (PTE) 100,000 tpy CO_{2e} or more. However, when determining whether a surface coal mine is a "major source" for GHG emissions, fuel combustion emissions from mobile sources are not included in calculating the PTE. Therefore, El Segundo's CO_{2e} emission from surface mining and post mining are about 60,000 tpy. Accordingly, El Segundo Mine does not constitute a "major stationary source."

Currently, there is no analytical methodology for quantifying incremental climate change impacts due to GHG emissions from a surface coal mine. Conclusions as to the significance of El Segundo Mine's GHG emissions on climate change cannot be reached because the geographic scope and estimated air emissions are too small to allow calculation of any measurable change on global climate under any scenario about whether and how climate might be changing. Because climate change must be viewed in the context of global conditions, the magnitude of El Segundo's GHG emissions need to be viewed in that context.

Globally, CO_2 emissions in 2008 from all human sources were estimated to be 29,000 MMt (International Energy Agency 2010). Net CO_{2e} emissions from all anthropogenic emission sources in New Mexico were estimated to be approximately 62 MMt in 2000, and projected to be more than 68 MMt by 2010—an 11 percent increase (NMED 2010). The New Mexico Greenhouse Gas Inventory and Reference Case projections for 1990-2020, taking into account all human emission sources within the state, reports that New Mexicans emit about 45 tons of CO_{2e} per capita, 80 percent more than the national average, largely the result of its GHG-intensive gas, oil, and electricity production industries (Appendix D). The New Mexico GHG inventory specifically addressed CH_4 emissions from coal mining in the state. According to the inventory, these emissions were approximately 1.1 MMt in 2007, an estimated increase of 0.9 MMt CO_{2e} since 2000 (NMED 2010). This sharp increase resulted primarily from a former surface mine being developed as a new underground mine. Underground mine production rose from near zero in 2000 to around 28 percent of total coal production from 2004-2008. This is due to ventilation and degasification at underground mines, resulting in higher CH_4 emissions per ton of coal produced (NMED 2010).

PNRC estimated its GHG emissions from all sources at the EL Segundo Mine to be 112,000 metric ton total CO_{2e} in 2011 (PNRC 2011), or 0.16 percent of New Mexico's 2010 projection. This indicates the mine GHG impact is extremely small compared to all sources aggregated in the state.

3.3.5 Noise and Vibration

Noise is defined as unwanted or undesirable sound created when an object vibrates and radiates

part of its energy as acoustic pressure or waves through air, water, or a solid object. Sound pressure levels are expressed in units called decibels (dB). The A-weighted decibel (dBA) is the basic unit of sound used to describe the human response to noise at any instant in time from industrial and transportation sources. Human judgment of noise levels at 60 dBA is judged to be comfortable, at 70 dBA is considered to be moderately loud, and the threshold of pain is considered to be 120 dBA (URS, 2006). To account for variations in noise levels over time from various sources, a single descriptor called the equivalent sound level (L_{eq}) is used, and is the average A-weighted sound level during a specific time interval. The most common interval is a 24-hour day, and the equivalent sound level for this interval is termed the day-night average equivalent noise level, or L_{dn}.

No noise surveys or detailed field reconnaissance have been conducted to measure background noise sources or levels within or adjacent to the permit area. Typical source noise levels expected in the permit area for (front end loaders, dozers, and scrapers that will be used for mining) range from 70 to 77 L_{dn} at a source-to-receiver distance of 300 feet (Minor, Michael & Associates, 2000). Higher noise exposure levels can be expected for these machines and other sources such as rock drills and haul trucks, but at much shorter source-to-receiver distances of only 50 feet. Railroad lines can exhibit noise exposure levels of 60 L_{dn} at a source-to-receiver distance of 240 feet, and noise exposure levels of 75 L_{dn} at a source-to-receiver distance of 30 feet (Harris, Miller, Miller & Hanson Inc., 1995).

Low frequency vibrations are normally felt rather than heard. Vibrations may occur as heavy equipment or trucks travel through an area or, more importantly for the El Segundo Mine, from blasting. Blasting is used as part of the mining operations to fragment material for excavation and transport. The three major effects of blasting are flyrock, air blast, and ground motion. Energy liberated from blasting is converted into vibrations as either ground motion or air overpressure (air blast). Ground motion is principally generated by blasting. Air blast may be more noticeable and is measured as dB's because the overpressure is normally at low frequencies and may be more felt than heard. Ground motion is measured as peak particle velocity and is used as an indicator of possible blast damage.

The region of influence is the geographic area that could potentially be affected by changes in noise or vibrations levels due to mining at El Segundo and varies for different project components. The region of influence where new or increased blasting may occur at El Segundo may extend up to several miles from the source. The region of influence for less intensive noise and vibration sources, such as mining equipment or the railroad would be a few hundred feet or less. Noise impacts occur only where there are people (noise-sensitive receptors) to hear it. Therefore, the region of influence for any noise impacts is directly related to the location of receptors.

3.3.6 Noise and Vibration Impacts and Mitigation

The El Segundo Mine permit area is situated in a rural, very sparsely populated area. Rural populations typically experience average outdoor sound levels lower than 50 L_{dn} and wilderness areas experience noise levels as low as 30 to 40 L_{dn} (EPA 1978). Dispersed noise receptors such

as ranch dwellings are present some distance from the permit area. Due to the absence of significant noise sources in the region, the ambient noise level throughout the region is probably less than 50 dBA during daytime hours and 30 dBA at night. Typical noise sources would be overhead aircraft, off-road vehicles, traffic along State Road 509, and wind.

Noise-sensitive receptors include a few ranch dwellings outside of the permit area. The most proximate residence to the permit area lies about 2.0 miles to the south. The nearest rural community is over 2.0 miles away. The noise environment within the permit area and near to sensitive receptors will be dominated by noise associated with the mining operations including coal extraction and hauling, coal processing and shipping, and blasting. The mine pits, haul roads, and coal preparation area including the railroad loop are 2.0 miles distant from the nearest dwelling. The daytime noise levels at receptors should be well under 50 dBA, punctuated with occasional audible noise from blasting activity.

Blasting will be conducted only from sunrise to sunset. Pre-blast surveys will be performed at any dwelling or structure that is within ½ mile of the permit area. However, no dwellings currently exist within this distance. Blasting must abide by plans outlined in Section 902 of the El Segundo PAP and in accordance with the standards set forth in NMAC 19.8.20.2032 for controlling adverse effects from blasting. The blasting rules include a limit of 133 dB at 2 hertz at any residence near the permit area. Flyrock ejected along the ground or into the air from blasting is controlled by blasting design and by limiting access in the vicinity of the blast. NMAC regulations prohibit flyrock from being cast more than one-half mile the distance to the nearest dwelling, beyond the area of control, or beyond the permit boundary.

The impacts from noise and vibration due to mining activities at the El Segundo Mine are expected to be minimal. A single residence lies some 2.0 miles distant and the next occupied dwelling is over 2.0 miles distant, and noise levels at this distance from the mine will not be significantly increased over ambient levels. Impacts from vibrations that will result from mining will be minimized by implementing the blasting plan approved by the MMD, which requires compliance with stringent standards set forth in NMAC regulations for controlling adverse effects.

3.4 Biota and Endangered Species

3.4.1 Flora

Two major vegetation types occur on the El Segundo permit area, Great Basin Desert scrub and desert grassland. A third lesser type, juniper savannah, has scattered occurrence on the permit area. Within the permit area these major types are further characterized by five predominant plant communities: grassland, shrub/grassland, shrub/juniper/grassland, saltbush, and scoria. Shrub/grasslands occupy the largest portion of the permit area followed by grassland and shrub/juniper/grassland. No riparian, wetland, or woodland communities are present. Grasses predominate in all communities and include blue grama, galleta, alkali sacaton, and Indian ricegrass as principle species. A large variety of forbs typical of southwestern desert grasslands

are present in all communities, though their relative abundance is low. Common forb species include globemallows, tansyasters, buckwheats and cryptantha. Shrubs and subshrubs are ubiquitous throughout the permit area and major species include 4-wing saltbush, winterfat, Bigelow sagebrush, and broom snakeweed. One-seed juniper is the only significant tree species and its occurrence is scattered within the permit area.

3.4.2 Fauna

Wildlife habitat closely correlates with the five major plant communities identified under flora above. An additional habitat type is sandstone outcrops and associated cliff features. The species documented during wildlife surveys are typical of high elevation desert grassland habitat in the southwest. Nearly 100 bird species have been identified on the El Segundo permit area. Common or significant species include red-tailed hawk, great horned owl, American kestrel, pinyon jay, western scrub jay, common raven, western bluebird, vesper sparrow, and Townsend's solitaire. Over 20 mammalian species were identified including desert cottontail, black-tailed jackrabbit, spotted ground squirrel, Ord's kangaroo rat, deer mouse, and coyote. Large mammals include pronghorn, and less commonly, mule deer and elk. Seven reptile and amphibian species were documented but only the lesser earless, sagebrush, and prairie lizards were common. The prairie rattlesnake was present but uncommon.

3.4.3 Endangered species

During vegetation surveys, no threatened, endangered, or rare plant species (T&E) were documented nor were there suitable habitats present for species of concern. No federally or state listed T&E fauna were found during wildlife surveys. Gunnison's prairie dogs were noted in early surveys but none were found in subsequent field efforts. Surveys were conducted for black-footed ferrets and mountain plovers but none were recorded nor was any sign observed. Two sensitive, but uncommon species were documented on the permit area; the ferruginous hawk and golden eagle. The MMD has consulted with the appropriate State and Federal agencies and has concurred with the results of the T&E surveys and that no T&E species are present on the permit area (MMD, 2005).

3.4.4 Impacts and mitigation.

As a part of the approval process for the El Segundo Mine permit application, MMD performed a thorough administrative review and technical analysis in consultation with the appropriate jurisdictional federal and state agencies. Impacts and mitigation were considered under the analysis and the findings are presented in the July 2005 Technical Analysis Summary prepared by the MMD.

Mining and associated activities at the El Segundo Mine would result in temporary displacement of wildlife species and impacts to existing vegetation and habitats. There would-be short-term loss of vegetation and habitat types from clearing of vegetation during mining and associated

activities. The disturbances and loss of habitat will be ongoing but incremental during the mining progression and life of the operation. Reclamation operations will begin as soon as sufficient area is available for backfilling and grading, soil redistribution, and seeding. From that period forward, reclamation operations will be contemporaneous with mining operations. Typically, once contemporaneous reclamation is ongoing, 50 percent or more of the total disturbance is reclaimed at any given time. Overburden and plant growth suitability analysis in the approved permit guarantees suitable spoil will be present in the rooting zone of the final graded configuration. The approved reclamation and revegetation plan in the El Segundo Mine PAP provides for salvage and redistribution of the soil resource and establishment of vegetation similar to the native plant communities and habitat. Loss of livestock forage will be a short-term and temporary loss. The reclamation is designed to restore rangeland and livestock grazing which will also be compatible with the needs of regional wildlife species. Most species in the seed mix have a high utility for livestock and will provide necessary forage quantity and quality. In order to achieve this, the reclamation program will use methods to encourage reestablishment of a functional soil ecosystem and establish effective vegetation capable of successional development.

The seed mix is comprised of all native species including warm and cool season grasses, forbs, and shrubs. The native shrub 4-wing saltbush is an important component in native habitats, particularly for breeding bird populations. This species is a prominent component of the seed mix and is readily established in reclaimed areas. The many growth forms in the seed mix will restore structural diversity in the reclaimed habitats. Successional development and recruitment of native species from adjacent undisturbed areas will over time return vegetation and habitat similar in form and function to the native vegetation communities. Thus, there will be a short-term loss of vegetation and habitat and the impact will be minor. Impacts to species more representative of climax conditions may be longer-term. The comprehensive reclamation program, restoration of a functioning ecosystem, and successional processes would reduce the overall impact to vegetation resources and over the long-term it would be minor.

Reclaimed vegetation and community development will encourage breeding birds, small mammals and associated predators to return as soon as food and cover are sufficiently developed. Large native ungulates will find foraging utility in reclaimed habitats. Postmine topography will include drainages and other relief features similar to, but smoother than the existing topography. Sandstone boulders will be placed in the reclamation to provide additional habitat features. Existing sandstone bluff and cliff features will be minimally affected by the mining and reclamation operations.

Avoidance mitigation will be employed whenever possible for wildlife and vegetation. Human activities away from mining will be limited. Disturbances to existing native vegetation will be restricted to that necessary to support mining operations. Raptor monitoring and nest searches will be conducted during the breeding season and will identify existing or new nest locations. For identified species, disturbance to nesting raptors will be avoided until young are fledged or the nest abandoned. Powerlines will be constructed according to the guidelines in “Suggested

Practices for Raptor Protection on Power Lines: The State of the Art in 1996" (Avian Power line Interaction Committee 1996). There will be a short-term loss of habitat during operations and early reclamation. The impacts may be major for some species, particularly small species with relatively small home ranges. The general mobility of most wildlife species, the availability of adjacent habitat, and the comprehensive reclamation plan would result in only a minor overall impact over the long-term.

Consultation regarding the potential presence of Threatened & Endangered (T&E) species was initiated with the US Fish & Wildlife Service under consultation number 2-22-01-1-405, the New Mexico Game & Fish Department, and the MMD. Correspondence regarding consultations is included in Attachment E. There were no T&E plant species or essential habitat found during surveys. No federally or state listed T&E wildlife species were observed on or near the permit area during surveys. No impacts are anticipated for plant or wildlife T&E species. Wildlife monitoring will continue during the life of the mine and will include searches for T&E or special concern species. Any identified T&E species will result in contact of the US Fish & Wildlife Service, the Endangered Species Program of the New Mexico Game & Fish Department, and the MMD.

3.5 Floodplain Management and Wetland Protection

3.5.1 Floodplain Management

Part 20 of Chapter 8, Coal Mining, in Title 19, Natural Resources and Wildlife of the New Mexico Administrative Rules contains performance standards operators must meet while conducting surface coal mining operations. These performance standards apply to temporary impoundments that are planned for treating disturbed area runoff at the El Segundo Mine, and include specific requirements for design and construction. The MMD has determined all temporary impoundments proposed for the El Segundo Mine comply with these standards.

All of the temporary impoundments will be incised, and will not feature dams or berms. None of the ponds meet the USDA-NRCS Class B or Class C criteria, or other criteria on the Mine Safety and Health Administration at 30 CFR 77.216(a). In addition, there has been no FEMA mapping of 100-year floodplains within or adjacent to the permit area, and map reviews indicate no residence or other significant structures are situated within the arroyo bottoms or valley sides downstream of any temporary sediment impoundments for more than several miles. Temporary impoundments to be constructed at the El Segundo Mine will be stable, have low hazard potential, and will be located where failure would not be expected to cause loss of life or serious property damage. Based on the above, plans to control and treat disturbed area runoff at the El Segundo Mine using temporary sediment impoundments will have little impact on floodplains.

3.5.2 Wetlands Protection

No wetlands were found during pre-mining surveys of surface water sources within and adjacent

to the permit area. Small areas in the immediate vicinity of a few windmill stock wells in the vicinity support some wetland vegetation, but these are of limited extent and are only present due to overflow from the stock well discharge. Sources of stock water from stock wells that may be impacted or removed by mining will be replaced with water from the mine supply Well SJ-120, which is proposed to be left for supporting post-mining land use after mining is completed.

In May 2016, PNRCESM sent information to the U.S. Army Corps of Engineers Albuquerque District (USACOE) in order to seek a decision on jurisdictional determination under Section 404 of the CWA for construction activities at the El Segundo Mine. Based upon review of the information in May 2016, the USACOE determined no waters of the United States are located within the project site (see USACOE correspondence dated December 13, 2016). Drainages on site were found to consist of swales or erosional features which did not have an ordinary high water mark or change due to sheet flow. No wetlands were identified by the USACOE within the project area.

3.5.3 Impacts and Mitigation

Because no wetlands were found within and adjacent to the El Segundo permit area during pre-mining surface water surveys and the USACOE found no wetlands during a field visit in 2005, impacts to wetlands will not occur as a result of the El Segundo Mine. No protection of wetlands or mitigation will be required by the USACOE under a Section 404 permit.

3.6 Cultural Resources and Historical Preservation.

Between 1978 and 2001, nine archaeological surveys were conducted on or through portions of the El Segundo permit area. Five early studies were in narrow right-of-way corridors or drill hole locations and four later surveys were more intensive over the larger portion of the permit area. The background, results, and discussion of the various surveys and inventory work are presented in Subpart 810.B of the approved El Segundo permit. Included in Subpart 801.B are tables listing proposed site descriptions, isolated features, and isolated occurrences. Additionally, Tables 801-6 through 801-9 present National Register Evaluations for Laguna, Acoma, Zuni, and Hopi Traditional Cultural Properties.

The surveys documented 272 sites, 91 isolated features, and 458 isolated occurrences. The sites range from early Archaic prehistoric use and activity to recent historical trash scatters or dumps. Historic or recent use accounted for 40 percent of the sites while pre-Columbian and the Pueblo I-III period accounted for 22 and 21 percent of the site components, respectively. Historic Pueblo, Laguna, and Navajo sites are limited. Ten percent of the site components indicate early to late Archaic activity and five percent of the site components show Basketmaker II-III activity.

The Archaic and Basketmaker period site components indicate populations were increasing and suggest large group movements through the area with transitory occupation and long-term revisitation of specific locations. While the evidence indicates long-term use of the area, lack of

base camp evidence supports the interpretation of scattered transitory occupation primarily for gathering wild plants. The number of pre-Columbian lithic scatters supports this observation. Occupation during the Pueblo period was also limited. Individual and community structures characteristic of Pueblo sites are uncommon to the El Segundo permit area. Indicators of the Pueblo period consist primarily of lithic debris and ceramics. Site remains appear primarily related to foraging except for a few habitation sites near potential agricultural sites. There is the potential for subsurface pit structures. The project area was apparently of limited value to Pueblo era people, using it primarily for gathering or as a passageway to other areas.

After A.D. 1300, little evidence exists for occupation of the El Segundo permit area until the late 19th century. The Navajo used the area sparingly for grazing and hunting with temporary camps the extent of habitation. Similarly, the Laguna presence was mostly related to herding and livestock activities. Historic Hispanic use was limited due to the area being recognized as Navajo territory. Activity, again, was mostly transitory with some livestock use unless curtailed by Navajo raiders. The historic Anglo-American activity is primarily related to ranching and livestock operations first on lands leased from the Atlantic and Pacific railroad and later purchased. Navajos and small scale ranchers were displaced by large operations. Oil, gas, and mineral extraction have been important activities following World War II.

While reconnaissance surveys covered most of the El Segundo permit area, 3.5 sections in the northwest corner of the permit area require survey. In surveyed areas, most previously recorded sites have no eligibility determination except three. Significance evaluations are based on a site's potential, or in other words, its ability to contribute information important to area or regional history. Of the 367 site components identified, 104 are recommended as significant, 38 as not significant, 156 are in need of further assessment, and 68 are potentially significant. Apart from their use in defining the general cultural landscape, the isolated occurrences (beyond the 367 site components) do not contain significant information beyond that recorded for them during survey. Archaeological survey work to date provides insight about the occupational history, site cultural-temporal variability, site density and distribution pattern, and the physical properties of area sites.

No public parks or sites currently on or nominated to the State and National Registers of Historic Places occur within or adjacent to the permit area.

3.6.1 Impacts and Mitigation

For the NEPA analysis, the criterion for a significant impact on cultural resources was defined as an unavoidable adverse effect that appeared to have little potential for acceptable mitigation through consultation with those participating in the project review to comply with Section 106 of the national Historic Preservation Act (NHPA). There is the potential for adverse effects on the archaeological, cultural, and historical resources within the El Segundo permit area. Disturbance of the sites would be long-term permanent impacts as a result of mining and other surface disturbance activities associated with the mining operation.

A variety of measures are used to mitigate impacts to cultural resources beginning with survey and documentation of the resources. Operational plans are developed to reduce or avoid impacts to sites where possible. Sites to be avoided are secured and protection from disturbance is coordinated with mine operations and associated activities. Where disturbance is unavoidable, sites are surveyed, tested, and cleared to recover data, preserve information, and determine eligibility under the requirements of NHPA and in cooperation with the New Mexico SHPO, MMD, and tribal cultural preservation offices. Mitigation and data recovery are conducted by qualified archaeological personnel. At the El Segundo mine, mitigation of sites identified from the archaeological surveys will be conducted in a sequential manner over time and staged to mine progression. Initial disturbance associated with facilities and roads and the boxcut area will be tested, cleared, and data recovered. As mining progresses, all sites within a new projected five-year mining block will be mitigated prior to disturbance. If new sites or unanticipated finds are encountered as a result of activities in an operational area, mining activities will be temporarily suspended to survey and clear the site as appropriate. Normally, unanticipated finds are encountered during grubbing or soil salvage. Tribal representatives from the Four Western Pueblos and the Navajo Nation expressed concern that burials could be present in the El Segundo permit area. While none have been encountered to date, testing of existing sites or an unanticipated find during mining operations may uncover human remains or burials. If human remains or burials are discovered and these sites are to be impacted, consultation and mitigation according the requirements of the Native American Graves Protection and Repatriation Act (NAGPRA), the New Mexico Cultural Properties Act and the New Mexico Historic Preservation Division (HPD) will be followed. Tribal cultural preservation representatives of the Four Western Pueblos and the Navajo Nation will be notified and procedures for identification, recovery, and re-internment implemented according to appropriate tribal cultural practices or traditions.

The comprehensive mitigation measures and state, tribal, and federal rules and regulations will minimize impacts and respect Native American culture and traditions. The recovery of significant information will preserve and increase the historical and cultural knowledge. Because of the mitigation efforts, procedures, and the nature of the sites to be encountered, the overall level of impact is anticipated to be minor.

3.7 Socioeconomics

Impacts to the human environment are measured in terms of the social and economic characteristics of the area where the proposed action is to take place. Economic impacts are generally expressed as changes to population, employment, income, and government revenue and expenditures. Social impacts are measured in terms of changes to community infrastructure such as access to social services. The extent of the affected environment is determined by the communities that would experience socioeconomic impacts and benefits. The proposed action is located in McKinley County, New Mexico, and the affected environment for socioeconomic impacts extends to the surrounding counties, including Cibola, Rio Arriba, Sandoval, and San

Juan Counties, New Mexico, because employees and residents affected by the proposed action reside and use services in communities throughout the five-county area (see Figure A-8 in Appendix A)(USCB 2010). This socioeconomic baseline also focuses on these counties and on the Navajo Nation Chapters near the Project Area

3.7.1 Population

The total population for the five county area is about 400,000 individuals. Of these, San Juan and Sandoval Counties have the greatest populations, with about 130,000 individuals each. Overall, New Mexico experienced a population increase of about 13 percent between 2000 and 2010. The five county area experienced varying growth rates during this same time period, with San Juan and Sandoval exceeding the state growth rate, Cibola growing more modestly, and both McKinley and Rio Arriba losing population (BBER 2010). McKinley County experienced a decrease in population of 4.4 percent between 2000 and 2010 (USCB 2010; BBER 2010). Table 3.7-1 includes the population or projected population for each county between 1990 and 2030.

Table 3.7-1. Population for the Affected Counties, 1990-2030

County/State	Population				
	1990	2000	2010	2020	2030
New Mexico	1,515,069	1,819,046	2,059,179	2,540,145	2,864,796
Cibola	23,794	25,595	27,213	32,293	33,873
McKinley	60,686	74,798	71,462	88,155	93,294
Rio Arriba	34,365	41,190	40,246	46,206	46,879
San Juan	91,605	113,801	130,044	146,815	155,593
Sandoval	63,319	89,908	131,561	163,315	200,822

3.7.2 Employment

Table 3.7-2 includes number of employees by sectors for the state and the five county area. The Northwestern New Mexico Regional Comprehensive Economic Development Strategy (NW-CEDS 2009), which includes San Juan, McKinley, and Sandoval Counties, identified retail, health care and social assistance, energy, tourism, and construction as the area's economic strengths (NW- CEDS 2009).

McKinley County differs from other counties in the region because it has the highest proportion of health and education jobs. McKinley County has been the focus of several public health campaigns and grants over the past two decades, which have built facilities and increased health care professional employment opportunities (McKinley Community Health Alliance 2009). Over

60 percent of McKinley County land is within the Navajo Nation boundaries; thus, Indian Health Services is a significant employer in the health care sector. Gallup, the only incorporated place in

Table 3.7-2. Number of Employees by Sector in the Each County in the Affected Region in 2017

Sector	Cibola	McKinley	Rio Arriba	San Juan	Sandoval	Region Total
Total, all industries	7,691	20,712	9,928	47,970	29,916	117,248
Health Care & Social Assistance	1,827	5,443	1,639	8,090	3,949	17,114
Retail Trade	816	3,162	1,131	5,971	3,309	14,389
Education Services	590	2,765	1,296	4,943	3,019	12,613
Accommodation & Food Services	620	2,874	1,331	4,691	3,482	12,998
Public Administration	1,442	1,939	2,449	3,245	2,307	11,382
Professional, Scientific & Technical Services	57	189	123	1,000	841	2,210
Construction	314	653	366	3,886	1,716	6,935
Admin., Support, Waste Mgmt, Remediation	403	343	270	1,106	4,469	6,591
Manufacturing	90	531	143	1,092	2,302	3,858
Transportation & Warehousing	73	409	199	1,316	453	2,450
Other Services (except Public Admin.)	79	454	228	1,208	613	2,582
Finance & Insurance	122	408	130	875	Confidential	1,535
Wholesale Trade	165	465	59	1,558	47	2,694
Mining	304	13	53	4,993	110	5,473
Arts, Entertainment, and Recreation	595	457	132	1,164	1,531	3,879
Information	25	193	73	350	222	863
Agriculture, Forestry, Fishing & Hunting	37	Confidential	70	574	43	724
Real Estate & Rental & Leasing	41	186	57	537	442	1,263
Utilities	93	203	129	1,123	89	1,637
Management of Companies & Enterprises	8	19	50	249	27	353
Unclassified establishments	NA	NA	NA	NA	NA	NA

Sources: LASER 2012; MSHA 2012.

Note: *Number of Lee Ranch and El Segundo Mine employees in McKinley County.

McKinley County, is the main center of employment and social services (City of Gallup 2009).

Total mining employment in the five county area is estimated to be about 5,473 jobs or about 3% of the mining employment in New Mexico. Current employment at PNRC mines is about 305 employees. Despite the overall increase in employed persons in the state and region, through2015 and 2018 mining in New Mexico remains a leading United States mineral producer. The economy in New Mexico has seen a slow employment growth in the three of the five county area. The number of employed persons in the State and the region increased slightly between 2015 and 2018. Table 3.7-3 gives the number and change in employed persons in New Mexico and the five county area for 2015 to 2018 (LASER 2019).

Table 3.7-3. Employment in the Affected Region 2015-2018

State/County	Employed Persons				Change 2015-2018
	2015	2016	2017	2018	
New Mexico	873,422	874,424	881,252	893,823	20,401
Cibola	8,551	8,540	8,408	8,366	--185
McKinley	21,985	22,106	22,223	22,111	126
Rio Arriba	15,304	15,509	15,728	15,802	498
San Juan	51,932	49,479	49,941	49,508	-2,424
Sandoval	58,111	59,884	60,623	61,416	3,305

Table 3.7-4 gives the unemployment rates for the five county area from 2008 to 2011. All five counties experienced an increase in unemployment between 2008 and 2009. McKinley, Rio Arriba, San Juan, and Sandoval Counties' unemployment rates persist in exceeding that of New Mexico (LASER 2019; U.S. Bureau of Labor Statistics 2012).

Table 3.7-4. Mean Annual Unemployment Rates for New Mexico and the Five County Affected Area, 2015-2018

State/County	Year			
	2015	20162009	2017	2018
New Mexico	6.5%	6.50%	5.30%	5.0%
Cibola	8%	8.1%	7.4%	6.3%
McKinley	9.7%	9.3%	8.2%	7.1%
Rio Arriba	8.0%	7.4%	6.1%	5.2%
San Juan	6.9%	8.7%	7.2%	5.8%
Sandoval	6.6%	6.5%	5.9%	5.0%

3.7.3 Income

The median household income (MHI) for New Mexico in 2015 was about $45,524, which is about $11,000 below the national MHI (USCB 2010). Cibola, McKinley, and Rio Arriba Counties all have lower MHIs than the State of New Mexico, while San Juan and Sandoval have higher MHIs. Sandoval County's MHI is substantially higher than the state MHI. Table 3.7-5 gives the MHI for the five counties. McKinley County has the lowest MHI of any county in New Mexico; approximately 70 percent of the State MHI (LASER 2019).

Table3.7-5. Median Household Income and Average Weekly Wage in 2015 for the Five County Affected Area and New Mexico

County/State	Median Household Income ($)	Average Weekly Wage ($)
New Mexico	45,524	819
Cibola	35,580	685
McKinley	29,040	635
Rio Arriba	37,319	626
San Juan	49,173	834
Sandoval	62,833	799

3.7.4 Government Revenues and Expenditures

In 2018, New Mexico received $11 million in revenue from coal production and sales (NM-EMNRD 2018). The production value for coal that year totaled $413 million and employed about 906 individuals. While mining contributes 2.2 percent of the personal income of New Mexico's residents (BBER 2012), the state has effectively taxed the industry in a way to harness more significant revenues (Headwaters Economics 2011). Coal mining represented 19 percent of the total mining employment (2018 New Mexico Energy, Minerals, and Natural Resources Department Annual Report). Table 3.7-6 gives an overview of taxes paid at the federal, state, and county levels for extraction of natural resources in New Mexico and the estimated average annual revenues paid by PNRC between 2009 and 2011. The average annual tax revenues are estimated using annual coal production for El Segundo Mine (6 million tons) and a coal price of $23.60 per ton estimated from surface coal mine prices in New Mexico.

Table 3.7-6. State, Federal, and County Taxes by PNRC from El Segundo Mine

Tax	Amount	Level	Description	Average Annual Revenue Paid in $ Million
Property Tax	31.567 (mill levy) on taxable income	County	To compensate government for cost of services based on the value of real and personal property	$1.6
Resources Excise Tax	0.75% after royalties	State	To provide revenue for servicing the public by taxing the privilege of severing and processing natural resources within New Mexico	$1.1
Oil & Gas Conservation Tax	0.02%	State	To compensate public for loss of natural resources and encourage conservation of resources	$0.3
Gross Receipts Tax	6.75%	State and County	To compensate state and local government for cost of services based on value of taxable sales	$9.4
Severance Tax and Severance Surtax	$0.57/ton + 1.02/ton	State	To compensate present and future citizens for loss of natural resources by individuals and corporations that make profit by using up irreplaceable natural wealth of a state	$6.0
Federal Reclamation Tax	$0.35/ton	Federal	To create funding to clean up abandoned mine sites where no responsibility can be identified otherwise	$2.1
Black Lung Federal Tax	$0.55/ton	Federal	To create funding for victims and families of victims of black lung disease	$3.25
Federal Mineral Leasing Royalty Fee	12.5% of taxable income	Federal	Royalty paid to the Federal Government for extraction of federally owned minerals; half of the royalties are returned to the state	2.7
			TOTAL Average Annual Tax Payments	**24.4**

Sources: New Mexico Taxation and Revenue Department 2009; MSHA 2012.

Revenue from fossil fuel and mineral extraction in New Mexico is distributed as follows: 6 percent to direct energy spending; 44 percent to education; 44 percent to general government; and 6 percent to long-term investments as shown in Figure 3.12.1 (Headwaters Economics 2011). Because of long-term contracts, coal markets are generally less volatile than other fossil fuel markets; therefore, represent a more stable source of revenue and employment for New Mexico (Headwaters Economics 2011). However, between 2008 and 2009, coal production decreased by 7 percent and coal industry payrolls decreased by over 10 percent, reducing tax revenues paid to the state and coal-producing counties in New Mexico.

In McKinley County, coal production is taxed at mill levy of $0.031567, or $31.57 per thousand dollars of assessed value. Roughly 11 percent of the county's revenue comes from taxes on coal production. In 2011, coal production was the greatest source of revenue for the county, totaling about $2.6 million dollars (McKinley County Assessor 2012). Figure 3.7-1 gives the distribution of tax revenues from fossil fuel extraction in New Mexico and McKinley County (Headwaters Economics 2011; McKinley County Assessor 2012). The largest portion of the fossil fuel revenue to McKinley County is used to pay for county operations and education (Figure 3.7.2).

Figure 3.7-1. Distribution of Tax Revenue Generated from Fossil Fuel Extraction in New Mexico, 2011

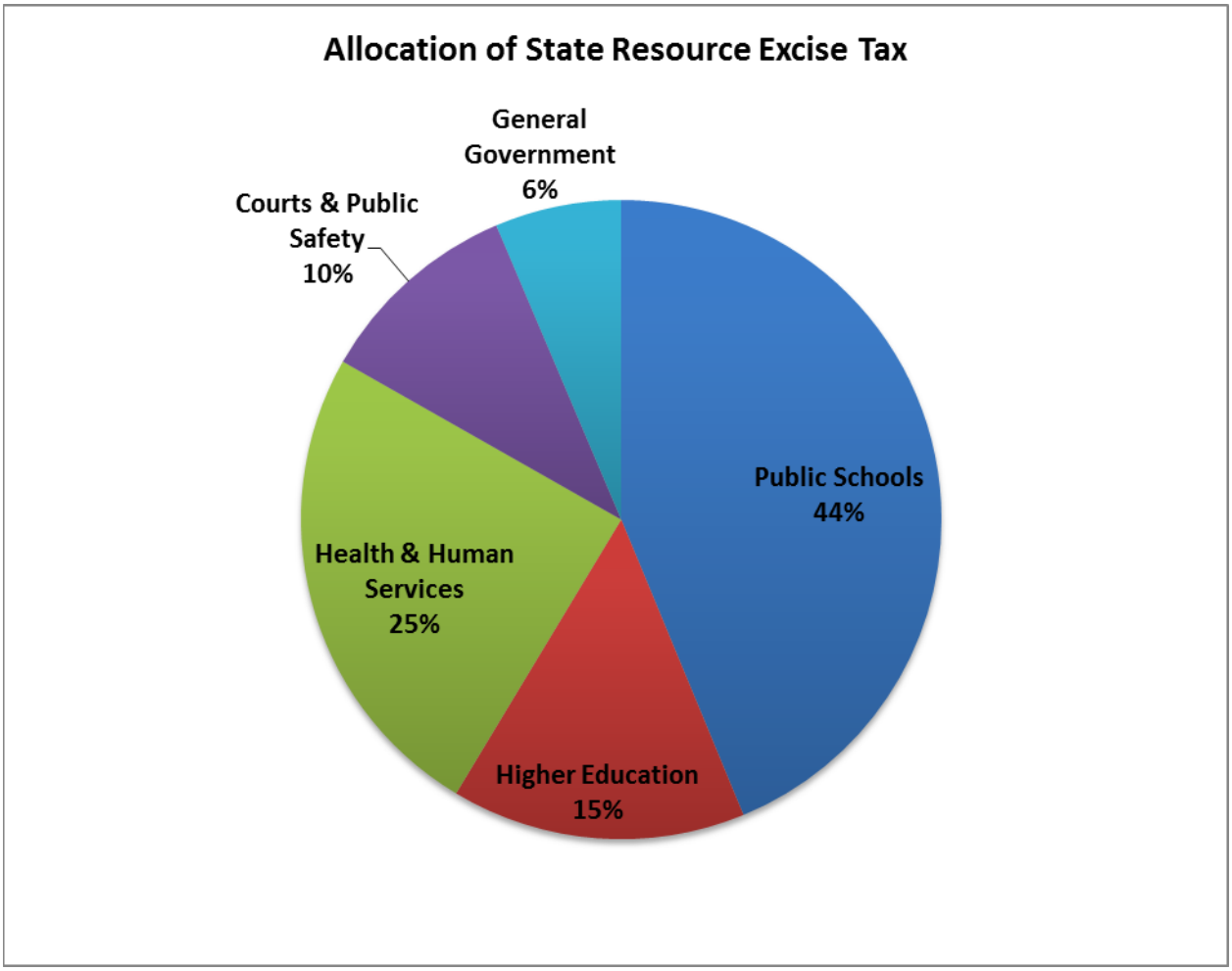
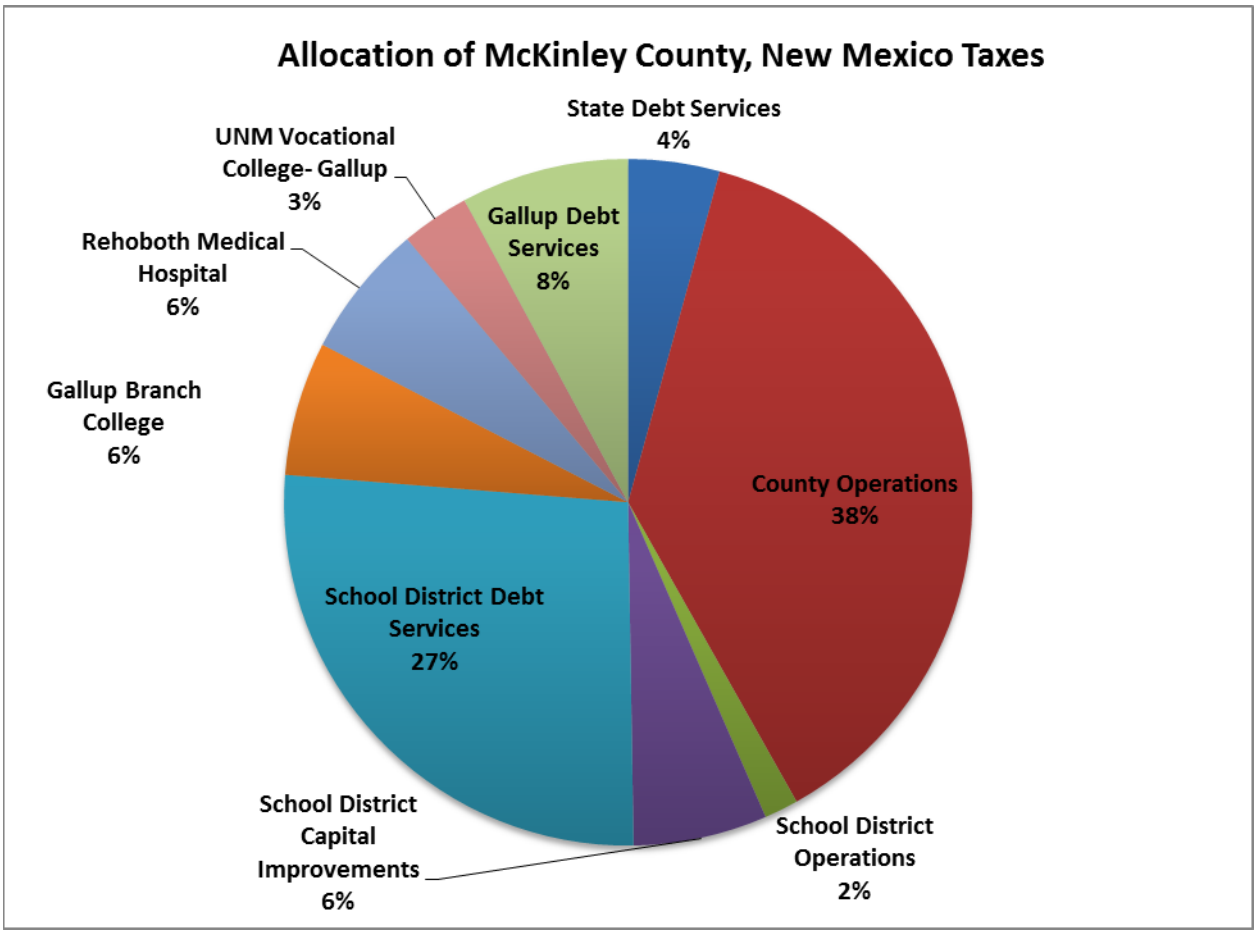


Figure 3.7-2. Distribution of Tax Revenue Generated from Fossil Fuel Extraction in McKinley County, 2011



3.7.5 Navajo Nation Socio-Economic Profile

More than half of McKinley County's land area and over three-quarters of its population is Native American (USCB 2010). The proposed action is located adjacent to the Navajo Reservation and Trust Lands. Navajo Chapters located near the proposed action include Becinti, Casamero Lake, Crownpoint, Little Water, Mariano Lake, Ojo Encino, Pueblo Pintado, Smith Lake, Torreon, and Whitehorse Lake as shown in Figure A-9 (Appendix A).
The total population of the Navajo Nation, which falls within New Mexico, Utah, and Arizona, was about 200,000 in 2010. McKinley County's Navajo population totals over 42,000 individuals. Table 3.7-7 shows the total population of McKinley County, the Navajo Nation, and the Chapters located near the proposed action (USCB 2010, NW-CEDS 2009).

Table 3.7-7. Population Counts and Estimation for the Navajo Nation, McKinley County, and the Navajo Chapters Located within McKinley County

County/Chapter	Population			
	1990	2000	2010	2020
Navajo Nation	146,001	180,462	212,216	258,822
McKinley County	60,686	74,798	71,462	88,155
Becenti	193	506	595	726
Casmero Lake	555	549	646	788
Crownpoint	2,468	2,906	3,417	4,168
Little Water	636	571	672	819
Mariano Lake	720	870	1,023	1,247
Ojo Encino	577	709	832	1,016
Pueblo Pintado	447	464	546	666
Smith Lake	504	1,067	1,254	1,530
Torreon/Star Lake	1,326	1,818	2,138	2,607
White Horse Lake	603	547	643	784

Much of the Navajo Reservation is rural and many of the population centers in the region are located off Reservation lands; thus, creating a vacuum of employment opportunities for residents. The Navajo Nation government is the largest employer on the Reservation, followed by Indian Health Services (NW-CEDS 2009). Taxes to property and businesses are the most significant source of Navajo Nation revenue, followed by coal mining and external funding from the federal government and grants. Median household income of the Navajo Nation within McKinley County in 2010 was about $27,000, compared to $30,000 for the county. The Crownpoint community MHI was about $25,000 (USCB 2010). The Navajo Nation economy has been characterized by consistently high unemployment rates (NW- CEDS 2009). In 2007, the Navajo Division of Economic Development estimated the unemployment rate on the Navajo Reservation as a whole to be over 50 percent. The unemployment rate for Crownpoint, which is the largest Navajo Nation community located within McKinley County, could be as high as 65 percent (Federal Reserve Bank of Kansas City 2009). Census data for 2010 indicates the unemployment rate in Crownpoint is over 29 percent, compared to about 10 percent for the county as a whole (USCB 2010).

3.7.6 Public Safety

Access to the El Segundo Mine will be limited to a mine access road off of State Road 509, and public access will be limited by fencing and entrance with permission only at a guard shack located along the mine access road. A concrete "at-grade" crossing may be built at the southern most portion of State Road 509 (see NPDES Site Map, Attachment F) after consulting with the New Mexico Department of Transportation and in accordance with New Mexico DOT specifications for signage, warnings, and road stability. As an alternative to the at-grade road crossing, an elevated coal conveyor is being considered at approximately the same location over State Road 509. The New Mexico DOT would be consulted to determine construction design and monitoring prior to construction. The elevated coal conveyor will be built with sufficient protective shrouds to completely enclose the belt and prevent spillage and dust from the coal conveyor belt.

3.7.7 Socioeconomic Impacts and Mitigation

Economic impacts are measured in terms of changes to population, employment, income, and government revenues in the affected region. Social impacts include changes to community infrastructure such as access to social services. The significance criteria for economic impacts are based on changes to employment, income, and government revenues generated by coal production in the Project Area. High impacts would have changes greater than 25 percent compared to baseline conditions. Moderate impacts would have changes between 10 and 24 percent compared to baseline conditions. Low impacts are those changes that are less than 10 percent from baseline conditions or too small to be measured. The significance criteria for social impacts also include the rate of change of employment, income, and government revenues. Sudden shifts in these measures tend to reduce the ability of governments to respond to changes in demand for social services because of the lag time between employment changes and receipt of tax or royalty revenues. The same levels as used in the significance indicators for economic impacts, (i.e., 25 percent for high, 10 percent for moderate, and too small to be measured) apply to the rate of change of employment, income, and government revenues over the 10-year mining period.

3.7.8 Proposed Action

The socioeconomic impacts are directly related to the amount of coal that would be mined from the Project Area between 2019 and 2023. No changes to employment are expected; therefore no change to the income, population or employment of the counties surrounding McKinley County is expected. In 2018, employment at El Segundo Mine was 221 and total coal production was over 5.5 million tons. Table 3.7-8 shows coal production and estimated government revenues that would be generated by coal production from the Project Area.

Table 3.7-8. Estimated Coal Production and Government Revenue from Mining the Project Area of the El Segundo Mine

Year	Project Area (million tons of coal)	Estimated Income ($ million)	Estimated Revenue ($ million)		
			Federal	State	McKinley County, NM
2019	1.17	$ 27.6	$4.5	$3.3	$0.3
2020	1.22	$ 28.8	$4.7	$3.5	$0.3
2021	1.26	$ 29.7	$4.9	$3.6	$0.3
2022	0.61	$ 14.4	$2.3	$1.7	$0.2
2023	0.11	$ 2.6	$0.4	$0.3	$0.0
TOTAL	4.37	$ 103	$16.8	$12.4	$1.1

Sources: PNRC 2012; DOE EIA 2012; NM Tax and Revenue Department 2012; McKinley County Assessor 2012.

Annual employment, wages, and tax revenues generated by mining activities would not change measurably from the baseline as a result of the Proposed Action. As shown in Table 3.7-8, the economic impact of the proposed action would be to government revenues. Total federal government revenues derived from federal royalties and fund taxes would total about $16.8 million over a 5-year period, an amount insignificant compared to the total annual revenue to the federal government of about $22 trillion. The State of New Mexico revenues from royalty, severance, and gross receipts taxes are estimated to be more than $12.4 million over 5 years, also insignificant compared to total annual revenue of $1.8 billion. An estimated $1.1 million in property tax revenue, out of about $246 million, would be paid to the county over the 5-year period. This amounts to about 1 percent of McKinley County's estimated total revenue over the 5-year period. Therefore, there would be no direct or indirect economic or social impacts for this alternative.

3.7.9 No Action Alternative

Socioeconomic impacts are directly related to the amount of coal mined from the El Segundo Mine. If mining in the Project Area does not occur then employment, wages and tax revenues generated by the El Segundo Mine would not differ from those described in Section 3.12.

3.7.10 Environmental Justice

The CEQ guidance (CEQ 1997) on incorporating environmental justice into NEPA analysis notes, "In order to determine whether a Proposed Action is likely to have disproportionately high and adverse human health or environmental effects on low-income populations, minority populations, or Indian tribes, agencies should identify a geographic scale for which they will

obtain demographic information on the potential impact area. Minority populations should be identified where… (b) the minority population percentage of the affected area is meaningfully greater than the minority population in the general population or other appropriate unit of geographic analysis." The same guidance is given for measuring low-income populations. Usually, this is measured by comparing the individual poverty rate for the affected area to a comparison area.

To determine whether a risk or rate of hazards exposure by a vulnerable population such as minority or low-income population is significant according to NEPA, CEQ guidance requires that the risk or rate "much appreciably exceeds or is likely to appreciably exceed the risk or rate to the general population or other appropriate comparison group; and whether health effects occur in a minority population, low-income population, or Indian tribe affected by cumulative or multiple adverse exposures from environmental hazards." Therefore, the environmental justice impact analysis compares the risk and rate of adverse impacts associated with the proposed action for the affected area to a comparison group to determine whether there are significant environmental justice impacts.

New Mexico's poverty rate in 2019 substantially surpasses the national rate (11.8 percent). All of the counties in the region, with the exception of Sandoval County, exceed the state poverty rate. Cibola, McKinley, and San Juan Counties all have poverty rates above 20 percent. McKinley County, as the poorest county in the state, exceeds the state poverty rate by more than 10 percent. All five counties in the affected region have measurably greater Native American populations than New Mexico. McKinley County's Native American population is over 75 percent. Table 3.7-9 gives the race and ethnic composition of New Mexico and the region, as well as the poverty rate for all individuals derived from 2010 census data (USCB 2010).

Due to the disproportionate population of Native Americans and the substantially higher poverty rate in the region, an analysis of disproportionate impacts to vulnerable populations is required.

Table 3.7-9. Race/Ethnic Composition and Poverty Rates of New Mexico and the Five County Area, 2010 Census

Locality	% White Non-Hispanic	% Hispanic	% Native American	% Black or Other	% Poverty Rate
United States	60.4	18.3	1.3	13.4	11.8
New Mexico	37.1	49.1	10.9	2.6	19.5
Cibola	19.5	38.4	43.8	1.4	30.1
McKinley	8.4	14.4	79.2	0.7	37.8
Rio Arriba	12.7	71.2	19.3	0.9	28.9
San Juan	38	20.5	41.1	0.8	23.1
Sandoval	43.1	39.4	14	2.7	15.3

3.7.11 Environmental Justice Impacts and Mitigation

There would be no disproportionate impacts to low-income or minority populations as a result of the Proposed Action because there would be no measureable changes to socioeconomic measures from baseline conditions. There are no foreseeable environmental hazards that would disproportionately affect low income or minority populations in the area due to the proposed action.

3.7.12 No Action Alternative

Because there would be no change from socioeconomic baseline conditions and no foreseeable environmental hazards, there would be no disproportionate impacts to low income or minority populations.

3.8 Cumulative Effects.

The cumulative effects of coal surface mining at El Segundo would increase acreages with gentler slopes, smoother topography, and somewhat less dense drainage patterns. Mining operations will remove a total of 117 million tons over the 30-year life of mine, or approximately 8.5 million tons peak annual production. The mining operation will disturb approximately 7,862 acres over the life of the mine. It is anticipated that no more than 2000 acres will remain disturbed in any one year since mining and reclamation are performed contemporaneously. The cumulative effects of mining operations on the soil resources on the permit area would be beneficial to neutral. The project would result in conversion of native grassland and shrubland to reclaimed grassland and grass shrubland. The revegetation plan and seeded species is expected to improve the existing range condition and increase utility for grazing and wildlife habitat on all affected acres.
Impacts of cultural change, deterioration, weathering, and erosion of the tangible cultural resources are cumulative over time. There has been degradation or loss of cultural resources from prior and ongoing activities and these will continue in the future. Oil and gas exploration, continued development of mineral properties, ranching, and recreation are included activities. Although the proposed project will affect a number of cultural resources, thousands of cultural resources have been surveyed and recorded in the region as a result of mineral development and oil and gas exploration. Archaeological surveys and mitigation discussed in this document will serve to lessen the cumulative impact. The impacts of the proposed project in context of this and the relatively small areal extent of the project in the region is expected to represent only a minor increment to cumulative impacts on the cultural resources of the region.

With respect to hydrology, NMAC Rule 19.8.11.1106 provides criteria for approving or denying coal mining permits in New Mexico. One important requirement involves an assessment of the probable cumulative hydrological impacts (CHIA) of all anticipated coal mining in a defined

cumulative impact area. This assessment on the hydrologic balance has been made by the director, and the operations described in the application (PAP) have been designed to prevent damage to the hydrologic balance outside the proposed permit area. The MMD finalized the CHIA document for the El Segundo Mine during 2005 after internal review and addressing comments from the Albuquerque State Engineer office and the Denver office of the Office of Surface Coal Mining Reclamation and Enforcement (MMD, 2005). Pertinent information and impact assessments contained in this document are discussed in Section 3.2, Water Resources of this EA. The CHIA found that mining activities proposed at the El Segundo Mine have been designed to prevent material damage to the hydrologic balance outside of the permit area. The CHIA gives sound scientific evidence that the cumulative effects of mining activities planned at the El Segundo Mine will be minimal.

Similarly under NMAC rule 20.2.72.203, an air construction permit must affirmatively demonstrate that a new or modified source will not cause or contribute to ambient concentrations of pollutants in excess of New Mexico Ambient Air Quality Standards. A noted in Section 3.3.1 of this analysis, such a demonstration has already been made and resulted in the granting of NSR Air Quality Permit No. 2604.

4.0 OTHER ENVIRONMENTAL CONSIDERATIONS

4.1 Unavoidable Adverse Impacts.

Mining is expected to result in the removal of the Orphan Annie stock well within the permit area. This well will be permanently plugged and seeded using methods approved by the MMD. An alternative source of water will be provided from the mine supply well SJ-120 to replace and mitigate the loss of this water source and to provide additional sources of water for supporting the post-mining land use, therefore the impact will be short-term with long-term impact mitigation provided by the alternate water source.

There is the possibility that some archaeological information may be lost as a result of an unanticipated site encountered during construction and mining activities. This should be a potentially minor impact because of the comprehensive archaeological survey and mitigation plan for the El Segundo permit area as discussed in section 3.6 of this document and provisions established by MMD to address unanticipated finds.

Loss of existing vegetation resulting from construction and mining activities will be an unavoidable but short-term adverse impact. Section 3.4 of this document addresses impacts to vegetation and the revegetation program that will mitigate the loss of vegetation over the long-term.

Topsoil removal in areas of construction and mining activity will result in unavoidable loss of soil types and associated characteristics such as soil structure and physical characteristics. Soil salvage and replacement and restoration of soil productivity as a result of the reclamation plan is discussed in sections 3.1.4 and 3.4.4 of this document and will mitigate long-term impacts to soil resources.

Wildlife will be displaced during construction and mining activities which will result in an unavoidable but short-term impact. Wildlife mobility, reclamation, and restoration of habitat features as discussed in section 3.4 of this document will mitigate the impact over the long-term.

Land use will be adversely impacted over the life of the mining operation. Contemporaneous reclamation and restoration of productivity as discussed in sections 3.1 and 3.4 of this document serve as mitigation of any land use impacts over the long-term.

4.2 Relationship Between Local Short-term Use of the Environment and Maintenance and Enhancement of Long-term Productivity

Short-term impacts are those that would occur from the time when mining begins through reclamation of a unit when vegetation has been reestablished. Long-term impacts are defined as the period from when vegetation is established and lands have been released to post-mine land uses.

The El Segundo mine would be committed to coal production and reclamation during the approximate 30 year life of mine. The project would supply reliable low cost fuel to power plant customers. Mining would result in roads, facilities, powerlines, fences, etc. in the permit area. Over the short term, mining would continue to change the environment and commit resources and then the affected area would be reclaimed and restored to rangeland for livestock grazing and wildlife habitat. Over the long-term, use of the land for grazing and wildlife habitat would not be affected because reclamation restored functional land use.

Approximately 7,862 acres would be disturbed by the El Segundo mining operation. There would be long-term changes to the existing geology and topography, and soils from backfilling and grading and soil replacement operations; however the modified topography would support and likely enhance grazing and habitat. Over the long-term, soil and vegetation would return and possibly exceed pre-mine conditions due to more uniform soil depths, textures and chemical and physical composition of soils.

There would also be a short-term loss of vegetation and wildlife habitat. Seeded native grasses and shrubs would establish a grass/shrubland reclaimed vegetation community. It is likely the revegetated areas would have higher herbaceous productivity than pre-mine communities (common in coal mined reclamation in the west), but there would be some long-term loss of structural habitat elements such as scattered trees or rock outcrops. Over time the reclaimed community would support a diverse wildlife community but with species more adapted to grassland habitats.

Over the short-term, mining would sustain a workforce for the 30 year life-of-mine. Surrounding communities would be benefited over the short-term through revenues and jobs generated by the mining operation. Long-term impacts would be moderate as a result of the mine closure and related loss of jobs and revenues. There would be short-term impacts to local ranching operations, but these would be diminished over the long-term after cessation of the mining operation, reclamation is completed, and land use is restored. There are few residences in the area and none within two miles of or adjacent to the permit area (see the air quality discussion presented previously in this document).

4.3 Irreversible/Irretrievable Commitment of Resources.

Both irreversible and irretrievable impacts would occur under all alternatives for geology and minerals, soils, wildlife, land use, and cultural resources. There would be an irreversible and irretrievable commitment of coal resources as a result of extracting 117 million tons of coal. The structure and characteristics of the original soil types would be irreversibly changed for lands disturbed by mining or in facilities areas requiring soil salvage. Commitment of the resources would be irreversible in mining areas, but reclamation efforts would recover soil productivity over time and thus there would not be an irretrievable loss. An irretrievable commitment of wildlife habitat would occur from facilities construction and mining activity. However, the

reclamation program would restore habitat that would develop further as a result of successional processes and there would not be an irreversible loss of habitat. An irretrievable loss of land use would occur over the short-term as a result of mining; however reclamation efforts will restore productivity and the ability to achieve postmining land use which would not result in an irreversible loss. Disturbance of all known historic and prehistoric cultural resource sites on the mine area would be mitigated to the maximum extent possible but would be irreversible. Accidental destruction of presently unknown archaeological or paleontological values would be irreversible and irretrievable. Some loss of cultural resources would be irretrievable but survey and data recovery would retrieve information and artifacts that would preserve historical information and some could be addressed through compliance with MMD's policy for discovery and mitigation of unanticipated finds. Traditional cultural values may be irretrievably lost from construction of facilities and changes to visual resources.

5.0 COORDINATION WITH OTHER AGENCIES

The MMD developed a document that summarizes technical analyses that were performed on information contained in the El Segundo PAP after it was submitted by PNRC in September 2002 (MMD, 2005). This document provides a chronology of permitting processing, technical analyses performed by NMAC regulation, and other review actions conducted by agencies in coordination with the MMD prior to issuing Permit No. 2015-01 to PNRCPNRC for the El Segundo Mine in September 2015. PNRC also coordinated air quality permitting with the State of New Mexico Environment Department (NMED) and has been working with the U.S. Environmental Protection Agency and NMED on the individual NPDES point-source permit.

Several Federal and State agencies were consulted for review and comment during the three-year permit review process. These agencies include the following:

- U.S. Fish and Wildlife
- U.S. Army Corps of Engineers, Albuquerque District
- U.S. Environmental Protection Agency, Region 6
- Office of Surface Mining Reclamation and Enforcement
- New Mexico Department of Game and Fish
- New Mexico State Historic Preservation Division
- New Mexico Commissioner of Public Lands
- Air Quality Bureau, State of New Mexico Environment Department
- Water Quality Bureau, State of New Mexico Environment Department
- City of Gallup Water Board

Numerous Native American Tribal governmental agencies and several Navajo Nation local Chapters were also consulted, including the following:

- Pueblo of Acoma Historic Preservation Office
- Hopi Cultural Preservation Office
- Navajo Historic Preservation Office
- Navajo Mineral Resources Division
- Navajo Nation EPA
- Pueblo of Laguna NAGPRA Committee
- Zuni Heritage and Historic Preservation Office
- Casamero Lake Chapter
- Littlewater Chapter
- Whitehorse Lake Chapter

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ATTACHMENT A

Cumulative Hydrologic Impact Assessment for El Segundo Mine

Cumulative Hydrologic Impact Assessment
for
El Segundo Mine

Table of Contents

PART I

INTRODUCTION

1) THE CHIA PROCESS

1.1 PREFACE

Prior to approval of a surface or underground coal mine permit, the regulatory authority must assess the probable cumulative impacts of all anticipated mining on the hydrologic balance in the cumulative impact area. The regulatory authority must also determine that the proposed operation has been designed to prevent material damage to the hydrologic balance outside the permit area. These requirements can be found in the State of New Mexico Surface Coal Mining Rules 19 NMAC 8.11.1106(C) and the coal mining federal regulations at 30 CFR 780.21(2) (g). This assessment is known as a Cumulative Hydrologic Impact Assessment (CHIA).

The permit application package(PAP) is submitted to the regulatory authority by the operator and is specific to the individual coal mine and the mining and reclamation issues involved with that particular operation. The CHIA is intended to take into consideration the effects of all coal mining operations on the regional hydrologic balance, and to ensure that the proposed operation has been designed to prevent material damage outside the permit area related to surface and ground water quantity and quality.

An integral portion of the CHIA process is delineation of the Cumulative Impact Area (CIA). The CIA is the area within which cumulative hydrologic impacts of the proposed mining operation and all anticipated mining are expected to occur. Determination of the cumulative impact area should focus on the identification of the total area that contributes to the magnitude

of hydrologic impacts outside the permit areas. Because it is difficult to estimate the extent of the CIA before the impacts occur, and because it is difficult to estimate all future mining ventures, the CHIA process must depend on an estimated CIA.

El Segundo coal mine is located in the Standing Rock Cleary coal area, Figure 1, of the southeastern San Juan Basin, as described by Shomaker in NMBMMR Memoir 25. The proposed mine is located in McKinley county approximately 16 miles east of Crownpoint, New Mexico or 8 miles southwest of Hospah, New Mexico. El Segundo Mine is the only Surface Mining Control and Reclamation Act (SMCRA) regulated mine currently proposed in the area. The mine has submitted a PAP, requesting to surface mine coals of the Cleary Member of the Menefee Formation. The request for mining creates the need for the formulation of a CHIA. This study, in general, conforms to all current Office of Surface Mining and Reclamation Enforcement (OSMRE) guidelines, and is organized by guideline elements.

Pursuant to the Surface Mining Control and Reclamation Act (SMCRA) of 1977, Sections 507(b) and 10(b) require that an assessment of the probable cumulative impact on all anticipated mining in the area on the hydrologic balance be made by the regulatory authority and that the permit shall not be approved until a cumulative hydrologic impact assessment (CHIA) has been performed by the regulatory authority. It is the purpose of this CHIA to fulfill these regulatory requirements for the proposed Peabody Coal Company El Segundo Mine. This CHIA has been prepared in conformance with the December 1985 Draft Guidelines for Preparation of a Cumulative Hydrologic Impact Assessment by the Office of Surface Mining.

This document describes the cumulative hydrologic impacts associated with the Peabody Coal Company, El Segundo Mine. The El Segundo Mine is located in the south central San Juan

Basin in the northeastern quarter of McKinley County, New Mexico. The mining project straddles the continental divide, lying in both the San Juan underground water basin on the west and the Rio Grande underground water basin on the east.

PART II

DELINEATION OF THE CIA BOUNDARIES

1) DESCRIPTION OF THE STANDING ROCK CLEARY COAL AREA

1.1 INTRODUCTION

The definition of impacts, and the CIA, depends upon current and anticipated mining and the hydrogeologic systems they impact. The El Segundo Mine is currently the only anticipated mining operation within the Standing Rock Cleary coal area. This portion of the CHIA will discuss the general features of the Standing Rock Cleary coal area and delineate the CIA boundaries. The proposed surface mining operations are restricted to the area between the Point Lookout sandstone outcrop to the south and southwest and a cost prohibitive depth limitation of approximately 200 feet which falls to the north/northeast. Areas of mineable coal reserves fall roughly along a line extending WNW from Section 1, Township 16 North, Range 9 West, to Section 19, Township 17 North, Range 10 West.

1.2 GEOGRAPHY OF THE El SEGUNDO MINE AREA

El Segundo coal mine is located in the eastern end of the Standing Rock Cleary Coal area

as described by Shomaker and others(1971) which is located in the southern part of the San Juan Basin in an area known as the Chaco Slope. The Chaco Slope is a broad, gently dipping part of the San Juan Basin extending from the edge of the Zuni uplift on the south, northward to the central area of the basin. Regionally, the Chaco slope dips northerly, averaging about 1° with local dip increases to several degrees (Kelly & Clinton, 1960). The southern edge of the coal resource area is the cropline of the Point Lookout Sandstone. The field is dominated by low relief with beds dipping less than 5^{o} to the north. The proposed permit area straddles the continental divide at elevations approximating 7,000 feet above mean sea level (MSL). The region consists mostly of sparsely vegetated grazing lands. Slopes and uplands are characterized by Piñon-Juniper floral communities and valley floors by plains grassland communities.

The area is considered to be semi-arid, receiving about 10-12 inches of precipitation annually. The majority of precipitation occurs during the late summer as thunderstorms. Average July temperatures are near 69 degrees Fahrenheit and temperatures for January average around 28 degrees Fahrenheit.

The proposed El Segundo Mine lease area straddles the continental divide in an area that is crossed by several unnamed ephemeral, arroyos. The main arroyo that crosses the mining area east of the continental divide is Inditos Draw. The National Hydrologic Database (NHD) indicates that Inditos Draw, as it leaves the proposed permit area, is classified as ephemeral. The NHD reach code for this section of Inditos Draw is (1302020500420). The ephemeral Inditos Draw drains to the southeast after precipitation events and has several unnamed ephemeral arroyos as tributaries. The approximate size of the eastern surface watershed as it leaves the permit area is fourteen square miles. Only about 4.1 square miles(29%) of the eastern surface

watershed will be disturbed by mining within the proposed permit boundary.

There are no named drainages to the west of the continental divide within the proposed permit area. The main drainage through the western mine area has the NHD reach code of (14080106000944) and is identified as ephemeral as it leaves the permit area. The drainage area for the main western drainage as it leaves the permit area is approximately 24.7 square miles of which about 6.1 square miles(25%) of the total watershed are proposed to be disturbed by mining. Approximately one mile west of the permit boundary is Laguna Castillo(140801060004850), an ephemeral lake used mostly for opportunistic livestock watering. The main surface hydrologic feature within the permit area is Orphan Annie Tank(14080106004311), a manmade feature that was used to collect surface water for livestock watering but was breached at some point in time and is no longer functional.

1.3 CULTURAL FEATURES OF THE STANDING ROCK CLEARY COAL AREA

The Standing Rock Cleary Coal area encompasses Townships 16 North to 19 North and Ranges 9 West to 17 West, in McKinley County. The coal field stretches from about 10 miles north of the village of Standing Rock to 8 miles south of the community of Hospah. The only other community of size is Crownpoint which is approximately 16 miles west of the proposed mine. State road 371 to Crownpoint and state road 509 through Hospah are the major paved roads in the area besides the road to the mine. There are several gravel county roads and forest roads in the area. A spur line of the Santa Fe Pacific Railroad runs from the Prewitt Generating Station to the proposed El Segundo Coal Mine. At the present time there are no exploration or other proposed coal activities.

Land use in the Standing Rock field is primarily stock grazing. State, federal and private lands comprise the permit lands. Grazing rights to public lands are owned by several large ranches. Coal mining rights (state and federal leases) are primarily held by Peabody Natural Resources Company. El Segundo Coal Mine has conducted extensive lithologic exploration activities in the mine area portion of the Standing Rock Cleary coal field. Coal reserve estimates within the El Segundo Coal Mine permit application indicates that approximately 102 million tons of recoverable, subbituminous A, coal reserves exist in the proposed permit area. A detailed discussion of coal geology can be found in section 1.4 of Part III.

2) PROJECTION OF ANTICIPATED COAL MINING

2.1 INTRODUCTION

The CHIA process is a dynamic process. As mining continues within an area, as economic or exploration developments come to light, the CHIA region grows. For the purposes of this CHIA, an "anticipated mine" is one for which a permit application has been filed, or, if mining Federal coal, one for which there are due diligence development requirements. For these reasons, the current and envisioned mining activity within the region of the proposed El Segundo Mine, represents only a first approximation. The baseline data and analytical techniques are robust enough to accommodate evolving mining activity.

The Standing Rock Cleary coal field is currently under development by Peabody Natural Resources Company at the El Segundo Mine. The only current exploration permit (#E-91) was issued to the Lee Ranch coal Company in June, 2001. Because of the relatively small size of the

field and increasing depth of the coal to the north, further exploration is not expected to occur and this circumstance is not expected to change in the foreseeable future. All mining projections in the CHIA are based upon the proposed El Segundo Coal Mine plans and projections.

2.2 PAST MINING ACTIVITY NEAR THE STANDING ROCK CLEARY COAL FIELD

The nearest coal mining operation is the Lee Ranch Mine, a large-scale, open pit operation, which opened in late 1984 in Section 27 of Township 15 North and Range 8 West in the San Mateo Menefee area. Estimated recoverable tons of coal for the Lee Ranch Mine, at that time, were around 215 million tons. Coal production for the last five years has averaged about 5.1 million tons per year for the period 1997 to 2001. The coal is sold to two power producers: Plains Electric for use at the nearby Escalante Generating Station, and Tucson Electric's Springerville Station in northeast Arizona. The only recent exploration in the area was conducted by the South Hospah Coal Company. Exploration permits were issued to the South Hospah Coal Company in September of 1993 and January of 1994. There has been no other mining exploration recorded in the surrounding townships on a large or small scale.

2.3 ANTICIPATED MINING ACTIVITY AT THE STANDING ROCK CLEARY FIELD

Based upon the exploration results cited above, the Lee Ranch Coal Company estimates that there is at a minimum, 102 million tons of recoverable coal reserves in the proposed mine area. The proposed mining area consists of approximately the equivalent of twenty three sections, primarily in the north of Township16 North, Range 9 West and in the south of Township 17 North, Range 10 West. The present mine plan projects the mine life through 2034

while mining at a rate of 5.2 million tons per year for the first 6 years and 3.0 million tons per year afterward. Coal from the Lee Ranch Mine is currently being transported by the Santa Fe Pacific Railroad to the Plains Electric Generating Station in Prewitt, New Mexico and the Tucson Electric Power Company in Springerville, Arizona. At this time it is expected that coal from the El Segundo mine will be taken to a planned, ultra-low emissions, 300 mega watt generating station near the proposed mine. (news release, Oct.14, 2004)

3) SYNTHESIS OF THE CHIA AREA

3.1 INTRODUCTION

The regulatory intent of the CHIA is to evaluate ground and surface water cumulative impacts of the mining operation. The boundaries of the CHIA are defined by these impacts. At the outset, these impacts are unknown in detail. Reasonable estimations can be made, however, as a first approximation.

3.2 SURFACE WATERS

As stated earlier, the proposed mining operation straddles the continental divide with the eastern half of the mine being in townships 16 and 17 North, Range 9 West and the western half of the mine in Townships 16 and 17 North, Range 10 West. Inditos Arroyo on the eastern half of the mine is eventually tributary to Arroyo Leon which is ephemeral in this area and probably doesn't become intermittent until shortly before it enters the Rio Puerco, some 20 miles to the east, as a tributary to Arroyo Chico. The USGS records for Station 08340500 at this point indicate extensive periods of no flow for the period of 1944 to 1986. Arroyo Leon, which

includes Inditos Arroyo, has a watershed area of 274 square miles as calculated by the Soil Conservation Service on the 1989, Conservation Needs Inventory Watersheds, New Mexico map. The water type at station 08340500 was a sodium sulfate type in a sample taken in April of 1978, with a calculated TDS value of 1460 mg/l.

The western half of the mine drains to the west and eventually is tributary to Kim-me-ni-oli Wash near Crownpoint at USGS site 09367687. A sample was taken here in June of 1982 and the water type was also sodium sulfate and the calculated TDS value was 798 mg/l. Total contributing watershed area at this location is similar to the other watershed, at 228 square miles.

Waters of the proposed permit area flow over many of the same formations as the waters collected at stations 08340500 and 09367687. Differences between the mine-site samples and the USGS samples are most likely due to distance traveled in the watershed and less exposure to differing soil types. To date, nine baseline storm water samples have been collected at the mine site. Five of the nine samples are classified as calcium-sodium-bicarbonates, two are classified as sodium-calcium-bicarbonates and two are calcium-bicarbonates. The difference between these samples and those collected at the previously mentioned USGS sites is probably the proximity to the head waters of the mine sites as compared to being further down the drainage at the USGS sites. The total dissolved solids (TDS) values at the mine sites are comparable with the values at the USGS sites. Minesite TDS values range from 160 mg/l to 1140 mg/l with an average of 622 mg/l which compares to 798 mg/l and 1460 mg/l for the USGS sites. Lower TDS values at the mine sites might be an indication that the mine site samples have not traveled as far in the watershed as the downstream USGS samples.

All surface drainages in the mine area are ephemeral and flow only in response to

precipitation events. Surface water use is confined to opportunistic use by ranchers for livestock watering. The following is a table of State surface water numeric criteria for livestock and wildlife.

Pollutant	Livestock, ug/L	Wildlife, ug/L
Aluminum, dissolved	5,000	
Arsenic, dissolved	200	
Boron, dissolved	5,000	
Cadmium, dissolved	50	
Chlorine residual		11
Chromium, dissolved	1,000	
Cobalt, dissolved	1,000	
Copper, dissolved	500	
Cyanide, weak acid dissoc		5.2
Lead, dissolved	100	
Mercury, total	10	0.77
Selenium, dissolved	50	
Selenium, total recoverable		5.0
Vanadium, dissolved	100	
Zinc, dissolved	25,000	

All baseline surface water samples had dissolved aluminum results that were less than State numeric criteria for livestock with the exception of one sample that contained 5,650 ug/L.

All baseline surface water sample results for Arsenic, Boron, Chromium, Cobalt, Copper, Cadmium, Lead, and Zinc were less than state livestock water criterion. Baseline surface water sample results for total Mercury and total recoverable Selenium were less than 1ug/L and 10ug/L, respectively.

3.3 GROUND WATERS

Proposed operations can be expected to effect one aquifer locally and three aquifers regionally. In the immediate vicinity of the open pit mine disturbance, the Menefee coal has exhibited limited saturation at best. Three monitoring wells have been completed into the Menefee Formation with all of the holes being of questionable value for monitoring water levels due to the lack of saturation in the formation. Ground water in the Cleary Coal Member of the Menefee Formation is used as a source of water for livestock at the Lee Ranch mine but appears to be of limited resource in the El Segundo mine area. Effects of mining on the Menefee Formation will be isolated from deeper formations by the presence of a thick shale sequence consisting of the Satan Tongue of the Mancos Shale, the Mullato Tongue of the Mancos shale, and the Mancos shale. Impacts to the three deeper aquifers, Dalton Sandstone, Gallup Sandstone, and Westwater Sandstone, should consist of declines in water levels caused by use of water for dust suppression and other mining related activities.

The first aquifer beneath mining is the Cretaceous Point Lookout Sandstone. This aquifer is saturated in the El Segundo Mine area. Two Point Lookout monitoring wells have been completed in the mine permit area and the water from both wells is classified as a sodium, sulfate, bicarbonate, the same as the New Four Corners Well at the Lee Ranch Mine, also

completed in the Point Lookout.

Samples from the two Point Lookout wells in the permit area have been less than all groundwater standards with the exception of Sulfate and Total Dissolved Solids values for domestic water supplies. Average sulfate values have been 1000 mg/L and average TDS values have been 1800 mg/L, which probably precludes water from the Point Lookout being used for a domestic water resource.

The New Mexico State Human Health Standards for groundwater with less than 10,000 mg/L TDS are as follows:

Arsenic	0.1 mg/L
Barium	1.0 mg/L
Cadmium	0.01 mg/L
Chromium	0.05 mg/L
Cyanide	0.2 mg/L
Fluoride	1.6 mg/L
Lead	0.05 mg/L
Total Mercury	0.002 mg/L
Nitrate	10.0 mg/L
Selenium	0.05 mg/L
Silver	0.05 mg/L

Other New Mexico Standards for Domestic Water Supply are:

Chloride	250.0 mg/L

Copper	1.0 mg/L
Iron	1.0 mg/L
Manganese	0.2 mg/L
Sulfate	600.0 mg/L
Total Dissolved Solids	1000.0 mg/L
Zinc	10.0 mg/L
pH	Between 6 and 9

The principal recharge area for the Menefee Formation and the underlying Point Lookout Sandstone is in and around the sandstone outcrops located south and southwest of the permit area. Fractures in these rock exposures allow rapid percolation of precipitation and minimize evapotranspiration losses. The recharge area will not be disturbed by mining. Ground water has not been encountered in the unconsolidated alluvial materials occurring in the drainages within the permit area.

Water supply for the El Segundo Mine will come from a well drilled in the center, sw1/4, ne1/4, of section 2, Township 16 North, Range 10 West, declaration Number SJ-120. The well was completed in April of 1975 in three aquifers; the Dalton Sandstone Member of the Crevasse Canyon Formation, the Gallup Sandstone, and the Westwater Canyon Sandstone Member of the Morrison Formation. The well was drilled to a depth of 2795 feet below ground surface. A declaration to appropriate and beneficially use 650 acre feet of ground water per year for use at the mine was filed with the New Mexico State Engineer's Office in October of 1976.

3.4 LAND USE AND CULTURAL FEATURES

No extensive commercial or residential holdings (other than ranching) occur along the margins of either the Inditos Arroyo watershed to the east or the Kim-me-ni-oli watershed to the west. The northern edge of the Inditos watershed is about 5 miles south of the village of Hospah while the southern edge of the watershed is about 10 miles north of the village of San Mateo. The northeastern edge of the Kim-me-ni-oli watershed is about 7 miles southwest of Hospah and the western edge of the watershed is about 5 miles east of Crownpoint.

3.5 CONCLUSION

For the reasons cited above, the surfacewater CIA boundary east of the continental divide will be that portion of the Inditos Arroyo watershed that falls northwest of the NHD Reach Code 13020205000416 as shown on the following figure. The surfacewater CIA west of the continental divide will consist of that portion of the watershed upstream from NHD Reach Code 14080106012225 as shown in the same figure.

Office of Surface Mining guidance(December, 1985, pg IV-6) suggests that the boundary of the aquifer CIA should include the *maximum extent* of all drawdown cones expected to occur in the aquifer. Based on this criteria, the maximum extent of all drawdown cones presented in the PHC would be represented by the drawdown cone depicted by the worst case scenario for the Gallup aquifer. The worst-case scenario drawdown cone is based on pumping 650 ac-ft/yr and that portion of water that would be produced from the Gallup aquifer based on the aquifers transmissivity versus total transmissivity for the screened intervals in the well, or roughly 200

gpm. This results in a drawdown cone with an approximate 5 foot drawdown limit, 19 miles from SJ-120, limited on the south, southwest by the outcrop of the Gallup aquifer. The following figure gives a rough approximation of the groundwater CIA area.

PART III

THE HYDROLOGIC SYSTEM

1) GEOLOGY AND GEOMORPHOLOGY OF THE CIA AREA

1.1 PREFACE

The CHIA region lies on the southsoutheastern margin of the San Juan basin generally in an area bounded by the Standing Rock Dome, the Chaco Slope, and the McCarty Syncline associated with the Acoma Sag and the Mesa Chivato volcanics near Mount Taylor. The Acoma Sag and McCartys syncline along with the major faults of the area, San Rafael and Standing Rock, are considered to be Laramide in age. Some faults that dislocate the volcanics capping Mesa Chivato around Mount Taylor may be late Pliocene or early Pleistocene.

1.2 STRATIGRAPHY AND LITHOLOGY

The El Segundo CHIA region is underlain by a series of Mesozoic sedimentary units which were formed in a transgressive/regressive sequence of delta-plain to coastal-plain, beach-barrier, and shallow offshore environments. This sequence represents the shifting margin of a late Cretaceous, epicontinental, shallow seaway which dissected the North America continent along a northwest/southeasterly line. As the Cretaceous seaway regressed in a generally

northeasterly direction, the coal-bearing, deltaic sediments were deposited at higher stratigraphic level. The El Segundo Menefee coals are represented by the basal Cleary member of the Menefee Formation.

The oldest Cretaceous age formation in the San Juan basin is represented by the Dakota Sandstone. The Dakota Sandstone is generally thought to be of earliest Late Cretaceous age, although the lowermost part may be of latest Early Cretaceous age (Fassett, 1977, p.225). The Dakota Sandstone was deposited on a regional erosion surface. The strata represent a transition from continental alluvial-plain deposition in the lower part of the formation to marine shore zone deposition in the upper part. The Dakota Sandstone unconformably overlies the Brushy Basin Member of the Morrison Formation (Late Jurassic age) throughout much of the basin. However, the Dakota overlies the Westwater Canyon Member of the Morrison in the southwest and the Burro Canyon Formation in the north. The upper contact of the Dakota is conformable with the Mancos Shale and intertonguing of these two units is common.

In the area of the mine, the Dakota consists of four members which, in ascending order, are the Oak Canyon Member, Cubero Tongue, Paguate Tongue, and Twowells Tongue. The upper two sandstone members intertongue with the Graneros Member of the Mancos Shale.

The Dakota Sandstone contains three principal lithologies. It typically consists of a sequence of buff to brown, cross-bedded, poorly sorted, coarse-grained conglomeratic sandstone and moderately sorted, medium-grained sandstone in the lower part; dark-gray carbonaceous shale with brown siltstone and lenticular sandstone beds in the middle part; and yellowish-tan, fine-grained sandstone interbedded with gray shale in the upper part.

The Twowells and Paguate Tongues of the Dakota are composed of very fine to fine-

grained sandstone which is silty in part. The Paguate contains some interbedded layers of siltstone and a very minor amount of medium-grained sandstone. The fauna, physical character, and regional stratigraphic relations of the Twowells and Paguate Tongues indicate that they are representative of extensive offshore shallow-water marine-shelf sandstones.

The Cubero Sandstone Tongue is mostly composed of very fine to fine-grained sandstone that is silty and carbonaceous in part. In some areas almost 25 percent of the Cubero is composed of siltstone and clay shale with abundant carbonaceous material. The upper part of the Cubero is coarser grained than the lower part. The depositional environment of the Cubero is similar to that of the Twowells and Paguate Tongues and apparently reflects deposition of increasingly coarser sediments in a shallowing sea.

The Oak Canyon type area represents a complex assemblage of fluviatile, lagoonal, estuarine and open-marine sediments composed of shales, silty sandstones, and sandstones that are all commonly carbonaceous, and clay shale, bentonite, limy siltstone, and limestone. In most of its area of occurrence the Oak Canyon can be divided roughly into two subdivisions, an upper part that consists mostly of fine-grained open-marine sediments and a lower part that contains some relatively coarser-grained sediments. The upper part of the Oak Canyon Member consists largely of open-marine sediments that were deposited during transgression of the Cretaceous sea from the east and northeast. The lower portion of the Oak Canyon Member is composed of coarse to very fine grained sandstone that is in places conglomeratic with granule-and pebble-sized clasts, and that is in places silty. Carbonaceous, almost coaly, shales and medium- to dark-gray shale with small amounts of plant debris are common. The lowest bed of the unit is generally a sandstone that may be conglomeratic. No megafossils have been collected from the

lower part but microfossils and flora indicate an early Cretaceous age of Albian and possibly Aptian age.

The Clay Mesa Shale and the Whitewater Arroyo Shale are the two lower members of the Mancos shale that intertongue with the upper Dakota sandstones. The Clay Mesa Shale is described as being composed mostly of medium to dark-gray clay shale, silty in part, with bentonites, limy concretions, and thin limestone beds. The upper part of the Clay Mesa commonly includes a few sandy beds and is siltier than the rest of the unit. The bentonites, thin limestone beds, and limy concretions are more common in the lower half of the unit. The Clay Mesa Shale in the lower part of the Mancos Shale is composed mostly of fine-grained clastics that were deposited in quiet marine waters.

The Whitewater Arroyo Shale is separated from the underlying Clay Mesa Shale by the Paguate Sandstone Tongue of the Dakota Formation. The Whitewater Arroyo is composed of medium-gray shale and clayey to sandy, medium-dark-gray siltstone with some bentonite layers and yellow-weathering cone-in cone limestone concretions. The fauna of this unit indicates a shallow-water marine shelf environment. Part of the Whitewater Arroyo is composed of clay shale with bentonites and limy concretions and does not contain megafossils. These parts probably represent deposition in quieter and deeper water.

Above the Dakota Formation lies the Mancos Shale. The Mancos is composed mostly of marine rocks and the dominant lithology is clay shale, which is silty in places, and which contains subordinate quantities of siltstone, sandstone, limy beds or concretions, and bentonites. The most common fossils are open-water marine animal, found in the limy or concretionary parts of the unit. The very fine grained sediments, extensive bentonites, limy beds and concretions,

and offshore fauna of the lower part of the Mancos Shale all indicate deposition in quiet open-marine offshore waters.

The Mancos can be divided into upper and lower subgroups with the two subgroups being separated by the Gallup Sandstone. The lower subgroup can then be further subdivided into the Graneros, Greenhorn, Lower Carlile, Juana Lopez, and Upper Carlile. In the CHIA area the upper Mancos is divided into two shale tongues, the lower Mulatto shale and the upper Satan, separated by sands of the Hosta Tongue of the Point Lookout Sandstone. It is beyond the scope of this paper to investigate in detail the intricacies of the Mancos Shale and should be sufficient at this point to characterize the Mancos as an open-marine, shale deposit of late Cenomian to mid Turonian age.

The Gallup Sandstone consists of a series of northeastward prograding coastal barrier or delta front sandstones that grade seaward into more offshore marine mudstones of the Mancos Shale and intertongue landward with nonmarine coastal plain deposits consisting of paludal mudstones, fluvial channel sandstones and minor coal beds. In prograding from southwest to northeast, the Gallup Sandstone rises stratigraphically and becomes younger to the northeast. The deposition of each coastal barrier or delta front bar is followed by a slight to significant transgression or stratigraphic rise, which in turn is followed by a subsequent regression. In the southeast region of the San Juan basin, near the CHIA area, the Gallup is considered to be of nondeltaic origin as indicated by the lack of distributary channels. Molenaar(1973) mapped seven distinct sandstone packages designated A-F with A being the youngest. Near the proposed mine area the Gallup sandstone is represented by the C or Gallego sandstone, which is interpreted as a coastal barrier sandstone. Coastal barrier sands separate the open marine facies

from the restricted or nonmarine facies and can be divided into three parts, (1) a lower shoreface unit, (2) an upper shoreface unit, and (3) a foreshore unit.

The lower shoreface unit is typically well sorted, very fine grained at the bottom with an increasing grain size towards the top. Bedding is usually flat to very slightly inclined with burrows and bioturbation common. The upper shoreface unit is thought to be associated with longshore currents and the breaker zone. The sandstone is well to very well sorted and fine grained with occasional medium to coarse grains. Bedding is moderately to highly festoon cross-bedded. Burrows are minor to absent. The foreshore unit is generally flat-bedded and thought to be the beach or swash zone deposits. The sands are very well sorted and fine grained. Burrows are common. The water supply well for the El Segundo Mine is most likely completed in the Gallego sandstone member of the Gallup Sandstone, a coastal, barrier sandstone.

Immediately above the Gallego sandstone lies the Crevasse Canyon Formation, which is a sequence of coal-bearing strata that lies immediately below the Hosta Tongue of the Point Lookout Sandstone. The formation consists of four members: The Dilco Coal Member at the base, the Bartlett Member, the Dalton Sandstone Member, and the Gibson Coal Member at the top. The Dilco Coal Member is separated from the overlying Dalton Sandstone by the previously mentioned Mullato Tongue of the Mancos Shale.

The Dilco Coal Member of the Crevasse Canyon formation overlies and is coupled with the regressive Gallup Sandstone along the northern flank of the Zuni Mountains. The Dilco-Gallup contact is indistinct and the Gallup Sandstone contains coal in the upper part. The Dilco Coal Member is a nonmarine sequence of sandstone, siltstone, shale, carbonaceous shale, and coal. The sequence is dominated by shale. The sandstone beds are shaly to silty and tend to

have a fine- to very fine-grained matrix. The coals in the Dilco are generally thin, shaly and pyritic. These coals were probably formed in swamps on a coastal floodplain during still stands of the shoreline.

In the CHIA area the Mulatto Tongue and the Satan Tongue of the Mancos shale generally consist of interbedded, pale-brown to medium-gray, silty, laminated marine shales and yellowish-gray sandstones. In the lower part of the Mulatto unit, medium- to coarse-grained sandstone bodies and limy, silty zones occur.

The Gibson Coal Member of the Crevasse Canyon Formation represents transgressive (upper part) and regressive (lower part) conditions. As a result, the coal-bearing sediments are sandwiched between the overlying, transgressive, Hosta Tongue of the Point Lookout Sandstone and the underlying regressive Dalton Sandstone Member of the Crevasse Canyon Formation. The Dalton sandstone is typically a very fine to medium grained, lithic, arkose and is the major aquifer within the Crevasse Canyon Formation. In the Dalton type area the sandstone is 180 feet thick. In well SJ-120 the Dalton sandstone is about 240 feet thick. The Hosta Tongue of the Point Lookout Formation is separated from the main body of the Point Lookout Sandstone by the Satan Tongue of the Mancos Formation.

The regressive marine Point Lookout Sandstone has an alternating sand-shale transitional lower contact with the Satan Tongue of the Mancos Shale. The contact between these two units is characterized by a series of sand beds and intervening shales in which the sand beds increase gradually in thickness upward until only a massive cliff-forming sand exists. Bedding at the base of the Point Lookout generally has planar lamination while bedding towards the top tends to have cross-lamination. Sandstones of the Point Lookout tend to be composed of subangular to

subrounded, very fine to fine grained quartz grains. Grain size tends to increase from the base to the top of the formation. *Ophiomorpha* trace fossils may be common in some outcrops.

Outcrops of Point Lookout Sandstone are very pale orange to light gray in color for the most part, although toward the top exposures may be very light gray to white. Bedding toward the base of the unit is generally less than 3 feet thick and has planar-lamination; bedding toward the top is thicker and has cross-lamination.

Quartz is the dominant mineral in the Point Lookout, especially in the finer grained sandstones. Detrital grains of chert, feldspar, rock fragments, and organic debris are more common in the coarser sandstones of the upper Point Lookout (Sabins, 1964).

Examination of well logs across the Torreon Wash area shows the thickness of the Point Lookout Sandstone ranges from 75 feet to 260 feet. The thickness varies in a systematic way to form a series of west-northwest- trending ridges and troughs.

The Point Lookout Sandstone forms the basal unit on which the Cleary Member of the Menefee Formation was deposited. This sandstone is a regressive, shoreline-related deposit with its transitional sand-shale basal contact and a general upward increase in grain size. The silty, clayey, very fine to fine sands which make up the Point Lookout are typical of the material delivered by fluvio-deltaic distributaries to a delta front. The sands of the Point Lookout often contain thin, interlaminated, carbonaceous debris and clay clasts, unlike typical, clean, wave-winnowed beach sands. The marine invertebrate fossils found in the Point Lookout are commonly accumulations of mixed faunal assemblages, which appear to be storm deposits rather than a record of living communities. Finally, the direct superposition of fresh-water coal swamp deposits on the Point Lookout and the lack of any recognized lagoonal deposits and an

associated brackish-water faunal assemblage makes it difficult to fit the Point Lookout into a simple, barrier-beach depositional model.

The Menefee Formation consists of interbedded shales or mudstones, siltstones, sandstones and coals. The three members of the Menefee mapped in the Torreon Wash area were essentially divided on the basis of the presence or absence of coal. These members in ascending order are the coal-bearing Cleary Member, the sandy Allison Member, and upper unnamed coal-bearing member, formerly considered part of the Allison Member.

These three members represent the gradational succession of depositional environments from a coastal swamp to a floodplain and back to coastal swamp. Since the succession is gradational, it necessarily follows that the contacts between units are gradational and not easily defined. The contact between the Cleary and Allison members is drawn at the base of a thick, cliff-forming channel sandstone sequence, which overlies the uppermost major coal horizon of the Cleary. The upper contact of the Allison Member with the overlying upper coal members is even less well defined. This contact is drawn where coals and brown to black carbonaceous shales, rarely found in the Allison Member, once again begin to predominate over drab-gray and tan mudstones.

The Cleary Coal Member of the Menefee Formation of Late Cretaceous age is mostly fine - to medium -grained sandstone, sandy shale, mudstone, shale and several thin beds of coal. Thickness is about 300 feet. The Cleary Coal Member crops out over a large area in the north-central part of the Grants quadrangle. To the south, the Cleary Coal Member is buried by Tertiary basalt flows and other volcanic rocks of the Mount Taylor volcanic field.

The coal beds in the Cleary Coal Member are generally less than 3 ft thick and

discontinuous in the Grants quadrangle. The coal is considered sub-bituminous in rank (U.S. Geological Survey and New Mexico Bureau of Mines and Mineral Resources, 1981). However, analyses of core samples taken from the Standing rock area northwest of the Grants quadrangle show an apparent rank of high-volatile C bituminous and subbituminous A (Shomaker, 1971). Beaumont (1971) assumes that the quality of coal in the Standing Rock area is similar to the quality of coal in the Grants quadrangle.

Several exposed areas of the Cleary coal Member of the Menefee Formation contain locally thick coal beds as much as 3.5 feet thick and under less than 500 ft of overburden. This unit is composed of palludal deposits and is generally 200 feet to 300 feet thick. Lithologically the Cleary Member is dominated by finer grained palludal deposits composed of silt-clay size particles and abundant organic debris. Abundant plant impressions and fragments ranging up to sections of logs are found along bedding planes but no macro invertebrate fossils are found. The random orientation of the plant debris and the occasional presence of an upright stump indicate most of the organic debris accumulated in place. The coal is characterized by medium bands of vitrain with bits of amber along horizontal cleats.

1.3 STRUCTURE

The CHIA area is located in the southern part of the San Juan Basin, in a structural subdivision defined by Kelley(1950, p. 102) as the Chaco Slope. This broad, gently dipping part of the San Juan Basin extends from the margin of the Zuni uplift on the south northward to the Central Basin. The regional dip of the beds is northerly, and the average dip across the Chaco Slope is about 1degree. Locally, the dip increases to several degrees, and on the margins

of the several domal structures and noses situated on the Chaco Slope the dip locally exceeds 10 degrees. Faulting is not common on the Chaco Slope, but the occurrence of normal faults with displacements in the range of 10-150 feet are not uncommon, particularly on the margins of the positive structures. Small faults are not readily detectable in the Menefee Formation owing to the lenticularity of the sandstone units.

The CHIA area is located on the northeast flank of the Zuni uplift, just south of the nose that separates the north flank of the Zuni uplift from the west flank of the Mount Taylor syncline. The south-trending, eastward-dipping beds of the Menefee are locally deflected eastward again along the margin of the Standing Rock dome. The CHIA area is located just north of this irregularly shaped domal structure.

About 6 miles northeast of the Standing Rock structure is a second structurally positive feature, the San Miguel Creek dome. It is irregular in outline and is about 5 miles in average diameter. Though having less maximum structural relief than the Standing Rock dome, it has a greater closure, possibly in the range of 600 feet. To the west and southwest of the CHIA area are several other domed areas. Edward C. Beaumont, a noted coal geologist, believes that these domes, the Walker dome, North Ambrosia Lake anticline, and South Ambrosia Lake anticline are outliers of the much larger Zuni uplift, and that the present nature of these structures is due to draping above Precambrian knobs. If this is true, then these features were probably somewhat positive during Late Cretaceous deposition, and it would seem quite logical that they were factors in the distribution of the accumulations of peat and associated sediments.

Two faults are present in the western section of the CHIA area, both extending northward from the area of the Standing Rock dome. Both faults are north trending normal faults that are

down thrown to the east. The western most fault has a maximum displacement of approximately 30 feet, the other has a maximum displacement of about 75 feet. These faults are associated with the domed areas and are thought to be minor tensional-adjustment features that should die out quickly away from the positive structures.

1.4 COAL GEOLOGY

The exploitable coals in the CHIA area are contained within the Cleary Member of the lower Menefee Formation and range in thickness from 1.5 to more than 15 feet. The following description is from Beaumont and his description of the coals near the South Hospah (El Segundo) Mine.

"The South Hospah area has been divided into several lesser areas. The proposed mine is in Area C. In the vicinity of the mine are three coal groups, in descending order Purple, Blue, and Red. The Purple beds consist of one to four relatively thin coals, two of which might be of mineable thickness at any given locality. The maximum thickness of a Purple coal may locally reach 5 feet. In the vicinity of the mine the Purple coal beds are discontinuous, and where two or more beds are present, the interval separating them varies from 1 to 10 feet.

In the vicinity of the mine the Blue A coal bed is underlain by the Blue B bed. The Blue A bed, which is locally truncated at the west end of the mine, attains a maximum thickness of slightly more than 5 feet. It lies from about 10 feet to more than 40 feet below the lowermost Purple coal. About 2.5 miles east of the mine the lowermost Purple bed merges with, and becomes indistinguishable from, the Blue A; it is separated from the Blue B coal bed by 5-12 feet in the area covered by Figure 2, but elsewhere in Area C the Blue A and B beds merge into a

single 15 foot unit. The barren interval between A and B varies widely over short distances, from a few feet to nearly 50 feet, as sand bodies come and go in this interval. Especially the Blue B is likely to have partings and splits. The Blue coals are the most persistent and the thickest throughout the South Hospah area; because of this, they constitute the principal reserve units.

Coal quality is variable with respect to ash and sulfur content. The distribution of sulfur is probably a function of the depositional environment of the peats, and the distribution of mineral matter is more than likely related to the depositional position within the swamps. Extensive sampling and analysis in the vicinity of the mine resulted in an average set of as-received values for this coal as follows: ash 18%, moisture 16%, sulfur <1%, Btu/lb 9,200. Application of the Parr formula to these components places this coal in the upper end of the Subbituminous A rank."

GEOLOGY OF THE MENEFEE FORMATION

The Menefee Formation is of Late Cretaceous age and crops out beyond the margins of the Central San Juan Basin. Erosion-resistant sandstones in the Menefee commonly cap isolated buttes and hillocks, whereas softer shale units form slopes and broad valleys or flats. Topography formed on the Menefee typically is rolling to rough, broken and steep, and generally has a badlands appearance. The upper part of the Menefee formation commonly forms steep slopes below mesas or buttes capped by the erosion-resistant Cliff House Sandstone.

In general, the Menefee Formation consists of interbedded and repetitive sequences of

differing thicknesses of sandstone, siltstone, shale and claystone, carbonaceous shale, and coal beds of differing thicknesses. Typically the sandstones are lenticular, light brown to gray, thick to very thick bedded, and fine to medium grained, with clay matrix and various types of cement. The siltstones are commonly tabular, gray, and thin to thick bedded; shales and claystones typically are light-brownish gray and thick to very thick bedded.

The Cleary Coal member of the Menefee Formation is 93 to 290 feet thick in the eastern part of the Standing rock field. The coal-bearing sequence consists of sandstone, siltstone, shale, carbonaceous shale, and coal. Sandstone is the most dominant lithology in the sequence, followed by shale or siltstone. The coals in the Standing rock sections are typically within a shale-dominated interval but several are overlain or underlain by siltstone or sandstone. In some locations coal is directly above or within a foot of the Point Lookout Sandstone contact. Most of the coals are within 75 ft of the Point Lookout Sandstone. There are three to seven coals in the Cleary coal-bearing sequence and most of them are thin.

The coals of the eastern Standing Rock field have variable amounts of vitrain, poor to good cleat, and fine to medium banding. They are pyritic, resinous, and commonly shaly. Coal quality is good; heating values range from 8870 to 10810 Btu per pound, ash content from 4.9 to 18.4 percent, and sulfur content from 0.5 to 1.0 percent.

2) HYDROLOGY OF CHIA AREA

2.1 PREFACE

Like most of the semiarid northwest part of the state, the CHIA area lacks adequate supplies of surface water and thus relies upon ground water. The CHIA area straddles the

continental divide, lying within the Rio Grande Underground Water Basin which was first declared by the State Engineer on November 29, 1956 and the San Juan Underground Water Basin which was first declared on July 29, 1976. The surface water and ground water supplies that are available, are important resources for livestock, wildlife and domestic use.

2.2 SURFACE WATER QUANTITY

The ephemeral arroyos passing through the CHIA area flow only in direct response to storm events and have channel bottoms that are above the local water table. The watercourses throughout most of the area are broad, flat channels whose flow depths for the 10-year, 24-hour event are generally less than three feet, occasionally concentrating into channels approaching four feet in depth.

The western half of the proposed permit area is drained by an unnamed, ephemeral, drainage which flows westward from the continental divide, through Orphan Annie Tank and Laguna Castillo before finally flowing into a named drainage, Kim-me-ni-oli Wash. The USGS maintained a gaging station on Kim-me-ni-oli wash from October 1981 to September of 1983. The utility of this station is questionable due to a base discharge to the wash from the proposed Phillips Petroleum, Nose Rock Uranium Mine at that time period. The maximum discharge for the 2 year period of record was 1060 cu.ft./sec, whereas minimum flows were represented by periods of no flow.

The major drainage in the eastern half of the proposed permit is named Inditos Draw. Inditos Draw is tributary to Voght Draw, which flows into Arroyo Chico which eventually flows into the Rio Puerco in the NE/4 of Section 30, Township 16 North, Range 3 West.

The USGS maintained a continuous streamflow monitoring station on Arroyo Chico just prior to where it enters the Rio Puerco, from 1944 until October of 1986. The 42 years of records show that the highest discharges commonly occur between July 1 and September 30, presumably in response to intense, local precipitation in the drainage basin. Another lower peak commonly occurs between February and April which is probably a response to spring snow melt or snow melt in combination with early spring rains. The drainage basin at this point consists of approximately 1390.0 square miles. The largest recorded peak flow at this station occurred on September 12, 1972 and was 15,200 cubic feet per second.

Six points within the permit area were selected for hydrologic evaluation to determine peak flows and runoff volumes. Since stream gage data is not available for the drainages in the permit area, all arroyo flows are based on rainfall runoff relationships. The procedures used are those developed by the USDA, National Resource Conservation Service (formerly the Soil Conservation Service) for use on watersheds where stream flow records are not available. Watershed characteristics and precipitation-frequency data were used in conjunction with a mathematical model (USDA-SCS, 1973) to arrive at runoff volumes and peak flows for various frequency precipitation events. Basic 24-hour rainfalls for the 2, 5, 10, 25, 50, and 100-year storms were determined. The following tables represent the peak discharges, runoff volumes, and the average annual runoff volumes for each prediction point.

Surface water within the permit area is confined to ephemeral arroyos. The channels at prediction points 2 and 4 are broad flat features. The maximum flow depth for the 10 year, 24 hour event is less than 3.0 feet in each case.

PRE AND POST-MINING DISCHARGE RATES

Premining Prediction Point	2 yr – 24hr (cfs)	5yr – 24hr (cfs)	10yr – 24hr (cfs)	25yr – 24hr (cfs)	50yr – 24hr (cfs)	100yr-24hr (cfs)
SWM-1	558	1207	1591	2448	2913	3398
SWM-2	538	1165	1536	2363	2812	3280
SWM-3	411	831	1072	1604	1889	2184
SWM-4	256	536	699	1061	1256	1459
SWM-5	828	1683	2177	3264	3848	4453
SWM-6	72	164	220	345	414	485
Postmining Prediction Point	2 yr – 24hr (cfs)	5yr – 24hr (cfs)	10yr – 24hr (cfs)	25yr – 24hr (cfs)	50yr – 24hr (cfs)	100yr-24hr (cfs)
SWM-1	658	1360	1769	2672	3159	3664
SWM-2	651	1347	1752	2646	3128	3629
SWM-3	470	929	1191	1764	2071	2388
SWM-4	256	536	699	1061	1256	1459
SWM-5	906	1791	2297	3403	3993	4604
SWM-6	72	164	220	345	414	485

PRE AND POST-MINING RUNOFF VOLUMES

Premining Prediction Point	2 yr – 24hr (ac ft)	5yr – 24hr (ac ft)	10yr – 24hr (ac ft)	25yr – 24hr (ac ft)	50yr – 24hr (ac ft)	100yr-24hr (ac ft)
SWM-1	211	457	603	927	1103	1287
SWM-2	187	405	533	820	976	1139
SWM-3	93	187	242	361	425	492
SWM-4	37	77	100	152	180	210
SWM-5	153	312	403	604	713	825
SWM-6	7	16	22	34	41	48
Postmining Prediction Point	2 yr – 24hr (ac ft)	5yr – 24hr (ac ft)	10yr – 24hr (ac ft)	25yr – 24hr (ac ft)	50yr – 24hr (ac ft)	100yr-24hr (ac ft)
SWM-1	249	515	670	1012	1197	1388
SWM-2	226	468	608	919	1086	1260
SWM-3	106	209	268	397	466	538
SWM-4	37	77	100	152	180	210
SWM-5	168	332	425	630	739	853
SWM-6	7	16	22	34	41	48

2.3 SURFACE WATER QUALITY

Surface water monitoring stations were established at several locations throughout the mine to gain information on background water quality and to determine the effect of the mine on post-mine water quality. Stations 1 through 4 were established in the western drainage where it begins at the continental divide and proceeds westward. Station 5 was installed in Inditos

Arroyo where it exits the permit area to the east. Station 6 is on the east side of the continental divide and monitors undisturbed drainage. Station 4 is nearest the continental divide on the west and also monitors undisturbed waters. Station 1 is the furthest west and will eventually monitor waters as they leave the disturbed area. Station 5 on the east will provide baseline information for the eastern watershed now and will eventually provide a comparison of premine water quality versus postmine water quality following reclamation. Each station consists of a crest stage gauge capable of measuring flows of five feet in depth and a pair of single stage sediment samplers, each with the capacity to collect a one liter sample at two different flow depths.

A review of the samples collected at the mine reveals that the two main ephemeral drainages within the permit area have baseline total suspended solids that have averaged 2415 mg/L in the Inditos Draw drainage and 13071 mg/L in the western unnamed drainage. A dissolved aluminum value of 5.65 mg/L was recorded at station 2 which exceeds the livestock standard of 5.0 mg/L. Values for arsenic, boron, cadmium, chromium, cobalt, copper, lead, zinc, total mercury, and total recoverable selenium were consistently below detection levels.

The parameter values for all of the surface water samples are considered to represent baseline conditions since runoff from these areas comes from areas that have not been disturbed by mining. This indicates that the surface water in the Inditos Arroyo and western unnamed Arroyo drainages have total suspended solids and possibly aluminum concentrations that exceed various water quality standards under natural conditions. Maximum total suspended solids values range from 2,550 mg/L at SW-2 to 35,100 mg/L at SW-1 on September 11, 2003. Inditos Arroyo suspended solids values were 2,200 mg/L and 2,630 mg/L in samples collected on September 29, 2003.

Trilinear plots of the surface water collected at the mine sites indicate that bicarbonate is the dominant anion present in all surface waters. The western drainage is dominated by calcium as the major cation followed by sodium in some samples. The Inditos drainage is also dominated by calcium as the major cation followed by sodium.

2.4 GROUND WATER QUANTITY

Ground water occurs in some of the sandstone units and coal seams constituting the Menefee Formation. The Menefee Formation contains the Cleary Coal Member which is the mineable seam. The water-bearing units within this formation are likely in a relatively unconfined condition in the southern and southwestern portion of the permit area, due to the thinner and more highly fractured nature of the lithologic units near the Standing Rock dome. Down gradient, relatively impermeable shales limit vertical permeability which results in confined aquifer conditions. The stratum immediately below the lowest mineable coal seam is predominantly shale, which forms a barrier between the mining activities and the underlying Point Lookout Sandstone.

The Point Lookout Sandstone is laterally continuous and exists in a confined condition throughout the permit area. This geologic unit will not be disturbed by mining. The Crevasse Canyon Formation and Gallup Sandstone lie beneath the Point Lookout Sandstone and are hydrologically isolated from the mining activities. Groundwater has not been encountered in the unconsolidated materials overlying the Menefee Formation within and adjacent to the permit area.

In the Mesa Chivato area, a short distance southeast of the permit area, Craigg and Stone

described the Cleary Coal Member as being 200 to 300 feet thick, consisting locally of sandstones, barren shales and claystones, and abundant carbonaceous shales and coals. At the Lee Ranch Mine, two observation wells were completed in coal beds of the Menefee Formation. One well was completed in a 5 foot thick coal bed and the transmissivity was calculated to be 1.0×10^{-4} ft^2/d. The second well was completed in a 13.7 foot thick coal and transmissivity was calculated to be 20 ft^2/d. Two sandstone core samples were also taken from the Cleary Coal Member and analyzed for porosity and horizontal and vertical permeability. Values for porosity were 2.4 and 26.3 percent. Values for horizontal permeability were 210 and 163 millidarcies, whereas the values for vertical permeability were 98 and 314 millidarcies. Seven other wells completed in the Menefee were inventoried and yields from the pumping wells were small, usually 1.0 gpm or less.

The Point Lookout Sandstone in the Mesa Chivato area is characterized by Craigg and Stone as consisting of upward-coarsening sequences of light olive gray to yellowish gray, thick to very thick bedded, very fine to medium grained, poorly to moderately sorted, sandstones. Three aquifer tests were completed in this area on wells completed in the Point Lookout Sandstone and the results indicated that the transmissivity is low. Calculated transmissivity values range from 1×10^{-2} to 1×10^{-1} ft^2/d. Three sandstone core samples were analyzed for porosity, horizontal and vertical permeability. Porosity ranged from 18.2 to 21.3 percent. Horizontal permeability ranged from 0.81 to 8.9 millidarcies, whereas vertical permeability ranged from 0.72 to 5.4 millidarcies. In the Arroyo Chico-Torreon Wash area, maximum known yields from Menefee Sandstones is 1 gpm while maximum known yields from the Point Lookout Sandstones is 1.4 gpm as reported by Craigg and Stone.

Aquifer characteristics for the Lee Ranch mine permit area were determined using information derived from pump tests and slug tests conducted within and adjacent to the permit area. Pump tests performed at four locations during 1980 were used to estimate the transmissivity and hydraulic conductivity of the Menefee Formation and Point Lookout Sandstone. A transmissivity value of 1.7 gpd/ft was reported for the Menefee coal. The hydraulic conductivity calculated from this test was 0.2 gpd/ft^2. Transmissivities ranging from 150 to 415 gpd/ft were reported for the Point Lookout Sandstone at four well tests. Horizontal hydraulic conductivities of 1 to 2 gpd/ft^2 and vertical conductivities in the range of 0.1 to 0.5 gpd/ft^2 were calculated to the wells completed in the Point Lookout.

Slug tests were conducted at four temporary monitor wells during 1982 to provide additional transmissivity and hydraulic conductivity estimates for the Menefee formation and the Point Lookout Sandstone.

Significant ground water inflows have not been encountered in the pits at the Lee Ranch Mine. Water levels in the wells outside the permit area were not expected to decline excessively due to the distance of these wells from the mining disturbance, combined with the low permeability of the Menefee Formation and the Point Lookout Sandstone. Some water level declines may occur in wells completed into these Formations within and adjacent to the permit area. Water level declines in wells in the vicinity of the permit area were contemplated in the El Segundo Mine permit to appropriate underground water that was issued by the State Engineer's Office on October 29, 1976. This permit includes an annual ground water appropriation of 650 acre feet of water which includes water that enters the pits and water from supply wells.

Well SJ-120 is the production well for the El Segundo project and it is completed in three

aquifers, the Dalton sandstone, the Gallup sandstone, and the Westwater member of the Morrison Formation. The waters from all three aquifers are commingled in the well and so a water sample would provide little useful information about individual aquifer characteristics. Information on the Dalton aquifer is not readily available due to its not being laterally extensive and thus few wells are completed in this aquifer. Geologically, the Dalton aquifer occurs beneath the Hosta tongue of the Point Lookout Formation and is probably similar in aquifer characteristics.

In a study conducted by the U.S.G.S., transmissivity values for the Point Lookout Sandstone ranged from 0.4 foot squared per day to 236 feet squared per day. A storage coefficient value of 0.000041 was obtained from drawdown in an observation well. Hydraulic conductivity values from deeper parts of the basin were calculated to be 0.0058 foot per day, which doesn't compare well with figures obtained at the nearby Lee Ranch Mine.

The modeled transmissivity of the Dalton aquifer was estimated at about 1,350 gpd/ft, based on the fact that the Gallup and Dalton together indicated a transmissivity of about 2,000 gpd/ft and apportioning the transmissivity according to screened thickness. This figure seems high when compared to published transmissivity values for the Crevasse Canyon Formation.

SUMMARY OF AQUIFER CHARACTERISTICS – Lee Ranch Mine		
AQUIFER(test method)	TRANSMISSIVITY gpd/ft	HYDRAULIC CONDUCTIVITY gpd/ft^2
Kmf (slug test)	0.69	0.14
Kmf (slug test)	4.81	0.96
Kmf (pump test)	1.7	0.2

SUMMARY OF AQUIFER CHARACTERISTICS – Lee Ranch Mine		
Kmf	0.00075	
Kmf	149.6	
Kpl (slug test)	11.18	1.12
Kpl (slug test)	3.78	.38
Kpl	.074	
Kpl	0.74	
Kpl (pump test)	150 - 415	1 – 2

The top of the Gallup aquifer in well SJ-120 lies at about 1,105 feet below ground level with the top of the massive Gallup Sandstone at 1,176 feet below ground level. Transmissivity of the Gallup was estimated at 700 gpd/ft by apportioning the total transmissivity determined for the Gallup and Dalton combined zones on the basis of screened interval. The storage coefficient for the Gallup zone was estimated at 0.0001. Transmissivity and storage coefficient data determined by the U.S.G.S. study of 17 wells in the San Juan basin found that transmissivity ranged from 15 to 390 feet squared per day and storage coefficients determined at 4 wells ranged from 0.000002 to 0.000033. Storage coefficients determined by the U.S.G.S. are on the order of one to two orders of magnitude lower than those estimated by the permit applicant.

The deepest contributing aquifer in SJ-120 is the Westwater Canyon Member of the Morrison Formation. The geological characteristics of the Westwater Canyon Member make it the most important hydrologic unit of the Morrison Formation. The Westwater is found at about 2,445 feet below ground level. Transmissivity of the aquifer is estimated at about 2,000 gpd/ft as

determined from tests at Crownpoint and at Borrego Pass. Water in the aquifer is under artesian pressure and will rise to within 383 feet of ground surface. The storage coefficient for the Westwater at SJ-120 is estimated at 0.0003. Investigations by the U.S.G.S. found transmissivities in the Westwater from 31 wells throughout the basin to range from 2 to 480 feet squared per day with a median value of 115 feet squared per day. The storage coefficients calculated at 9 of these wells range from 0.00002 to 0.0002. Transmissivity and storage coefficient values used by the permit applicant for the Westwater Formation are comparable to U.S.G.S. values.

2.5 GROUND WATER QUALITY

Beginning in 1984, the U.S.G.S. conducted an extensive study of the aquifers of the San Juan basin including the Menefee, Point Lookout, Gallup, and Westwater formations. The study included a survey of distinguishing water characteristics of each aquifer that allows for the development of Stiff diagrams for the comparison of each aquifers water types from around the basin.

QUALITY OF WATER FROM THE MENEFEE FORMATION

Out of 85 samples from the Menefee formation analyzed for pH, 44(52 percent) samples exceeded the secondary drinking –water standard. From a total of 117 samples analyzed for sulfate and 134 samples analyzed for chloride, 47(40 percent) of sulfate samples and 9 (7 percent) of chloride samples exceeded the secondary drinking-water standard. Concentrations of sulfate differ greatly between adjacent wells and no apparent trend is evident. From a total of 123 samples analyzed for fluoride, 29 percent exceeded the primary drinking-water standard of 4

milligrams per liter. The percentage would have been higher if the standard was 2, as it is currently. Out of 104 samples tested for dissolved solids 89(86 percent) exceeded the secondary drinking–water standard.

SELECTED PROPERTIES OF WATER FROM THE MENEFEE FORMATION

Property	Number of samples	Minimum	Maximum	Median
Specific Conductance	131	179	7000	1600
pH	85	5.3	10.0	8.6
Temp. degree Celsius	71	6.0	50.0	15.5
Calcium	114	.6	600	4.1
Magnesium	116	0.1	780	1.4
Sodium	67	10.0	1300	290
Potassium	64	0.8	7.4	2.0
Alkalinity, total	120	35	9080	473.5
Sulfate	117	1.8	4100	170
Chloride	134	0.1	1600	23
Fluoride	123	0.1	14.0	1.7
Dissolved Solids	104	130	4400	995
Nitrate	99	0.02	3.2	0.14
Boron, ug/L	73	10	920	130

SELECTED PROPERTIES OF MENEFEE WELLS IN MCKINLEY COUNTY EAST OF HIGHWAY 57 AND NORTH OF LATITUDE NORTH 35° 40′ according to Levins, etal., 1990

Property	Number of Samples	Minimum	Maximum	Median
Discharge, gpm	17	2	50	10
Specific capacity	12	.02	.27	.155
Temp. deg. Celsius	8	12.5	35.5	17.75
Sulfate	13	20	1100	540
Fluoride	15	.38	8.0	2.6
Dissolved solids	15	800	2900	1300

Menefee Formation water quality data is scarce in the area of the proposed mine. Levings et al, indicate that sodium bicarbonate is the predominate water type found in the Menefee Formation with a significant concentration of sulfate ions being found in the central and southern portion of the San Juan basin. Variation in water chemistry may be the result of wells being completed in lenticular sandstones, characteristic of the Menefee Formation. The hydraulic connection among these lenticular sandstones is generally poor, causing the localized differences in water chemistry. Craigg and Stone tested several wells completed in the Cleary coal member of the Menefee Formation in the Torreon Wash area. These wells are APLW, R32,C1 and TW2 on the following trilinear diagram. Water types for these wells varies from a sodium bicarbonate to a sodium sulfate type water. Water types for the South Hospah area are also quite variable as is evidenced on the same trilinear diagram. Wells MW-2 and MW-3 were supposedly completed in Menefee Formation sandstones at Lee Ranch, while wells D15-9 and E3-3 were completed in Menefee coal formations. The two wells completed in coal formations are of the sodium bicarbonate type while the two wells completed in the sandstones have water chemistries high in calcium, sodium, bicarbonate and sulfate.

No drinking water quality data is available for the Torreon Wash Menefee samples. Data for the El Segundo samples, MW-2, MW-3, D15-9, and E3-3 are from one time samples but indicate that TDS values are close to or exceed secondary drinking water standards for D15-9 and E3-3. MW-2 and MW-3 have TDS values in excess of 1000 mg/l and sulfate values that approach 500 mg/l. Values for the above parameters suggest that waters from the Menefee Formation in the area of the El Segundo mine are suitable only for livestock consumption on a regular basis.

QUALITY OF WATER FROM THE POINT LOOKOUT FORMATION

Craigg, et al, 1990, report that generally two types of water are represented in the Point Lookout Sandstone: a sodium bicarbonate water and a sodium sulfate bicarbonate water. Generally, a sodium bicarbonate water occurs near the outcrop, and a sodium sulfate bicarbonate water occurs away from the outcrop. Calcium, magnesium, and chloride concentrations in water from water wells generally are insignificant, however, concentrations in some samples do exceed the secondary drinking water standard for chloride but no pattern is apparent.

The Point Lookout Wells that were tested in the Torreon Wash Area adhere more closely to the type waters described by Craigg in that they can be described as sodium sulfate bicarbonates, but the percentages of bicarbonate and sulfate vary dramatically.

The Point Lookout has been extensively monitored at the Lee Ranch Mine and is probably the closest source of recently obtained data. Data from well GW-PL-1 indicates that TDS values are consistently above the 1000 mg/l value, a cadmium value exceeding the drinking water standards was collected in September of 1984, and sulfate values are consistently above 750 mg/l. Although the single cadmium value is the only value to exceed a drinking water standard, there are multiple exceedances of secondary drinking water standards as recommended by the EPA. TDS values above 500 mg/L give a taste to the water and may be associated with cardiovascular disease when combined with low hardness. Sulfate values above 250 mg/l give a salty taste and have a laxative effect. There has been one value for zinc reported above 5 mg/L, which will give a metallic taste to the water.

Groundwater monitoring began at GW-PLD-2, 3, and 4 in the spring of 1992 following the inclusion of the “D” area into the Lee Ranch permit. Ground water monitoring at GW-PLD-

2 and 3 have consistently been a sodium bicarbonate type water as shown by the trilinear diagrams. Sampling results at these wells indicate that this water is of very good quality, not having any exceedances of the domestic drinking water standards or the secondary standards, and well 3 having only one exceedance of the lead standard for livestock since monitoring began.

Ground water monitoring at GW-PLD-4 at Lee Ranch Mine has also been of a consistent type but containing a higher calcium content than wells 2 and 3, characterizing it more as a calcium sodium bicarbonate. Water quality at this well is also very good with no exceedances of the domestic primary or secondary standards and only one exceedance of the lead livestock standard since the beginning of monitoring. Both exceedances in wells 3 and 4 for lead occurred on the same sampling period so there is the possibility that there was sample contamination or other outside influences on the sample that don't reflect the true value for that sampling period.

Monitoring well GW-PL-5 was drilled later than the previous three in a structurally deeper, more basinward portion of the permit area. Sampling there began in the spring of 1993. Water type at this well has been more variable than at the other Point Lookout wells, wandering on the trilinear diagram but generally tending to contain equal parts of the cations calcium, magnesium, sodium with sodium somewhat more predominant and equal parts of the sulfate and bicarbonate anions. Attempts at demonstrating a seasonality to the variations have shown no correlation. The variation and water type may be attributable to the position of the well being further from the outcrop than the other three.

Water quality at well GW-PL-5 is also not as good as at the other Point Lookout wells. The pH values have exceeded 9 on three occasions and TDS values are consistently at or above

the 500 mg/L level, a secondary drinking water standard. Sulfate values average 286 mg/l which is above the 250 mg/l secondary drinking water standard and there has been one exceedance of the secondary fluoride standard and two exceedances of the livestock lead standard, one of which occurred in the same sampling period as the others which violated the lead standard.

There are two Point Lookout monitoring wells at the El Segundo mine, KPL-4 and KPL-5. Baseline water samples at these wells have fallen into the sodium sulfate bicarbonate type. Waters from the Point Lookout formation at the El Segundo Mine pass all primary drinking water standards but have consistently exceeded the secondary drinking water standards of sulfate, iron, manganese, and TDS. For this reason, water in the Point Lookout formation in the El Segundo area is only suitable for livestock grazing and not domestic consumption.

The following data is from the U.S.G.S. study of the Point Lookout formation of the San Juan Basin. From a total of 37 samples for pH, 22 (59 percent) exceeded the secondary drinking water standard. Out of a total of 43 samples for sulfate, 16 samples (37 percent) exceeded the secondary drinking-water standard. Only 1 sample for chloride out of 49 samples (2 percent) exceeded the primary drinking –water standard of 4 milligrams per liter. Twenty-nine samples (69 percent) from a total of 42 samples for dissolved-solids concentration exceeded the secondary drinking water standard. From the results of this study it can be concluded that generally the quality of water from the Point Lookout Sandstone is not suitable for human consumption and is best used for livestock watering.

SELECTED PROPERTIES OF WATER FROM THE POINT LOOKOUT SANDSTONE

Property	Number of Samples	Minimum	Maximum	Median
Specific Cond.	48	211	5500	935
pH	37	7.0	9.1	8.6
Temp.deg.Celsius	27	6.0	46.0	16.0
Calcium	43	2.0	160	7.0
Magnesium	44	0.4	96	2.0
Sodium	31	10.0	1400	210
Potassium	30	0.1	15	2.7
Alkalinity, total	47	89	1640	357
Sulfate	43	3.8	1300	100
Chloride	49	3.0	840	15
Fluoride	44	0.1	7.4	1.15
Dissolved Solids	42	150	3300	690
Nitrate	37	0.02	3.2	0.14

QUALITY OF WATER IN THE GALLUP SANDSTONE

The most comprehensive study of the quality of waters in the Gallup Sandstone of the San Juan Basin probably comes from the U.S.G.S. study completed in 1989. The distribution of chemical constituents dissolved in the waters of the Gallup Sandstone indicates that sodium and sulfate are the predominate ions found in samples of water from this aquifer. Water from the Gallup aquifer is usually very hard, having an equivalent quantity of calcium carbonate that exceeds 180 mg/L.

Samples that were collected by the U.S.G.S. for primary drinking water standard testing showed that only two of 72 samples exceeded the fluoride concentration standard of 4. All

samples collected were less than the nitrate primary drinking water standard.

In samples tested for secondary drinking water standards, 10 samples of 57 exceeded the pH standard of 8.5 pH units. Samples tested for dissolved sulfate revealed that 48 of 77 samples exceeded the 250 mg/L secondary standard. The standard of 500 mg/L for total dissolved solids was exceeded by 56 of 75 samples, ranging from 210 to 6,000 mg/L.

SELECTED PROPERTIES OF WATER FROM THE GALLUP SANDSTONE

Property	Number of Samples	Minimum	Maximum	Median
Specific Cond	78	351	10200	1220
PH	57	71	9.2	8.0
Temp.deg.Celsius	54	6.5	58	18.4
Calcium	75	1.0	460	26.0
Magnesium	74	0.3	220	10
Sodium	32	36	720	220
Potassium	31	0.8	8.0	2.6
Alkalinity, total	76	70	567	243
Sulfate	77	9.7	2800	350
Chloride	77	2.0	3000	20
Fluoride	72	0.1	5.3	0.7
Dissolved Solids	75	210	6000	830
Nitrate	65	0.01	2.9	0.07

QUALITY OF WATER IN THE WESTWATER CANYON SANDSTONE

Within the basin, areas of stress from groundwater development in the Morrison Formation generally represent areas of uranium mine dewatering. The primary uranium ore body is the Westwater Canyon Member.

Water from the Morrison Formation, of which the Westwater Canyon is the most

important hydrologic unit, is generally a sodium sulfate type water, however some water is a sodium bicarbonate. From 50 samples tested for fluoride concentrations by the U.S.G.S., only 3 contained fluoride above 4 mg/l. The concentration of nitrate was not detected above the standard in 21 samples tested. Arsenic however, was detected at levels above the standard of .05 mg/l in 5 of 19 samples. Selenium was found at levels above the standard of .01 mg/l in only 1 of 17 samples tested. Water from the Morrison Formation contains radioactive elements derived from decay of uranium ore deposits. In 17 samples tested for radium 226, 5 of the samples exceeded the standard for radium of 5 picocuries per liter.

SELECTED PROPERTIES OF WATER FROM THE MORRISON FORMATION

Property	Number of Samples	Minimum	Maximum	Median
Specific Cond.	52	300	6000	876
PH	42	6.6	9.4	8.2
Temp.deg.Celsius	39	6.0	76.0	23.0
Calcium	56	0.8	550	14
Magnesium	53	0.1	62	3.7
Sodium	57	43	1400	140
Potassium	56	0.1	24	2.0
Alkalinity, total	56	10	670	200
Sulfate	52	6.0	3200	160
Chloride	57	1.1	1200	8.9
Fluoride	50	0.2	7.7	0.6
Dissolved solids	52	116	5000	614
Nitrate	21	0.1	4.5	0.4

SELECTED PROPERTIES OF MORRISON FORMATION WATER IN MCKINLEY AND SAN JUAN COUNTIES EAST OF HIGHWAY 57 according to Dam, etal., 1990

Property	Number of Samples	Minimum	Maximum	Median
Discharge,gpm	13	40	175	124
Specific Capacity	4	.43	1.35	.66
Temp.deg.Celsius	9	14.5	65	35.5

Dissolved Solids	13	250	3400	990

PART IV

ESTIMATION OF HYDROLOGIC IMPACTS

1) DETERMINATION OF MAJOR WATER QUANTITY IMPACTS

1.1 PREFACE

The primary purpose of this study is the evaluation and comparison of hydrologic consequences to the existent and planned water usages within the effected area. If possible, specific criteria should be developed to assist in this evaluation. These criteria should be based upon the current and anticipated water usage within the affected area.

1.2 LAND OWNERSHIP AND WATER USAGE REQUIREMENTS

Land ownership in the vicinity of the mine area is mostly private with the remainder divided between state lands, the Fernandez Company, Ltd. lands, and lands owned by the Peabody Natural Resources Company. Primary surface use of these lands is livestock grazing. Ground and surface water is used by ranchers for both domestic consumption and stock watering. Beef cattle require a minimum of about 9.5 to 23 gallons of water per day depending upon time of year and size (Guyer, 1977). The 1972 Grazing Capacities map published by the Department of Agriculture, Soil conservation Service indicates that under average rainfall and management conditions, a section of land in this area should be able to support 12 head of cattle for a year. This translates to a figure of about 114 to 276 gallons of water per day, per section, after evaporation, for responsible livestock grazing. Craigg and

Stone, 1985, determined that the potential evapotranspiration for this area was approximately 33 inches per year. This value is almost three times the average annual precipitation figure which is not unexpected for a semiarid region. Conservatively, the figure for gallons per day per section required for responsible grazing could be 2 to 3 times higher than the 114 to 276 gallons per day figure. Several areas within the mine permit indicate that the concept of responsible grazing is not well understood.

The effects of mining on the water needs of the faunal community are also unclear. All fluvial systems in the CHIA area are ephemeral. There are two identified springs within the CHIA area, Hidden Spring and Sand Spring, neither of which are expected to be removed by mining. Hidden Spring and Sand Spring are approximately 6.70 and 2.63 miles from the permit boundary but are close enough to mining to possibly be influenced by mining. These two springs and any springs that are eliminated by drawdowns caused by mining will be replaced by the mine operator.

The only additional water use in the CHIA region is domestic consumption. New Mexico state law allots 3 acre-feet of water per year (2700 gpd) for domestic, stock watering, and personal landscaping use. Most rural residences use between 50 and 75 gallons per day per person, NMSEO, 1991. Four sources of domestic water use that may be affected by mining include Escondido Ranch, South Ranch, Albers Ranch and a source identified as flowing well in section15, T17N, R11W that appears to be the source of water for several Navajo homes. Potential aquifers for replacement in the event of these wells being affected include the Crevasse Canyon Formation or the Gallup Sandstone.

1.3 WATER QUALITY REQUIREMENTS

The following table is a list of the state of New Mexico criteria and standards for water quality. Two water quality requirements will be addressed, the quality of water delivered by wells for use by wildlife and livestock, and the quantity of deep aquifer water used domestically.

Both wildlife and livestock require surface water of comparable quality with the exception of Total mercury and Total recoverable selenium which NMED set at 0.012 µg/L and 2 µg/L, respectably for wildlife standards. Surface waters are only casually used by stock and wildlife due to the ephemeral nature of this resource. Underground water, delivered by wells and springs, are the main water supply for animal life in the region and any pollution of these aquifers would be a detrimental impact. Surface waters are only marginally used for livestock watering thus degradation of surface water below the domestic use criteria would not impact this usage. Ground water is used for domestic consumption and any degradation of water quality within the regional aquifers would have important consequences and clear impact.

Excess sediment normally impacts fish habitat, water supplies, and engineered structures. The first two usages are not major within the CHIA region. Excess sediment yield would impair culverts and thus an additional sediment yield above background would produce an adverse hydrologic impact within the CHIA region.

New Mexico Water Quality Standards and Criteria

Parameter	New Mexico Groundwater Standard,mg/L	Drinking Water Standard or Criterion, ug/L	Stockwater Criteria, mg/L	Irrigation Criteria, ug/L
Total Dissolved Solids(mg/l)	1,000	500	3,000	5,000
Sodium Absorption Ratio (SAR)	---	-----	------	8-18
Chloride	250	250	------	700
Fluoride	1.6	4	2	15
Sulfate	600	250	------	------
pH	6-9	5-9	------	4.5 - 9
Nitrate	10	10000	100	------
Aluminum	5	-----	5	5000
Arsenic	0.1	50	0.2	100
Boron	0.75	-----	5	750
Barium	1	2000	------	------
Beryllium	-----	4	------	------
Cadmium	0.01	5	0.05	10
Chromium	0.05	100	1.0	100
Copper	-----	-----	0.5	200
Cobalt	0.05	------	1	50
Cyanide	0.2	200	------	------
Iron	1	-----	------	20000
Lead	0.05	50	0.1	5000
Manganese	0.2	------	------	-----
Mercury, Total	0.002	2	0.01	------
Molybdenum	1.0	------	------	1000
Nickel	0.2	100	------	------
Phenol	0.005	-----	------	------
Selenium	0.05	50	0.05	130
Silver	0.05	-----	------	------
Thallium	-----	2	------	------
Vanadium	-----	------	0.1	100
Uranium	5	5000	------	------
Zinc	10	------	25	2000
Radium-226 and 228 (pci/l)	30	5	30	------
Radium -226 (pci/l)	-----	0.5	------	------

1.4 IDENTIFICATION OF HYDROLOGIC IMPACTS

The El Segundo mine project has submitted a superposition groundwater model as an attempt at projecting probable hydrologic consequences as a result of pumping well SJ-120 for 30 years at the anticipated mine, followed by 20 years of recovery. In a superposition model, the starting water-level surface is assumed to be flat for each layer in the model and only the incremental effects due to pumping stresses are calculated. The assignment of hydrogeologic properties (transmissivity, storativity, and leakage) to each cell in the model determines how ground-water flow, induced by pumping, will behave.

The model evaluated two scenarios, a more-practicable scenario and a worst-case scenario. In the more-practicable scenario, pumping rates are based on the projected tonnage of coal expected to be produced in a given year for the next 30 years, and the mining companies estimate of water required. The rate of simulated ground-water pumping in the worst-case scenario is 650 ac-ft/yr, which is the declared water right associated with well SJ-120.

The well, SJ-120, is screened in multiple aquifers, and, to simulate ground-water pumping from this well, the total pumping rate is proportioned among the aquifers. The amount of water pumped from each aquifer is assumed to be proportional to the ratio of the aquifer's transmissivity to the total transmissivity for all of the screened aquifers. Transmissivity values for the three screened intervals of the model are 50 ft^2/d for layer 1 (Mesaverde), 200 ft^2/d for layer 2 (Gallup), and 203.6 ft^2/d for layer 5 (Morrison). Based on these assumptions, 44.8 % of the water produced should come from the Morrison, 44.1 % should come from the Gallup, and the remaining 11.1 % from the Mesaverde.

The more-practicable scenario is based upon production of 5.2 million tons of coal per year for years 1-6, 3 million tons of coal per year for years 7-29, and 1.8 million tons of coal for

year 30. The corresponding water consumptions are 520 ac-ft/yr for years 1-6, 300 ac-ft/yr for years 7-29, and 180 ac-ft/yr for year 30, for a total use of 10,200 ac-ft over 30 years. The worst-case scenario is based on using 650 ac-ft/yr for 30 years or a total use of 19,500 ac-ft over 30 years.

For the more-practicable scenario, water production in years 1-6, is estimated at about 35 gpm from layer 1, 142 gpm from layer 2, and 144 gpm from layer 5. In years 7-29, water production is estimated at 20.5 gpm from layer 1, 82 gpm from layer 2 and 83.5 gpm from layer 5. As coal production is winding down, year 30 water production is calculated at 12.3gpm for layer 1, 49 gpm for layer 2, and 50 gpm for layer 5.

Estimated water production for the worst-case scenario is about 50 gpm for 30 years from layer 1, 200 gpm for 30 years from layer 2, and 200 gpm for 30 years from layer 5.

Model-predicted drawdowns at Crownpoint for the more-practicable scenarios are 2.7 feet for layers 1 and 2 after 30 years and 1.1 feet at Crownpoint after 30 years for layer 5. For the worst-case scenario drawdowns are 4.9 and 5.0 feet respectively for layers 1 and 2, and 2.0 feet for layer 5 at Crownpoint after 30 years of pumping.

The Mining and Minerals Division(MMD) has reviewed the model and finds that the transmissivity values used are generally within acceptable ranges, however, the storage coefficients seem to be high for the Gallup sandstone and Morrison Formation, both of which exceed published USGS values by about one order of magnitude for the area in question. Storage coefficients for the model were estimated by multiplying the thickness of the aquifers by $10^{-6}ft^{-1}$, an accepted practice when storage coefficients are not well known. The MMD used a conservative Theis approach to calculating drawdown in the three contributing aquifers screened

in SJ- 120 and arrived at drawdown values after 30 years that are larger and more extensive than those shown in the mine model. The mine model used a variable pumping rate based upon coal production rates for the duration of 30 years for a more-practicable scenario and a constant pumping rate equivalent to 650 acre feet per year for the worst-case scenario. The simpler Theis approach, used by MMD, used pumping rates of 50 gpm from the Dalton sandstone and 200 gpm from both the Gallup sandstone and the Westwater Canyon member of the Morrison formation for a period of 30 years, the equivalent of the worst case scenario. For the storage coefficients, the MMD used a lower number (.00001) for the Gallup sandstone and (.0002) for the Morrison Formation. The (.00001) value for the Gallup Sandstone was obtained from three values located northwest of Crownpoint, published by the USGS on atlas HA-720-H (sheet 2of 2) figure 8. The value of (.0002) for the Morrison also came from wells located near Crownpoint on atlas HA-720-J (sheet 1 of 2) figure 9.

Using the Theis approach, transmissivity(T) of 200ft^2/day, storativity(S) of .00001, Q of 200gal/minute, the MMD arrived at a drawdown at 10 miles from the pumping well for the Gallup aquifer of about 80 feet after 30 years for the worst-case scenario. Similarly for the Morrison Formation, transmissivity(T) of 200ft^2/day, storativity(S) of .0002, and Q of 200 gal/minute resulted in a drawdown, using the Theis equation, of approximately 35 feet, 10 miles from SJ-120 after 30 years of pumping.

For the Dalton sandstone, the MMD used a transmissivity(T) of 25ft^2/day, a storage coefficient of .0003, and a pumping rate(Q) of 50gpm. After 30 years of pumping at this rate the approximate drawdown, 10 miles from SJ-120 is approximately 10 feet.

In terms of ground and surface water quantity, mine related concerns of major

importance include:

1) The effects of mining on the stock watering capability of rangelands within the CHIA by increased drawdowns in watering wells and the interception of surface flows or the introduction of poor quality water into the bedrock ground waters.

2) Destruction of habitat by the drawdown and elimination of springs and seeps.

3) An increase in pumping costs at and/or remediation of shallow domestic wells located at neighboring ranches due to the drawdown of aquifers or their contamination and subsequent abandonment or degradation.

These topics will be discussed in the following chapter, Estimation of Material Damage.

2) ESTIMATION OF MATERIAL DAMAGE

2.1 PREFACE

Specific criteria for material damage are required for all OSMRE CHIA's. Although such criteria are qualitative they are based upon technical judgement and related quantitative studies. The ultimate criterion for the CHIA is " damage to the hydrologic balance outside of the proposed permit area" (19 NMAC 8.2 subpart 1106.C).

The specific criteria developed below will be founded upon the three broad areas of hydrologic impact determined in the preceding chapter.

2.2 DAMAGE CRITERIA FOR IDENTIFIED HYDROLOGIC CONCERNS

Although any impact to water table elevations will affect wells within the CHIA, it is necessary to establish some conceptual limit to material damage. OSMRE proposed a cut off of 25% in additional drawdown for stock and domestic watering wells at the Black Mesa/ Kayenta Mine in Arizona (OSMRE 1988). This is a reasonable criteria to apply to the El Segundo CHIA area.

In 1990, the U.S.G.S. published a study entitled "Hydrogeology of the Morrison Formation in the San Juan Structural Basin", Atlas HA-720-J. In this study on sheet 1 of 2, Figure 8 is a map of the "Altitude of potentiometric surface of water in the Morrison Formation. A well east of Crown Point in the vicinity of the mine, indicates that the potentiometric surface is at 6471 feet above sea level. If you assume that the potentiometric surface of the Morrison Formation at well SJ-120 is 6450 feet above sea level and the top of the Westwater sandstone is at 2450(4450 feet above sea level), this would indicate that there is approximately 2000 feet of head attributable to the Morrison Formation at well SJ-120. Drawdown predictions developed by the MMD indicate approximately 56 feet of drawdown at 5 miles from the pumping well within the Morrison Formation after 30 years. A prediction of 56 feet of drawdown at 5 miles from the pumping well amounts to about 3% of the available head in the Morrison Formation, far less than the 25% criteria established for material damage. State Engineer and NTUA records indicate only wells located in section 18 of T16N, R10W as being completed in the Morrison Formation. These wells are listed as observation wells, not domestic sources of water and are almost exactly 5 miles from the pumping well.

As part of the 1990 study, the U.S.G.S. also published "Hydrogeology of the Gallup Sandstone in the San Juan Structural Basin", Atlas HA-720-H. On sheet 1 of 2, figure 7, the

potentiometric surface of a well near the mine is 6648 feet above sea level. If this figure is applied to well SJ-120 and you assign the top of the Gallup Sandstone to be at 1120(5873 feet above sea level) then there is approximately 775 feet of available head from the Gallup sandstone at SJ-120. After 30 years of pumping, the MMD predicted nearly 100' of drawdown in the Gallup sandstones, at a distance of 5 miles from the pumping well. The predicted drawdown at this distance is approximately 13% of the available drawdown, again less than the 25% criteria for material damage. State Engineer and NTUA record reviews do not indicate any Gallup sandstone wells located within 5 miles of the pumping well.

Static water level in well SJ-120 is at 295 feet below ground surface. The top of the Dalton Sandstone is at about 475 feet below ground surface. This indicates that the potentiometric head of the Dalton sandstone at SJ-120 is equivalent to about 180 feet. The MMD has calculated that at the end of 30 years, drawdown at 5 miles from the pumping well in the Dalton sandstone should be about 39 feet which amounts to nearly 22% of available drawdown from the Dalton sandstone. The figure of 22% is close to the cutoff value of 25% and indicates that extra vigilance should be used when monitoring drawdowns in the Dalton Sandstone. A review of New Mexico State Engineer records and NTUA records indicates that there may be 5 wells possibly completed in the Dalton sandstone within 5 miles of SJ-120. These wells are located in sections 16, 18, 29, and 30 of T16N, R9W and section 29 of T16N, R10W.

Water quality criteria for stock watering are primarily keyed to total dissolved solids (TDS). Background TDS for Menefee and Point Lookout water in the CHIA area is from 250 to 800 mg/l. The state criteria for stock water formerly was 3000 mg/l for TDS. An increase in excess of 3.75 times background at some locations would place the values for TDS above this

level indicating that material damage had occurred to the water within these aquifers. Past experience at the Lee Ranch mine with undisturbed Menefee and Point Lookout recharge areas hasn't found this level of TDS increases to be likely to occur.

The four U.S.G.S. topographic maps surrounding the mining area do not indicate any seeps or springs within five miles of the pumping well. Without an indication of seeps or springs it is difficult to evaluate the effect of mining on drawdowns of shallow aquifers. Wild life in the area have been noted to take advantage of stock ponds and wind mill ponds as sources of water.

El Segundo Mine personnel have agreed to construct three monitor wells at a distance of approximately 1.5 miles from SJ-120 in a northeasterly direction. These monitoring wells are to be completed in the Dalton sandstone, the Gallup sandstone, and the Westwater sandstone and should be in place prior to pumping well SJ-120 for mining purposes. At permit renewal time (5 years), data from well monitoring will be evaluated to determine whether model predictions are accurate and whether the model predictions need to be revised, based on newly gathered information. Water levels will be taken on a quarterly basis and immediately prior to using the monitor wells as temporary production wells in the event of a well malfunction at SJ-120. Water level data will be reported to MMD on a quarterly basis with other water quality data.

2.3 CONCLUSION

All anticipated mining within the El Segundo Mine CHIA area has been designed to prevent material damage to the hydrologic regime outside the permit area. The operation as presented has been designed to prevent material damage to aquifers which define the hydrologic system and as such, should prevent material damage to stock watering wells, domestic wells, and

springs and seeps outside the permit area.

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Dalton Aquifer – Worst Case
495-696, screened 201 feet

Top of Dalton in SJ-120 475'
SWL SJ-120 295'

475-790, 315 feet thick available drawdown 180’

$T = 25ft^2/day \times 7.48\ gal/ft^3 = 187\ gal/day/ft$ $S = .0003$ $Q = 50$ gal/minute

$U = 1.875Sr^2/Tt$ $h_0-h = (114.6Q/T)\ w(u)$

100days	u	w(u)	h_0-h	%drawdown
.5 mile	.2090880	1.2227	37.46	18.7
1 mile	.836352	.2602	7.9	--
5 mile	20.9088	--		
10 mile	83.6352	--		

365 days	u	w(u)	h_0-h	%drawdown
.5 mile	.0572884	2.3437	71.81	35.9
1 mile	.2291375	1.1454	35.09	17.5
5 mile	5.7284384	.0005085	.01	--
10 mile	22.9137534	--		

1825 days	u	w(u)	h_0-h	%drawdown
.5 mile	.0114569	3.9436	120.83	60.4
1 mile	.0458275	2.5684	78.70	39.3
5 mile	1.1456877	.1860	5.69	2.8
10 mile	4.5827507	.002073	.06	--

3650 days	u	w(u)	h_0-h	%drawdown
.5 mile	.0057284	4.5958	140.82	70.4
1 mile	.0229138	3.2614	99.93	49.9
5 mile	.5728438	.4830	14.79	7.4
10 mile	2.2913753	.03719	1.13	--

7300 days	u	w(u)	h_0-h	%drawdown
.5 mile	.0028642	5.3037	162.51	81.2
1 mile	.0114569	3.9436	120.83	60.4
5 mile	.2864219	.9573	29.33	14.6
10 mile	1.1456877	.1860	5.69	2.18

10950 days	u	w(u)	h_0-h	%drawdown
.5 mile	.0019095	5.6906	174.36	87.1
1 mile	.0076379	4.3100	132.06	66.0
5 mile	.1909479	1.2649	38.75	19.3
10 mile	.7637918	.3341	10.23	5.1

Gallup Aquifer – Worst Case Top of Kg SS SJ-120 +5873’

1120-1365 SWL SJ-120 +6648 from

245 feet thick Atlas HA-720-H, fig.7

T = 200ft^2/day X 7.48 gal/ft^3 = 1496 gal/day/ft S = .00001

U = 1.875Sr^2/Tt h_0-h = (114.6Q/T) w(u) Q = 200 gal/minute available drawdown 775’

100days	u	w(u)	h_0-h	%drawdown
.5 mile	.0008712	6.4707	99.13	12.8
1 mile	.0034848	5.1102	78.29	10.1
5 mile	.08712	1.9498	29.87	3.8
10 mile	.34848	.8147	12.48	1.6

365 days	u	w(u)	h_0-h	%drawdown
.5 mile	.0002387	7.8004	119.5	15.4
1 mile	.0009547	6.3828	97.78	12.6
5 mile	.0238685	3.2179	49.3	6.3
10 mile	.0954740	1.8695	28.64	3.7

1825 days	u	w(u)	h_0-h	%drawdown
.5 mile	.0000477	9.3882	143.83	18.5
1 mile	.0001909	7.9915	122.43	15.8
5 mile	.0047737	4.7877	73.35	9.4
10 mile	.0190948	3.4050	52.16	6.7

3650 days	u	w(u)	h_0-h	%drawdown
.5 mile	.0000239	10.1028	154.78	19.9
1 mile	.0000955	8.6845	133.05	17.1
5 mile	.0023868	5.4999	84.263	10.8
10 mile	.0095474	4.0887	62.64	8.09

7300 days	u	w(u)	h_0-h	%drawdown
.5 mile	.0000119	10.8404	166.08	21.4
1 mile	.0000477	9.3882	143.83	18.5
5 mile	.0011934	6.2363	95.54	12.3
10 mile	.0047737	4.7877	73.35	9.4

10950 days	u	w(u)	h_0-h	%drawdown
.5 mile	.0000080	11.1589	170.96	22.08
1 mile	.0000318	9.8043	150.21	19.4
5 mile	.0007956	6.5671	100.61	12.9
10 mile	.0031825	5.2022	79.7	10.2

Westwater Aquifer – Worst Case Top of Jm SJ-120 +4450’

2450 – 2775’ SWL SJ-120 +6450 from

325 feet screened Atlas HA-720-J, fig.8

$T = 200ft^2/day \times 7.48\ gal/ft^3 = 1496\ gal/day/ft$ S = .0002

$U = 1.875Sr^2/Tt$ $h_0-h = (114.6Q/T)\ w(u)$ Q = 200 gal/minute available drawdown 2000'

100days	u	w(u)	h_0-h	%drawdown
.5 mile	.0174240	3.5143	53.8	2.69
1 mile	.0696960	2.1643	33.1	1.65
5 mile	1.74240	.07465	1.14	--
10 mile	6.9696	.0001293	--	--

365 days	u	w(u)	h_0-h	%drawdown
.5 mile	.0047737	4.7877	73.35	3.6
1 mile	.0190948	3.4050	52.16	2.6
5 mile	.4773699	.5979	9.16	.4
10 mile	1.9094795	.05620	.86	--

1825 days	u	w(u)	h_0-h	%drawdown
.5 mile	.0009547	6.3828	97.78	4.8
1 mile	.0038190	4.9993	76.59	3.8
5 mile	.0954740	1.8695	28.64	1.4
10 mile	.3818959	.7371	11.29	.5

3650 days	u	w(u)	h_0-h	%drawdown
.5 mile	.0004774	7.0860	108.56	5.4
1 mile	.0019095	5.6906	87.18	4.35
5 mile	.0477370	2.5268	38.71	1.9
10 mile	.1909479	1.2649	19.37	.9

7300 days	u	w(u)	h_0-h	%drawdown
.5 mile	.0002387	7.8004	119.5	5.9
1 mile	.0009547	6.3828	97.78	4.8
5 mile	.0238685	3.2179	49.3	2.4
10 mile	.0954740	1.8695	28.64	1.4

10950 days	u	w(u)	h_0-h	%drawdown
.5 mile	.0001591	8.2278	126.0	6.3
1 mile	.0006365	6.7932	104.0	5.2
5 mile	.0159123	3.6374	55.72	2.7
10 mile	.0636493	2.2494	34.46	1.7

ATTACHMENT B

El Segundo Permit Application Package Technical Analysis Summary
July 2005

EL Segundo Permit Application Package Technical Analysis Summary
July 2005

Background

On September 30, 2002, the Lee Ranch Coal Company (LRCC) submitted an application for the El Segundo Mine. The proposed permit area comprises approximately 15,000 acres of State and private surface and mineral ownership, located approximately 35 miles north of Milan, New Mexico, along State Road 509, McKinley County (T16N R10W, T17N R10W, T16N R9W, and T17N R9W). The purpose of this technical analysis is to provide a history of the project, technical issues and rational for the finding of facts and conclusions of law that will assist the Director with his decision on this permit application package (PAP).

Mining activities will be conducted in multiple pit areas at a given time by employing a truck/shovel operation. Coal will be recovered from 1 to 9 seams. The minable coal seams range from 1 foot to 17 feet in thickness. Anticipated peak annual coal production is expected to be about 5.2 million tons, depending upon coal sales. The estimated total coal production for the life of the mine is 102 million tons over approximately thirty years. Coal will be transported from the mine via a railroad loop owned and operated by the Burlington Northern/Santa Fe Railroad.

Mining will disturb approximately 7,862 acres. Since mining and reclamation are performed contemporaneously, no more that about 2000 acres will remain disturbed in any one year. A total of 7751 acres will be reclaimed for a post mining land use of rangeland grazing. Coal will be transported from the mine via a railroad loop owned and operated by the Burlington Northern/Santa Fe Railroad.

Permit Processing Chronology

The following is a summary of MMD's administrative record:

October 28, 2002	MMD's 1st Administrative Completeness Review
December 21, 2002	MMD's 1st Technical Review
March 5, 2003	MMD determines Application Administratively Complete
February 20, 2004	MMD's 2nd Technical Review
October 19, 2004	MMD's 3rd Technical Review
April 12, 2005	MMD's Final Technical Review

Lee Ranch Mine Public Notice Process

In response to MMD's March 5, 2003 determination the PAP was administratively complete, LRCC published a public notice for four consecutive weeks in a newspaper serving McKinley County describing the proposed mine and soliciting public comments. The following is a list of the newspaper and notice publication dates:

The Independent (Gallup)	April 7, April 14, April 21, April 28, May 5 and May 12, 2003

Cibola County Beacon (Grants) April 14, April 18, April 25 and May 2, 2003

A thirty-day public comment period ran through June 12, 2003. No public comments were received.

MMD Agency Notices

On May 5, 2005, MMD sent written notifications to fourteen federal, state and local government agencies notifying them about the June 15, 2005 Public Meeting and the comment period extension until June 30, 2005. The first agency notification on the complete application was sent out December 16, 2004 requesting comments on the permit no later than January 21, 2005.

Comments were received from the Fish and Wildlife Service (May 31, 2005), New Mexico Department of Game & Fish (January 27, 2005), State Historic Preservation Division (March 3, 2005), Commissioner of Public Lands (January 5, 2002), and the Office of Surface Mining (January 12, 2005).

MMD Public Meeting

Based on the length of time since the first public notice (March and April 2003), the Director determined it would be appropriate to hold a public meeting to allow public comment on the permit. The meeting was held on June 15, 2005. MMD published notices for the meeting in *The Independent* (Gallup) on May 12, 2005 and the Cibola County Beacon (Grants) on May 13, 2005.

The meeting was held at the McKinley County Courthouse at 6 P.M. Twenty-one people attended the meeting, providing testimony primarily on economic develop and job creation.

Informational meetings concerning the groundwater hydrology were also held with the City of Gallup Water Board on July 14, 2005, and the McKinley County Water Board on July 15, 2005.

Native American Consultations

As part of the baseline data collected to evaluate potential impacts the new mine may have on the environment and surroundings of the proposed mine, LRCC was required to conduct an archaeological inventory and an ethnographic evaluation of sacred and traditional cultural properties. Southwestern Archaeological Consultants completed the archaeological investigations (Report SW 459a). Anthropological Studies conducted the Ethnographic evaluations of the Western Pueblos (Pueblo of Ácoma Historic Preservation Office, the Hopi Cultural Preservation Office, the Pueblo of Laguna, Native American Graves Protection and Repatriation Act (NAGPRA) Committee, and the Zuni Heritage and Historic Preservation Office). Klara Kelley and Harris Francis performed a similar study of the Navajo. The results of these studies served as a focal point for tribal consultation and informational meetings. These are summarized below:

> **Spring 2001** direct that Lee Ranch Mine conduct a Traditional Cultural Properties inventory and an archaeological inventory of the proposed El Segundo Mine as a baseline data requirement.

June 5, 2001 consult with the Historic Preservation Division (HPD) on a need for inventory and outline plans for the archaeological and ethnographic work.

August 29, 2001 mine sponsored ethnographers contact Victor Sarracino, Chairman of the Pueblo's Native American Grave Repatriation Act Committee (NAGPRA), to discuss the El Segundo project and elicit their cooperation in the Traditional Cultural Properties study.

August 30, 2001 mine sponsored ethnographers contact Damian Garcia, Director, Acoma Historic Preservation Office, to discuss the El Segundo project and elicit their cooperation in the Traditional Cultural Properties study.

September and October 2001 mine sponsored ethnographers made presentations to the Casamero Lake, Littlewater and Whitehorse Lake Navajo chapters' planning boards, consisting of the chapter officers.

October and December 2001 mine sponsored ethnographers interviewed individual residents starting with people recommended in meetings with Chapters and the Navajo Historic preservation Office. Twenty-eight people were names, seventeen of whom were interviewed. Work was conducted under Navajo permit C-0114-E.

October 3 and 4, 2001 and March 14, 2002 mine sponsored ethnographers conduct fieldwork with representatives designated by Laguna Pueblo.

October 24 and 25, 2001 mine sponsored ethnographers conduct fieldwork with representatives designated by Hopi Pueblo.

November 7 and 8, 2001 mine sponsored ethnographers conduct fieldwork with representatives designated by Acoma Pueblo.

November 20, 2001 mine sponsored ethnographers conduct fieldwork with representatives designated by Zuni Pueblo.

May 2, 2002 Prepare a Programmatic Agreement between HPD and MMD regarding consultation process for cultural resources affected by El Segundo. Propose concerned tribes be considered concurring parties to the proposed consultations. HPD never pursued the agreement so MMD gave up the idea.

September 30, 2002 Lee Ranch Coal Mine (LRM) submits El Segundo permit application to MMD.

October 2002 LRM supplies MMD with preliminary summary and tables associated with ethnographic research at EL Segundo Mine

March 5, 2003 MMD determines the El Segundo application is administratively complete.

April 2, 1003 LRM provides MMD with summary of Ethnographic research to distribute to the Tribes for initial consultations.

April 14, April 18, April 25 and May 2, 2003 Public Notice published in the Cibola County Beacon

April 7, April 14, April 21, April 28 and May 5, 2003 Public Notice published in Gallup's The Independent.

April 23, 2003 - 1st consultation letter - Enclosing ethnographic report and requesting comments questions and offering government-to-government meetings. The report summarized information obtained by tribal liaison committees concerning TCP that may be affected by El Segundo Mine. The letter was sent to the following people:

Governor Fred S. Vallo, Sr.
P.O. Box 309
Acoma Pueblo, NM 87034

Governor Roland Johnnson
P.O. Box 194
Laguna Pueblo, NM 87026

Governor Arlen P Quetawki, Sr.
Pueblo of Zuni
P.O. Box 339
Zuni, New Mexico 87327

Chairman Wayne Taylor, Jr.
Hopi Tribal Council
P.O. box 123
Kykotsmovi, AZ 86039

Dr. Alan Downer, Director
Navajo Nation Historic Preservation Department
P.O. box 4950
Window Rock, AZ 86515

May 20, 2003 receive a letter, dated July 29, 2003, from Laguna Governor Roland Johnson confirming the Pueblo of Laguna's interest in the El Segundo Coal Mine project. Information was forwarded to the NAGPRA committee for review.

July 29, 2003 receive a second letter, dated July 29, 2003, from Laguna Governor Roland Johnson confirming the Pueblo of Laguna's interest in the El Segundo Coal Mine project. Information was forwarded to the NAGPRA committee and Governor's staff for review.

August 4, 2003 LRM submits draft version of *El Segundo Ethnohistory* report to MMD

August 28 2003 MMD to Pueblo of Laguna Governor Johnson requesting the name of a contact person for purposes of coordination on El Segundo consultation.

September 25, 2003 letter sent to MMD from Governor Johnson naming Victor Sarracino as contact person.

October 2003 Jim O'Hara contacts Victor Sarracino to make arrangements for a briefing. Mr. Saraccino asks MMD for a request in writing with recommended dates for a meeting.

October 28, 2003 letter sent from MMD to Victor Sarracino enclosing ethnographic information and a request to meet for a briefing.

October 28, 2003 a 2nd request for consultation sent by MMD to:

Damian Garcia
Historic Preservation Office
P.O. Box 309
Acoma Pueblo, NM 87034

Dr. Jonathan Damp, Director
Tribal Historic Preservation Office
P.O. Box 1149
Zuni, NM 87327

Leigh J. Kuwanwisiwma, Director
Hopi Cultural Preservation Office
The Hopi Tribe
P.O. Box 123
Kykotsmovi, AZ 86039

Dr. Alan Downer, Director
Navajo Nation Historic Preservation Department
P.O. Box 4950
Window Rock, AZ 86515

November 2003 MMD is contacted by Jonathan Damp of Zuni to arrange a meeting with Zuni Tribal Council.

November 2003 Follow-up phone calls to Navajo, Acoma and Hopi asking to arrange briefing meetings.

November 24, 2003 Jim O'Hara holds a briefing with the Zuni Tribal council. The briefing included a summary of the proposed mine, summary of the ethnographic work conducted with the Zuni's representatives, presentation of the Zuni findings and recommendations based on the ethnographic study. Mr. O'Hara requested the Council to consider the documentation and provide MMD with any additional questions or comments. The Council requested some additional information.

December 30, 2003 MMD sends Zuni additional information requested and asks for formal comments by February 27, 2004.

September 7, 2004 LRM submits final version of the archaeological and ethnohistory reports to MMD.

December 4, 2004 MMD forwards reports with recommendations for eligibility to HPD for their review and comments.

February 28, 2005 Jim O'Hara of MMD called Littlewater, Whitehorse Lake and left message with Casamero Lake requesting an opportunity to brief the Chapter officials at the next Planning Meeting.

March 1, 2005 Jim O'Hara met with Littlewater Chapter officials at their monthly planning meeting. Other members of the Chapter were also in attendance.

March 2, 2005 Jim O'Hara met with Littlewater Chapter officials at their monthly planning meeting. Other members of the Chapter were also in attendance.

March 2, 2005 MMD sends Littlewater Chapter President follow-up letter with additional information.

March 2, 2005 Jim O'Hara attended the Whitehorse Lake Chapter Planning meeting. All of the Chapter officers were in attendance except the Vice-President. Jim O'Hara gave them the Navajo presentation verbally because the computer crashed. I also handed out copies of the presentation. Received several questions from the Council Delegate about the mine and was invited back for the March 14 general Chapter meeting.

March 3, 2005 Jim O'Hara received request for information from Ahktar Zamed chief or the Navajo Mineral Resources Division and Eugenia Quintana from Navajo EPA. Sent a summary description of the mine with location map via e-mail and mailed electronic copy of the permit to Navajo Minerals Division.

March 14, 2005 The trip to Whitehorse Lake Chapter was canceled due to the snow. Jim O'Hara asked them to notify him of the next meeting.

March 14, 2005 Letter to Whitehorse Lake Chapter offering to make up for snow cancellation. They are requested to contact Jim O'Hara about next possible meeting date.

March 14, 2005 Letter to Casamero Lake Chapter offering to brief them at their next Planning Meeting. Jim O'Hara unable to contact the Planning Coordinator by phone.

May 6, 2005 MMD sent letters to the Governors of Acoma, Laguna, Zuni and Hopi and the Presidents of the Navajo Nation, Littlewater, Whitehorse Lake and Casmero Lake Chapters notifying them of the June 15 public meeting and asking them for their participation and comments on the permit application.

June 15, 2005 John Stucker of the Navajo Minerals Resources Division attended El Segundo public meeting held in Gallup. He provided no comments or testimony. No other tribal governments were represented.

June 28, 2005, the Archaeological Management Plan required by 19.8.9.912 NMAC was provided to the Director to satisfy the requirement at 19.8.11.1106.P NMAC (SW 493B). The plan was distributed to State Historic Preservation Division and the Governors of Acoma, Laguna, Zuni and Hopi and the Presidents of the Navajo Nation, Littlewater, Whitehorse Lake and Casmero Lake Chapters requesting their review and comment by August 5, 2005.

Technical Analysis

CSMC Rule 19.8.5.505 NMAC requires applications for surface coal mines to include, at a minimum, all applicable information under Parts 7, 8 and 9. MMD reviewed the permit using these criteria to determine administrative and technical completeness. The following section is a summary of this review. Some parts of the regulations are not included because they deal with experimental practices or other issues that are not applicable to the El Segundo PAP. John Guranich (Engineering), Monte Anderson (Hydrology), David Clark (Vegetation and Wildlife), Joe Vinson (Soils) and James O'Hara (Legal, Bonding and Cultural Resources) performed the various aspects of the review and through numerous meetings and correspondence worked out the details for the current PAP.

LEGAL, GENERAL ENVIRONMENT

19.8.7.700 Responsibility
This Subpart applies to any person who applies for a permit to conduct surface coal mining operations. ***Lee Ranch Coal Company (LRCC) hereby submits the following permit application to conduct surface coal mining operations on the El Segundo mine.*** It is the responsibility of the permit applicant to provide to the Director all of the information required by this Subpart.

19.8.7.701 Identification of Interests
An application shall contain the following information, except that the submission of a social security number is voluntary:
A. A statement as to whether the applicant is a corporation, partnership, single proprietorship, association, or other business entity.
Section 1.7 (1-6)
The applicant Lee Ranch Coal Company is a Subsidiary of Peabody Natural Resources Company, a Delaware General Partnership.
B. The name, address, telephone number and, as applicable, social security number and employer identification number of the:
(1) applicant;
Lee Ranch Coal Company
P.O. Box 757
Grants, New Mexico 87020
Phone Number (505) 285-4651
Federal Employer Identification Number 51-0332232

State CRS ID 02-230650-001

(2) applicant's resident agent; and

The Corporation Trust Company
Corporation Trust Center
1209 Orange Street Wilmington
New Castle County, Delaware 19801
Phone Number (302) 658-7518

(3) person who will pay the abandoned mine land reclamation fee.

Controller
Lee Ranch Coal Company
P.O. Box 757
Grants, New Mexico 87020
Phone Number (505) 285-4651

C. For each person who owns or controls the applicant under the definition of "owned or controlled" and "owns or controls" in Subpart 107 of these rules, as applicable:

(1) the person's name, address, social security number and employer identification number;

EXHIBIT 701-1 LRCC CERTIFICATE OF INCUMBENCYpdf

(2) the person's ownership or control relationship to the applicant, including percentage of ownership and location in organizational structure;

EXHIBIT 701-2 COMPANIES AND AFFILIATES

(3) the title of the person's position, date position was assumed, and when submitted under paragraph 1113(d), date of departure from the position;

NA

(4) each additional name and identifying number, including employer identification number, Federal or State permit number, and MSHA number with date of issuance, under which the person owns or controls, or previously owned or controlled, a surface coal mining and reclamation operation in the United States within the five years preceding the date of the application; and

LRCC, Lee Ranch Coal Company, currently has and continues to operate the Lee Ranch Mine a surface coal mine operation 35 miles north of Milan. New Mexico Permit No. 19-2P, MSHA No. 29-01879 in the United States. LRCC has no other previous mines.

(5) the application number or other identifier of, and the regulatory authority for, any other pending surface coal mining operation permit application filed by the person in any State in the United States.

LRCC, Lee Ranch Coal Company, has no pending permit applications for surface coal mining operations at the time of this application submittal in the United States.

D. For any surface coal mining operation owned or controlled by either the applicant or by any person who owns or controls the applicant under the definition of "owned or controlled" and "owns or controls" in Subpart 107 of this chapter, the operation's:

(1) name, address, identifying numbers, including employer identification number, Federal or State permit number and MSHA number, the date of issuance of the MSHA number, and the regulatory authority; and

LRCC, Lee Ranch Coal Company, has a current surface coal mining permit for the Lee Ranch Mine, (New Mexico Permit No. 19-2P, MSHA No. 29-01879) in the United States.

(2) ownership or control relationship to the applicant, including percentage of ownership and location in organizational structure.

E. The name and address of each legal or equitable owner of record of the surface and mineral property to be mined, each holder of record of any leasehold interest in the property to be mined, and

any purchaser of record under a real estate contract for the property to be mined.
Plate 700-1 and 700-2, Table 701-1, 701-2, and 701-4
F. The name and address of each owner of record of all property (surface and subsurface) contiguous to any part of the proposed permit area.
Table 701-3
G. The Mine Safety and Health Administration (MSHA) numbers for all mine-associated structures that require MSHA approval.
The MSHA Mine ID Number for El Segundo is 2902257
H. A statement of all lands, interest in lands, options, or pending bids on interests held or made by the applicant for lands contiguous to the area described in the permit application. If requested by the applicant, any information required by this Paragraph which is not on public file pursuant to State law shall be held in confidence by the Director, as provided under paragraph 606(b).
Table 701-4
EXHIBIT 703-1 (NOTE OF MEMO & SURF FERN & SFPRC.pdf)].
EXHIBIT 703-2 ASSIGNMENT AND ASSUMPTION OF SURFACE USE AGREEMENT WITH SFPM AND HNRC.pdf
I. After an applicant is notified that his or her application is approved, but before the permit is issued, the applicant shall, as applicable, update, correct or indicate that no change has occurred in the information previously submitted under Paragraphs (a) through (d) of this Subpart .
J. The applicant shall submit the information required by this Subpart and by Subpart 702 in any format prescribed by the Director, that is approved by OSM.

19.8.7.702 Compliance Information
Each application shall contain:
A. A statement of whether the applicant or any subsidiary, affiliate, or person controlled by or under common control with the applicant has:
LRCC has not had a Federal or State mining permit suspended or revoked in the last five years, or forfeited a mining bond or similar security deposited in lieu of bond.
(1) had a Federal or State coal mining permit suspended or revoked in the 5 years preceding the date of submission of the application; or
(2) forfeited a performance bond or similar security deposited in lieu of bond.
B. A brief explanation of the facts involved if any such suspension, revocation, or forfeiture referred to in Paragraphs (a)(1) and (2) of this Subpart has occurred, including:
No such suspension, revocation, forfeiture referred to in Paragraph 702.A.(1 & 2) has occurred.
(1) identification number and date of issuance of the permit, and the date and amount of bond or similar security;
(2) identification of the authority that suspended or revoked the permit or forfeited the bond and the stated reasons for the action;
(3) the current status of the permit, bond, or similar security involved;
(4) the date, location, and type of any administrative or judicial proceedings initiated concerning the suspension, revocation, or forfeiture; and
(5) the current status of the proceedings.
C. a listing of each violation notice received by the applicant in connection with any surface coal mining operation during the 3-year period before the application date, and a list of all outstanding violation notices received prior to the date of the application by any surface coal mining operation that is deemed or presumed to be owned or controlled by either the applicant or any person who is deemed or presumed to own or control the applicant under the definition of "owned or

controlled" and "owns or controls" in Subpart 107. For each notice of violation issued pursuant to 30 CFR 843.12 or under a Federal or State program for which the abatement period has not expired, the applicant shall certify that such notice of violation is in the process of being corrected to the satisfaction of the agency with jurisdiction over the violation. For each violation notice reported, the list shall include the following information, as applicable:

Three Notices of Violation (NOV) have been received at the Lee Ranch Mine, Permit No. 19-2P in the three years prior to this application. The NOV's have been issued by the New Mexico Mining and Minerals Division. All have been abated.

NOV No. 668 – June 27, 2000

NOV No. 670 – November 21, 2000

NOV No. 648 – April 23, 2001

(1) Any identifying numbers for the operation, including the Federal or State permit number and MSHA number, the dates of issuance of the violation notice and MSHA number, the name of the person to whom the violation notice was issued, and the name of the issuing regulatory authority, department or agency;

(2) A brief description of the violation alleged in the notice;

(3) The date, location, and type of any administrative or judicial proceedings initiated concerning the violation, including, but not limited to, proceedings initiated by any person identified in Paragraph (c) of this Subpart to obtain administrative or judicial review of the violation;

(4) The current status of the proceedings and of the violation notice; and

(5) The actions, if any, taken by any person identified in Paragraph (c) of this Subpart to abate the violation.

D. After an applicant is notified that his or her application is approved, but before the permit is issued, the applicant shall, as applicable, update, correct or indicate that no change has occurred in the information previously submitted under this Subpart .

19.8.7.703 Right of Entry and Operation Information

A. Each application shall contain a description of the documents upon which the applicant bases his or her legal right to enter and begin surface coal mining operations in the permit area and whether that right is the subject of pending legislation. The description shall identify those documents by type and date of execution, identify the specific lands to which the document pertains, and explain the legal rights claimed by the applicant.

EXHIBIT 701-3 WAR DEED OF SURF OWNER FOR PNRC

EXHIBIT 703-7 LEASE OF STATE LANDS

B. Where the private mineral estate to be mined has been severed from the private surface estate, the application shall also provide for lands within the permit area:

In an Agreement dated July 31, 1979, the Fernandez Company, Ltd. granted SFPRC the right to conduct surface mining operations on the lands contained in the proposed permit area, as provided in the Notice and Memorandum of Surface Use Agreement between the parties dated March 26, 1980, recorded in McKinley County, Book 262, pages 1881 and 1882, and reproduced as EXHIBIT 703-1. Peabody Natural Resources Company (Lee Ranch Coal Company) through Assignment and Assumption of June 25, 1993 EXHIBIT 703-2 has acquired the Surface Use Agreement between Fernandez Company, Ltd. and SFPM.

(1) a copy of the written consent of the surface owner to the extraction of coal by surface mining methods; or

(2) a copy of the document of conveyance that expressly grants or reserves the right to extract the coal by surface mining methods; or

(3) if the conveyance does not expressly grant the right to extract the coal by surface mining methods, documentation that under applicable State law, the applicant has the legal authority to extract the coal by those methods.

C. Nothing in this Subpart shall be construed to afford the Director the authority to adjudicate property title disputes.

19.8.7.704 Relationship to Areas Designated Unsuitable for Mining

A. Each application shall contain a statement of available information on whether the proposed permit area is within an area designated unsuitable for surface coal mining operations under Subpart 4 or under study for designation in an administrative proceeding under these rules and regulations.

No area within the original permit area and proposed expansion area is known by LRCC to be within an area designated unsuitable for surface coal mining operations under Subpart 4 or under any study for designation in an administrative proceeding under 19 NMAC 8.2.

B. If an applicant claims the exemption in paragraph 1106(d)(2), the application shall contain information supporting the applicant's assertion.

LRCC does not presently claim the exemption in Subpart 1106.D.(2).

C. If an applicant proposes to conduct surface coal mining operations within 100 feet of a public road or within 300 feet of an occupied dwelling, the application shall contain the waiver of the owner of the dwelling as required in Subpart 202(d).

LRCC does not propose to conduct surface coal mining operations within 300 feet of an occupied dwelling.

19.8.7.705 Permit Term Information

A.

The anticipated starting and termination date of each phase of the surface and coal mining operations and the anticipated number of acres of surface land to be affected by each phase of mining over the life of the permit is set forth in Section 903. Lee Ranch Mine does not anticipate any underground mining. PLATE 900-1 (PLATE 900-1.dwg) shows disturbance sequence. TABLE 906-2 (TABLE 906-2.xls) lists the annual disturbance sequence and total anticipated number of acres of disturbance.

(1) Each application shall state the anticipated or actual starting and termination date of each phase of the surface coal mining operations and the anticipated number of acres of surface land to be affected for each phase of mining and over the total life of the permit.

(2) The horizontal and vertical extent of the proposed workings for each phase of the operation for the life of the permit shall be shown for underground mining.

B. If the applicant proposes to conduct the surface coal mining operations in excess of 5 years, the application shall contain the information needed for the showing required under paragraph 1111(a).

Lee Ranch Coal Company is not requesting a permit term greater than five years for the El Segundo Mine.

19.8.7.706 Personal Injury and Property Damage Insurance Information

Each permit application shall contain either a certificate of liability insurance or evidence that the self-insurance requirements in Subpart 1407 are satisfied.

EXHIBIT 706-1 CERTIFICATEOFINSURANCE

19.8.7.707 Identification of Other Licenses and Permits

Each application shall contain a list of all or other licenses and permits needed by the applicant to conduct the proposed surface coal mining operations. This list shall identify each license and permit by:

In TABLE 707-1 Lee Ranch Coal Company identifies other licenses and permits pending or issued to LRCC to conduct surface coal mining operations.

A. type of permit or license;

B. name and address of issuing authority;

C. identification numbers of applications for those permits or licenses or, if issued, the identification numbers of the permits or licenses; and

D. if a decision has been made, the date of approval or disapproval by each issuing authority.

19.8.7.708 Identification of Location of Public Office for Filing of Application

Each application shall identify, by name and address, the public office where the applicant will simultaneously file a copy of the application for public inspection under paragraph 1100(d).

This application/permit and mining plan is filed for public inspection in the McKinley County Clerk's Office, McKinley County Courthouse, 201 W Hill, Gallup, NM 87301, In the Mother Whiteside public library, 525 West High, Grants, NM 87020, and Mining and Minerals Division, 1220 South Saint Francis Drive, Santa Fe, NM 87505

19.8.7.709 Newspaper Advertisement and Proof of Publication

A copy of the newspaper advertisement of the application and proof of publication of the advertisement shall be filed with the Director and made a part of the complete application, not later than 4 weeks after the last date of publication required under paragraph 1100(a).

EXHIBIT 709-1 Notice

19.8.8.801 General Environmental Resources Information

Each application shall describe and identify:

A. the size, sequence, and timing of the subareas of the lands subject to surface coal mining operations over the estimated life of those operations for which it is anticipated that individual permits for mining will be sought.

Plate 900-1 and Table 906-2

B. the nature of cultural and historic resources listed or eligible for listing on the National Register of Historic Places and known archeological features within the proposed permit and adjacent areas. The description shall be based on all available information, including, but not limited to, data of State and local archeological, historical, and cultural preservation agencies.

Chapter 801.B

EL SEGUNDO MINE'S ARCHAEOLOGICAL MANAGEMENT PLAN

19.8.8.802 Description of Hydrology and Geology: General Requirement

(A) Each application shall contain a description of the geology, and water quality and quantity of all lands within the proposed permit area and the adjacent area. The description shall include information on the characteristics of all surface and ground waters within the permit and adjacent area, and any water which will flow into or receive discharges of water form the permit area. The description shall be prepared according to Section 802 through 806 and conform to the following:

Descriptions of the geology and groundwater and surface water quality and quantity of all lands within the proposed permit area and the adjacent area are presented under Subparts 803 through 806 of this application. The descriptions include information on the characteristics of

all surface waters and groundwaters within the permit and adjacent area, and any water which will flow into or receive discharges of water from the permit area.

(1) information on hydrology, water quality and quantity, and geology related to hydrology of areas outside the proposed permit area shall be provided by the Director, to the extent that this data is available from an appropriate Federal or State agency.

(2) If this information is not available from those agencies, the applicant shall gather and submit this information to the Director as part of the permit application.

(3) The permit shall not be approved by the Director until this information is made available in the application.

(B) The use of modeling techniques may be included as part of the permit application, but the same surface and ground water information may be required for each site as when models are not used.

Modeling techniques were utilized as a part of the permit application for developing storm water runoff volumes and discharge rates, and for determining pre- and post-mining soil loss values.

19.8.8.803 Geology Description

(A) The description shall include a general statement of the geology within the proposed permit area accompanied by appropriate maps and cross-sections down to and including the first aquifer to be affected below the lowest coal seam to be mined.

Regional geology is illustrated on FIGURE 803-1 (FIGURE 803-1.dwg). A general geologic cross section is provided on FIGURE 803-2 (FIGURE 803-2.dwg). Typical geologic columns are shown on FIGURE 803-3 (FIGURE 803-3.dwg). Development drilling has revealed one high angle fault that trends north-south, running along the western border of the permit area in Section 1, T16N, R10W and the center of Section 36, T17N, R10W (PLATE 803-1.dwg).

(B) (1) Test borings or core samples from the proposed permit area shall be collected and analyzed down to and including the stratum immediately below the lowest coal seam to be mined to provide the following data in the description:

Description of the coal and overburden on El Segundo permit area is based on information obtained from numerous exploration holes drilled on the property [PLATE 803-1 (PLATE 803-1.dwg)]. Cross sections at four locations within the permit area, which are based on test borings, have been provided as PLATES 803-2, 803-3, 803-4, and 803-5 (PLATE 803-2 thru 5.dwg).

(b) logs of drill holes showing the lithologic characteristics and thickness of each stratum and each coal seam;

EXHIBIT 803B-1

(c) physical properties of each stratum within the overburden including compaction, erodibility, and if this material is to be used as topdressing, potential soil texture;

TABLES 803-1, 803-2 & 803-3 and 803-4

(d) for surface mining activities, chemical analyses of a composite sample of each stratum within the overburden and the stratum immediately below the lowest coal seam to be mined and for underground mining activities, chemical analyses of the stratum immediately above and below the coal seams to identify at a minimum, those horizons which contain potential acid-forming, toxic-forming, or alkalinity producing materials and a composite sample from each stratum shall be analyzed for the following parameters:

TABLES 803-1, 803-2, 803-3 and 803-4

(e) If this material is to be considered for use as topdressing, analyses for the parameters necessary for plant growth shall be performed, in addition to those listed above, and shall include at a minimum the following:

TABLES 803-1, 803-2 & 803-3

(f) A demonstration of the suitability of topsoil substitutes or supplements in paragraph 2005(e) shall be based upon analysis of the thickness of soil horizons and/or geologic strata, total depth, texture, percent coarse fragments, pH, and areal extent of the different kinds of soils. Analyses of additional parameters or additional data may be required by the Director. **TABLES 810-1, 810-4, 810-2A, 810-2B, PLATE 810-1, and EXHIBITS 803-4 and 810-4**

(g) If the applicant can demonstrate that the analyses of any particular parameter is of little or no significance in the proposed permit area, then such parameter(s) may be waived upon approval of the Director;

EXHIBIT 803-4

(h) analysis of the coal seam, including, but not limited to an analysis of the sulfur, pyrite, and marcasite content.

TABLE 803-1

(i) The applicant shall submit a proposed sampling plan to the Director for approval **Text in SUBPART 803, Overburden Sampling subsection**

(3) An applicant may request that the requirements for a statement of the results of the test borings or core samplings be waived by the Director. The waiver may be granted only if the Director makes a written information is accessible to him in a satisfactory form. **N/A**

19.8.8.804 Ground Water Information

(A) The application shall contain a description, including appropriate maps, cross sections, and written statements, of the ground water hydrology for the proposed permit and adjacent areas including:

FIGURE 804-1 (FIGURE 804-1.dwg) is an approximate east-west cross section showing the sequence of formations beneath El Segundo Mine. The Point Lookout crops out along the southern edge of the permit area [PLATE 803-8 (PLATE 803-8.dwg)] and is present just below the Cleary coals from the outcrop northward. The Point Lookout exhibits saturation in the northern part of the permit area [PLATE 804-2 (PLATE 804-2.dwg).

(1) the depth below the surface and the horizontal extent of the water table and aquifers;
(2) the lithology and thickness of the aquifers;
(3) known uses of the water in the aquifers and water table; and
(4) the quality of subsurface water, if encountered.

Groundwater quality samples from well KPL-4 and KPL- 5 (both completed in the Point Lookout) are presented in TABLE 804-1 (TABLE 804-1.xls).

(B) The application shall contain additional information which describes the recharge, storage, and discharge characteristics of aquifers and the quality and quantity of ground water, according to the parameters and in the detail required by the Director.

This information is found in the JSAI report, Table 1.

(C) All water-quality analyses performed to meet the requirements of this section shall be conducted according to the methodology in the 15th edition of "Standard Methods for the Examination of Water and Wastewater," which is incorporated by reference, or the methodology in 40 CFR Parts 136 and 434. Water quality sampling performed to meet the requirements of this section shall be conducted according to either methodology listed above when feasible.

All water quality analyses will be conducted according to the methodology in the most recent edition of "Standard Methods for Examination of Water and Wastewater" or 40 CFR Parts

136 and 434 when feasible.

19.8.8.805 Surface Water Information

(A) Surface water information shall contain appropriate maps, cross-sections, charts and written-statements, including the name of the watershed which will receive water discharges, the water discharge into any surface body of water, and descriptions of surface drainage systems sufficient to identify, in detail, the seasonal variations in water quantity and quality within the proposed permit and adjacent areas.

The permit area straddles the Continental Divide. Surface water is confined to small ephemeral arroyos. The east portion of the permit area is drained by Inditos Draw, a tributary of Vought Draw which flows into Arroyo Chico, a tributary of the Rio Puerco which flows into the Rio Grande. The west portion of the permit area is drained by an unnamed arroyo, an upstream tributary of Kim-me-ni-oli Valley, a tributary of the Chaco River which flows into the San Juan River, a tributary of the Colorado River.

(B) Surface water information shall include:

(1) minimum, maximum, and average discharge conditions which identify critical low flow and peak discharge rates of streams sufficient to identify seasonal variations; and

Peak discharges for both the pre-mining and post-mining watersheds are summarized in TABLE 805-1 (TABLE 805-1.xls), and runoff volumes are summarized in TABLE 805-2 (TABLE 805-2.xls).

(2) water quality data to identify the characteristics of surface waters in, discharging into, or which will receive flows from surface or ground water from affected areas within the proposed permit area, sufficient to identify seasonal variations, showing:

Surface water quality data is presented in Table 805-6 (TABLE 805-6.xls).

(a) total dissolved solids in milligrams per liter;
(b) total suspended solids in milligrams per liter;
(c) acidity;
(d) pH in standard units;
(e) total and dissolved iron in milligrams per liter;
(f) total manganese in milligrams per liter; and
(g) such other information as the Director determines is relevant.

(3) All water-quality analyses performed to meet the requirements of this section shall be conducted according to the methodology in the 15th edition of "Standard Methods for the Examination of Water and Wastewater," which is incorporated by reference, or the methodology in 40 CFR Parts 136 and 434. Water quality sampling performed to meet the requirement of this Section shall be conducted according to either methodology listed above when feasible.

All water quality analyses will be conducted according to the methodology in the most recent edition of "Standard Methods for Examination of Water and Wastewater" or 40 CFR Parts 136 and 434 when feasible.

19.8.8.806 Alternative Water Supply Information

The application shall identify the extent to which the proposed surface coal mining operations may proximately result in contamination, diminution, or interruption of an underground or surface source of water within the proposed permit or adjacent areas for domestic, agricultural, industrial, or other legitimate use. If contamination, diminution, or interruption may result, then the description shall identify the alternative sources of water supply that could be developed to replace the existing sources.

The only existing water supply that will be affected by the mining operation is Orphan Annie Well, a livestock well [PLATE 804-1 (PLATE 804-1.dwg)]. After mine reclamation, the supply can be replaced by water from the mine supply well, South Hospah No. 1 (formerly C. & P. No. 1), via a pipeline if water is required.

19.8.8.807 Climatological Information

A. The application shall contain a statement of the climatological factors that are representative of the proposed permit area, including:

(1) the average monthly and seasonal precipitation;

Table 807-1 & 2

(2) the average direction and velocity of prevailing winds;

Table 807-5

(3) seasonal temperature ranges; and

Table 807-6 & 7

(4) a plan for collection of climatological data throughout the operator's period of responsibility.

Section 807.A(4)

B. The Director may request such additional data as deemed necessary to ensure compliance with the requirements of this Chapter.

19.8.8.808 Vegetation Information

A. The permit application shall contain a map that delineates existing vegetative types and a description of the plant communities within the proposed permit area for surface mining activities, or for underground mining activities the areas to be affected within the permit area by surface operations or facilities, and within any proposed reference area. This description shall include information adequate to predict the potential for re-establishing vegetation and quantitative data for each strata (herb, shrub, tree) which includes but not limited to:

(1) a comprehensive listing of species by plant community;

Table 808-1; Exhibit 808-2

(2) ground cover, frequency, and constancy values for each species in the herbaceous stratum for each plant community;

Tables 808-4 through 808-9, Tables 808-17 and 808-18

(3) ground cover, density, and frequency values for each species in the shrub stratum for each plant community;

Tables 808-4 through 808-9, Table 808-19

(4) foliage cover, basal area, and density of non-timber and timber tree species and volume data for commercial timber producing species;

Table 808-6; no timber trees extant

(5) acreage which shall be determined for each plant community type and presented on the vegetative map, the quantitative data collected for each plant community shall be correlated with slope, aspect, and soil type within that plant community;

Tables 808-2 and 808-3, Plate 808-1

(6) animal unit months (AUMs) the area is supporting or the AUMs the area could support; and

Section 811, Section 808.A(6)

(7) a report describing location, soils, and habitat and mitigation measures to be taken for any rare, threatened, or endangered species found within the permit area.

No T&E species were found within the permit area

(8) The Director may request such additional data as deemed necessary to ensure compliance with the requirements of Subparts 2060 through 2066.

B. If the applicant intends to develop a historic record of pre-mining conditions as a basis for comparison to the postmining revegetation, the applicant shall submit a plan indicating:

(1) a timetable for collecting data and developing the historic record;

Section 808.B(1)

(2) the sampling techniques to be used;

Exhibit 808-3

(3) the number of samples to be collected; and

Section 808.C

(4) location of each permanent sampling point within each vegetative type identified on the map required for this Subpart.

Permanent transects were not used; 2001 transect locations indicated on Plate 808-2

C. Sampling intensity shall be such that the data presents a valid statistical value for the area or population from which the samples were collected.

Section 808.C; Exhibit 808-3

D. The map or aerial photograph required shall include sufficient adjacent areas to allow evaluation of vegetation as important habitat for fish and wildlife for those species of fish and wildlife identified under Subpart 809. The map may be prepared by the local Soil and Water Conservation District of the area or other qualified government or private organization.

Section 808.D; Plate 808-1

E. The Director may request such additional data as deemed necessary to ensure compliance with the requirements of Subpart s 2060 through 2066.

Five years of baseline vegetation data have been acquired to support the proposal of revegetation technical standards

19.8.8.809 Fish and Wildlife Resources Information

A. Each application shall include a study of fish and wildlife and their habitats within the proposed permit area and the portions of the adjacent areas where effects on such resources may reasonably be expected to occur.

Subpart 809, Fish and Wildlife Resources Information

B. The applicant in consultation with the appropriate State and Federal fish and wildlife management, conservation, or land management agencies having responsibilities for fish and wildlife or their habitats, shall propose the level of detail and the areas of such studies, after consideration of:

(1) published data and other information;

1980 and 1981 South Hospah wildlife baseline studies were considered

(2) site-specific information obtained by the applicant; and

2001 wildlife baseline study was conducted

(3) guidance obtained from agencies consulted.

Exhibits 809-1 and 809-2, USFWS and NMGF correspondence

C. The Director in consultation with the appropriate agencies will approve or disapprove the level of detail in the study.

19.8.8.810 Soil Resources Information

A. The applicant shall provide adequate soil survey information of the permit area for surface mining activities or for underground mining activities the areas to be affected within the permit area by surface operations or facilities consisting of the following:
(1) a map delineating different soils; **PLATE 810-1**
(2) soil identification; **TABLES 810-1 and 810-4**
(3) soil descriptions; and **Text within SUBPART 810 and Mapping Unit Descriptions subsection**
(4) present and potential productivity of existing soils. **Text within SUBPART 810, Soil Productivity subsection and TABLE 810-5**
B. The local Soil and Water Conservation District Office may be contacted for available information. **N/A**
C. Where the applicant proposes to use selected overburden materials as a supplement or as topdressing, the application shall provide results of the analyses, trials, and tests required under paragraph 803(b)(1)(v) and Subpart 2005. **TABLES 810-1, 810-4, 810-2A, 810-2B, PLATE 810-1, and EXHIBITS 803-4 and 810-4; additional discussion within Subpart 905(B)5(g)**
D. The Director may request such additional data as deemed necessary to ensure compliance with the requirements of Subparts 2004 through 2008. **N/A**

19.8.8.811 Land-use Information
A. The application shall contain a statement of the condition, capability, and productivity of the land within the proposed permit area for surface mining activities or for underground mining activities the area which will be affected within the permit area by surface operations and facilities, including:
(1) a map and supporting narrative of the uses of the land existing at the time of the filing of the application. If the premining use of the land was changed within 5 years before the anticipated date of beginning the proposed operations, the historic use of the land shall also be described.
Plate 811-1
(2) a narrative of land capability and productivity, which analyzes the land-use description under Paragraph (a) of this Subpart in conjunction with other environmental resources information required under this Subpart . The narrative shall provide analyses of:
(i) the capability of the land before any mining to support a variety of uses, giving consideration to soil and foundation characteristics, topography, vegetative cover and the hydrology; and
Tables 811-2 and 811-3
(ii) the productivity of the proposed permit area for surface mining activities or for underground mining activities, the area proposed to be affected within the permit area by surface operations and facilities before mining, expressed as average yield of food, fiber, forage, or wood products from such lands obtained under proper levels of management. The productivity shall be determined by yield data or estimates for similar sites based on current data from the U.S. Department of Agriculture, State Agricultural Universities or appropriate State natural resource or agricultural agencies.
Table 810-5, Tables 808-10 through 808-15
B. The application shall state whether the proposed mine plan area has been previously mined, if so, the following, if available:
The mine plan area has not been previously mined, page 811-3

C. The application shall contain a description of the existing land uses and land use classification under local law, if any, of the proposed permit and adjacent areas.

Subpart 811, Land Use Information

19.8.8.812 Maps: General Requirements

The permit application shall include maps showing:

A. all boundaries of land and names of present owners of record of those lands, both surface and subsurface, included in the permit area and where available the present owners of record of lands contiguous to the permit area;

PLATES 700-1and 700-2

B. the boundaries of land within the proposed permit area upon which the applicant has the legal right to enter and begin surface coal mining operations; ***FIGURE 812-1***

C. the boundaries of all areas proposed to be affected over the estimated total life of the proposed surface coal mining operations, with a description of size, sequence, and timing of the mining of sub-areas for which it is anticipated that additional permits will be sought; ***Plate 903-1***

D. the location of all buildings on and within 1,000 feet of the proposed permit area, with identification of the current use of the buildings; ***Plate 903-1***

E. the location of surface and subsurface man-made features within, passing through, or passing over the proposed permit area, including, but not limited to major electric transmission lines, pipelines, and agricultural drainage tile fields; ***Plate 903-1***

F. the location, vegetative type, and size of any proposed reference areas for determining the success of revegetation;

Reference areas are not proposed, technical standards are under development, based on five years of baseline data

H. each public road located in or within 100 feet of the proposed permit area; ***Plate 903-1***

I. the boundaries of any public park and locations of any cultural or historical resources listed or eligible for listing in the National Register of Historic Places and known archaeological sites within the permit or adjacent areas.

Confidential - MMD has a separate GIS project for site locations.

J. each cemetery, known grave site, or unmarked burial ground located in or within 100 feet of the proposed permit area;

There are no known cemeteries, gravesites, or unmarked burial grounds located in or within 100 feet of the proposed permit area.

K. any land within the proposed permit area and adjacent area which is within the boundaries of any units of the National System of Trails of the Wild Scenic Rivers System, including study rivers designated under Section 5(a) of the Wild and Scenic Rivers Act; and

There is no land within the permit area and adjacent area which within the boundaries of any units of the National System of Trails of the Wild Scenic River System, including study rivers designated under Section 5(a) of the Wild and Scenic Rivers Act

L. other relevant information required by the Director. ***NA***

19.8.8.813 Cross Sections, Maps and Plans

The application shall include cross sections, maps and plans showing:

(A) elevations and locations of test borings and core samplings;

The elevations and location of test borings and core samplings within the permit area are provided in PLATE 803-1 (PLATE 803-1.dwg).

B. elevations and locations of monitoring stations used to gather data for water quality and quantity, fish and wildlife, and air quality if required, in preparation of the application;

Plate 809-1 indicates wildlife monitoring transect locations and elevations

The elevations and locations of monitoring stations used to gather data for water quality and quantity and for air quality are provided in PLATE 903-1 (PLATE 903-1.dwg).

(C) nature, depth, and thickness of the coal seams to be mined, any coal or rider seams above the seam to be mined, each stratum of the overburden and the stratum immediately below the lowest coal seam to be mined;

Depth and thickness of the coal seams to be mined is shown in the geologic columns in FIGURE 803-3 (FIGURE 803-3.dwg) and along four cross sections within the permit area illustrated in PLATES 803-2, 803-3, 803-4, and 803-5 (PLATE 803-2 thru 5.dwg).

(D) all coal crop lines and the strike and dip of the coal to be mined within the proposed permit area;

Coal crop lines and the strike and dip of the coal to be mined within the permit area are indicated on PLATES 803-6, 803-7, and 803-8 (PLATE 803-6.dwg; PLATE 803-7.dwg; PLATE 803-8.dwg).

E. location and extent of known workings of active, inactive, or abandoned underground mines, including mine openings to the surface within the proposed permit and adjacent areas; ***NA***

(F) location and extent of sub-surface water, if encountered, within the proposed permit or adjacent area;

The location and extent of sub-surface water encountered within the permit and adjacent areas is delineated as a piezometric surface corresponding to the Point Lookout acquifer in PLATE 804-2 (PLATE 804-2.dwg).

(G) location of surface water bodies such as streams, lakes, ponds, springs, constructed or natural drains and irrigation ditches within the proposed permit and adjacent areas;

The location of surface water bodies, such as arroyos or ponds, within the permit and adjacent areas are identified on PLATE 805-1 (PLATE 805-1.dwg).

H. location and extent of existing or previously surface mined areas within the proposed permit area; ***NA***

I. location and dimensions of existing areas of spoil, waste, and non-coal waste disposal, dams, embankments, other impoundments and water treatment and air pollution control facilities within the proposed permit area;

There are no existing areas of spoil, waste, and non-coal waste disposal, and water treatment and air pollution control facilities within the permit area. Low dams and embankments for stock ponds and erosion control impoundments are indicated on PLATE 811-1 (PLATE 811-1.dwg), LAND USE MAP.

Plate 903-1

K. the existing land surface configuration of the proposed permit area on contour maps of a maximum of 5 foot contour intervals;

The existing land surface configuration of the permit area is represented by 5-foot contour intervals on PLATE 813-1 (PLATE 813-1.dwg), PERMIT AREA AND PRE-MINING TOPOGRAPHY.

Plate 900-1

L. Maps, plans, and cross sections included in a permit application which are required by this Subpart shall be prepared by or under the direction of and certified by a qualified professional geologist or a registered professional engineer, with assistance from experts in related fields such as land surveying reclamation or mined land rehabilitation and shall be updated as required by the Director.

Maps, plans, and cross sections required by Subpart 813 and included as part of the permit application have been prepared under the direction and certified by a registered professional engineer.

19.8.8.814 Prime Farmland Investigation

No pre-mining Prime Farmlands exist at El Segundo

A. The applicant shall conduct a pre-application investigation of the proposed permit area to determine whether lands within the area may be prime farmland. The Director in consultation with U.S. Soil Conservation Service shall determine the nature and extent of the required reconnaissance investigation.

EXHIBIT 814-1 and Subpart 814 text

B. Land shall not be considered prime farmland where the applicant can demonstrate one of the following:

EXHIBIT 814-1 and Subpart 814 text

C. If the investigation establishes that the lands are not prime farmlands, the applicant shall submit with the permit application a request for a negative determination which shows that the land for which the negative determination is sought meets one of the criteria of paragraph (b).

EXHIBIT 814-1 and Subpart 814 text

19.8.9.900 Operation Plan: General Requirements

Each application shall contain a description of the mining operations proposed to be conducted within the proposed permit area including, at a minimum, the following:

A. a narrative description of the type and method of coal mining procedures and proposed engineering techniques, anticipated annual and total production of coal, by tonnage, and the major equipment to be used for all aspects of those operations; and ***Section 900.A, Table 900-1, Table 900-2***

B. a narrative explaining the construction, modification, use, maintenance, and removal of the following facilities (unless retention of such facilities is necessary for postmining land use as specified in Subpart 2073): ***Section 900.B***

(1) dams, embankments, and other impoundments; ***907. A***

(2) overburden and topdressing handling and storage areas and structures; ***902.B(2)***

(3) coal removal, handling, storage, cleaning, and transportation areas and structures; ***900.B.(3), Plate 903-1***

(4) spoil, coal processing waste, and non-coal waste removal, handling, storage, transportation, and disposal areas and structures; ***900.B(4)***

(5) mine facilities; and ***900.B(5)***

(6) water and air pollution control facilities. ***900.B (6)***

19.8.9.901 Operation Plan: Existing Structures

A. Each application shall contain a description of each existing structure proposed to be used in connection with or to facilitate the surface coal mining and reclamation operation. The description shall include: ***NA***

(1) location; ***NA***

(2) plans of the structure which describe its current condition; ***NA***

(3) approximate dates on which construction of the existing structure was begun and completed; and ***NA***

(4) a showing, including relevant monitoring data or other evidence, whether the structure meets the performance standards of Chapter K of these rules and regulations. ***NA***

B. Each application shall contain a compliance plan for each existing structure which does not meet the performance standards of Subpart 20 and which is proposed to be modified or reconstructed for use in connection with or to facilitate the surface coal mining and reclamation operation. The compliance plan shall include: ***NA***

19.8.9.902 Operation Plan: Blasting

Each application shall contain a blasting plan for the proposed permit area, explaining how the applicant intends to comply with the requirements of Parts 2028 through 2033 and including the following: ***Section 902***

A. types and approximate amounts of explosive to be used for each type of blasting operation to be conducted; ***902.A***

B. description of procedures and plans for recording and retention of information on the following during blasting: ***902.B***

(1) drilling patterns, including size, number, depths, and spacing of holes;

(2) charge and packing of holes;

(3) types of fuses and detonation controls; and

(4) sequence and timing of firing holes.

C. description of blasting warning and site access control equipment and procedures; ***902.C***

D. description of types, capabilities, sensitivities, and locations of use of any blast monitoring equipment and procedures proposed to be used; ***902.D***

E. description of plans for recording and reporting to the Director the results of preblasting surveys, if required; and ***902.E***

F. description of unavoidable hazardous conditions for which deviations from the blasting schedule will be needed under 19.8.20.2030.A(3) NMAC. ***902.F***

19.8.9.903 Operation Plan: Maps and Plans

Each application shall contain maps and plans of the proposed permit area and adjacent areas as follows:

A. The maps and plans shall show the underground mining activities to be conducted, if any, the lands proposed to be affected throughout the surface coal mining operations and any change in a facility or feature to be caused by the proposed operations, if the facility or feature was shown under Subparts 812 and 813; ***NA***

B. The following shall be shown for the proposed permit area unless specifically required for the adjacent area by the Director:

(1) buildings, utility corridors and facilities to be used; ***Plate 903-1***

(2) the area of land to be affected within the proposed permit area, according to the sequence of mining and reclamation; ***Plate 903-1, Plate 900-1, Plate 906-1***

(3) each area of land for which a performance bond or other equivalent guarantee will be posted under Chapter J of these rules and regulations; ***Plate 903-1***

(4) each coal storage, cleaning and loading area; ***Plate 903-1***

(5) each topdressing, spoil, coal waste, and non-coal waste storage area; ***Plate 903-1***

(6) each water diversion, collection, conveyance, treatment, storage, and discharge facility to be used; ***Plate 903-1***

(7) each air pollution collection and control facility, if any; ***Plate 903-1***

(8) each source of waste and each waste disposal facility relating to coal processing or pollution control; ***NA***
(10) each explosive storage and handling facility; ***Plate 903-1***
(11) location of each sedimentation pond, permanent water impoundment, coal processing waste bank, and coal processing waste dam and embankment, in accordance with Subpart 909, and fill area for the disposal of excess spoil in accordance with Subpart 914; ***Plate 903-1***
(12) each profile, at cross-sections specified by the Director of the anticipated final surface configuration to be achieved for the affected areas; ***Plates 903-1 through 903-11***
(13) location of each water monitoring point;
The locations of groundwater and surface water monitoring point are indicated on PLATE 903-1 (PLATE 903-1.dwg). Locations of ground water monitoring wells are found on page 907-9.
(14) location of each facility that will remain on the proposed permit area as a permanent feature after the completion of surface coal mining operations; and ***Plate 903-1***
(15) in addition to the above, underground mines shall indicate the location of each subsidence monitoring point. **NA**
C. Maps, plans, and cross-sections required under 903.B(4),(5),(6),(10), and (11) shall be prepared by, or under the direction of and certified by a qualified professional geologist or registered professional engineer, with assistance from experts in related fields such as land surveying, reclamation or mined land rehabilitation, except that: ***Present***
(1) maps, plans and cross-sections for sedimentation ponds may only be prepared by a qualified registered professional engineer; and
(2) spoil disposal facilities, maps, plans, and cross-sections may only be prepared by a qualified registered professional engineer.

19.8.9.905 Fish and Wildlife Plan
A. Each application shall contain a fish and wildlife plan, consistent with Section 2051 which provides:
(1) a statement of how the plan will minimize disturbances and adverse impacts on fish and wildlife and related environmental values during surface coal mining and reclamation operations, and how enhancement of these resources will be achieved, where practicable. The plan shall cover the permit and adjacent areas as determined by the Director pursuant to paragraph 809(c).
Sections 905.A(1) and 905.A(2)

(2) if the applicant states that it will not be practicable, in accordance with paragraph (1), to achieve a condition which clearly shows a trend toward enhancement of fish and wildlife resources at the time revegetation has been successfully completed under Subpart s 2060 through 2066, a statement explaining why it is not practicable to achieve such a condition shall be submitted to the Director.
Not applicable
B. a statement, describing the methods, if any, the applicant will utilize to protect or enhance the following, if they are to be affected by surface coal mining operations:
(1) threatened or endangered species of plants or animals which are indigenous to the State listed under the Endangered Species Act of 1973 as amended, and the Wildlife Conservation Act, Sections 17-3-37 et. seq. NMSA 1978, the Habitat Protection Act, Sections 17-6-1 et. seq. NMSA 1978, and the laws relating to the protection of native New Mexico plants including Sections 76-8-1 through 76-8-4 NMSA 1978; and their critical habitats;

Section 905.B(1)
(2) species such as eagles, migratory birds or other animals protected by State or Federal Law and their habitats; or other species identified through the consultation process pursuant to Subpart 809; or
Section 905.B(2)
(3) habitats of unusually high value for fish and wildlife, such as wetlands, riparian areas, cliffs supporting raptors, areas offering special shelter or protection, reproduction and nursery areas, and wintering areas.
Section 905.B(3), Plate 809-1

19.8.9.906 Reclamation Plan: General Requirements
B. Each plan shall contain the following information for the proposed permit area:
(1) a detailed timetable for the completion of each major step in the reclamation plan; ***Table 906-1, Table 906-2, Plate 906-1***
(2) a detailed estimate of the cost of reclamation of the proposed operations required to be covered by a performance bond under Chapter J of these rules and regulations, with supporting calculations for the estimates; ***Not Yet Submitted***
(3) a plan for backfilling, soil stabilization, compacting, and grading, with contour maps or cross sections that show the anticipated final surface configuration of the proposed permit area, in accordance with Subpart s 2054 through 2059 of these rules and regulations; ***Section 906.B(3)***
(4) a plan for removal, storage, protection and redistribution of topsoil, subsoil, and other material suitable for topsoil to meet the requirements of Subparts 2004 through 2008 of these rules and regulations; **TABLES 906-2 and 906-3; PLATES 810-1and 906-1; additional discussion within text and profile descriptions within Subparts 806, 900 (introductory text) and 900.B.(2)**
(5) a plan for revegetation as required in Subpart s 2060 through 2066 of these rules and regulations, including, but not limited to, descriptions of the:
(a) schedule of revegetation;
Section 906.B(5)(a),
(b) species and amounts per acre of seeds and seedlings to be used;
Table 906-4
(c) methods to be used in planting and seeding;
Section 906.B(5)(c)
(d) mulching techniques;
Section 906.B(5)(d)
(e) irrigation, if appropriate, and pest and disease control measures, if any;
Section 906.B(5)(e)
(f) measures proposed to be used to determine the success of revegetation, as required in Subpart 2065; and
Section 906.B(5)(f)
(g) a soil testing plan for evaluation of the results of topdressing handling and reclamation procedures related to revegetation.
Section 906.B(5)(g)
(6) a description of measures to be used to maximize the use and conservation of the coal resource as required in Section 2027; ***Section 906.B(6)***
(7) a description of measures to be employed to ensure that all debris, acid-forming and toxic-forming materials, and materials constituting a fire hazard are disposed of in accordance with

Subparts 2046 and 2056, and a description of the contingency plans which have been developed to preclude sustained combustion of such materials; **Discussion within Subparts 906.B.(7) and 900.B.(4)**

(8) a description, including appropriate cross sections and maps, of the measures to be used to seal or manage mine openings, and to plug, case, or manage exploration holes, other bore holes, wells, and other openings within the proposed permit area, in accordance with Sections 2001 through 2003; and

Drill holes will be cased, sealed, or managed to prevent contamination of the surface or ground water systems and to ensure the safety of people, livestock, wildlife, and machinery. All drill holes that are not used for water monitoring or otherwise managed in an approved manner will be permanently sealed. Drill holes that intercept water-bearing strata will be sealed with cement or abandonment mud extending 50' above and below the water-bearing unit or to the bottom of the hole. The upper 5' of these holes and drill holes that do not encounter water will be backfilled and sealed with cement.

Mining is expected to result in the removal of 11 monitor wells and Orphan Annie Well within the permit area. Water wells uncovered or exposed by mining activities will be permanently plugged using cement or abandonment mud unless approved for water monitoring, or otherwise managed in a manner approved by the Director, as provided for in Subparts 2001 and 2021.

19.8.9.907 Reclamation Plan: Protection of Hydrologic Balance

(A) Each plan shall contain a detailed description, with appropriate maps and cross section drawings, of the measures to be taken during and after the proposed surface coal mining operations, in accordance with Subpart 20 of these rules and regulations, to ensure the protection of:

(1) the quality of surface and ground water systems, both within the proposed permit and adjacent areas, from the adverse effects of the proposed surface coal mining operations;

19.8.9.907(A)(1) is adequately addressed on pages 907-1, 2, and 3.

(2) the rights of present users of surface and ground water;

19.8.9.907(A)(2) is adequately addressed on pages 907-3 and 4.

(3) the quantity of surface and ground water both within the proposed permit area and adjacent area from adverse effects of the proposed surface coal mining operations, or to provide alternative sources of water in accordance with Sections 806 and 2022, where the protection of quantity cannot be ensured; and

19.8.9.907(A)(3) is adequately addressed on pages 907-4, and 5.

(3) water quality by locating openings for underground mines in accordance with Section 2026.

No underground mines exist or are proposed for the permit area.

B. The description shall include:

(2) a plan for the treatment, where required under Chapter K and these rules and regulations, of surface and ground water drainage from the area to be disturbed by the proposed operations, and proposed quantitative limits on pollutants in discharges subject to Section 2010 according to the more stringent of the following:

Temporary impoundments are the only treatment facilities planned for surface and groundwater drainage from disturbed areas. The impoundments are expected to be capable of providing the treatment required to meet the effluent limitations specified under Subpart 2010

and NPDES discharge.

(3) for surface mining activities, a plan for the restoration of the approximate recharge capacity of the permit and adjacent areas in accordance with Section 2019; and

19.8.9.907(B)(3) is adequately addressed on pages 907-7, and 8.

(4) a plan for the collection, recording, and reporting of ground and surface water quality and quantity data, according to Section 2020 of these rules and regulations and based on the determination required under paragraph 907.C of this Section and the analysis of all baseline hydrologic, geologic and other information in the permit application. The plan shall provide for the monitoring of parameters that relate to the suitability of surface and ground water for current and approved postmining land uses and to the objectives for protection of the hydrologic balance set forth in paragraph 907.A of this Section. It shall identify the quantity and quality parameters to be monitored, sampling frequency, and site locations. It shall describe how the data may be used to determine the impacts of the operation upon the hydrologic balance.

19.8.9.907(B)(4) is adequately addressed on pages 907-8 through 16.

(C) The description shall include a determination of the probable hydrologic consequences of the proposed surface coal mining operations on the cumulative impact area and shall address all proposed mining activities associated with the permit area for which a permit is sought, not just those expected to occur during the term of the permit. This determination shall include findings on:

19.8.9.907(C) is addressed on pages 907-17 through 21.

19.8.9.908 Reclamation Plan: Post Mining Land Use

A. Each plan shall contain a detailed description of the proposed use, following reclamation of the land within the proposed permit area for surface mining activities or for underground mining activities, the areas to be affected within the proposed permit area by surface operations or facilities, including a discussion of the utility and capacity of the reclaimed land to support a variety of alternative uses, and the relationship of the proposed use to existing land use policies and plans. This description shall explain:

(1) how the proposed postmining, land use is to be achieved and the necessary support activities which may be needed to achieve the proposed land use;

Subpart 908, Post-mining Land Use

(2) for surface mining activities, where range or grazing is the proposed postmining use, the detailed management plans to be implemented;

Subpart 908, Post-mining Land Use

(3) where a land use different from the pre-mining land use is proposed, all materials needed for approval of the alternative use under Subpart 2073; and

Not applicable

(4) the consideration which has been given to making all of the proposed surface coal mining operations consistent with surface owner plans and applicable State and local land use plans and programs.

Subpart 908, Post-mining Land Use

B. The description shall be accompanied by a copy of the comments concerning the proposed use by the legal or equitable owner of record of the surface of the proposed permit area for surface mining activities or for underground mining activities, the areas to be affected within the proposed permit area by surface operations or facilities, and the State and local government agencies which would have to initiate, implement, approve, or authorize the proposed use of the land following reclamation, unless such owners and agencies fail to make such comments within 30 days.

***Reclamation activities conducted at El Segundo Mine will return disturbed areas to the pre-mining land use of rangeland. Comments from surface landowners have been solicited (EXHIBIT 908-1.doc, EXHIBIT 908-2.doc, EXHIBIT 908-3.doc, EXHIBIT 908-4.doc, EXHIBIT 908-5.doc, and EXHIBIT 908-6.doc). No* response were received**

19.8.9.909 Reclamation Plan: Ponds, Impoundments, Banks, Dams, and Embankments

A. General. Each application shall include a general plan for each proposed sedimentation pond, water impoundment, and coal processing waste bank, dam, or embankment within the proposed permit area. ***Section 909***

(1) Each general plan shall:

(a) be prepared by, or under the direction of, and certified by a registered professional engineer, with assistance from experts in related fields such as land surveying, reclamation or mined land rehabilitation; ***Present***

(b) contain a description, map, and cross section of the structure and its location; ***Present***

(c) contain preliminary hydrologic and geologic information required to assess the hydrologic impact of the structure; ***Present***

(d) contain a survey describing the potential effect on the structure from subsidence of the subsurface strata resulting from past underground mining operations if underground mining has occurred; and ***NA***

(e) contain a certification statement which includes a schedule setting forth the dates that any detailed design plans for structures that are not submitted with the general plan will be submitted to the Director. The Director shall have approved, in writing, the detailed design plan for a structure before construction of the structure begins. ***NA***

(2) Each detailed design plan for a structure that meets the U.S. Soil Conservation Service Class B or C criteria for dams in SCS Technical Release No. 60 (210-VI-TR60, Oct. 1985), 'Earth Dams and Reservoirs', or meets or exceeds the size or other criteria of the Mine Safety and Health Administration, 30 CFR 77.216(a) shall: ***NA***

(a) be prepared by, or under the direction of, and certified by a qualified registered professional engineer with assistance from experts in related fields such as geology, land surveying, reclamation or mined land rehabilitation;

(b) include any geotechnical investigation, design, and construction requirements for the structure;

(c) describe the operation and maintenance requirements for each structure; and

(d) describe the timetable and plans to remove each structure, if appropriate.

(3) Each detailed design plan for a structure that does not equal or exceed the size or other criteria in 19.8.9.909.A(2) NMAC shall:

(a) be prepared by, or under the direction of, and certified by a qualified registered professional engineer or registered land surveyor except that all coal processing waste dams and embankments covered by 19.8.20.2047 through 2049 NMAC shall be certified by qualified registered professional engineer;

(b) include any design and construction requirements for the structure, including any required geotechnical information;

(c) describe the operation and maintenance requirements for each structure; and

(d) describe the timetable and plans to remove each structure, if appropriate.

B. Sedimentation ponds. Sedimentation ponds, whether temporary or permanent, shall be designed in compliance with the requirements of 19.8.20.2014 NMAC. Any sedimentation pond

or earthen structure which will remain on the proposed permit area as a permanent water impoundment shall also be designed to comply with the requirements of 19.8.20.2017 NMAC. Each plan shall, at a minimum, comply with the requirements of the Mine Safety and Health Administration, 30 CFR 77.216-1 and 77.216-2, and the State Engineer and shall be submitted to the Director as part of the permit application. ***Present***

C. For impoundments not included in 19.8.9.909.A(2) NMAC, the Director may establish through the State program approval process, engineering design standards that ensure stability comparable to a 1.3 minimum static safety factor in lieu of engineering tests to establish compliance with the minimum static safety factor of 1.3 specified in 19.8.20.2017.E(3) NMAC.

D. Coal processing waste banks. Coal processing waste banks shall be designed to comply with the requirements of 19.8.20.2039 through 2042 NMAC. ***NA***

E. Coal processing waste dams and embankments. Coal processing waste dams and embankments shall be designed to comply with the requirements of 19.8.20.2047 through 2049 NMAC. Each plan shall be submitted to the Director as a part of the permit application, and shall comply with the requirements of the Mine Safety and Health Administration, 30 CFR 77.216-1 and 77.216-2 and the State Engineer and shall contain the results of a geotechnical investigation of the proposed dam or embankment foundation area, to determine the structural competence of the foundation which will support the proposed dam or embankment structure and the impounded material. The geotechnical investigation shall be planned and supervised by an engineer or engineering geologist, according to the following: ***NA***

19.8.9.910 Reclamation Plan: Surface Mining Near Underground Mining *NA*

19.8.9.911 Diversions

Each application shall contain descriptions, including maps and cross sections, of stream channel diversions and other diversions to be constructed within the proposed permit area to achieve compliance with Subparts 2011 and 2012. ***Section 911***

19.8.9.912 Protection of Public Parks and Historic Places

For any public parks or historic lands that may be adversely affected by the proposed operations, each plan shall describe the measures to be used to minimize or prevent these impacts and to obtain approval of the Director and other agencies as required in paragraph 202(e).
EL SEGUNDO MINE ARCHAEOLOGICAL MANAGEMENT PLAN

19.8.9.913 Relocation or Use of Public Roads

Each application shall describe, with appropriate maps and cross sections, the measures to be used to ensure that the interests of the public and landowners affected are protected if, under paragraph 19.8.2.202.E NMAC, the applicant seeks to have the Director approve: ***Section 913***

A. conducting the proposed surface coal mining operations within 100 feet of the right-of-way line of any public road, except where mine access or haul roads join that right-of-way; or

B. relocating a public road.

19.8.9.914 Disposal of Excess Spoil from Surface Mining Activities

No disposal of excess spoil is expected. All spoil material will be used to achieve approximate original contour. Locations selected for the initial overburden placement are on moderately sloping and naturally stable areas. Site preparation will involve removing vegetation from the

fill area. The fill materials will be hauled and placed in horizontal lifts in a controlled manner that encourages compaction, and graded along the contour. The materials in the initial overburden stockpiles will be graded to the adjacent final topography.

19.8.9.915 Disposal of Underground Development Waste *NA*

19.8.9.916 Transportation Facilities

Each application for a permit to conduct surface coal mining and reclamation operations shall contain plans and drawings for of each road, conveyor, or rail system to be constructed, used or maintained within the proposed permit area. Plans and drawings shall include a map, appropriate cross sections, and the following: ***Section 916***

A. specifications for road width, road gradient, road surface, road cut, fill embankment, culvert, bridge, drainage ditch, and drainage structure and low-water crossings. ***Present***

B. A description of measures to be taken to obtain approval of the Director for alteration or relocation of a natural drainage way under paragraphs 2074.E(1) or 2075.C(5). ***Present***

C. Plans and schedules for the removal and reclamation of each road not proposed for retention as part of the post-mining land use. ***Present***

D. Plans and drawings for each primary road shall be prepared by, or under the direction of, and certified by a registered professional engineer or a qualified registered professional land surveyor, experienced in the design and construction of roads, as meeting all program requirements and current, prudent engineering practices. ***Present***

19.8.9.917 Return of Coal Processing Waste to Abandoned Underground Workings *NA*

19.8.9.918 Subsidence Information and Control Plan *NA*

19.8.9.919 Support facilities *NA*

19.8.10.1004 Prime Farmlands N/A,
No Prime Farmlands exist at El Segundo, see Subpart 814, above

19.8.11.1105 Review of Permit Application

A.(2) The Director shall determine the adequacy of the fish and wildlife plan submitted pursuant to 19.8.9.905 NMAC, in consultation with State and Federal fish and wildlife management and conservation agencies having responsibilities for the management and protection of fish and wildlife or their habitats which may be affected or impacted by the proposed surface coal mining and reclamation operations.

April 16, 2001 Metric Corporation, consulting for Lee Ranch Coal Company, sent a letter requesting input from NMGF.

May 4, 2001 NMGF responded, stating that:
(1) all aquatic and riparian areas be identified and described, and potential impacts assessed;
(2) areas used by pronghorn and mule deer should be identified and to the extent possible avoided;
(3) an assessment of the status of the State-threatened Gray Vireo in the project area should be included in the baseline study.

The comments above were addressed in the wildlife baseline study conducted by Metric. Aquatic habitat was limited to overflow from a few windmill driven wells, and was characterized; impacted wells will be replaced.
Pronghorn and mule deer use of the area was found to be occasional and general.
No Gray Vireos were observed during standard bird monitoring surveys.

December 16, 2004 MMD requested comments from NMGF regarding the administratively complete application.

January 11, 2005 NMGF Habitat Specialist Rachel Jankowitz and David Clark visited the proposed permit area with Mark Hiles of Lee Ranch Coal Company.

January 14, 2005 NMGF sent MMD a comment letter. The NMGF letter was forwarded to Lee Ranch Coal Company, and it was requested by MMD that responses to the NMGF comments be included with responses to MMD's technical deficiency letter dated October 19, 2004.
NMGF made five comments regarding the vegetation baseline study. The frequency metric was questioned, and two grammatical errors were noted. It was noted that a specific statement that rare plants had been searched for in appropriate habitats was missing. Tamarisk was missing from the noxious weed list. A request for a better description of the random sampling method was made.
NMGF made two critical comments regarding the wildlife baseline study. Mapping of rimrock habitat was requested. A protocol survey specifically designed for Gray Vireos was requested.
NMGF made four critical comments regarding the fish and wildlife plan, amongst several positive comments. It was noted that some long-term diminishment of wildlife habitat diversity will occur, and the application should so state. The need for a plan to ensure that sediment ponds do not become a wildlife hazard was cited. It was recommended that construction and ground -clearing activities take place outside the migratory bird nesting season. It was recommended that a permit from the USFWS be obtained prior to mining near eagle and hawk nests, or document that USFWS consider a permit unnecessary.
NMGF made four comments regarding the reclamation plan. It was proposed that American vetch be substituted for the proposed prairie clover species. A treatment schedule for pre-existing noxious

weed infestations was requested. A specific deadline for establishment of the revegetation success technical standards was requested. A discrepancy in the plan for waste material handling was identified.
NMGF made one comment regarding the post mining land use. Two versions of NMGF-recommended livestock fence design were suggested.

March 17, 2005 Lee Ranch Coal Company adequately responded to each of the NMGF comments, although in two cases the NMGF recommendations were not accepted. The proposed substitution of American vetch for prairie clover was rejected; prairie clover is part of the premine flora and is much easier to establish than American vetch, which was not found in the baseline study and is usually found in more mesic settings. The fence designs suggested by NMGF were contrary to the designs in the agreements with the project area landowners.

May 5, 2005 MMD sent letter to U.S. Fish and Wildlife Service requesting information on T&E species listings for the El Segundo Mine area the comments on comments on effects the proposed mine may have on listed species.

May 31, 2005 U.S. Fish and Wildlife Service responds with a letter and list of T&E species in McKinley County. They also recommend contacting New Mexico Game and Fish for additional information.

905. FISH AND WILDLIFE PLAN

Mining activities for El Segundo Mine are not expected to have a significant negative impact on the wildlife populations. Areas of natural vegetation will be affected by facilities, such as buildings, roads, stockpiles, crushers, loaders, and other equipment, that are projected to last for the life of mine (30 years). While the mine is active there will always be pits, temporary roads, and equipment adjacent to un-mined or reclaimed areas that are or will be occupied by wildlife.

905.A.(1). Minimizing Disturbance and Adverse Impacts on Fish and Wildlife

Mining within El Segundo permit area will result in the temporary (5-40 years) loss of habitat (Though 40 years is half a life-time for humans, it is a relatively short time for an ecosystem). Wildlife habitat will be restored incrementally as areas are reclaimed. The reclamation plan for El Segundo is designed to restore rangeland and wildlife habitat to conditions comparable or better than before mining.

Wildlife will be protected wherever possible. Large mammals normally avoid areas of activity directly around facilities and active pits. Bodies of water containing potentially harmful substances exceeding livestock standards may be fenced to keep wildlife out. If ponds of unsuitable water quality attract water birds and appear to be detrimental to wildlife, they will be covered.

Human activities away from active mining areas will be limited. This will minimize disturbance of wildlife in areas that have not been mined, and will allow wildlife to continue normal activities and produce offspring to help maintain viable populations in the vicinity of the mine that can colonize reclaimed mine lands as they again become available.

Minimizing human disturbance of nesting Golden Eagles and Ferruginous Hawks will allow them to continue to produce young that will help to maintain viable population levels of these predatory birds in northwestern New Mexico. Any power lines and poles constructed within the permit area will comply with the guidelines contained in Suggested Practices for Raptor Protection on Power Lines: the State of the Art in 1996 (Avian Power Line Interaction Committee, 1996).

905.A.(2). Utilizing Reclamation to Enhance Future Wildlife Populations

The aim of post mining reclamation at El Segundo Mine will be to restore native grassland suitable for grazing. The emphasis of reclamation will be to reestablish this self-sustaining natural system as quickly as possible. Vegetative species replaced during mine reclamation will be selected to provide high quality forage for livestock. The very characteristics that make high quality rangeland will also provide a good resource base for wildlife communities in grasslands.

During reclamation, approximate original contours and drainage patterns will be replaced to the extent practicable. Prior to planting, the seed bed will be prepared to provide a favorable medium for plant growth, to collect and concentrate moisture, and to retard surface erosion. Stockpiled scoria will be used as a soil cover for stabilization of steeper slopes in the reclamation area, which may improve forb and woody taxa establishment. Additionally, small-area depressions will be provided at selected locations, as indicated on PLATE 903-2, POST MINING TOPOGRAPHY (PLATE 903-2.dwg) for vegetative and wildlife diversity.

Along drainage bottoms, where pre-mining saltbush communities exist, four-wing saltbush will be planted to restore habitat for migratory birds and resident mammals. This will reestablish the community with the greatest species richness found during the preliminary wildlife studies.

Permanent livestock watering ponds may be included in the reclamation areas. If so, they will be designed in accordance with Subpart 19.8.20.2017.

The small portion of shrub/juniper/grassland or juniper savanna expected to be disturbed with the mining activities will not be reestablish as part of reclamation of mined areas. It is expected that through time these trees from surrounding areas will invade the reclaimed areas and this type of wildlife habitat would again be reestablished.

Wildlife colonization will be a function of vegetative reclamation. As naturally patterned vegetative reclamation occurs on areas disturbed by mining, small mammals will move into the reclaimed area from adjacent habitats as soon as food and cover are sufficiently restored. Because of the temporal and spatial heterogeneity found in desert ecosystems, most desert-adapted mammals have evolved very effective dispersal strategies (Whitford 1977). Airborne birds also readily re-colonize reclaimed habitats as they become suitable.

905.B.(1). Protection and Enhancement of Threatened and Endangered Species

There are currently no records for any federally or state listed species within or near the permit area. The ongoing monitoring program (see below) will provide opportunities to watch for listed species. If a listed species is more likely to occur in winter or autumn migration, LRCC will arrange for surveys at the proper time. Should any threatened or endangered species be found to reside within the permit area at any time during the life of the mine, the Director of MMD, the Endangered Species Program of the New Mexico Game and Fish Department, and the U.S. Fish and Wildlife Service will be contacted immediately.

The planned grassland community may prove suitable for Mountain Plover, a species currently (2002) proposed for listing as Threatened by the U. S. Fish and Wildlife Service. This species inhabits areas with very short grass or shrubs so that it can more easily watch for predators.

905.B.(2). Protection and Enhancement of Eagles, Migratory Birds, or Other Protected Animals

Active nests of two species of raptors, Golden Eagle and Ferruginous Hawk were documented on the permit area in 2002. Red-tailed Hawks were regularly seen and likely nest on or near the permit area. To determine long-term use and productivity of these territories, these nest sites will be monitored during each breeding season throughout the life of the mine. Nest searches will be a combination of ground and aerial observation, and will include not only the known nest sites, but also cliffs and trees within two miles of the permit area boundary.

Active nest sites will be off-limits for personnel at the mine. Minimizing human disturbance of nesting Golden Eagles and Ferruginous Hawks will allow them to continue to produce young that will help to maintain viable population levels of these predatory birds in northwestern New Mexico.

The area that includes the 2002 cliff nest of the Golden Eagles will not be mined according to the current mining plan. In 2015 the active pit will get within a half mile of the nest site. An artificial nest site attached to another cliff in the area may be a viable option by that time.

The active pit will get within a half mile of the current Ferruginous Hawk nest tree in the 2019, then again in 2027 and the area containing the nest is slated to be mined in 2031. By the time mining approaches this site, considerable data will have been collected on these birds and their tolerance of human activity will be better understood. An artificial nest site on a pole, placed away from the active pit, may be a viable option by that time.

The area frequented by the Red-tailed Hawks is between the railroad and the highway south of Orphan Annie Tank. The area of the known nest is to be mined in 2007. The Central Facilities will also be placed within half a mile of that nest, which has not been active during 2001 or 2002. Additional efforts to locate an active nest will be incorporated into 2003 surveys.

905.B.(3). Protection of Habitats of Unusually High Value (cliffs supporting raptors, wetlands, etc.)
The permit area contains several miles of cliff lines that provide a unique nesting substrate for nesting raptors and other species, such as Common Ravens and Say's Phoebes. Most of these cliff lines are low, 10-25 foot escarpments that for the most part are not highly attractive to cliff nesting raptors. However, most of these cliffs are not scheduled to be mined. In 2023 a low promontory southwest of Orphan Annie Rock will be mined. There was a Common Raven nest near there (<.25 mile) in 2001 but the cliff where that nest site is (PLATE 809-1.dwg) will not be mined. Another old stick nest (possibly raven or hawk) was found on a cliff in the southeast quarter of section 25 (PLATE 809-1); mining in 2007, 2021, and 2027 will be within a quarter mile of this nest site but is not expected to damage the cliff.

A few water birds, mostly migrants, use the existing tanks when they contain water. There has been no significant or long–term water habitat since Orphan Annie Tank was breeched in the 1990s. The cause of the breach is uncertain, but according to the landowner, the breach resulted from animal burrows and/or settling cracks. Permanent livestock watering ponds, although not presently planned, may be included in the reclamation areas. If so, they will be designed in accordance with Subpart 19.8.20.2017.

905. BIBLIOGRAPHY

Avian Power Line Interaction Committee (APLIC). 1996. suggested Practices for Raptor Protection on Power Lines: The State of the Art in 1996. Edison Electric Institute and the Raptor Research Foundation. Washington, D.C.

19.8.11.1106 Criteria for Permit Approval or Denial

No permit or revision application shall be approved, unless the application affirmatively demonstrates and the Director finds, in writing, on the basis of information set forth in the application or from information otherwise available, which is documented in the approval and made available to the applicant, that:

C. the assessment of the probable cumulative hydrological impacts (CHIA) of all anticipated coal mining in the cumulative impact area on the hydrologic balance, as described in 19.8.9.907.C NMAC has been made by the Director, and the operations proposed under the application have been designed to prevent damage to the hydrologic balance outside the proposed permit area;

In the first week of December, 2004, Monte Adnderson distributed a draft copy of the El Segundo CHIA to Bill Brancard, Karen Garcia, Ted Apodaca, and Jim O'Hara for their comments and review. He received comments from Jim O'Hara.

Monte also sent a draft copy to Jess Ward of the Albuquerque district office of the State Engineer because they oversee that portion of New Mexico and should be most familiar with the area. He assigned the review responsibilities to Linda Logan. She reviewed the document and returned it with comments the second week of May, 2005.

A draft copy was also sent to Paul Clark of the Denver office of OSM. He reviewed the document and returned it with comments around June 1, 2005.

ATTACHMENT C

Correspondence

Table of Contents
Attachment C

DEPARTMENT OF THE ARMY
ALBUQUERQUE DISTRICT, CORPS OF ENGINEERS
DURANGO REGULATORY OFFICE
1970 EAST 3RD AVENUE, SUITE 109
DURANGO, COLORADO 81301

REPLY TO
ATTENTION OF

December 13, 2016

Regulatory Division

SUBJECT: No Permit Required – Action No. SPA-2005-00407, El Segundo Mine

Peabody Energy
ATTN: Chad Gaines
P.O. Box 757
Grants, New Mexico 87020

Dear Mr. Gaines:

I am writing this letter in response to your request for a determination of Department of the Army permit requirements for the proposed El Segundo Mine Construction located at approximately latitude 35.58 North, longitude -107.91 West, in McKinley County, New Mexico. The work, as described in your email, will consist of mine construction. We have assigned Action No. SPA-2005-00407 to this project. This letter is an update and supersedes the recent issued letter on July 28, 2016. Please reference this number in all future correspondence concerning the project.

Based on the information provided, the original determination issued on December 9, 2005, and your statement that no changes have been made to the original plans submitted in the original request dated October 11, 2005, we have determined that a Department of the Army permit is not required because there are no jurisdictional waters of the U.S. within the project site. However, it is incumbent upon you to remain informed of any changes in the Corps Regulatory Program regulations and policy as they relate to your project. If your plans change such that waters of the U.S. could be impacted by the proposed project, please contact our office for a reevaluation of permit requirements.

This decision is based on an approved jurisdictional determination (JD) (attached) that there are no waters of the United States on the project site. The basis for this JD is that the project site contains isolated waters. A copy of this JD is also available at http://www.spa.usace.army.mil/reg/JD. This approved JD is valid for five years unless new information warrants revision of the determination before the expiration date.

You may accept or appeal this approved JD or provide new information in accordance with the attached Notification of Administration Appeal Options and Process and Request for Appeal (NAAOP-RFA). If you elect to appeal this approved JD, you must complete Section II of the form and return it to the Army Engineer Division, South

Pacific, CESPD-PDS-O, Attn: Tom Cavanaugh, Administrative Appeal Review Officer, 1455 Market Street, Room 1760, San Francisco, CA 94103-1399 within 60 days of the date of this notice. Failure to notify the Corps within 60 days of the date of this notice means that you accept the approved JD in its entirety and waive all rights to appeal the approved JD.

If you have any questions concerning our regulatory program, please contact me at 970-259-1947 or by e-mail at Christopher.r.wrbas@usace.army.mil. At your convenience, please complete a Customer Service Survey on-line available at http://corpsmapu.usace.army.mil/cm_apex/f?p=regulatory_survey.

Sincerely,

Chris Wrbas
Project Manager

LEE RANCH

P.O. Box 757
Grants, NM 87020

EL SEGUNDO MINE

DIGITAL IMAGES OF DRAINAGES

EL SEGUNDO
COAL MINE
UTM ZONE 13 NAD 27

Compiled by David L. Bleakly, Dec 2005

Seam: Varies Date: 10/31/05 Drawn By: Technical Services	County(s): McKinley State: New Mexico USGS Quads: Laguna Castillo & Orphan Annie Rock
Latitude: 35° 37' 30" Longitude: 107° 51' 20" Contour Interval: Twenty Five (25) Feet	Topo/Aerial Source: Ortho Shop Tucson, AZ August 23, 2001

SCALE: 1" = 1200 meters

0m 600m 1200m 1800m

NW QUADRANT

SW QUADRANT

NE QUADRANT

SE QUADRANT

ORPHAN ANNIE DRAW

ORPHAN ANNIE TANK

NM-509

CONTINENTAL DIVIDE

Diagonal Road

Northeast Road

Northeast Tank

Lower Northeast Tank

INDITOS DRAW

NORTHEAST DRAW

STATE OF NEW MEXICO
DEPARTMENT OF CULTURAL AFFAIRS
HISTORIC PRESERVATION DIVISION

228 EAST PALACE AVENUE
SANTA FE, NEW MEXICO 87501
(505) 827-6320

BILL RICHARDSON
Governor

March 3, 2005

James O'Hara
Coal Program Manager
New Mexico Energy, Minerals & Natural Resources Dept.
Mining & Minerals Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

Re: Cultural Resources Inventory for the Proposed El Segundo Coal Mine, HPD Log # 72967.

Dear Mr. O'Hara:

Thank you for the additional materials. We apologize for the lengthy time it took to get to where we are with this review, but we have completed our review of the materials that you provided regarding the proposed project.

Attached you will find our Determinations of Eligibility for properties for which we received a Laboratory of Anthropology (LA.) Site Record form. As previously noted in an e-mail, we saw that you, as the project sponsor, did not fill out your part of Section 5 of the LA Site Record form indicating your National Register of Historic Places (NRHP) determinations of eligibility (DOE). We would like you to do that with your future submissions.

We are unable to concur with your assessments that the "Historic Component" of LA 27853, 135500, 135507 and 135509 are not eligible because they do not possess additional data potential. Site eligibility is based on historic values; the artifacts, features and components present as a whole, not separately. A component of a feature may not be contributing over-all to the site's eligibility, but the site may still be eligible. We found that LA 135507 should be eligible to the NRHP, and that LA 27853, 135500 and 135509 need additional evaluation or testing to determine their eligibility. In addition, we were unable to find recent LA Site Record forms, or updates, for LA 27862, 27870 and 27897. It appears these sites have not been visited in almost a quarter-century, and site updates are needed in order to make a professional evaluation of those sites at present. Please provide us with a current LA Site Record form and site sketch maps for those sites.

Many of the sites evaluated now have an eligibility of "Not Determined", and will require additional evaluation or testing in order to determine their eligibility. Eligible sites are to be managed, or treated, as if they are eligible, as indicated in your letter, until eligibility can be better determined.

If you have any questions concerning these comments, please feel contact me at (505) 827-6314.

Sincerely,

P.A. Young

Phillip A. Young
Preservation Planning Coordinator

Copy: David Eck, SLO

Proposd El Segundo Coal Mine
Determinations of Eligibility
HPD Log # 72967

Comments: Project sponsor did not fill out their part of Section 5-L.A. Site Record form indicating their NR determinations of eligibility (DOE), which is not acceptable for future submissions (this is a sponsoring agency rsponsibility). Thus, many sites now have "Not Determined" eligibility that may have been determined eligible or not eligible. In addition, DOE for sites on State Trust lands are to be concurred with by the State Lands Office (SLO) before being sent to SHPO or ARMS.
Needs Add'l Evaluation or Testing (NET)

LA Number	SWAC DOE	MMD DOE	Tribal DOE	SHPO DOE	
135439	ND		E a & d	ND	
135440	E d		E a & d	E d	
135441	ND		E a & d		NET
135442	E d		E a & d	E d	
135443	E d			E d	
135444	NE		E a & d	ND	NET
135445	ND		E a & d	ND	NET
135446	E d		E a & d	E d	
135447	E/NE		E a & d	E d	site has info potential; part of site can not be eligible and other part NE.
135448	ND		E a & d	ND	NET
135449	ND		E a & d	ND	h&p components; 9 features, probably eligible
135450	ND		E a & d	ND	
135451	ND		E a & d	ND	
135452	E d		E a & d	E d	
135453	ND			E d	NET
135454	ND			ND	NET
135455	NE		E a & d	NE	
135456	ND		E a & d	ND	NET, probably E d
135457	ND			ND	Historic rock art site, probably eligible
135458	ND			ND	Historic rock art site, probably eligible
135459	ND		E a & d	ND	NET
135460	ND		E a & d	ND	NET
135461	ND		E a & d	ND	NET
135462	E d		E a & d	E d	
135463	ND		E a & d	ND	NET
32864	E d		E a & d	E d	
135464	ND		E a & d	ND	NET
135465	E d		E a & d	E d	
135466	E d		E a & d	E d	
135467	E d		E a & d	E d	
135468	E d		E a & d	E d	
32849	E d		E a & d	E d	SLO
135469	E d		E a & d	E d	
135470	E d		E a & d	E d	
135471	E d		E a & d	E d	
135472	E d		E a & d	E d	
32857	E d			E d	

Proposd El Segundo Coal Mine
Determinations of Eligibility
HPD Log # 72967

135515	E d	E a & d	E d	SLO
135516	E d	E a & d	E d	
135517	E d	E a & d	E d	SLO
135518	E d	E a & d	E d	
32850	ND	E a & d	ND	NET
135519	ND	E a & d	ND	NET
135520	ND	E a & d	ND	NET, SLO
135521	E d	E a & d	E d	
135522	ND	E a & d	ND	NET, SLO
135523	E d	E a & d	E d	
32848	E d	E a & d	E d	SLO
135524	E d	E a & d	E d	
135525	ND	E a & d	ND	NET, SLO
135526	E d	E a & d	E d	
135527	NE	E a & d	ND	SLO
135528	E d	E a & d	E d	
135529	E d	E a & d	E d	
135530	E d	E a & d	E d	
135531	E d	E a & d	E d	SLO
135532	E d	E a & d	E d	
135533	ND	E a & d	ND	NET, SLO
135534	ND	E a & d	ND	NET, SLO
135535	ND	E a & d	ND	NET, SLO
135536	ND	E a & d	ND	NET, SLO
135537	E d	E a & d	E d	SLO
137145	ND	E a & d	ND	NET
137146	E d	E a & d	E d	
137147	E d	E a & d	E d	
137148	ND	E a & d	ND	NET
137149	E d	E a & d	E d	
135539	ND	E a & d	ND	NET, SLO
137150	ND	E a & d	ND	NET
137151	ND	E a & d	ND	NET
137152	E d	E a & d	E d	
137153	ND	E a & d	ND	NET
137154	ND	E a & d	ND	NET
137155	ND	E a & d	ND	NET
137156	ND	E a & d	ND	NET, probably E d
137157	E d	E a & d	E d	
137158	E d	E a & d	E d	
137159	ND	E a & d	ND	NET
137160	ND	E a & d	ND	NET
137161	E d	E a & d	E d	
137162	E d	E a & d	E d	
137163	ND	E a & d	ND	NET
137164	ND	E a & d	ND	NET, SLO
137165	ND	E a & d	ND	NET
27793	ND	E a & d	ND	NET
27820	ND		ND	NET
27838	ND		ND	NET, rock alignments
27850	ND	E a & d	ND	NET, historic
27851	ND	E a & d	ND	NET

Proposd El Segundo Coal Mine
Determinations of Eligibility
HPD Log # 72967

135473	E d	E a & d	E d	
135474	E d	E a & d	E d	
135475	E d	E a & d	E d	
135476	E d	E a & d	E d	
135477	ND		ND	Historic rock art site, probably eligible
32855	ND		ND	Historic rock art site, probably eligible
135478	E d	E a & d	E d	
135479	E d	E a & d	E d	
135480	E d	E a & d	E d	
135481	E d	E a & d	E d	
135482	ND	E a & d	ND	NET
32851	E d	E a & d	E d	
32852	E d	E a & d	E d	
32856	E d	E a & d	E d	
135483	ND	E a & d	ND	NET, probably E d
135484	ND/NE	E a & d	ND	NET
135485	E d	E a & d	E d	
135486	ND	E a & d	ND	NET, probably E d
137169	ND	E a & d	ND	NET
135487	ND		ND	Historic rock art site
135488	E d	E a & d	E d	
135489	E d	E a & d	E d	
135490	ND	E a & d	ND	NET
135491	ND	E a & d	ND	NET, probably E d
135492	E d	E a & d	E d	
32869	ND		ND	
135493	E d	E a & d	E d	
135494	ND	E a & d	ND	NET
135495	ND	E a & d	ND	
135496	ND	E a & d	ND	
32860	E d	E a & d	E d	
32858	ND	E a & d	ND	NET, probably E d
32867	E d	E a & d	E d	
135497	ND	E a & d	ND	NET
32859	E d	E a & d	E d	
135498	NE	E a & d	NE	two pot drops, no subsurface
135499	E d	E a & d	E d	
135500	ND	E a & d	ND	NET
135501	ND	E a & d	ND	NET
135502	ND	E a & d	ND	NET, probably not E
135503	NE	E a & d	NE	
135504	ND	E a & d	ND	NET, probably not E
135505	NE	E a & d	NE	
135506	ND	E a & d	ND	NET, probably E d
135507	E d	E a & d	E d	
135508	E d	E a & d	E d	
135509	ND	E a & d	ND	NET
135510	ND	E a & d	ND	NET
135511	ND	E a & d	ND	NET
135512	ND	E a & d	ND	NET
135513	ND	E a & d	ND	NET
135514	ND	E a & d	ND	NET

Proposd El Segundo Coal Mine
Determinations of Eligibility
HPD Log # 72967

27852	NE	E a & d	NE	
27853	ND	E a & d	ND	NET
27854	E	E a & d	E d	
27855	E	E a & d	E d	
27856	ND	E a & d	ND	NET
27857	ND	E a & d	ND	NET
27809	E	E a & d	E d	
27816	E	E a & d	E d	
27831	E		E d	
27884	ND		ND	NET
27885	ND		ND	NET
27886			E d	
27887			E d	
27888			E d	
27889			E d	
27890/2791	E		E d	
27891	ND		ND	NET
27892/2792	E		E d	
27822	ND		ND	NET
27893	ND		ND	NET
27895	ND		ND	NET
27906	ND		ND	NET
27911	ND		ND	NET
27912	ND		ND	NET
27913/2791	E		E d	
27914	ND		ND	NET
27915	Not Relocated			
27916	E		E d	
27922	ND		ND	NET

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New Mexico Ecological Services Field Office
2105 Osuna NE
Albuquerque, New Mexico 87113
Phone: (505) 346-2525; Fax: (505) 346-2542

MAY 31 2005

Cons. #2-22-05-I-0375

Mr. James O'Hara
Coal Program Manager
New Mexico Energy, Minerals and Natural Resources Department
1220 South St. Francis Drive
Santa Fe, New Mexico 87505

Dear Mr. O'Hara:

Thank you for your May 5, 2005, letter requesting a list of federally threatened and endangered species for the proposed El Segundo Mine Permit Project. The proposed project would be located in McKinley County, New Mexico.

We have enclosed a current list of federally endangered, threatened, proposed, and candidate species, and species of concern that may be found in McKinley County, New Mexico.[1] Under the Endangered Species Act, as amended, it is the responsibility of the Federal action agency or its designated representative to determine if a proposed action "may affect" endangered, threatened, or proposed species, or designated critical habitat, and if so, to consult with us further. If your action area has suitable habitat for any of these species, we recommend that species-specific surveys be conducted during the flowering season for plants and at the appropriate time for wildlife to evaluate any possible project-related impacts. Please keep in mind that the scope of federally listed species compliance also includes any interrelated or interdependent project activities (e.g., equipment staging areas, or utility relocations) and any indirect or cumulative effects.

Candidates and species of concern have no legal protection under the Act and are included in this document for planning purposes only. We monitor the status of these species. If significant declines are detected, these species could potentially be listed as endangered or threatened. Therefore, actions that may contribute to their decline should be avoided. We recommend that candidates and species of concern be included in your surveys.

Under Executive Orders 11988 and 11990, Federal agencies are required to minimize the destruction, loss, or degradation of wetlands and floodplains, and preserve and enhance their natural and beneficial values. We recommend you contact the U. S. Army Corps of Engineers for permitting requirements under section 404 of the Clean Water Act if your proposed action

[1] Additional information about these species is available on the Internet at <http://nmrareplants.unm.edu>, <http://nmnhp.unm.edu/bisonm/bisonquery.php>, and <http://ifw2es.fws.gov/endangeredspecies>.

could impact floodplains or wetlands. These habitats should be conserved through avoidance, or mitigated to ensure no net loss of wetlands function and value.

The Migratory Bird Treaty Act (MBTA) prohibits the taking of migratory birds, nests, and eggs, except as permitted by the U. S. Fish and Wildlife Service. To minimize the likelihood of adverse impacts to all birds protected under the MBTA, we recommend construction activities occur outside the general migratory bird nesting season of March through August, or that areas proposed for construction during the nesting season be surveyed, and when occupied, avoided until nesting is complete.

We suggest you contact the New Mexico Department of Game and Fish and the New Mexico Energy, Minerals, and Natural Resources Department, Forestry Division for information regarding fish, wildlife, and plants of State concern.

Thank you for your concern for endangered and threatened species and New Mexico's wildlife habitats. In future correspondence regarding this project, please refer to consultation # 2-22-05-I-0375. If you have any questions about the information in this letter, please contact Santiago R. Gonzales at the letterhead address or at 505-761-4755.

Sincerely,

Susan MacMullin

Susan MacMullin
Field Supervisor

Enclosure

cc: (w/o enclosure)
Director, New Mexico Department of Game and Fish, Santa Fe, NM
Director, New Mexico Energy, Minerals, and Natural Resources Department, Forestry Division, Santa Fe, NM
District Engineer, U. S. Army Corps of Engineers, Regulatory Branch, Albuquerque, NM

Rev: May 2005

FEDERAL ENDANGERED, THREATENED,
PROPOSED, AND CANDIDATE SPECIES
AND SPECIES OF CONCERN WITHIN COUNTIES IN NEW MEXICO
Consultation Number 2-22-05-I-0375

McKinley County

ENDANGERED

- Black-footed ferret (*Mustela nigripes*)**
- Southwestern willow flycatcher (*Empidonax traillii extimus*)

THREATENED

- Bald eagle (*Haliaeetus leucocephalus*)
- Mexican spotted owl (*Strix occidentalis lucida*) with critical habitat
- Zuni fleabane (*Erigeron rhizomatus*)

CANDIDATE

- Yellow-billed cuckoo (*Coccyzus americanus*)
- Zuni bluehead sucker (*Catostomus discobolus*)

SPECIES OF CONCERN

- American peregrine falcon (*Falco peregrinus anatum*)
- Arctic peregrine falcon (*Falco peregrinus tundrius*)
- Black tern (*Chlidonias niger*)
- Northern goshawk (*Accipiter gentilis*)
- Mountain plover (*Charadrius montanus*)
- Western burrowing owl (*Athene cunicularia hypugea*)
- New Mexico silverspot butterfly (*Speyeria nokomis nitocris*)
- San Juan checkerspot butterfly (*Euphydryas anicia chuskae*)
- Acoma fleabane (*Erigeron acomanus*)
- Goodding's onion (*Allium gooddingii*)
- Parish's alkali grass (*Puccinellia parishii*)
- Sivinski's fleabane (*Erigeron sivinskii*)

Index

Endangered	=	Any species which is in danger of extinction throughout all or a significant portion of its range.
Threatened	=	Any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.
Candidate	=	Candidate Species (taxa for which the Service has sufficient information to propose that they be added to list of endangered and threatened species, but the listing action has been precluded by other higher priority listing activities).
Proposed	=	any species of fish, wildlife or plant that is proposed in the Federal Register to be listed under section 4 of the Act.
Species of Concern	=	Taxa for which further biological research and field study are needed to resolve their conservation status OR are considered sensitive, rare, or declining on lists maintained by Natural Heritage Programs, State wildlife agencies, other Federal agencies, or professional/academic scientific societies. Species of Concern are included for planning purposes only.
*	=	Introduced population
**	=	Survey should be conducted if project involves impacts to prairie dog towns or complexes of 200-acres or more for the Gunnison's prairie dog (*Cynomys gunnisoni*) and/or 80-acres or more for any subspecies of Black-tailed prairie dog (*Cynomys ludovicianus*). A complex consists of two or more neighboring prairie dog towns within 4.3 miles (7 kilometers) of each other.
***	=	Extirpated in this county
†	=	May occur in this county from re-introductions in Colorado.

EXHIBIT 808-1

CORRESPONDENCE FROM
NEW MEXICO FORESTRY DIVISION OF
NEW MEXICO ENERGY, MINERALS AND
NATURAL RESOURCES DEPARTMENT
AND
UNITED STATES DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE

NEW MEXICO ENERGY, MINERALS and NATURAL RESOURCES DEPARTMENT

GARY E. JOHNSON
Governor
Jennifer A. Salisbury
Cabinet Secretary

Toby Martinez
Director
Forestry Division

17 May 2001

Pete Metzner
METRIC Corporation
8429 Washington Place NE, Suite A
Albuquerque, New Mexico 87113

Dear Pete:

The NM Forestry Division has received and reviewed your request for rare and endangered plant concerns on the proposed South Hospah Coal Mine permit application area. I am not aware of any rare or endangered plant populations in that area, but I suggest the applicant conduct additional field search for the following reasons: 1) The proposed area may not have been adequately surveyed by a competent field botanist during the original 1980 permit application; 2) new plant species of concern were discovered in McKinley County after 1980. You can find a McKinley County list of rare plant species on our website at http://nmrareplants.unm.edu.

Best Regards,

Robert Sivinski

Robert Sivinski

Index

E	=	Endangered (in danger of extinction throughout all or a significant portion of its range).
PE	=	Proposed Endangered
T	=	Threatened (likely to become endangered within the foreseeable future throughout all or a significant portion of its range).
PT	=	Proposed Threatened
CH	=	Critical Habitat
PCH	=	Proposed Critical Habitat
C	=	Candidate Species (taxa for which the Service has sufficient information to propose that they be added to list of endangered and threatened species, but the listing action has been precluded by other higher priority listing activities).
SC	=	Species of concern (taxa for which further biological research and field study are needed to resolve their conservation status OR are considered sensitive, rare, or declining on lists maintained by Natural Heritage Programs, State wildlife agencies, other Federal agencies, or professional/academic scientific societies). Species of concern are included for planning purposes only.
S/A	=	Similarity of Appearance
*	=	Introduced population
†	=	May occur in this county from re-introductions in Colorado.
XN	=	Nonessential Experimental Population
**	=	Survey should be conducted if project involves impacts to prairie dog towns or complexes of 200-acres or more for the Gunnison's prairie dog (*Cynomys gunnisoni*) and/or 80-acres or more for any subspecies of Black-tailed prairie dog (*Cynomys ludovicianus*). A complex consists of two or more neighboring prairie dog towns within 4.3 miles (7 kilometers) of each other.
***	=	Extirpated in this county

Threatened, Endangered, and Candidate Species,
and Species of Concern
McKinley County, NM
May 21, 2001

McKinley

Black-footed ferret, Mustela nigripes, E**
Fringed myotis, Myotis thysanodes, SC
Long-eared myotis, Myotis evotis, SC
Occult little brown bat, Myotis lucifugus occultus, SC
Spotted bat, Euderma maculatum, SC
American peregrine falcon, Falco peregrinus anatum, SC
Arctic peregrine falcon, Falco peregrinus tundrius, SC
Bald eagle, Haliaeetus leucocephalus, T
Black tern, Chlidonias niger, SC
Ferruginous hawk, Buteo regalis, SC
Loggerhead shrike, Lanius ludovicianus, SC
Mexican spotted owl, Strix occidentalis lucida, T w/PCH
Northern goshawk, Accipiter gentilis, SC
Southwestern willow flycatcher, Empidonax traillii extimus, E
Western burrowing owl, Athene cunicularia hypugaea, SC
White-faced ibis, Plegadis chihi, SC
Yellow-billed cuckoo, Coccyzus americanus, SC
Mountain plover, Charadrius montanus, PT
Zuni bluehead sucker, Catostomus discobolus yarrowi, SC
New Mexico silverspot butterfly, Speyeria nokomis nitocris, SC
San Juan checkerspot butterfly, Euphydryas anicia chuskae, SC
Acoma fleabane, Erigeron acomanus, SC
Goodding's onion, Allium gooddingii, SC
Parish's alkali grass, Puccinellia parishii, SC
Sivinski's fleabane, Erigeron sivinskii, SC
Zuni (=rhizome) fleabane, Erigeron rhizomatus, T

United States Department of the Interior

FISH AND WILDLIFE SERVICE

New Mexico Ecological Services Field Office
2105 Osuna NE
Albuquerque, New Mexico 87113
Phone: (505) 346-2525 Fax: (505) 346-2542

May 21, 2001

Cons. # 2-22-01-I-405

Peter H. Metzer, President
Metric Corporation
8429 Washington Place NE, Suite A
Albuquerque, New Mexico 87113

Dear Mr. Metzer:

This responds to your April 16, 2001, letter requesting information on threatened or endangered plant or wildlife species or habitats of concern possibly occurring within the proposed South Hospah Mine in McKinley County. It is our understanding that surface coal mine plan and permit application is being prepared.

We have enclosed a current list of federally-endangered, threatened, candidate species, and species of concern that may be found in McKinley County, New Mexico. Additional information about these species is available on the internet at <http://nmrareplants.unm.edu>, <http://nmnhp.unm.edu/bisonm/bisonm.cfm>, and <http://ifw2es.fws.gov/endangeredspecies>. Under the Endangered Species Act, as amended (Act), it is the responsibility of the Federal action agency or its designated representative to determine if a proposed action "may affect" any threatened, endangered, or proposed species, or critical habitat, and if necessary, to consult with us further. If your action area has suitable habitat for any of these species, we recommend that species-specific surveys be done during the appropriate flowering or breeding season to evaluate any possible project-related impacts.

Candidates and species of concern have no legal protection under the Act and are included in this document for planning purposes only. We are required to monitor the status of these species. If significant declines are detected, these species could potentially be listed as endangered or threatened. Therefore, actions that may contribute to their decline should be avoided. We recommend that candidates and species of concern be included in your surveys.

Under Executive Order 11990, Federal agencies are required to minimize the destruction, loss, or degradation of wetlands, and preserve and enhance their natural and beneficial values. We recommend you contact the U.S. Army Corps of Engineers for permitting requirements under Section 404 of the Clean Water Act if your proposed action could impact wetlands. These habitats should be conserved through avoidance or mitigated to ensure no net loss of wetlands functions and values.

The Migratory Bird Treaty Act (MBTA) prohibits the taking of migratory birds, nests, and eggs, except as permitted by the Service. To minimize the likelihood of adverse impacts to all birds protected under the MBTA, we recommend construction activities occur outside the general migratory bird nesting season of March through August, or that areas proposed for construction during the nesting season be surveyed, and if necessary, avoided until nesting is complete.

Please keep in mind that the scope of federally-listed species compliance also includes any interrelated or interdependent project activities (e.g., equipment staging areas, offsite borrow material areas, or utility relocations) and any indirect and cumulative effects. We suggest you contact the New Mexico Department of Game and Fish, and the New Mexico Energy, Minerals, and Natural Resources Department, Forestry Division for information regarding fish, wildlife, and plants of State concern.

Thank you for your concern for endangered species and New Mexico's wildlife habitats. If you have any questions, please contact Jude R. Smith at the letterhead address or at (505) 346-2525, ext. 104.

Sincerely,

Joy E. Nicholopoulos

Joy E. Nicholopoulos
Field Supervisor

Enclosure

cc: (w/o enc)
Director, New Mexico Department of Game and Fish, Santa Fe, New Mexico
Director, New Mexico Energy, Minerals, and Natural Resources Department, Forestry Division, Santa Fe, New Mexico

EXHIBIT 809-2

CORRESPONDENCE FROM
STATE OF NEW MEXICO
DEPARTMENT OF GAME AND FISH

STATE OF NEW MEXICO
DEPARTMENT OF GAME & FISH
P.O. Box 25112
Santa Fe, NM 87504

Visit our website at www.gmfsh.state.nm.us
For basic information or to order free publication: 1-800-862-9310

May 4, 2001

Mr. Peter H. Metzner, President
METRIC Corporation
8429 Washington Place NE
Suite A
Albuquerque, NM 87113

RE: Surface coal mine plan and permit application for Star Lake Mine and South Hospah Mine, McKinley County, NM (NMGF No. 7435)

Dear Mr. Metzner:

The Department of Game and Fish (Department) has received two letters dated 16 April 2001 from METRIC Corporation (METRIC) that request information on threatened and endangered wildlife species and habitats of concern in the vicinity of two proposed surface coal mines in McKinley County. The proposed mines are:

Star Lake Mine (Peabody Group): approximately 18,220 acres of Indian, Federal, State, and private lands in T19N, R6W, Sections 1-5, 9-12; T20N, R6W, Sections 17-21, 26-36; and T20N, R7W, Sections 13-16, 23-25.

South Hospah Mine (Lee Ranch Coal Company): approximately 15,539 acres of State and private lands in T16N, R9W, Sections 3-6; T16N, R10W, Sections 1-3; T17N, R9W, Sections 31-35; and T17N, R10W, Sections 19-22, 25-30, 34-36.

The Department understands that METRIC is preparing a mine plan and permit application for the two proposed mines. METRIC has already reviewed information on wildlife of McKinley County provided in the Department's Biota Information System of New Mexico (BISON-M) database in anticipation of updating existing wildlife survey information for the two project areas. To assist you in development of the wildlife survey information, we recommend the following be included in the two mine plans and permit applications:

1. Any aquatic and riparian habitats, including springs and spring runs, within or near the proposed project areas may be suitable habitat for the State and Federally endangered Southwestern Willow Flycatcher. These habitats are of high value to wildlife species in general. All aquatic and riparian areas should be clearly identified and described, and potential impacts to these areas should be assessed.

2. The Department is aware of scattered localities within the proposed project areas that are used by mule deer and pronghorn antelope. These areas should be identified and, to the extent possible, avoided. Department survey information on deer and antelope may be obtained from our Division of Wildlife (505/ 827-7885).

3. The State threatened Gray Vireo is of potential occurrence in well-developed juniper-grassland habitat in McKinley County. An assessment of the status of this species in the project areas should be included.

We appreciate the opportunity to assist you in the development of the plans and permit applications for these two proposed coal mines. Please contact Jim Stuart of my staff at 827-4083 should you have any questions.

Sincerely,

Tod W. Stevenson

Tod W. Stevenson, Chief
Conservation Services Division

TWS/JNS

Cc: Joy E. Nicholopoulos (Ecological Services Supervisor, USFWS)
Scott Brown (Assistant Director, NMGF)
Bill Hays (Conservation Services Asst. Division Chief, NMGF)
Luke Shelby (Northwest Area Operations Chief, NMGF)
Mike Gustin (Northwest Operations Area Habitat Specialist, NMGF)
Jim Stuart (Conservation Services Mining Habitat Specialist, NMGF)

MINING AND MINERALS DIVISION
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

DIRECTOR'S ORDER
WITH FINDINGS OF FACT, CONCLUSIONS OF LAW AND PERMIT CONDITIONS

EL SEGUNDO SURFACE COAL MINE
PERMIT RENEWAL APPLICATION 2015-01

THIS MATTER having come before the Director of the Mining and Minerals Division ("Director"), of the Energy, Minerals and Natural Resources Department, of the State of New Mexico, upon the application of Peabody Natural Resources Company ("PNRC"), to renew Permit No. 2010-01, for El Segundo Surface Coal Mine, located approximately 35 miles north of Milan, New Mexico, on both sides of State Road 509. The permit area consists of approximately 16,559 acres in T17N, R10W; T17N, R9W; T16N, R10W; T16N, R9W; T16N, R8W and T15N, R8W.

The Director, having considered both the Permit Renewal Application Package ("PRAP 2015-01") and all other associated documentation, having reviewed the Mining and Minerals Division's files and being otherwise fully advised in the premises, now enters the following Findings of Fact, Conclusions of Law, Conditions and Order:

FINDINGS OF FACT

1. The Director has jurisdiction over El Segundo Surface Coal Mine located in McKinley County, New Mexico.

2. The permit renewal is issued pursuant to the New Mexico Surface Mining Act, §69-25A-l et seq. NMSA 1978 ("Act") and the Coal Surface Mining Commission's Rules 19.8 NMAC ("Rules"), and is subject to the Act, the Rules, and all laws and regulations that are now or hereafter in force.

3. PRAP 2015-01, submitted to the Director on May 11, 2015, is administratively complete and all procedures required under Rules 19.8.13.1303 and 1304 NMAC have been completed.

4. No evidence has been submitted to the Director that establishes that (i) the terms and conditions of PNRC's current permit (No. 2010-01) are not being satisfactorily met, (ii) present surface coal mining and reclamation operations are not in compliance with the environmental standards under the Act and 19.8.19 through 19.8.28 NMAC, or (iii) this renewal substantially jeopardizes the PNRC's continuing responsibility to comply with the Act and 19.8 NMAC on existing permit areas.

5. Public notice of the submittal of PRAP 2015-01 was published for four consecutive weeks in newspapers serving McKinley County and Cibola County, describing the proposed renewal and soliciting public comments. Notices were published in both the *Gallup Independent* and the *Cibola Beacon* on July 10, July 17, July 24, and July 31, 2015. A thirty-day public comment period after the last publication ran through August 31, 2015. Notice of PRAP 2015-01 was also posted on the MMD website from July 1, 2015 through August 31, 2015. No public comments were received.

6. On May 22, 2015 the Director sent written notifications to local, state, federal and tribal government agencies requesting comments concerning PRAP 2015-01. Comments were subsequently received from the New Mexico Office of the State Engineer ("NMOSE") on June 5, 2015 and from the New Mexico Environment Department ("NMED") on July 1, 2015.

7. NMOSE comments were resolved by PNRC submitting permit modification request 2015-06 on July 8, 2015 to update well identification and abandonment information in Permit 2010-01. Permit modification 2015-06 was approved by the Director on July 20, 2015.

8. NMED comments were determined by the Director to be the result of inconsistent fluoride detection limits being used by laboratories contracting with PNRC. The Director requested standardization of the fluoride detection limit, and by letter dated August 10, 2015 PNRC and the contract laboratory committed to standardize the fluoride detection limit at 0.2 mg/L.

9. The Director has reviewed the July 2005 Cumulative Hydrological Impact Analysis (CHIA) of all anticipated coal mining in the cumulative impact area. The current CHIA adequately describes the hydrologic consequences of continued surface mining. Downward trends have been measured for total dissolved solids, sulfate and fluoride at the two Point Lookout formation wells within the permit area since mining began in 2008. The Director determined the operations as described in PRAP 2015-01 have been designed to prevent damage to the hydrologic balance outside the proposed permit area pursuant to 19.8.9.907.C NMAC.

10. The proposed operations will not adversely affect any publicly owned parks or places included in the National Register of Historic Places. The Archaeological Management Plan required by 19.8.9.912 NMAC was provided to the New Mexico Historic Preservation Division and various Native American Tribes for their review and comment. The Director will ensure that PNRC implements all provisions of the plan.

11. PNRC has a performance bond approved by the Director, currently in the amount of one hundred eleven million, three hundred eighty-eight thousand, and eight hundred fifty-four dollars ($111,388,854.00), which will continue in full force and effect for the period of this renewal. PNRC provided disturbance and reclamation schedule information indicating that the worst-case bonding scenario during the 2015-2020 permit term will occur in late 2015. Thus, the Director is not requiring additional bond as part of this renewal action. This finding does not preclude the Director from adjusting the bond amount pursuant to the Rules, including without limitation pursuant to 19.8.14 NMAC.

12. PNRC has demonstrated that it has not controlled and does not control a mining operation with a pattern of willful violations of such nature, duration and with such irreparable damage to the environment as to show a noncompliance with the Act and with 19.8 NMAC. On September 11, 2015 the Director accessed the Office of Surface Mining Reclamation and Enforcement ("OSMRE") Applicant/Violator System database to obtain a compliance history report for outstanding violations, failure to abate cessation orders, and violations of other applicable federal or state laws or rules pertaining to air and water environmental protection, and determined that all persons who own or control PNRC are in good standing with OSMRE.

CONDITIONS

1. All cultural resources determined eligible to the National Register of Historic Places shall be protected consistent with the Archaeological Management Plan and shall not be disturbed or mined without prior written approval from the Director.

2. In the event previously unknown cultural or historic properties are encountered during mine-related activities, PNRC shall immediately (i) protect the properties from further mining disturbance and (ii) notify the Director. PNRC shall protect the properties from any disturbance until the Director has properly evaluated them. If appropriate, PNRC shall, at the direction of the Director, prepare and implement a treatment plan designed to mitigate the effects mining or reclamation operations conducted under this permit may have on properties eligible to the National Register of Historic Places. The Director, prior to implementation, shall approve said treatment plan. Should a treatment plan become necessary, it shall be conducted at the expense of PNRC.

3. In the event undocumented human remains are located or exposed during mining activities in the permit area, PNRC shall immediately notify the Director. Should a burial be exposed during earthmoving activities, the burial shall be protected from further disturbance until disposition of the burial has been resolved. The final disposition of human burials will be carried out in accordance with all applicable guidelines, regulations and laws.

CONCLUSIONS OF LAW

1. The Director has jurisdiction over El Segundo Surface Coal Mine, PNRC and the subject matter of this proceeding.

2. All procedures required under 19.8.13.1303 and 1304 NMAC have been satisfied.

3. PNRC is entitled to conduct coal mining and reclamation operations at El Segundo Surface Coal Mine in McKinley County, New Mexico, upon the conditions that PNRC complies with the requirements of this Order, the Act, 19.8 NMAC, PRAP 2015-01, all Permit Conditions imposed by this Order, and upon the submission of such annual reports and fees as may be required under 19.8 NMAC.

ORDER

NOW THEREFORE, IT IS HEREBY ORDERED that El Segundo Surface Coal Mine Permit Renewal Application 2015-01 is approved for a term of five years, ending on September 15, 2020. The renewal is subject to all conditions set out in this Director's Order with Findings of Fact, Conclusions of Law and Conditions. Unless specifically modified by this renewal, the terms and conditions of Permit 2010-01 remain in full force and effect and are incorporated herein.

By Order of the Director, Mining and Minerals Division, Energy, Minerals and Natural Resources Department, of the State of New Mexico.

Dated this 15th day of September, 2015

Fernando Martinez, Director

GARY E. JOHNSON
GOVERNOR

State of New Mexico
ENVIRONMENT DEPARTMENT
AIR QUALITY BUREAU
2048 Galisteo
Santa Fe, New Mexico 87505
Telephone (505) 827-1494
Fax (505) 827-1523

PETER MAGGIORE
SECRETARY

December 31, 2001

CERTIFIED MAIL NO. 7000-1670-0001-9567-6874
RETURN RECEIPT REQUESTED

Mark Hiles
Lee Ranch Coal Company
P.O. Box 757
Grants, NM 87010

Permit Application No. 2604
South Hospah Coal Mine
AIRS No. 35-031-0258

Dear Mr. Hiles:

Please find attached Permit No. 2604 for the construction and operation of the South Hospah Coal Mine. We would like to call attention to General Conditions 1.a-1.c which requires Lee Ranch to submit startup dates, equipment IDs, and dates of maximum production when equipment pieces are brought on-line.

If you have any questions please contact me in Santa Fe at (505) 955-8031.

Sincerely,

Lia Brodnax

Lia F. Brodnax, Ph.D.
Permit Engineer
New Source Review
Air Quality Bureau

cc: Manager, Enforcement Section, AQB, Santa Fe
Grants NMED Field Office

Enclosures: Permit No. 2604

GARY E. JOHNSON
GOVERNOR

State of New Mexico
ENVIRONMENT DEPARTMENT
AIR QUALITY BUREAU
2048 Galisteo
Santa Fe, New Mexico 87505
Telephone (505) 827-1494
Fax (505) 827-1523

PETER MAGGIORE
SECRETARY

CERTIFIED MAIL NO. 7000-1670-0001-9567-6874
RETURN RECEIPT REQUESTED

Permittee:

Lee Ranch Coal Company
P.O. Box 757
Grants, New Mexico 87010

NSR Air Quality Permit No. 2604
South Hospah Coal Mine
AIRS No. 35-031-0258

Company Official:

Mark Hiles
Environmental Manager

M a. Uhl for S. Ely
Sandra Ely
Bureau Chief
Air Quality Bureau

JAN 2 2002
Date of Issuance

Air Quality Permit No. 2604 is issued by the Air Quality Bureau of the New Mexico Environment Department (Department) to Lee Ranch Coal Co. pursuant to the Air Quality Control Act (Act) and regulations adopted pursuant to the Act including Title 20, New Mexico Administrative Code (NMAC), Chapter 2, Part 72, (20 NMAC 2.72), Construction Permits, Subpart II and is enforceable pursuant to the Act and the air quality control regulations applicable to this source.

This permit authorizes the construction and operation of the South Hospah Mine. The function of the facility is to mine and primary process (i.e., crush, segregate, and handle) coal. This facility is located in Townships 16N and 17N, Range 10W, Sections 34 and 35, approximately 40 miles North of Grants, New Mexico in McKinley County.

The Department has reviewed the permit application for the proposed construction and has determined that the provisions of the Act and ambient air quality standards will be met. Conditions have been imposed in this permit to assure continued compliance. 20 NMAC 2.72, Section 210.D,

states that any term or condition imposed by the Department on a permit is enforceable to the same extent as a regulation of the Environmental Improvement Board.

TOTAL EMISSIONS

The total potential emissions from this facility, excluding exempted activities, are shown in the following table. Emission limitations for individual units are shown in Condition 2.

Total Potential Criteria Pollutant Emissions from Entire Facility (for information only, not an enforceable condition):

Pollutant	**Emissions** (tons per year)
Total Suspended Particulate (TSP)	99.0
Particulate Matter <10μm (PM_{10})	38.7

As per 20.2.75 NMAC, the Department will assess an annual enforcement/compliance fee as specified in Section 110. At time of permit issuance this fee is $220. This fee does not apply to sources which are assessed an annual fee in accordance with 20.2.71NMAC. The AQB will invoice the permittee for the amount.

Pursuant to 20 NMAC 2.72, and the specific regulatory citations in parenthesis, the facility is subject to the following conditions.

SPECIFIC CONDITIONS

1. Construction / Modification / Revision and Operation
(20 NMAC 2.72, Section 210.A, NSPS 40 CFR 60 Subparts A and Y)

a) The equipment regulated by this permit consists of

Table 1.1: Regulated Equipment List

Emission Unit No.	Type of Unit	Make and Model	NSPS Y	Rated Capacity
1	Truck Unloading Station 1	TBD	N	2000 tph
2	Grizzly Hopper 1	TBD	Y	2000 tph
3a	Feeder/Breaker 1a	TBD	Y	2000 tph OR
3b	Feeder/Breaker 1b	TBD		3000 tph*
4	Breaker Loadout Conveyor	TBD	Y	2000 tph
5	Crusher	TBD	Y	2000 tph
6	Crusher Loadout Conveyor	TBD	Y	2000 tph
7	Shuttle Conveyor	TBD	Y	2000 tph

Emission Unit No.	Type of Unit	Make and Model	NSPS Y	Rated Capacity
8	Shuttle Conveyor	TBD	Y	2000 tph
9	Pile #1 Stacker Tube	TBD	Y	2000 tph
10	Pile #2 Stacker Tube	TBD	Y	2000 tph
11	Pile #3 Stacker Tube	TBD	Y	2000 tph
12	Coal Pile #1 Maintenance	N/A	N	N/A
13	Coal Pile #2 Maintenance	N/A	N	N/A
14	Coal Pile #3 Maintenance	N/A	N	N/A
15	Coal Pile #1 Reclaimer	TBD	Y	3000 tph
16	Coal Pile #2 Reclaimer	TBD	Y	3000 tph
17	Coal Pile #3 Reclaimer	TBD	Y	3000 tph
18	Reclaim Loadout Conveyor	TBD	Y	3000 tph
19	Railcar Loading Bin	TBD	Y	3000 tph
20	Railcar Loadout	TBD	Y	3000 tph
21	Emergency Coal Pile Maintenance	N/A	N	N/A
22	Truck Unloading 2	TBD	N	2000 tph
23	Grizzly Hopper 2	TBD	Y	2000 tph
24a	Feeder/Breaker 2a	TBD	Y	2000 tph OR 3000 tph*
24b	Feeder/Breaker 2b	TBD		
25	Transfer Conveyor #1	TBD	Y	2000 tph
26	Transfer Conveyor #2	TBD	Y	2000 tph
27	Transfer Conveyor #3	TBD	Y	2000 tph
28	Transfer Conveyor #4	TBD	Y	2000 tph
29	Transfer Conveyor #5	TBD	Y	2000 tph
30	Transfer Conveyor #6	TBD	Y	2000 tph
31	Transfer Conveyor #7	TBD	Y	2000 tph
32	Transfer Conveyor #8	TBD	Y	2000 tph
33	Coal Processing Fugitives	N/A	N	N/A

* Units 3a/3b will be either a single 2000 tph unit OR two (2) units at 1500 tph each. Units 24a/24b will be either a single 2000 tph unit OR two (2) units at 1500 tph each. Both Units 3a/3b and 24a/24b will be limited to 2000 tph throughput by the outlet transfer conveyors (e.g., Units 4 and 25). Units 22, 23, and 24a/24b are the remote unloading station located on the east side of the highway.

b) This facility is authorized to operate 24 hours per day, 7 days per week, and 52 weeks per year for a total of 8,760 hours per year.

c) This facility is subject to applicable requirements that include the following regulations:

Table 1.1 indicates affected equipment that is subject to federal New Source Performance Standards (NSPS) found in CFR Title 40, Part 60, Subpart A - General Provisions and Subpart Y-Standards of Performance for Coal Preparation Plants and shall comply with both the notification requirements in Subpart A and with the specific requirements of Subpart Y. NSPS Subpart Y affected equipment shall not emit to the atmosphere emissions with an opacity greater than or equal to 20%.

d) The coal preparation plant shall not process more than 6 million tons of coal into Units 1 and 22, combined, in any consecutive rolling 12-months.

e) Combined bulldozing activities at Units 12, 13, 14, and 21 shall not occur for more than 11.5 hours per any calendar day.

f) Substitution of equipment is authorized provided the equipment has the same or lower process capacity as the piece of equipment being substituted. The Department shall be notified in writing within fifteen (15) days of equipment substitutions. Equipment that is substituted shall comply with the opacity requirements in place for the original equipment.

2. Emission Limits (20 NMAC 2.72, Sections 210.A and 210.B.1.b, NSPS 40 CFR 60 Subparts A and Y)

Table 2.1: Allowable Emissions

Emission Unit No.	Type of Unit	TSP pph (tpy)	PM_{10} pph (tpy)
1	Truck Unloading Station 1	0.8 (1.2)	0.4 (0.6)
2	Grizzly Hopper 1	0.5	0.24
3a	Feeder/Breaker 1a*	0.5	0.24
3b	Feeder/Breaker 1b*		
4	Breaker Loadout Conveyor	0.5	0.24
5	Crusher*	0.5	0.24
6	Crusher Loadout Conveyor*		
7	Shuttle Conveyor	0.5	0.24
8	Shuttle Conveyor	0.5	0.24
9	Pile #1 Stacker Tube	0.5	0.24
10	Pile #2 Stacker Tube	0.5	0.24
11	Pile #3 Stacker Tube	0.5	0.24
12	Coal Pile #1 Maintenance	79.6 (40.8)	18.8 (9.6)
13	Coal Pile #2 Maintenance		
14	Coal Pile #3 Maintenance		
21	Emergency Coal Pile Maintenance		

Emission Unit No.	Type of Unit	TSP pph (tpy)	PM_{10} pph (tpy)
15	Coal Pile #1 Reclaimer*	0.5	0.24
16	Coal Pile #2 Reclaimer*		
17	Coal Pile #3 Reclaimer*		
18	Reclaim Loadout Conveyor*		
19	Railcar Loading Bin	0.5	0.24
20	Railcar Loadout	0.5	0.24
22	Truck Unloading 2	0.8 (1.2)	0.4 (0.6)
23	Grizzly Hopper 2	0.5	0.24
24a	Feeder/Breaker 2a*	0.5	0.24
24b	Feeder/Breaker 2b*		
25	Transfer Conveyor #1	0.5	0.24
26	Transfer Conveyor #2	0.5	0.24
27	Transfer Conveyor #3	0.5	0.24
28	Transfer Conveyor #4	0.5	0.24
29	Transfer Conveyor #5	0.5	0.24
30	Transfer Conveyor #6	0.5	0.24
31	Transfer Conveyor #7	0.5	0.24
32	Transfer Conveyor #8	0.5	0.24
33	Coal Processing Fugitives	1.7	0.8

* Units 3a/3b, 5/6, 15/16/17/18, and 24a/24b are each vented through combined vents (or have combined emission plumes), limited to an opacity of less than 20%.

3. Monitor Requirements
(20 NMAC 2.72, Section 210.B.4, 20 NMAC 2.72, NSPS 40 CFR 60 Subparts A and Y)

a) No Specific Conditions

4. Recordkeeping
(20 NMAC 2.72, Sections 210.B.4, and 210.D, NSPS 40 CFR 60 Subparts A and Y.)

a) The permittee shall maintain daily records of material unloaded into Units 1 and 22 (truck unloading). The daily records shall be totaled monthly.

b) The permittee shall maintain daily records of combined bulldozer-hours for Units 12, 13, 14, and 21.

5. Reporting
(20 NMAC 2.72, Sections 210.B and 210.E, and 212, NSPS 40 CFR 60 Subparts A and Y.)

a) No Specific Conditions

6. Compliance Test
(NMAC 2.72, Section 210.C, 213, and NSPS 40 CFR 60 Subparts A and Y.)

a) Initial compliance tests are required for affected equipment under NSPS Subpart Y, as indicated in Table 1.1 for opacity. Compliance test requirements from previous permits (if any) are still in effect, unless the tests have been satisfactorily completed. Compliance tests may be re-imposed if Department inspections indicate possible noncompliance with permit conditions subject to such testing, or noncompliance during the initial compliance or subsequent compliance tests, or if the tests were technically unsatisfactory.

b) These tests shall be conducted within sixty (60) days after the unit(s) achieve the maximum normal production. If the maximum normal production rate does not occur within one hundred twenty (120) days of source startup, then the tests must be conducted no later than one hundred eighty (180) days after initial startup of the source.

c) The tests shall be conducted in accordance with EPA Reference Methods 1 through 4, and 9 contained in CFR Title 40, Part 60, Appendix A, and with the requirements of Subpart A, General Provisions, 60.8(f). Alternative test method(s) may be used if the Department approves the change.

cc: Program Manager, Compliance and Enforcement Section
NMED Field office, Grants, New Mexico

Enclosure: Industry/Consultant Feedback Questionnaire with envelope

GENERAL CONDITIONS

1. Reporting
(20 NMAC 2.72, Sections 210.B and 210.E, and 212)

a) the anticipated date of initial startup of each new or modified source not less than thirty (30) days prior to the date;

b) the equipment serial number and the actual date of initial startup of each new or modified source within fifteen (15) days after the startup date;

c) the date when each new or modified emission source reaches the maximum production rate at which it will operate within fifteen (15) days after that date;

d) any change of owner/operators within fifteen (15) days of such change;

e) any necessary update or correction no more than sixty (60) days after the owner/operator knows or should have known of the condition necessitating the update or correction of the permit.

2. Revisions and Modifications
(20 NMAC 2.72, Sections 200.A.2, 210.B.4, and 200.E)

Any future physical changes or changes in the method of operation may constitute a modification as defined by 20 NMAC 2.72, Construction Permits. Unless the source or activity is exempt under 20 NMAC 2.72, Section 202, no modification shall begin prior to issuance of a permit.

Changes in plans, specifications, and other representations stated in the application documents shall not be made if they cause a change in the method of control of emissions or in the character of emissions, or will increase the discharge of emissions. Any such proposed changes shall be submitted as a revision or modification.

Modifications or revisions to this permit shall be processed in accordance with 20 NMAC 2.72.

3. Notification to Subsequent Owners
(20 NMAC 2.72, Sections 107.M.1, 210.B.4, and 212.C)

The permit and conditions apply in the event of any change in control or ownership of the facility. No permit modification is required in such case. However, in the event of any such change in control or ownership, the permittee shall notify the succeeding owner of the permit and conditions and shall notify the Department of the change in ownership within fifteen (15) days of that change.

Any new owner or operator shall notify the Department, within thirty (30) days of assuming ownership, of the new owner's or operator's name and address.

4. Right to Access Property and Review Records
(20 NMAC 2.72, Sections 210.B and 210.E, and 20 NMAC 2.73)

The Department shall be given the right to enter the facility at all reasonable times to verify the terms and conditions of this permit. The company, upon either a verbal or written request from an authorized representative of the Department, shall produce any records or information necessary to establish that the terms and conditions of this permit are being met.

5. Posting/Retention of the Permit
(20 NMAC 2.72, Section 210.B.4)

A copy of this permit shall be posted at the plant site or retained at the plant site at all times and shall be made available to Department personnel for inspection upon request.

6. Permit Cancellations
(20 NMAC 2.72, Section 211)

a) the Department shall automatically cancel any permit for any source which ceases operation for five (5) years or more, or permanently. Reactivation of any source after the five (5) year period shall require a new permit.

b) the Department may cancel a permit if the construction or modification is not commenced within two (2) years from the date of issuance or if, during the construction or modification, work is suspended for a total of one (1) year.

7. Unless modified by conditions of this permit, the applicant shall construct or modify and operate the facility in accordance with all representations of the application and supplemental submittals that the Department relied upon to determine compliance with applicable regulations and ambient air quality standards. If the Department relied on air quality modeling to issue this permit, any change in the parameters used for this modeling shall be submitted to the Department for review. Upon the Department's request, the applicant shall submit additional modeling for review by the Department. Results of that review may require a permit modification. (20 NMAC 2.72, Section 210.A)

8. Except as identified in the Specific Conditions, National Emission Standards for Hazardous Air Pollutants (NESHAP) do not apply to this facility. However, during any asbestos demolition or renovation work CFR Title 40, Part 61, Subpart M (NESHAP) does apply. (20 NMAC 2.72, Section 210.A)

9. For engines or turbines equipped with catalytic converters and/or air fuel ratio controllers, or similar device which performs the same function of maintaining appropriate air and fuel ratios, records shall be made and maintained by the owner or operator for a period of at least two (2) years from the date of generation and a summary of quarterly reports shall be submitted to the Department annually, which:

a) For each air fuel ratio (AFR) controlling type device, demonstrate that the manufacturer's or supplier's recommended maintenance is performed, including

replacement of oxygen sensor as necessary for oxygen-based controllers. Verification of proper operation of the controller shall be demonstrated at least quarterly by measuring and recording exhaust oxygen or NO_x concentrations with a properly calibrated portable analyzer as specified in the most current version of the SOP for "Use of Portable Analyzers in Performance Tests".

b) For any engine equipped with a catalytic converter, demonstrate the maintenance of the NO_x and CO reduction efficiency across the catalyst bed. This test shall be performed within ninety (90) days following initial startup and on a quarterly basis thereafter, unless an alternative testing schedule is specified by the department. Properly calibrated portable analyzers are acceptable for this demonstration. The test shall be conducted at ninety percent (90%) or greater of full load and shall include the exhaust volume flow rate (dscf) and the NOx and CO emission rate (lb/hr). (20 NMAC 2.72, Section 306.A.1.c.(2))

10. Except as provided in the Specific Conditions, records shall be maintained on-site for a minimum of two (2) years from the time of recording and shall be made available to Department personnel upon request. (20 NMAC 2.72, Sections 210.B.4, and 210.D)

11. If this permit requires any compliance testing, the owner or operator shall notify the Department at least thirty (30) days prior to the test date and allow a representative of the Department to be present at the test. The permittee shall submit a testing protocol to the Department at least thirty (30) days prior to the test date and shall observe the following testing procedures:

a) The test protocol and compliance test report shall conform to the standard format specified by the Department. The most current version of the format may be obtained from the Enforcement and Compliance Section of the Air Quality Bureau.

b) The permittee shall also provide a one-quarter (1/4) inch stainless steel sampling line adjacent to the sampling ports and extending down to within four (4) feet above ground level to provide access for future audits. The line shall extend into the stack a distance of 1/4 the stack diameter, but not less than one inch from the stack wall. The sampling line shall be maintained clear of blockage at all times. This line shall be in place at the time of any required compliance tests. For any source for which compliance tests are not required or for previously existing sources this line shall be installed no later than one hundred and eighty (180) days from the date of this permit.

c) As an alternative, the owner or operator may provide a portable sampling line that is readily available which allows the Department to safely obtain representative stack gas samples at the time of compliance audits or site inspections.

d) See 2.72, Section 210.C for stack sampling platform requirements and access to sampling ports. (20 NMAC 2.72, Sections 210.B.4, and 210.D)

ADDITIONAL REQUIREMENTS

Applications for permit revisions and modifications shall be submitted to:

Program Manager, Permits Section
New Mexico Environment Department
Air Quality Bureau
2048 Galisteo
Santa Fe, New Mexico 87505

Compliance test protocols, regularly scheduled reports, a copy of the test results, and excess emission reports, shall be submitted to:

Program Manager, Compliance and Enforcement Section
New Mexico Environment Department
Air Quality Bureau
2048 Galisteo
Santa Fe, New Mexico 87505

REVOCATION

The Department may revoke this permit if the applicant or permittee has knowingly and willfully misrepresented a material fact in the application for the permit. Revocation will be made in writing, and an administrative appeal may be taken to the Secretary of the Department within thirty (30) days. Appeals will be handled in accordance with the Department's Rules Governing Appeals From Compliance Orders.

APPEAL PROCEDURES

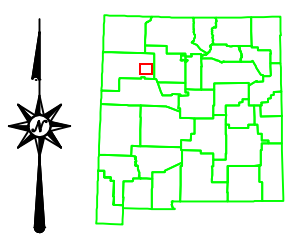
20 NMAC 2.72, Section 207, provides that any person who participated in a permitting action before the Department and who is adversely affected by such permitting action, may file a petition for hearing before the Environmental Improvement Board. The petition shall be made in writing to the Environmental Improvement Board within thirty (30) days from the date notice is given of the Department's action and shall specify the portions of the permitting action to which the petitioner objects, certify that a copy of the petition has been mailed or hand-delivered and attach a copy of the permitting action for which review is sought. Unless a timely request for hearing is made, the decision of the Department shall be final. The petition shall be copied simultaneously to the Department upon receipt of the appeal notice. If the petitioner is not the applicant or permittee, the petitioner shall mail or hand-deliver a copy of the petition to the applicant or permittee. The Department shall certify the administrative record to the board. Petitions for a hearing shall be sent to:

Environmental Improvement Board
1190 St. Francis Drive, Runnels Bldg.
P.O. Box 26110
Santa Fe, New Mexico 87502

ATTACHMENT F

Maps

PERMIT BOUNDARY



area of interest

P.O. Box 757
Grants, NM 87020

EL SEGUNDO MINE


T17N R10W
T17N R9W
T16N R9W
Permit Boundary
MAP LEGEND
BUILDINGS
STRUCTURES
ROADS
PAVED ROAD
ANCILLARY ROAD
TRAIL
RAILROADS
UTILITIES
ELECTRIC UTILITIES
CONTOUR LINES
CONTOUR
INDEX CONTOUR
DEPRESSION CONTOUR
DEP. INDEX CONTOUR
Watershed Diversions
FENCE LINE
Topsoiled
Vegetated
DISTURBANCE BOUNDARY
PERMIT BOUNDARY
SECTION LINE
TOWNSHIP/RANGE
Raw Water Line
WATER WELLS
MET TOWER/SAMPLE SITE
MONITORING WELL
PIT PROTECTION POND PPP-1
MINE SEDIMENT POND MSP-1
Proposed NPDES outfall ID
NPDES Outfall to Be Dropped
NPDES outfall ID
Internal Sediment Basin
area of interest
LEE RANCH
P.O. Box 757
Grants, NM 87020
EL SEGUNDO MINE
NPDES Permit No. NM0030996
NPDES SITE MAP
SITE DRAINAGE MAP
Seam: Varies
Date: July 19, 2019
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:
Cooper Aerial
February 2019
SCALE: 1" = 1000'
0' 1000' 2000' 3000'