Environmental Assessment

El Segundo Mine Lease By Application
Section 34, Township 17 N, Range 9 W

Prepared For:

Bureau of Land Management
Farmington Field Office

DOI-BLM-NM-F0101-2013-0139-EA

Revised January 2014

This page intentionally left blank.

TABLE OF CONTENTS

1. Introduction 1-1
1.1 Background 1-1
1.2 Purpose and Need 1-4
1.3 Conformance with Applicable Land Use Plan 1-4
1.4 Relationship to Statutes and Regulations 1-4
1.5 Scoping, Public Involvement, and Issues Identification 1-6
2. Description of Proposed Action and Alternatives 2-1
2.1 No Action Alternative 2-1
2.2 Proposed Action 2-1
2.2.1 Mining Activities 2-2
2.2.2 Reclamation 2-6
2.2.3 Resource Protection Design Features 2-9
2.3 Alternatives Considered But Eliminated from Detailed Analysis 2-10
3. Description of the Affected Environment 3-1
3.1 Air and Climate Resources 3-1
3.2 Geologic Resources 3-6
3.3 Soils 3-7
3.4 Surface and Groundwater Hydrology 3-9
3.4.1 Surface Water 3-9
3.4.2 Groundwater 3-10
3.5 Visual Resources 3-10
3.5.1 Background 3-10
3.5.2 Affected Environment 3-12
3.6 Noise 3-13
3.7 Vegetation 3-15
3.8 Wildlife and Migratory Birds 3-16
3.8.1 Migratory Birds 3-18
3.9 Invasive and Non-Native Species 3-19
3.10 Threatened and Endangered Species 3-19
3.11 Special Status Species 3-20
3.12 Socioeconomics 3-22

3.12.1 Population 3-23
3.12.2 Employment 3-23
3.12.3 Income 3-25
3.12.4 Government Revenues and Expenditures 3-26
3.12.5 Navajo Nation Socio-Economic Profile 3-29
3.13 Environmental Justice 3-30
3.14 Cultural Resources and Native American Religious Concerns 3-31
3.15 Land Use 3-33
3.16 Regulated Waste 3-34
3.17 Health and Safety 3-34
3.18 Traffic and Transportation 3-36
4. Environmental Consequences 4-1
4.1 Air and Climate Resources 4-1
4.1.1 Proposed Action 4-1
4.1.2 No Action Alternative 4-4
4.2 Geologic Resources 4-4
4.2.1 Proposed Action 4-4
4.2.2 No Action 4-5
4.3 Soils 4-5
4.3.1 Proposed Action 4-5
4.3.2 No Action Alternative 4-5
4.4 Surface and Groundwater Hydrology 4-6
4.4.1 Proposed Action 4-6
4.4.2 No Action Alternative 4-7
4.5 Visual Resources 4-8
4.5.1 Proposed Action 4-9
4.5.2 No Action Alternative 4-10
4.6 Noise 4-11
4.6.1 Proposed Action 4-11
4.6.2 No Action Alternative 4-12
4.7 Vegetation 4-12
4.7.1 Proposed Action 4-12
4.7.2 No Action Alternative 4-12

4.8 Wildlife and Migratory Birds 4-13
4.8.1 Proposed Action 4-13
4.8.2 No Action Alternative....4-14
4.9 Invasive and Non-Native Species 4-14
4.9.1 Proposed Action 4-14
4.9.2 No Action Alternative....4-15
4.10 Threatened and Endangered Species 4-15
4.10.1 Proposed Action 4-15
4.10.2 No Action Alternative....4-15
4.11 Special Status Species....4-15
4.11.1 Proposed Action 4-15
4.11.2 No Action Alternative....4-16
4.12 Socioeconomics 4-16
4.12.1 Proposed Action 4-17
4.12.2 No Action Alternative....4-18
4.13 Environmental Justice....4-18
4.13.1 Proposed Action 4-18
4.13.2 No Action Alternative....4-18
4.14 Cultural Resources and Native American Religious Concerns 4-18
4.14.1 Proposed Action 4-18
4.14.2 No Action Alternative....4-19
4.15 Land Use....4-19
4.15.1 Proposed Action 4-19
4.15.2 No Action Alternative....4-19
4.16 Regulated Waste 4-19
4.16.1 Proposed Action 4-19
4.16.2 No Action Alternative....4-19
4.17 Public Health and Safety....4-20
4.17.1 Proposed Action 4-20
4.17.2 No Action Alternative....4-20
4.18 Traffic and Transportation....4-20
4.18.1 Proposed Action 4-20
4.18.2 No Action Alternative....4-20

5. Cumulative Impacts, Unavoidable Adverse Effects, and Irreversible and Irretrievable Commitment of Resources 5-21

5.1 Past, Present, Reasonably Foreseeable Actions in the Project Vicinity 5-21

5.2 Air and Climate Resources 5-28

5.2.1 Temporal and Geographic Scope 5-28

5.2.2 Cumulative Effects 5-28

5.3 Geologic Resources 5-32

5.3.1 Temporal and Geographic Scope 5-32

5.3.2 Cumulative Effects 5-32

5.4 Water Resources 5-33

5.4.1 Temporal and Geographic Scope 5-33

5.4.2 Cumulative Effects 5-33

5.5 Visual Resources 5-34

5.5.1 Temporal and Geographic Scope 5-34

5.5.2 Cumulative Effects 5-35

5.6 Vegetation and Invasive Species 5-35

5.6.1 Temporal and Geographic Scope 5-35

5.6.2 Cumulative Effects Vegetation and Invasive Species 5-35

5.7 Wildlife and Migratory Birds 5-36

5.7.1 Temporal and Geographic Scope 5-36

5.7.2 Cumulative Effects 5-36

5.8 Special Status Species 5-36

5.8.1 Temporal and Geographic Scope 5-36

5.8.2 Cumulative Effects 5-36

5.9 Socioeconomics 5-37

5.9.1 Temporal and Geographic Scope 5-37

5.9.2 Cumulative Effects 5-37

5.10 Environmental Justice 5-37

5.10.1 Temporal and Geographic Scope 5-37

5.10.2 Cumulative Effects 5-38

5.11 Cultural Resources and Native American Religious Concerns 5-38

5.11.1 Temporal and Geographic Scope 5-38

5.11.2 Cumulative Effects 5-38

5.12 Health and Safety 5-38
5.12.1 Temporal and Geographic Scope 5-39
5.12.2 Cumulative Effects 5-39
6. Consultation and Preparers 6-1
6.1 Consultation and Coordination 6-1
6.2 List of Preparers 6-1
7. References 7-1
Appendix A —Map Figures A-1
Appendix B —Visual Resources B-1
Appendix C —Biological Survey Report C-1
Appendix D —Air Quality D-1
Appendix E —Comment/Response Matrix E-1
Appendix F —Emissions Sources in Eight-County Region F-1

LIST OF TABLES

Table 1.1-1. Estimated Annual and Cumulative Coal Production at the El Segundo Mine without Federal Lease 1-2
Table 2.2-1. Major Equipment Employed at the El Segundo Mine 2-3
Table 2.2-2. Annual Estimates of Blasting in the Project Area 2-5
Table 2.2-3. Anticipated Annual Coal Production from the El Segundo Mine and Project Area 2-5
Table 2.2-4. Anticipated Timing of Reclamation Activities 2-7
Table 2.2-5. Primary Species Used in Reclamation 2-8
Table 2.2-6. Revegetation Standards 2-9
Table 2.2-7. El Segundo Mine Design Features 2-9
Table 3.1-1. El Segundo Mine PM_{10} 24-Hour Ambient Air Concentrations 3-2
Table 3.1-2. Measurements exceeding the 24-hour PM_{10} NAAQS between 2008 and 2010 at El Segundo Mine 3-3
Table 3.3-1. Soils Present at the El Segundo Mine 3-7
Table 3.6-1. Definitions of Noise Terminology 3-14
Table 3.6-2. Maximum Noise Levels (2-minute Leq) Measured at 1,000 foot Intervals from Operational Sources at El Segundo and Lee Ranch Mines 3-15
Table 3.7-1. Acres and Percentages of Vegetation Communities within the Project Area and El Segundo Mine Permit Boundary 3-15
Table 3.10-1. Species Listed by the U.S. Fish and Wildlife Service as Threatened (FT), Endangered (FE), or Candidate (FC) for McKinley County, New Mexico, and the Potential to Occur in the Project or Action Area 3-20
Table 3.11-1. Bureau of Land Management, Farmington Field Office Special Status Species and their Potential to Occur in the Project Area 3-21

Table 3.12-1. Population for the Affected Counties, 1990-2030 3-23
Table 3.12-2. Number of Employees by Sector in the Each County in the Affected Region in 2011 3-23
Table 3.12-3. Employment in the Affected Region 2008-2011 3-25
Table 3.12-4. Average Annual Unemployment Rates for New Mexico and the Five County Affected Area, 2008-2011 3-25
Table 3.12-5. Median Household Income and Average Weekly Wage in 2010 for the Five County Affected Area and New Mexico 3-26
Table 3.12-6. State, Federal, and County Taxes by PNRC from El Segundo Mine 3-26
Table 3.12-7. Population Counts and Estimation for the Navajo Nation, McKinley County, and the Navajo Chapters Located within McKinley County 3-30
Table 3.13-1. Race/Ethnic Composition and Poverty Rates of New Mexico and the Five County Area, 2010 Census 3-31
Table 3.14-1. Summary of Findings Cultural Resources Surveys in the Project Area 3-32
Table 3.15-1. Land Ownership in McKinley County, New Mexico 3-33
Table 4.6-1. Noise Levels at Noise Sensitive Receptors near the El Segundo Mine 4-11
Table 4.12-1. Estimated Coal Production and Government Revenue from Mining the Project Area of the El Segundo Mine 4-17
Table 5.1-1. Reasonably Foreseeable Developments within the Cumulative Impacts Assessment Area 5-24
Table 5.2-1. 2011 Criteria Pollutant Emissions[1] by County (tons) 5-28

LIST OF FIGURES

Figure 3.12-1. Distribution of Tax Revenue Generated from Fossil Fuel Extraction in New Mexico and McKinley County, 2011 3-28

LIST OF MAPS

Map A-1. Permit Boundary and Project Area A-2
Map A-2. El Segundo Mine West A-3
Map A-3. El Segundo Mine East A-4
Map A-4. No Action Disturbance A-5
Map A-5. Water Resources A-6
Map A-6. Key Observation Points and Viewshed A-7
Map A-7. Vegetation Communities A-8
Map A-8. Affected Environment Population Centers A-9
Map A-9. Navajo Chapter Boundaries A-10
Map A-10. Cumulative Key Observation Points and Viewshed Overlap A-11

ACRONYMS AND ABBREVIATIONS

°F	degrees Fahrenheit
µPa	micropascals
AA	Antiquities Act of 1906
AADT	average annual daily traffic
ACI	Additional Coal Interests
AIRFA	American Indian Religious Freedom Act of 1978
ANFO	ammonium nitrate fuel oil
APS	Arizona Public Service
AQB	Air Quality Bureau
ARPA	Archaeological Resources Protection Act of 1979
BART	Best Available Retrofit Technology
BLM	Bureau of Land Management
BMP	Best Management Practices
BNSF	Burlington Northern Santa Fe
BSR	Biological Survey Report
Btu	British thermal unit
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CH_4	Methane
CHIA	Cumulative Hydrologic Impact Assessment
CMRP	Coal Mine Reclamation Program
CO	carbon monoxide
CO_2	carbon dioxide
CO_{2e}	carbon dioxide equivalent
COA	Conditions of Approval
CWA	Clean Water Act
dB	Decibels
dBA	a-weighted decibels
DEM	Digital Elevation Model
DOE	determination of eligibility for National Register of Historic Places
EA	Environmental Assessment
Ecosphere	Ecosphere Environmental Services
EIS	Environmental Impact Statement
ESA	Endangered Species Act
FCGS	Four Corners Generating Station
FEIS	Final Environmental Impact Statement
FFO	Farmington Field Office
GHG	greenhouse gas
KOP	key observation points
LBA	Lease by Application
L_{dn}	day/night average sound level
L_{eq}	equivalent noise level
LOM	life of mine
mg/L	micrograms per liter
MHI	median household income
MLA	Minerals Leasing Act

MMcf/d	million cubic feet per day
MMD	Mining and Minerals Division within the New Mexico Energy, Minerals, and Natural Resources Department
MMt	million metric tons
Mph	miles per hour
MSGP	Multi-Sector General Permit
MSHA	Mine Health and Safety Administration
MW	megawatt
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NAD	North American Datum
NAGPRA	Native American Graves Protection and Repatriation Act of 1990
National Register	National Register of Historic Places
NEPA	National Environmental Policy Act
NHP	National Historical Park
NHPA	National Historic Preservation Act of 1966
NMAC	New Mexico Administrative Code
NMED	New Mexico Environment Department
NMPIF	New Mexico Partners in Flight
NMSA	New Mexico Statutes Annotated
NO_2	nitrogen dioxide
NO_X	oxides of nitrogen
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
O_3	Ozone
OSM	U.S. Department of the Interior Office of Surface Mining Reclamation and Enforcement
Pb	Lead
PL	Public Law
PM	particulate matter
PM_{10}	particulate matter with a diameter between 2.5 and 10 micrometers
$PM_{2.5}$	particulate matter with a diameter of 2.5 micrometers or less
PNRC	Peabody Natural Resources Company
PRMP	Proposed Resource Management Plan
PTE	potential to emit
RCRA	Resource Conservation and Recovery Act
RFD	reasonably foreseeable development
RMP	Resource Management Plan
ROD	Record of Decision
SDA	Specially Designated Areas
SHPO	State Historic Preservation Office
SJGS	San Juan Generating Station
SMCRA	Surface Mining Control and Reclamation Act
SO_x	sulfur oxides
TCP	Traditional Cultural Property
TDS	total dissolved solids
Tpy	tons per year
USACE	U.S. Army Corps of Engineers
USBOR	U.S. Bureau of Reclamation
USC	United States Code
USDOI	U.S. Department of the Interior

USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	United States Geological Survey
VOC	volatile organic compounds
VRI	Visual Resource Inventories
VRM	Visual Resources Management
VS-VC	Visual Sensitivity-Visual Change
$\mu g/m^3$	micrograms per cubic meter of air

This page intentionally left blank.

1. INTRODUCTION

Peabody Natural Resources Company (PNRC) has filed an application to lease the federal coal reserves located on 640 acres within the permit boundaries of, and adjacent to, active mining at its El Segundo Mine. The area subject to the Lease by Application (LBA) is Section 34, Township 17 North, Range 9 West, in McKinley County, New Mexico (Project Area). The federal mineral estate in the Project Area is administered by the Bureau of Land Management (BLM) Farmington Field Office (FFO) and the surface is privately owned. The BLM/FFO reviewed the application and determined that the lease application meets the requirements of an LBA as defined by 43 Code of Federal Regulations (CFR) 3425.

This environmental assessment (EA) describes the environmental impacts of leasing the land and subsequently mining the federal coal reserves. This EA was prepared in accordance with the requirements of the National Environmental Policy Act (NEPA) of 1969 and the Council on Environmental Quality (CEQ) regulations implementing NEPA. The BLM is responsible for approval or denial of the lease application and the development of this EA, which follows BLM's NEPA Handbook H-1790-1. If the lease sale is held, the leaseholder would submit a mine plan to the U.S. Department of the Interior (USDOI) Office of Surface Mining Reclamation and Enforcement (OSM) for approval and additional NEPA documentation would be prepared.

1.1 Background

Lease by Application

The Mineral Leasing Act (MLA) of 1920 (as amended) and the Mineral Leasing Act for Acquired Lands of 1947 (as amended) gives the BLM the responsibility for leasing coal on lands where the mineral estate is owned by the federal government and where coal mining is permissible. Criteria set forth in 43 CFR 3461, establishes federal lands that are suitable for mining. Procedures for conducting competitive leasing of rights to extract federal coal are set forth in 43 CFR 3420-3427. The surface estate of these lands could be controlled by the BLM, other federal agencies, states, or private landowners.

The Federal Coal Leasing Amendments Act of 1976 that amended the Mineral Leasing Act of 1920 requires that coal leasing be a public, competitive process. Coal leasing may occur in two ways: (1) regional leasing, where the BLM identifies tracts, and (2) leasing by application, where a public entity nominates a tract of coal for lease sale. In recent years, new coal leases have been associated with extending existing mining operations, and all leasing is done by application.

The LBA process begins when the BLM receives an application to mine federal coal reserves. A Resource Recovery and Protection Plan, which contains a description of the geologic conditions, estimates of the coal reserve, and mining operations, is submitted along with the LBA. BLM reviews the application to ensure it conforms to existing land use plans and contains information adequate for determining the value of coal in the tract(s). If the application is deemed complete, an EA or environmental impact statement (EIS) is prepared in compliance with NEPA. The BLM consults with appropriate federal, state, and tribal agencies and the public before issuing a decision to hold the sale or deny the LBA. A lease sale begins with the BLM preparing an estimate of the fair market value of the coal. Sealed bids are accepted and the contract is awarded to the highest bid that meets or exceeds the BLM's estimation of fair market value and minimum bonus bid. Once a sale is held, a mine plan is

submitted by the leaseholder to the New Mexico Energy, Minerals, and Natural Resources Department, Mining and Minerals Division (MMD) and OSM for approval.

El Segundo Mine

El Segundo is a multiple seam surface coal mine, located approximately 35 miles north of Milan in McKinley County, New Mexico. The mine permit boundary encompasses approximately 15,000 acres in state and private surface ownership. Currently, the coal mined at El Segundo is privately owned. The blocks of federal coal that occur within the permit boundary are not currently mined. Leasing the Project Area would add one section (640 acres) of private surface, where the mineral estate is federally owned, to existing mine operations. Figure A-1 in Appendix A shows El Segundo Mine permit boundary, the section proposed for lease by application, and active mining at the El Segundo Mine.

The El Segundo Mine was opened in 2008 approximately 10 miles northwest of PNRC's Lee Ranch Mine in the southeastern plains of the San Juan Basin. Mining occurs in multiple pits with mine rates and sequencing determined primarily by coal quality and customer demand. Currently, active mining is occurring in six mining areas that are accessed by a network of haul roads. The mining process at the El Segundo Mine is described in detail in Section 2.2.1 of this EA. Existing and permitted coal handling, transportation, and storage facilities are shown on Figures A-2 and A-3 in Appendix A. The mine supplies coal to multiple customers under long- and short-term coal contracts. Coal is mined using a dragline, dozers, shovels, and trucks, and is transported to customers via the Burlington Northern Santa Fe (BNSF) Railway. Peak annual production is expected to be about 9.81 million tons. Total coal production for the life of the mine is estimated to be 133.84 million tons if the Project Area is not leased, and 143.05 million tons if the Project Area is leased. Table 1.1-1 contains the estimated annual and cumulative coal production at the El Segundo Mine without the Project Area, and Table 1.1-2 contains the annual and cumulative production with the Project Area.

Table 1.1-1. Estimated Annual and Cumulative Coal Production at the El Segundo Mine without Federal Lease

Year	Annual Production Existing Mine Non-federal (million tons)	Cumulative Production (million tons)
2008	3.28	3.28
2009	5.05	8.33
2010	6.64	14.97
2011	8.04	23.01
2012	8.30	31.31
2013	7.50	38.81
2014	8.81	47.62
2015	9.40	57.02
2016	8.38	65.40
2017	9.81	75.21
2018	9.81	85.02
2019	8.40	93.42

Year	Annual Production Existing Mine Non-federal (million tons)	Cumulative Production (million tons)
2020	7.60	101.02
2021	7.10	108.12
2022	7.10	115.22
2023	5.00	120.22
2024	4.88	125.10
2025	3.68	128.78
2026	3.25	132.03
2027	1.81	133.84
TOTAL	133.84	

Pending further assessment.

Table 1.1-2. Estimated Annual and Cumulative Coal Production at the El Segundo Mine with Federal Lease

Year	Annual Production Project Area Federal (million tons)	Annual Production Existing Mine Non-federal (million tons)	Annual Production Total Mine Federal + Non-federal (million tons)	Cumulative Production (million tons)
2008		3.28	3.28	3.28
2009		5.05	5.05	8.33
2010		6.64	6.64	14.97
2011		8.04	8.04	23.01
2012		8.30	8.30	31.31
2013		7.50	7.50	38.81
2014	0.41	8.40	8.81	47.62
2015	0.85	8.55	9.40	57.02
2016	1.3	7.08	8.38	65.40
2017	1.27	8.54	9.81	75.21
2018	1.01	8.80	9.81	85.02
2019	1.17	7.23	8.40	93.42
2020	1.22	6.38	7.60	101.02
2021	1.26	5.84	7.10	108.12
2022	0.61	6.49	7.10	115.22
2023	0.11	4.89	5.00	120.22
2024		4.88	4.88	125.10
2025		3.68	3.68	128.78
2026		3.25	3.25	132.03
2027		3.30	3.30	135.33
2028		3.40	3.40	138.73

Year	Annual Production Project Area Federal (million tons)	Annual Production Existing Mine Non-federal (million tons)	Annual Production Total Mine Federal + Non-federal (million tons)	Cumulative Production (million tons)
2029		3.13	3.13	141.86
2030		1.19	1.19	143.05
TOTAL	9.21	133.84	143.05	

1.2 Purpose and Need

PNRC has submitted an LBA to the BLM/FFO to lease and mine the federal coal reserves on 640 acres within the permit boundary of its El Segundo Mine. The purpose of the proposed action is to determine whether to lease the federal coal reserves in response to PNRC's LBA, preventing the by-pass of Federal coal. The need for the action is established by the BLM's responsibility under the Mineral Leasing Act and Federal Coal Leasing Amendments Act.

1.3 Conformance with Applicable Land Use Plan

Pursuant to 40 CFR 1502.21 and 1508.28, this site-specific EA tiers to and incorporates by reference the information and analysis contained in the Farmington Resource Management Plan/Final Environmental Impact Statement (RMP/FEIS) (BLM 2003a), which was approved as the Final Resource Management Plan for the FFO of the BLM by the Record of Decision (ROD) signed September 29, 2003 (BLM 2003b). The PRMP/FEIS and ROD are available for review at the FFO in Farmington, New Mexico, or electronically at http://www.blm.gov/nm/st/en/fo/Farmington_Field_Office/ffo_planning.html. This EA addresses site-specific resources and/or impacts that are not covered within the PRMP/FEIS, as required by NEPA. The El Segundo area is identified as an Additional Coal Interests (ACI) area that would be available for coal mining with stipulations (BLM 2003a, page 2-246). The proposed project would not be in conflict with any local, county, or state plans.

1.4 Relationship to Statutes and Regulations

This EA is prepared under the authority of NEPA (42 United State Code [USC] 321-4347) and CEQ regulations (40 CFR 1500-1508). It conforms to USDOI (Department Manual 516) and the BLM (Handbook H-1790-1) NEPA implementing guidance.

The MLA of 1920, as amended (30 USC 181 et seq.) authorizes the BLM to issue leases for coal-mining activities and permit the development of those leases. The lease would be a binding legal contract that allows development of the mineral by the holder. PNRC would be issued the lease subject to Conditions of Approval (COAs) by the BLM. COAs protect the rights of others and protect natural resources on public lands. Authorization for BLM approval of exploration permits are found in 43 CFR 3480—Coal Exploration and Mining Operations Rules.

The Surface Mining Control and Reclamation Act of 1977 (SMCRA), as amended, gives OSM primary responsibility for administering programs that regulate surface coal mining operations and the surface effects of underground coal mining in the United States. The New Mexico Energy, Minerals, and Natural Resources Department, MMD—Coal Mine Reclamation Program (CMRP) was created in the early 1980s

as part of New Mexico's enactment of surface coal mine reclamation regulations under SMCRA. The CMRP is responsible for regulating coal mines on all lands (federal, state, and private) within New Mexico, with the exception of Indian lands. CMRP is mandated to protect the public health and safety and the environment in and around surface coal mining operations by permitting, inspection, and enforcement.

Federal law mandates protection of some surface resources that would potentially be affected by the development of the proposed action. Cultural resources threatened by development are protected by:

- The Antiquities Act of 1906 [Public Law (PL) 52-209]
- The National Historic Preservation Act of 1966 (PL 89-665), and as amended (PL 52-209), and its regulations (36 CFR 800)
- NEPA (PL 91-852) and its regulations (40 CFR 1500 - 1508)
- The 1971 Executive Order No. 11593
- The Archaeological and Historical Conservation Act of 1974 (PL 93-291)
- The Archaeological Resources Protection Act of 1979 (PL 96-95) and its regulations (36 CFR 296)
- The American Indian Religious Freedom Act (48 USC 1996)
- The Native American Graves Protection and Repatriation Act of 1990 (PL 101-601; 104 Stat. 3048; 25 USC 3001; 43 CFR Part 10)

Compliance with Section 106 responsibilities of the National Historic Preservation Act are adhered to by following the BLM—New Mexico State Historic Preservation Office protocol agreement, which is authorized by the National Programmatic Agreement between the BLM, the *Advisory Council on Historic Preservation*, and the *National Conference of Council of State Historic Preservation Officers*, and other applicable BLM handbooks.

Under Section 402 of the Clean Water Act (CWA), as amended (33 USC 1251 et seq.), the U.S. Environmental Protection Agency (USEPA) regulates stormwater discharges for industrial and construction activities under the National Pollutant Discharge Elimination System (NPDES) program. Additionally, Section 404 of the Act, regulated by the U.S. Army Corps of Engineers (USACE), and Section 401 of the Act, regulated by the New Mexico Environment Department (NMED), protect wetlands and waters of the United States.

Surface water resources are protected from oil pollution sources by the Federal Water Pollution Control Act (40 CFR 112). The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 and other federal regulations are designed to control the releases of hazardous materials into the environment and to direct the handling of response to accidental spills.

Threatened and endangered flora and fauna species are protected under the Endangered Species Act (ESA) of 1973, as amended (PL 94-325). Additionally, the Migratory Bird Treaty Act (16 USC 703-712) and the Eagle Protection Act (16 USC 668-668d) protect other sensitive wildlife species potentially occurring in the proposed Project Area.

Executive Order 11312 of 1999, "Invasive Species," establishes measures to prevent the introduction of invasive species and provide for their control and to minimize the economic, ecological, and human health impacts that invasive species cause. The Executive Order provides guidelines to federal agencies to contend with invasive species, to create an Invasive Species Council, and to implement an Invasive Species Management Plan.

The Federal Plant Protection Act of June 2000 (7 USC 7701 et seq.), and the Federal Noxious Weed Act of 1974 (7 USC 2801 et seq.), provide for the control and management of non-indigenous weeds that injure or have the potential to injure the interests of agriculture and commerce, wildlife resources, or the public health. Section 2814 of the Federal Noxious Weed Act provides for coordination between federal agencies and the states, and provides that federal agencies “shall enter into cooperative agreements with state agencies to coordinate the management of undesirable plant species on Federal lands" (7 USC 7701).

Air quality standards in New Mexico are under the jurisdiction of the NMED Air Quality Bureau (AQB). The Environmental Improvement Act, New Mexico Statutes Annotated (NMSA) 1978, and the Air Quality Control Act, NMSA 1978, dictate state air quality standards. Also, 40 CFR 60 “Standards of Performance for New Stationary Sources” is administered by the NMED/AQB.

Executive Order 12898 of 1994, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," requires implementing procedures to ensure that proposed projects within the auspices of federal agencies do not result in disproportionate shares of negative environmental impacts affecting any group of people due to a lack of political or economic strength. Environmental justice requires, "...the fair treatment of people of all races, cultures, incomes, and educational levels with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies." As such, this document includes an assessment of the impacts of the project on minority and low-income populations.

1.5 Scoping, Public Involvement, and Issues Identification

Scoping is the process by which an agency solicits input on the issues, impacts, and potential alternatives to be addressed in a NEPA document. For this project, BLM interdisciplinary staff and contractors completed the internal scoping. External scoping can involve informing government agencies, organizations, tribes, and the public of a project and providing those entities the opportunity to comment. While external scoping for EAs is optional (40 CFR 1501.7) and at the discretion of the BLM, the BLM NEPA Handbook (H-1790-1) recommends that the EA document the rationale for determining whether to conduct external scoping. Several factors were considered in determining that external scoping was not necessary for this project. Foremost, multiple EAs and EISs related to coal mining actions have been prepared in the region within the last 5 years including the BHP Navajo Coal Company Pre-2016 Mine Plan for Area III and Area IV North EA, the Desert Rock Energy Project Draft EIS, and the Kayenta Mine Permit Renewal EA. These past documents were reviewed, and issues applicable to this EA were identified. Other factors considered in determining whether external scoping was warranted included the size of the project, the surface and adjacent lands ownership, whether the action is unique, and the potentially interested and affected parties. Because the proposed LBA is for a small area (640 acres) of federal minerals beneath private surface and surrounded by private lands and the active El Segundo Coal Mine, coupled with the list of NEPA issues identified by other coal projects, it was determined that public

involvement for this project would include notifying the public of the availability of the Draft EA for review and soliciting comments on that document. Additionally, a public information meeting was held to inform the public about the Proposed Action. Appendix E contains a comment-response matrix that lists all comments received during the public review period and how those comments were addressed in the Final EA.

Issues and concerns have been expressed by the public and government agencies relating to the potential impacts of coal leasing and development activities in the region. In response to these issues and concerns, the following items will be addressed in this EA:

- Potential impacts to transportation (rail or road) routes
- Potential impacts to human health
- Socioeconomic impacts
- Noxious weed concerns
- Potential impacts to visual resources
- Potential impacts to cultural and paleontological resources
- Potential impacts to wildlife
- Potential impacts to threatened and endangered species and other species of concern
- Potential air quality impacts
- Potential surface and groundwater quality and quantity impacts
- The need to address emissions from coal-fired power plants
- The need to address site-specific greenhouse gas emissions/climate change
- Waste management
- Noise/vibration
- End use of coal

2. Description of Proposed Action and Alternatives

NEPA requires agencies to evaluate the environmental impacts of a range of reasonable alternatives that meet the project purpose and need. Further, USDOI NEPA implementing regulations define reasonable alternatives as those that are technically and economically practical or feasible and meet the purpose and need of the proposed action (43 CFR Part 46.420.2.b).

The Proposed Action and No Action Alternative are described in Sections 2.1 and 2.2. Those alternatives that were considered but eliminated from detailed environmental impact analysis because they were not reasonable or practicable or do not meet the project purpose and need are summarized in Section 2.3.

2.1 No Action Alternative

Under the No Action Alternative, the application would be denied and no mining would take place in the Project Area. However, up to 163 acres of the Project Area would be disturbed by activities related to mining in adjacent permitted areas. These activities include development and eventual reclamation of pit walls in adjacent mined areas and construction of diversions and sediment ponds (Figure A-4).

Pit walls (also referred to as highwalls) are typically designed at an angle of 65 degrees from the pit floor to crest to provide for stability and safety. If no mining occurs in the Project Area, 112 acres would be disturbed to provide stable pit walls in adjacent mined areas and to reclaim pit walls in order to provide for stable slopes in the final reclaimed topography. Equipment used would include a dragline, haul trucks, shovels, loaders, and track dozers.

Diversions and sediment ponds would be used to control and treat water from disturbed areas of the mine and would be constructed according to specifications in the El Segundo Mine Permit (PNRC 2010). Approximately 45 acres would be disturbed for diversions, which are expected to be less than 10 feet deep. Approximately 6 acres would be disturbed for sediment ponds, which would likely be 20 feet in depth. Equipment for the pond and diversion construction would include dozers, scrapers, loaders, and small utility trucks. All areas would be reclaimed according to the El Segundo Mine Permit (PNRC 2010) and as described below for the Proposed Action. Diversions, sediment ponds, and pit wall disturbance would be reclaimed at the end of mining in adjacent areas.

In addition to the surface disturbance that would occur in support of mining the adjacent non-federal coal, mine operations of the larger El Segundo Mine would continue. Approximately 133.84 million tons of coal will be mined from the non-federal portion of the mine regardless of whether the Project Area is leased (see Table 1.1-1).

2.2 Proposed Action

PNRC has submitted an application to lease the federal coal reserves beneath a section of privately owned land located adjacent to its existing mining operations at the El Segundo Mine (Project Area). The Proposed Action is to lease the Project Area and to mine its federal coal reserves. Although the LBA process is an open and competitive one, the Proposed Action assumes that PNRC would be the successful bidder of the federal coal and the Project Area would be mined as a part of the permitted El Segundo

Mine. The proposed mining would occur on split estate lands where the surface is privately owned and the mineral estate is administered by the BLM/FFO. PNRC has completed exploratory drilling and sampling to determine the quality and quantity of coal present in the Project Area. The exploration activities were evaluated in a separate EA, which is on file with the BLM/FFO (BLM 2011a).

Mining activities at the El Segundo Mine are currently taking place in multiple areas with mining rates and sequencing dependent primarily on coal quality and customer demand. These and other factors could influence production and reclamation schedules at the mine, including the Project Area.

Existing facilities at the El Segundo Mine include an office, parking lot, fueling station, warehouses, garages and other maintenance buildings, truck wash, bathhouse, electrical substation, overhead crane, water and sewer system, direct access to and from the overpass crossing State Highway 509, coal load-out facilities and a railroad spur to move the coal product to market. No new facilities or buildings would be required to mine, remove, and ship coal from the Project Area. The following sections describe the proposed mining activities, transportation of coal within the mine, reclamation of the site once mining is complete, and resource protection design features incorporated into the Proposed Action to reduce or eliminate adverse impacts.

2.2.1 Mining Activities

El Segundo is a terraced, advancing open pit mine. In the Project Area, 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. The proposed activities in the Project Area are anticipated to begin in 2014 with removal of vegetation and topdressing. Coal removal would begin in 2014 and continue through 2023. Total surface disturbance associated with mining in the El Segundo LBA is anticipated to be 448 acres.

Mining would employ a dragline that would make east-west cuts across the Project Area, advancing to the north. Each cut would be 140 feet wide. To ensure miner’s safety, highwalls on the advancing face (north face) are typically designed to stand at a 65-degree angle when cut depths are less than 200 feet. When highwalls on the advancing face are over 200 feet, pre-benches (or safety benches) are used to accommodate equipment. These benches are typically 200 feet wide and 65 feet high. Electric front shovels and haul trucks would be used to create safety benches. Endwalls (highwalls lateral to the pit advance) would also stand at 65 degrees at cut depths less than 200 feet. Endwalls higher than 200 feet would be benched with safety catch ledges approximately 25 feet wide. The configuration of the mining pits would be adjusted as needed to accommodate the geologic conditions encountered in a particular area and the coal demand from customers. Advancement of the mine cuts would typically occur in a direction parallel to the previous benches. The shovels and haul trucks would operate on the same bench during loading operations. Haul trucks and auxiliary equipment would use the benches as ramps within the pits.

Mining activities in the Project Area would employ equipment currently in use at the El Segundo Mine such as front-end loaders, scrapers, bulldozers, motor graders, haul trucks, and a dragline (see Table 2.2-1).

Table 2.2-1. 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

The general mining sequence that would be implemented in the Project Area would be the same as what is currently used at the mine. This sequence 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.

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 (Figures A-2 and A-3 in Appendix A).

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 Figures A-2 and A-3 in Appendix A.

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. Between 5 and 12 blasts are expected to occur each year in the Project Area. Annual estimates are shown in Table 2.2-2.

Table 2.2-2. Annual Estimates of Blasting in the Project Area

Year	Number of Blasts
2014	10
2015	10
2016	6
2017	11
2018	11
2019	9
2020	12
2021	9
2022	9
2023	5

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 2010).

Coal Removal, Handling, and Transportation

Coal would be recovered from up to nine seams in the Project Area 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 2.2-3 along with the production that would be mined from the Project Area. Production from the Project Area would not increase the amount of coal mined annually at El Segundo but would extend production by 1 to 2 years.

Table 2.2-3. Anticipated Annual Coal Production from the El Segundo Mine and Project Area

	Anticipated Annual Production (million tons)	
Year	Project Area	Total El Segundo Mine
2008	0	3.28
2009	0	5.05
2010	0	6.64
2011	0	8.04
2012	0	8.30
2013	0	7.50

	Anticipated Annual Production (million tons)	
Year	**Project Area**	**Total El Segundo Mine**
2014	0.41	8.81
2015	0.85	9.40
2016	1.30	8.38
2017	1.27	9.81
2018	1.01	9.81
2019	1.17	8.40
2020	1.22	7.60
2021	1.26	7.10
2022	0.61	7.10
2023	0.11	5.00
2024	0	4.88
2025	0	3.68
2026	0	3.25
2027	0	3.30
2028	0	3.40
2029	0	3.13
2030	0	1.19
TOTAL	9.21	143.05

Coal from the Project Area would be loaded into haul trucks and transported to the truck dump or coal stockpile (Figures A-2 and A-3). 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 Project Area to customers. No new loading facilities or modifications to existing facilities would be required as part of the Proposed Action.

2.2.2 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 for the Project Area. 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 2010, 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 2.2-4. 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 2.2-4. 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 (Table 2.2-4). 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 2.2-5). 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.

Table 2.2-5. 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*)

Prior to 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 2010).

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 2.2-6 would be used to ascertain success of reclamation.

Table 2.2-6. 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

2.2.3 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 2010). Design features are considered part of the Proposed Action. Table 2.2-7 lists these design requirements and the resources they would affect.

Table 2.2-7. 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 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

Resource Protection Design Features	Resources Affected
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)	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

2.3 Alternatives Considered But Eliminated from Detailed Analysis

Lease Sale for a New Standalone Mine

As discussed in Chapter 1, the LBA process is a competitive sealed-bid process, which is open to the public. Though the LBA coal tracts are nominated for leasing by companies with an interest in acquiring them, the sale of coal is competitive and not restricted to the company nominating the lease. If the contract were won by a bidder other than PNRC, a new mine would be established to develop the coal resources, requiring considerable costs associated with constructing new facilities (e.g., roads, offices, shops, coal processing facilities, rail spur) and collecting extensive baseline data. This alternative is not considered economically feasible because the cost of obtaining access agreements and developing new mine infrastructure would make it difficult to recover investments due to the relatively small reserve base. Additionally, PNRC would be unlikely to grant access to lands it owns. This alternative would result in greater environmental impacts associated with establishing a new mine.

Delaying Lease Sale

Postponing the sale of the El Segundo LBA tract was also considered. Bypassing the coal in Section 34, which is surrounded on three sides by areas that will be mined, would result in the unnecessary loss of coal resources. The incentive for PNRC or another coal company to pursue a lease by application would be diminished if the coal in this section were not mined because additional resources would be required to re-access the area. Delaying the lease sale would reduce the maximum economic recovery of the coal and potentially could eliminate interest in the sale altogether.

3. DESCRIPTION OF THE AFFECTED ENVIRONMENT

This section describes the environment that would be affected by implementation of the alternatives described in Chapter 2. In compliance with requirements contained in NEPA, and implementing regulations and related guidance, the description of the affected environment focuses on those environmental resources potentially subject to impacts.

3.1 Air and Climate Resources

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 whether or not the Section 34 federal coal leasing project area is mined, 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 NAAQS for these categories of emissions at the existing El Segundo Mine (see Appendix D).

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 2008 to 2010, 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 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 3.1-1 shows the highest and second highest PM_{10} concentrations that meet the PM_{10} NAAQS at each sampler for the 3-year period. These concentrations do not include several measurements that exceed the 24-hour PM_{10} NAAQS. Table 3.1-2 shows measurements that exceed the 24-hour PM_{10} NAAQS. Meteorological data from the National Weather Service's Gallup, NM are included in the table for each exceedance. This information indicates that high winds or inversions were a primary contributor to the measured PM_{10} values given the dry, arid conditions, which prevail throughout the area for long periods; wind erosion can generate significant amounts of fugitive PM_{10} emissions. Despite the fact that PNRC operates its fugitive dust control plan to suppress mining-generated emissions of PM_{10} throughout the El Segundo Mine, climatic conditions may frequently transport off-site fugitive PM_{10} emissions into the mine boundary where their resultant impacts are monitored.

Table 3.1-1. El Segundo Mine PM_{10} 24-Hour Ambient Air Concentrations

Monitor Site	2008		2009		2010	
	First High	Second High	First High	Second High	First High	Second High
SH01	135	133	106	73	125	81
SH02	66	46	148	43	93	52
SH03	142	138	125	96	136	120

Table 3.1-2. Measurements exceeding the 24-hour PM_{10} NAAQS between 2008 and 2010 at El Segundo Mine

Monitor	Date	PM_{10} ($\mu g/m^3$)	Meteorological Conditions	Average Wind Speed[2] (mph)	Maximum Gust (mph)
SH01	4/29/2010	353	High Winds- West	24.1	56.4
SH01	6/25/2010	326	High Winds- East	11.4	39.1
SH02	4/12/2008	287	High Winds - variable	7.0	17.3
SH02	7/11/2008	299	High Winds- variable	10.1	41.4
SH02	10/3/2008	166	High Winds- West	10.6	25.3
SH03	4/24/2008	257	High Winds- West	17.0	44.9
SH03	4/12/2010	152	High Winds- South	19.3	48.3
SH03	4/29/2010	440	High Winds- West	24.1	56.4
SH03	5/1/2010	216	High Winds- West	13.5	32.2
SH03	5/22/2010	706	High Winds – Southwest	21.9	50.6
SH03	6/19/2010	224	High Winds- Southwest	11.7	38.0
SH03	9/21/2010	188	Temperature Inversion	8.9[3]	-
SH03	10/15/2010	155	Temperature Inversion	5.74[4]	-
SH03	12/2/2010	306	Temperature Inversion	5.9[4]	-
SH03	12/15/2010	215	High Winds- West	14.8	35.7

[1] based on Gallup, New Mexico Weather Data.

[2] Wind speed average determined over 24 hours (excluding calms) regardless of direction.

[3] Calm winds for 12 hours.

[4] Calm winds for 15 hours.

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 2008 through December 2010 are summarized by season in Table 3.1-3. This meteorological data describes the recent climate variables important to atmospheric transport and dispersion across the El Segundo Mine.

Table 3.1-3. Seasonal Meteorological Conditions at the El Segundo Mine (2008-2010)

	Winter	Spring	Summer	Fall	Annual Average
Average daily mean temperature (ºF)	31.5	49.0	69.2	51.4	50.2
Maximum daily temperature (ºF)	53.6	63.7	88.3	74.6	90.5
Minimum daily temperature (ºF)	8.3	22.5	47.9	26.5	2.9
Average wind speed (miles per hour)	10.8	13.6	11.0	11.0	10.5
Hourly maximum wind speed (miles per hour)	36.9	35.6	29.5	32.9	36.9
Precipitation (liquid inches)	0.5	0.2	1.7	0.6	8.7

Note: degrees Fahrenheit = ºF

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 estimated 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

3.2 Geologic Resources

For this analysis, geologic resources include topography, geology, minerals, and paleontological resources present in the Project Area. The Project Area is approximately 3 miles east of the Continental Divide on a gently rolling, southeast facing slope above Inditios Draw.

Topography

Topography in the Project Area is elevated to the north with a prominent hill and sandstone outcrop in the northeast corner. A vegetated swale evenly bisects the Project Area, running north to south. Similar swales enter and exit the Project Area near the southwest and southeast corners. The surrounding area includes rock outcrops to the north and east protruding from rolling plains. Dominant surface features surrounding the Project Area include the 500-foot-high cliffs and raised plateau of the Chacra Mesa complex in the northeast, Mount Taylor (11,305 foot elevation) to the southeast, and the Zuni uplift to the southwest. Elevations in the Project Area vary slightly from 7,096 feet on the summit of the rock outcrop in the northeast part of the Project Area to approximately 6,900 feet in the southern portion of the Project Area. Slopes within the Project Area range from 1 percent to 90 percent at the sandstone outcrop. The average slope is near 5 percent (Appendix A).

Geology and Paleontology

The primary geologic formations of the San Juan Basin near the El Segundo Mine belong to the Mesa Verde group. The proposed Project Area surface geology is dominated by Menefee Formation beds dipping northeast at less than 1 degree (PNRC 2010). Composed of mudstone, shale, and sandstone, the upper portion of overburden belongs to the Allison Member, while the lower portion is comprised of the coal- and shale-bearing strata belonging to the Cleary Member. Portions of the Project Area on the far eastern and western edges are comprised of recent unconsolidated surficial alluvium from the upper and middle Quaternary Period (NMBGMR 2003).

The Project Area is located within the paleontologically rich area of the San Juan Basin of northern New Mexico. The geological formations present in the Project Area include the Point Lookout Sandstone and Menefee Formation of the Mesa Verde Group from the late Cretaceous period (USGS 2010). The Point Lookout Sandstone was deposited as beach sand as the sea retreated. Few fossils occur in the Point Lookout Sandstone formation, but those present include crustaceans, clams, driftwood, and palm tree leaves. The Menefee Formation was formed after the sea withdrew from the area, leaving flat, coastal plains with swamps. Leaf impressions, tree branches, and other fossilized plant remains occur in this formation (NPS 2005).

Extensive inventories of paleontological resources were conducted at the Lee Ranch Mine site southeast of the El Segundo Mine. Geologically, the El Segundo Mine, including the Project Area, is similar to the Lee Ranch Mine site to the southeast. Because of the similarities in geological structure and age of formations, paleontological resources are expected to be comparable (PNRC 2010). No non-marine invertebrates were observed in the fluvial and paludal environments of the exposed Cleary Member of the Menefee Formation. Twenty taxa—all mollusks—were documented in the Point Lookout Sandstone in the sandstone outcrops. Silicified fossil wood and leaf floras were recorded throughout the Lee Ranch Mine. Turtles and possible large vertebrate fragments were recorded in the Cleary Member Formation.

The paleontological surveys at Lee Ranch Mine indicated that surface exposures revealed no sites classified by the BLM as significant or critical (LRCC 2011).

Minerals

Coal is the target solid leasable mineral resource within the Project Area. No oil or gas wells or underground mines area were located within or adjacent to the Project Area or the El Segundo Mine permit boundary. In the Project Area, the Cleary Member of the Menefee Formation contains the coal reserves to be mined. Two major coal seams occur within the Cleary Member, the Blue Seam, and the Green Seam. The Green Seam underlies the Blue Seam and contains 11 percent of the mine reserves. The Blue Seam contains 54 percent of the mine reserves. Where the two seams are combined as a single seam, they account for 19 percent of the mine reserves. The remaining 16 percent of the reserves occurs in three other smaller seams. Individual seam thicknesses vary from 1 to 17 feet (PNRC 2010, subpart 803). Approximately 136 million tons of surface mineable coal lies within the El Segundo Mine permit boundary and approximately 9 million tons are anticipated to be mined from the Project Area (see Table 2.2-3). The coal within the Project Area is subbituminous A, having 35 to 45 percent carbon content and low sulfur content, and burns cleaner than other coals (KET 2012). For more information about the existing El Segundo Mine, see Section 1.1, Background.

3.3 Soils

The soils in McKinley County, including the Project Area, have been surveyed by the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS) (NRCS 2001). Soils in the El Segundo Mine permit boundary have been surveyed by PNRC as a requirement for an initial permit to mine. Table 3.3-1 contains a list of soils present on the El Segundo Mine site. Data from the PNRC survey are the most spatially accurate soil data available (PNRC 2010). Descriptions and properties of soils present on the project site are derived from the NRCS Soil Survey for McKinley County, New Mexico (NRCS 2001). NRCS ecological site descriptions are provided as described by the NRCS to more closely link soil types with land production and vegetative characteristics. "Ecological Site" is defined as "a distinctive kind of land with specific characteristics that differs from other kinds of land in its ability to produce a distinctive kind and amount of vegetation" (NRCS ESIS 2011).

Table 3.3-1. Soils Present at the El Segundo Mine

Soil Unit and % Composition	Project Area (%)	Slopes (%)	Runoff Class	Flooding Hazard	Available Water Capacity
Fajada-Huerfano-Benally complex	37				
Fajada soils (30%)		1-5	High	None	Very low (2.3 inches)
Huerfano soils (30%)		1-5	High	None	Very low (1.6 inches)
Benally soils (25%)		1-3	Medium	None	Low (3.6 inches)
Minor components (15%)*					
Marianolake-Skyvillage complex	21				
Marianolake soils (50%)		1-8	Medium	None	High (10.5 inches)
Skyvillage soils (30%)		1-6	Medium	None	Very low (2.0 inches)
Minor components (20%)*					
Doak-Shiprock complex	20				
Doak soils (55%)		1-5	Low	None	Moderate (8.3 inches)
Shiprock soils (30%)		1-8	Low	None	Moderate (8.1 inches)
Minor components (15%)*					

Soil Unit and % Composition	Project Area (%)	Slopes (%)	Runoff Class	Flooding Hazard	Available Water Capacity
Starlake Clay (85%) Minor Components (15%)*	10	1-3	High	Rare	Low (5.4 inches)
Sparank-San Mateo-Zia complex Sparank soils (40%) San Mateo soils (35%) Zia soils (20%) Minor components (5%)	10	 0-3 0-3 1-3	 High Medium Very Low	 Occasional Occasional Rare	 High (10.0 inches) High (10.6 inches) High (8.0 inches)
Hospah-Skyvillage-Rock outcrop complex Hospah soils (35%) Skyvillage soils (30%) Rock outcrop (20%)* Minor components (15%)*	1	 2-35 2-15	 Very High Medium	 None None	 Very low (1.9 inches) Very low (1.0 inches)

*For additional information, see soil survey of McKinley Country, New Mexico (NRCS 2001)

The predominant soil mapping unit, occupying over 37 percent of the Project Area, is Fajada-Huerfano-Benally complex. This soil is found on erosional terraces and dipslopes on cuestas and valley floors, and consists of alluvial material generated from sandstone and shale (NRCS 2001). The individual soil classes in this unit are found in nearly equal proportions, and all support a “Loamy Upland” Ecological Site (NRCS ESIS 2011). Similar to the Starlake clay, all are considered sodic and fairly saline, restricting the plant communities that can survive in this soil type. All components have slow permeability (NRCS 2001).

The Marianolake-Skyvillage complex occupies 21 percent of the Project Area, though much of this lies in the northern part of the Project Area where mining is not planned to occur. The Marianolake component is loamy and well drained, and has low salinity and sodicity levels (NRCS 2001). The Skyvillage soil unit is in the “Shallow Sandstone” Ecological Site, and bedrock is found 5 to 20 inches beneath the soil (NRCS ESIS 2011). This soil is moderately permeable with a low available water capacity (NRCS 2001). It is assumed that all material above bedrock is suitable for topdressing, and combined with the Marianolake component, averages about 36 inches deep.

The Doak-Shiprock complex occupies 20 percent of the Project Area, mainly on the eastern edge of the area. The components consist of 45 percent Doak, 25 percent Shiprock, 15 percent of Norkiki, and 15 percent Benally soils. The parent material of this loamy soil is eolian material, and fan and slope alluvium (NRCS 2001). Likewise, the Ecological site is described as “Loamy Upland.” The soil is described as deep and well drained (NRCS ESIS 2011). This soil type is well suited for topdressing.

Starlake Clay covers an estimated 10 percent of the Project Area, occurring on stream terraces and valley floors, as well as fan remnants on valley sides. Parent material is generated via the sandstone and shale cut through by typically shallow drainages. The Starlake Clay is considered well drained but has very slow permeability. The depth of this soil type is greater than 60 inches (NRCS 2001). The Ecological site of this soil is considered “Sodic Slopes,” described as having high availability of sodium. The large percentage of clay and salt in this soil makes it a poor topdressing material as spreading and revegetation would be difficult, yet pockets of more desirable soil exists within this soil type (NRCS ESIS 2011). The Blancot component of this soil group is well drained and loamy, while the Tsosie soil type is well drained. These areas, combined with the Rock outcrops and Badlands common to this soil type, provide some level of topographic and ecological diversity to the Starlake clay soil type (NRCS 2011).

The Sparank-San Mateo-Zia complex located on the eastern edge and southwest corner of the Project Area with 0 to 3 percent slopes occupies about 10 percent of the Project Area. This soil is found in the lower altitude portions of the Project Area and is similarly described as being positioned in floodplains on valley floors and alluvial fans on valley sides, being born of fan and stream alluvium derived from sandstone and shale. The Sparank and San Mateo soils are similar, both being well drained and having very slow/moderately slow permeability. Salinity and sodicity in these soils is also low despite their clayey nature. The Zia soils are described as more sandy than the Sparank and San Mateo soils. In fact, this soil is described as "somewhat excessively drained," and the permeability is moderately rapid (NRCS 2001). The ecological site is "Sandy." The Sparank soil type is overly clayey and salty to be a useful topdressing material. The San Mateo soil is more suitable for topdressing, and it is estimated to be usable to a depth of 60 inches or more (NRCS ESIS 2011). It is possible to easily differentiate the two via plant communities and micro-relief.

The Hospah-Skyvillage-Rock outcrop complex is found in this Project Area as rock escarpments and occupies only 1 percent of the Project Area in a location that has not been proposed to be mined through. The Skyvillage component comprises about 40 percent of the soil in this unit, and the ecological site in these areas is considered shallow sandstone (NRCS ESIS 2011). Little loose material exists in the soil type that is suitable for salvage; therefore, it is unlikely that it can or will be used for topdressing. The Hospah soil type has a high shrink-swell potential, very low available water capacity, and has an overly dominant clay component to be desirable for topdressing (NRCS 2001).

Small patches of biological soil crusts were observed in the near rock outcrops in the northeast corner of the Project Area during a field survey on January 18, 2012. There are no alluvial valley floors in the Project Area.

3.4 Surface and Groundwater Hydrology

3.4.1 Surface Water

The Project Area is just east of the Continental Divide and is part of the Rio Grande Watershed. Three unnamed ephemeral drainages, as mapped by the National Hydrography Dataset, are located within the Project Area (Figure A-5, Appendix A) (USGS 2008). These drainages flow south into Inditos Arroyo in the southern portion of the mine boundary, and ultimately to Rio Puerco approximately 35 miles to the east and only in response to large precipitation events.

The drainages originate within the Project Area or just north of the Project Area near the Continental Divide and are considered headwater channels (i.e., small watersheds with little to no channel development) with no wetland or riparian vegetation observed during 2012 field surveys. The two drainages in the northeast corner of the Project Area do not contain defined bed-and-banks and are vegetated swales characterized by increased cover of alkali sacaton. As the channels flow off the southern portion of the Project Area, they exhibit defined channels that range in width from 1 to 2 feet and in depth from 1 to 3 inches. Around these channels, the vegetation cover is higher but still composed of upland species including alkali sacaton and James' galleta (*Pleuraphis jamesii*).

Surface water use is confined to opportunistic use by ranchers for livestock watering. There are four stock ponds just outside of the proposed Project Area (Appendix A), but none are within the Project Area.

PNRC has collected surface water quality samples for six stations for their SMCRA permit including one station (SWM #6) just west of the Project Area in a channel that parallels the Project Area channels. Samples taken from Inditos Arroyo (SWM #5) had elevated total suspended solids (average of 2,415 micrograms per liter [mg/L]), which is characteristic of ephemeral channels that primarily flow in response to large precipitation events. The majority of metals—including arsenic, total mercury, and total recoverable selenium—were below detection levels and less than state livestock water criterion. The Inditos Arroyo samples had elevated aluminum concentrations (average of 0.13 mg/L), but were still below state livestock water criterion (NM-EMNRD 2005). A summary of the surface water monitoring data collected from Inditos Arroyo, SWM #6, along with the rest of the sampling sites are included in Table 805-6 of PNRC's Mine Permit (PNRC 2010).

3.4.2 Groundwater

El Segundo Mine targets the Cleary Member of the Menefee Formation as its mineable coal seam. The thickness of the Menefee Formation ranges from 0 feet to 600 feet in the northeastern part of the mine permit boundary (PNRC 2010). Groundwater does occur in some of the sandstone units and coal seams that constitute the Menefee Formation; however, the Menefee Formation is not known to yield water to wells within the mine permit boundary. Further north, beyond the mine permit boundary, a number of wells yield small supplies of water primarily for cattle (PNRC 2010). The layer immediately below the lowest mineable coal seam is predominantly shale, which forms a barrier between the mining activities and the underlying Point Lookout Sandstone (NM-EMNRD 2005). The mine does not contain saturated alluvium in any of the ephemeral streams.

The Point Lookout Sandstone Formation exhibits saturation in the northern part of the mine permit boundary and serves as an aquifer for small supplies of water in wells within and north of the mine. However, this layer would not be affected by mining activities as it is below the mineable coal seam (NM-EMNRD 2005). Important aquifers for the San Juan Basin deeper than the Point Lookout Sandstone Formation include the Gallup and Westwater Canyon Member of the Morrison Formation aquifers. These aquifers would not be affected by mining activities, but could be affected by the drawdown of El Segundo's water well. El Segundo Mine has well SJ-120 for production water that taps three aquifers (the Dalton Sandstone, Gallup Sandstone, and the Westwater member of the Morrison Formation). El Segundo Mine is permitted to extract up to 650 acre-feet of water annually, although it has never used its full allotment of water in any given year since mining began (NM-EMNRD 2005).

The USGS conducted an extensive survey of the primary aquifers of the San Juan Basin including the predominant aquifers of the El Segundo Mine. Their findings, along with groundwater samples from PNRC's Lee Ranch Mine, indicate that water from the Menefee Formation is only suitable for livestock consumption and does not meet New Mexico secondary drinking water standards primarily due to high total dissolved solids (TDS) (NM-EMNRD 2005).

3.5 Visual Resources

3.5.1 Background

The Project Area is located on split estate lands, with private surface and BLM-managed minerals. Typically, the BLM applies its Visual Resource Management methodology to projects requiring a BLM-based decision. This system, which includes four Visual Resources Management (VRM) classes (ranked I

through IV), is designed to help maintain or enhance visual qualities and describe the different degrees of human modification that can be allowed to BLM-managed landscapes. Class I allows the least modification and Class IV allows the most (BLM 2003a). Visual Resource Inventories (VRI) are usually conducted to identify baseline visual conditions and to help establish recommended VRM classes. A VRI includes a scenic quality evaluation, a visual sensitivity level analysis, and a delineation of distance zones. VRI classifications represent the relative values of the visual resources at the time of the inventory and provide the basis for considering visual values in the resource management planning process.

Since the BLM/FFO does not assign visual management classes to private split estate land, VRM and VRI classes identified for BLM-managed lands located in the vicinity of the Project Area are provided in this document for general comparison and reference only and do not reflect classifications or management applied to the proposed Project Area. However, the BLM is required under NEPA to insure that measures be taken to "...assure for all Americans...aesthetically pleasing surroundings (43 U.S.C. 4321 et. seq. Section 101 [b]) and to "utilize a systematic, interdisciplinary approach that will ensure the integrated use of...Environmental Design Arts in …planning and decision making (43 U.S.C. 4321 et. Seq. Section 102)." Therefore, as part of the EA review process, visual resources are considered in this EA.

The BLM/FFO's 2003 RMP based interim VRM classes on a 1978-80 VRI of the BLM/FFO area (BLM 2003a). The 2003 VRM classifications are still being implemented on BLM-managed lands in the FFO pending the completion of a new VRI that would meet current BLM guidance and its review (BLM 2003a). In 2009, a new VRI was completed for the BLM/FFO area. This VRI indicated that the landscape has changed substantially since the 1978-80 VRI, warranting the need for an amendment to the RMP to address visual resources. Therefore, on June 13, 2011, the BLM/FFO filed a Notice of Intent (FR Doc. 2011-14491) to prepare an RMP amendment and EA for visual resources. The BLM/FFO will continue to honor all valid, existing rights and resource allocations discussed in the RMP (BLM 2011b). In the interim, until the amendment has been signed, both the 2003 VRM and 2009 VRI classifications will be discussed as relevant in BLM documents (Wegener 2011).

The closest BLM-managed lands to the Project Area are located approximately 4 miles to the northeast and southwest of the Project Area. The 2003 PRMP VRM class for these parcels is Class IV (BLM 2003a). The objective of this class is to provide for management activities that may require major modifications of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements of form, line, color, and texture.

The 2009 VRI classifications for the same parcels were Class IV for the parcel located to the northeast of the Project Area that lies within the middleground viewshed of the Project Area and Class III for the BLM-managed area located to the southwest of the Project Area. In general, BLM parcels located north, west, and east of the Project Area were given VRI classifications of IV; parcels south of the area were classified as VRI Class III (BLM 2009).

No Navajo tribal laws or policies concerning visual resources have been identified for the Project Area. In addition, the McKinley County Comprehensive Plan (2003) does not identify any requirements specific to visual resources that may apply to the project. The proponent has a surface owner agreement with the

landowner; however, this agreement was not available for review for visual resource stipulations due to confidentiality clauses.

3.5.2 Affected Environment

The area of effect for visual resources was identified by establishing the boundaries of the project's viewshed, or areas where the project may be visible from in the long term (greater than 5 years). This viewshed was defined using a 30-meter grid Digital Elevation Model (DEM) program, which identified areas that would be located within line-of-sight of proposed mine activities. The viewshed area of effect identified from the modeling is presented in Figure A-6, Appendix A. The methodology used to identify the area of effect is provided in Appendix B. Existing visual conditions in the Project Area of effect as established by the project viewshed (Figure A-6) are predominately natural. Deviations from natural conditions in this area include views of State Highway 509 and the existing Peabody coal-mining operations at the El Segundo Mine, located adjacent to State Highway 509. Views in the area generally include open, panoramic landscapes or views with a limited number of obstructions within a 360-degree field of vision. Foreground and middleground views throughout most of the Project Area include the dark brown and black coal stockpiles and light brown to gray overburden piles of the existing coal mining operations; dark green, patchy piñon-juniper woodlands interspersed with light brown grasslands to the east, south, and north of the active mining area; and views of mesas and escarpments.

Mount Taylor lies southeast of the Project Area and is one of the major landmarks in the area, both geographically and culturally. In 2009, Mount Taylor and its surrounding mesas, including San Mateo, Jesus, La Jara, Horace, Chivato, and Bibo, were listed as a Traditional Cultural Property (TCP) in the State Register of Cultural Properties (State of New Mexico 2009). The Hopi view the mountain as a community cultural site and have demonstrated that they have close cultural connections to Mount Taylor. Mount Taylor is also a landmark of cultural significance to the Navajo/Diné and is one of the four sacred mountains that define the traditional boundaries of Navajo/Diné lands. Mount Taylor is visible on the horizon to the southeast of the Project Area and adds a pyramidal or conical form to the otherwise generally horizontal lines and rectangular shapes present in the landscape.

State Highway 509, a curving, low-traffic public roadway visible in the Project Area, is the main access and runs through the middle of the existing El Segundo Mine permit boundary. Other visible travel routes in the area include a variety of gravel and two-track road access to local residences and corrals, including the small community of Hospah, which lies approximately 5 miles north-northeast of the Project Area and adjacent to State Highway 509. No residences are located within the Project Area; however, active residences were found within 2.5 to 3 miles northeast of the Project Area (see Figure A-6). These included more than five homes in the Hospah area and a small ranch located south of the existing coal-loading facilities to the west of the Project Area. A power line running north and south, likely a 64-kilovolt line, is visible to the west of the Project Area. Viewers in the immediate Project Area are primarily El Segundo Mine employees, livestock managers, travelers to and from Grants, New Mexico, and local residents. Existing visitation in the area is low and is expected to continue to be low.

Night lights used in existing mining operation and loading areas are sometimes visible from select foreground locations along State Highway 509 and from the community of Crownpoint, located approximately 17 miles west of the Project Area.

The Chacra Mesa Complex Specially Designated Area (SDA) is located approximately 15 miles to the northeast of the Project Area. A Chaco Culture NHP outlier located near the community of Crownpoint lies approximately 17 miles west of the Project Area. Both the SDA and the Monument parcels are located within the seldom seen distance zone of the Project's viewshed.

Critical view locations identified for this project include foreground views along State Highway 509, two residences located north and west of the Project Area, and the Chaco Culture NHP outlier located west of the Project Area near the community of Crownpoint. The proposed Project Area can be viewed in all distance zones (foreground, middleground, and background) from numerous locations.

Periodic blasting events cause fugitive dust from a blast that can be seen above the mine in the form of dust columns or plumes. Such an event was observed during a site visit associated with preparation of this EA. Because El Segundo Mine is located on the Continental Divide, prevailing winds typically dissipate fugitive dust plumes from blasting events. High winds also periodically affect local and regional air quality and the viewshed by mobilizing both on- and off-site fugitive dust. Under low wind conditions, blast plumes can persist for a matter of hours. Under these conditions, very little fugitive dust is generated by winds. Discussions related to existing fugitive dust emissions and haze conditions in the region, which are also relevant to visual resources, are provided in Section 3.1. Based upon information provided in those sections, NAAQs—including particulate emissions—are being met in the project vicinity with the exception of natural events.

Overall, existing conditions in the Project Area's viewshed are predominately natural outside of the existing mine operation areas, with minimal visual disturbance beyond improved travel corridors. Existing coal mining operations are clearly visible in foreground portions of the Project Area.

3.6 Noise

Noise is defined as unwanted or annoying sound associated with human activity that interferes with or disrupts normal activities. Generally, noise is perceived as an annoyance to people near a noise source. The response of individuals to similar noise events varies and is influenced by the type of noise, perceived importance of the noise and its appropriateness in the setting, time of day, type of activity during which the noise occurs, and sensitivity of the individual (BLM 2003a).

Noise is measured in decibels (dB), a unit of measurement that indicates the relative amplitude of a sound. The zero on the decibel scale is based on the lowest sound level that the healthy, unimpaired human ear can detect. Sound levels in decibels are calculated on a logarithmic basis. An increase of 10 dB represents a ten-fold increase in acoustic energy, while a 20 dB increase is 100 times more acoustic energy, etc. Sound is most commonly characterized in terms of a-weighted decibels (dBA). The A-weighting scale best characterizes human hearing, giving greater weight to frequencies of sound to which the human ear is most sensitive. Normal speech has a sound level of approximately 60 dBA. A low-level jet flyover or rock concert measures about 120 dBA. Because sensitivity to noise increases at night, 24-hour descriptors that incorporate penalties for nighttime noise events are used. The most common of these is the Day/Night Average Sound Level, or L_{dn}, which is a measure of the cumulative 24-hour noise exposure, with a 10-dB penalty added to nighttime (10:00 p.m. – 7:00 a.m.) noise levels. Table 3.6-1 contains definitions of the noise terminology used in this EA.

Table 3.6-1. Definitions of Noise Terminology

Term	Definition
Decibel (dB)	A unit describing the amplitude or loudness of sound by comparing it to a given reference level on a logarithmic scale. The reference level in air is 20 micropascals (µPa), corresponding to 0 decibels.
A-weighted sound level (dBA)	The sound pressure level in decibels as measured on a sound level meter using the a-weighting filter. The a-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise.
Equivalent noise level (L_{eq})	The average a-weighted noise level during a given measurement period. The hourly L_{eq} is denoted as L_{eq} [h].
Day/Night Noise Level (L_{dn})	The average a-weighted noise level during a 24-hour day, obtained after the addition of a 10 dBA penalty for nighttime noise from 10:00 p.m. and 7:00 a.m.

The USEPA set guidelines for acceptable noise levels for sensitive receivers such as residential areas—55 dBA L_{dn} for outdoor use areas and a maximum level of 70 dBA L_{dn} for indoor and outdoor noise in order to prevent hearing loss (USEPA 1974). USEPA levels can be used to assess the acceptability of project-related noise.

The Project Area lies adjacent to active mining at the El Segundo Mine (Figure A-3). Ambient noise levels are influenced by a number of sources of continuous and periodic mine-related noise including truck and shovel excavation, blasting operations, drilling and blasting, and road and rail noise. A noise study was conducted at the Lee Ranch and El Segundo Mine to characterize the existing soundscape and noise produced by mining equipment currently in use at the mine, which would be utilized in the Project Area (PNRC 2012). Noise levels (measured as 2 minute average L_{eq}) were measured at a number of operational sources (dragline, haul road, etc.) and at 1,000 foot intervals up to 10,000 feet in each cardinal direction from each source. Noise levels recorded at the greatest distance from each source, were considered ambient levels. No ambient noise level was recorded in the Project Area. The closest noise sampling location was approximately 300 feet from the southwest corner of the Project Area where ambient sound was 42.7 dBA.

The areas surrounding the mine are influenced by noise from existing operations. Table 3.6-2 provides a summary of the maximum noise levels recorded at varying distances from each operational sound source (PNRC 2012). The data show that for most operational sources, noise levels drop to ambient at 7,000 feet or less. Only the dragline can be heard at 10,000 feet, the greatest distance from the source that sounds levels were sampled. A single blast was measured at a distance of 2,500 feet. Blast noise at this distance was comingled with other noise sources and measured 57.1 dBA.

Table 3.6-2. Maximum Noise Levels (2-minute Leq) Measured at 1,000 foot Intervals from Operational Sources at El Segundo and Lee Ranch Mines

Source	Noise (dBA) at distances from Noise Source										
	0	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000
Dragline	50.3	62.9	67.4	36.3	64.7	60.5	63.6	73.5	66.5	66.9	58.3
Crusher	88.4	80.5	84.3	41.7	42.5	49.6	48.3	37	36	42.9	49.8
Rail Line	84.3	80.5	88.4	65.7	44.6	49.6	48.3	37	36	42.9	49.8
Shovel and Truck /Haul Road	74.3	59.5	57.3	52.5	53.1	47.6	45.6	52.6	49	59.2	42.7

3.7 Vegetation

Vegetation resources include the plant communities and the species that comprise them. Plant species protected by federal and state regulations are addressed in the discussion of Threatened and Endangered Species and Special Status Species (Sections 3.10 and 3.11).

Four natural vegetation community types occur within the Project Area including Great Basin desert scrub, desert grassland, juniper savanna, and saltbush (Figure A-7) (Dick-Peddie et al. 1993; PNRC 2010). Grasses constitute the largest component of each of these communities. The most common species in the El Segundo Mine include blue grama, alkali sacaton, fourwing saltbush, and broom snakeweed (*Gutierrezia sarothrae*) (PNRC 2010). These species, along with James' galleta, were the dominant species observed during the January 2012 field surveys of the Project Area. However, many species of grasses and forbs were not identifiable because of the time of the survey, recent snowfall, and livestock grazing. Scattered one-seed juniper (*Juniperus monosperma*) trees were observed in the juniper savanna vegetation communities located in the northern portion of the Project Area, as shown in Figure A-7. The Biological Survey Report (BSR) prepared for this project contains a complete list of plant species observed during the biological survey (Appendix C).

The majority of the Project Area is undisturbed. Signs of disturbance observed during the January 2012 field surveys included evidence of exploratory drilling, a two-track dirt road crossing the central portion of the Project Area, and evidence of livestock grazing including droppings, and browsed plants. Table 3.7-1 shows the acreages of each of these communities in the Project Area and the El Segundo Mine permit boundary described below.

Table 3.7-1. Acres and Percentages of Vegetation Communities within the Project Area and El Segundo Mine Permit Boundary

	Project Area		El Segundo Permit Boundary	
Vegetation Type	Acres	Percent	Acres	Percent
Desert Grassland	483	75	4,925	32
Great Basin Desert Scrub	121	19	6,222	40
Juniper Savanna	25	4	3,366	22
Saltbush	11	2	885	6

Desert Grassland

The grassland vegetation community comprises 75 percent of the Project Area. The composition of desert grassland communities is highly variable due to the transitional nature of this vegetation community (Dick Peddie et al. 1993). The Fajada-Huerfano-Benally complex, Marianolake-Skyvillage complex, Starlake Clay, and Sparank-San Mateo complex soil types that occur in the Project Area are strongly correlated with grasslands. The desert grassland community borders the Great Basin desert scrub community (Dick-Peddie et al. 1993).

Great Basin Desert Scrub

The shrub/grassland vegetation community comprises 19 percent of the Project Area. This vegetation type is known as "cold desert," a name assigned due to the climatic combination of cold winters, low precipitation, and wide fluctuations in daily and seasonal temperature extremes. The Great Basin desert scrub is characteristically dominated by salt-tolerant plants and has few cacti (Brown 1994). As a whole, the plant species diversity of Great Basin desert scrub is typically less than other types of desert scrublands. Shrub/grassland areas may have been grasslands before long-term grazing and possibly climate change shifted the species composition (Dick-Peddie et al. 1993). The shrub species composition varies slightly, depending on soil characteristics. The Fajada-Huerfano-Benally complex, Doak-Shiprock complex, and Marianolake-Skyvillage complex soil types found within the Project Area are strongly associated with shrub/grasslands. Common plant species found within shrub/grasslands and observed in the Project Area include fourwing saltbush, rubber rabbitbrush (*Ericameria nauseosa*), broom snakeweed, Bigelow's sagebrush (*Artemisia bigelovii*), and blue grama.

Juniper Savanna

The shrub/juniper/grassland vegetation community comprises 4 percent of the Project Area. This vegetation community type typically occurs in warm, dry sites with shallow, rocky soils on mountain slopes, mesas, plateaus, and ridges. Frost and drought limit the altitudinal distribution of this vegetation type (USGS 2006). The Marianolake-Skyvillage complex and Skyvillage-Rock outcrop complex soil types found within the Project Area are strongly correlated with this vegetation community. The key species in this community observed in the Project Area include one-seed juniper and blue grama. Also observed were Bigelow's sagebrush, broom snakeweed, and slenderleaf buckwheat (*Eriogonum leptophyllum*).

Saltbush

The saltbush community comprises 2 percent of the Project Area. Typically, this community is found in the bottomlands in major drainages where finer soils accumulate. This community is strongly correlated with the Sparank-San Mateo soil complex found within the Project Area. Fourwing saltbush and alkali sacaton dominate this community as observed in the Project Area.

3.8 Wildlife and Migratory Birds

Wildlife is defined as those terrestrial and aquatic animal species that occur or have the potential to occur in the Project Area and immediate surrounding areas. Migratory birds are protected by the Migratory Bird Treaty Act of 1918 (16 USC 703-712) and Executive Order 13186, which require federal agencies to consider management impacts to migratory non-game birds. Wildlife species protected by federal and

state regulations are addressed in the discussion of Threatened and Endangered Species and Special Status Species (Sections 3.10 and e.11). Data used to prepare this section are derived from existing data from the El Segundo Mine (PNRC 2010), which includes the Project Area and data collected during field-based habitat evaluations within the Project Area conducted in January 2012 (see Appendix C).

Wildlife

The Project Area supports a wide diversity of wildlife characteristic of the Great Basin desert scrub, desert grassland, juniper savanna, and saltbush vegetation communities. The El Segundo Mine and the Project Area have been extensively surveyed in compliance with the mine's SMCRA permit (Hawks Aloft 2006-2010, PNRC 2010 subpart 809). During the wildlife monitoring surveys, 99 bird species, 22 mammal species, and 7 amphibian and reptile species were recorded at the El Segundo Mine (PNRC 2010).

Mammal species commonly recorded in every habitat within the Project Area include deer mouse (*Peromyscus maniculatus*), northern grasshopper mouse (*Onychomys leucogaster*), Ord's kangaroo rat (*Dipodomys ordii*), and plain's pocket mouse (*Perognathus flavescens*). Black-tailed jackrabbits (*Lepus townsendii*) and desert cottontails (*Sylvilagus auduboni*) were regularly observed during the surveys. These species are likely important prey species to carnivores such as coyotes (*Canis latrans*) and raptors. (PNRC 2010). Mule deer (*Odocoileus hemionus*), pronghorn antelope (*Antilocapra americana*), and elk (*Cervus elaphus*) have been documented at the mine. The Project Area lies within the larger New Mexico Game and Fish Department Game Management Unit 7, a mix of private and public lands including lands managed by BLM to maintain and increase pronghorn antelope populations (J. Cummings, pers. comm.). In 1980, a small Gunnison's prairie dog (*Cynomys gunnisoni*) town with 52 burrows was reported within the El Segundo Mine. An intensive search of this and other prairie dog towns near the mine was conducted for signs of black-footed ferrets; none were observed. This area is now being mined. Since that time, no prairie dog towns have been observed within the mine including the Project Area (PNRC 2010) nor were any observed during the January 2012 biological survey.

Bird species commonly recorded in the grassland, shrub grassland, and juniper savanna vegetation communities within the Project Area include common raven (*Corvus corax*), horned lark (*Eremophila alpestris*), mountain bluebird (*Sialia currucoides*), chipping sparrow (*Spizella passerina*), and loggerhead shrike (*Lanius ludovicianus*) (PNRC 2010). Horned larks and common ravens were observed during the site visit in January 2012. The number of bird species recorded at the El Segundo Mine declined from 1981 to 2001 after the dam at the Orphan Annie Tank was breached and many water bird species were not recorded following the loss of the tank.

In addition to the surveys listed above, annual raptor monitoring is conducted in the El Segundo Mine (Hawks Aloft 2006-2010). Nesting habitat for common raven, American kestrel (*Falco sparverius*), ferruginous hawk (*Buteo regalis*), golden eagle (*Aquila chrysaetos*), great-horned owl (*Bubo virginianus*), long-eared owl (*Asio otus*), prairie falcon (*Falco mexicanus*), and red-tailed hawk (*Buteo jamaicensis*) have been documented within 6 miles of the Project Area. Active nests documented in 2010 within 1 mile of the Project Area included common raven, American kestrel, ferruginous hawk, and great-horned owl. A common raven nest occurs in the northwestern corner of the Project Area (Hawks Aloft 2006-2010). Northern harriers (*Circus cyaneus*) and merlins (*Falco columbarius*) have been observed during wildlife monitoring surveys (PNRC 2010). Although no individuals have been documented in the past, the small

mammal burrows located in the Project Area may provide suitable burrow habitat for burrowing owls (*Athene cunicularia*). Special Status Species including golden eagle, ferruginous hawk, prairie falcon, and burrowing owl are discussed in Section 3.11.

Reptiles and amphibians have been documented as incidental sightings or during wildlife surveys within the El Segundo Mine permit boundary. Short-horned lizards (*Phyrnosoma douglasi*) and unidentified spiny lizards (*Sceloporus* sp.) have been recorded in the mine permit boundary. Tiger salamanders (*Ambystoma tigrinum*) have also been documented in the cattle tanks within the mine permit boundary (PNRC 2010); however, there are no cattle tanks in the Project Area. No streams, ponds, or stock tanks that could support fish species occur within the Project Area.

3.8.1 Migratory Birds

While law protects all migratory songbirds, certain species have been determined to be at greater risk. Data collected through breeding bird surveys coordinated by the U.S. Fish and Wildlife Service (USFWS) as well as other private sector efforts have provided the basis for the New Mexico Partners in Flight (NMPIF) organization to develop bird watch lists and the USFWS's Birds of Conservation Concern List. The NMPIF organization has identified priority species of birds for the State of New Mexico by habitat type. The BLM/FFO area lies within the Colorado Plateau physiographic region as identified by NMPIF. The Project Area contains two of the habitat types addressed in these documents: Great Basin desert scrub and plains-mesa grassland.

The Bird Conservation Plan developed for the State of New Mexico by NMPIF lists the sage thrasher (*Oreoscoptes montanus*) and sage sparrow (*Amphispiza belli*) within the Great Basin desert scrub habitat type and the ferruginous hawk, mountain plover, and long-billed curlew (*Numenius americanus*) within the plains-mesa grassland habitat type as "highest priority" species for conservation (NMPIF 2007).

Most of the priority bird species identified by the NMPIF also occur on the USFWS Division of Migratory Bird Management's Birds of Conservation Concern 2008 within Bird Conservation Region 16—Southern Rockies/Colorado Plateau. Birds included on this list are those "species, subspecies, and populations of all migratory non-game birds that, without additional conservation actions, are likely to become candidates for listing under the ESA of 1973" (USFWS 2008b). Some of the birds listed as highest by the NMPIF group and the USFWS Birds of Conservation Concern in these habitat types include the ferruginous hawk, gray vireo (*Vireo vicinior*), Bendire's thrasher (*Toxostoma bendirei*), mountain plover, and long-billed curlew.

The open grassland and desert scrub habitats in and surrounding the Project Area provide foraging habitat for large raptors such as golden eagles, ferruginous hawks, prairie falcons, and American kestrels. The short cliffs surrounding the Project Area provide known nesting and perching habitat for these species. These communities also provide nesting and foraging habitat for black-throated sparrows (*Amphispiza bilineata*), Brewer's sparrows (*Spizella breweri*), and mountain bluebirds (*Sialia currucoides*) (NMPIF 2007).

USFWS and NMPIF highest priority species recorded at the mine including the Project Area include: Bendire's thrasher, black-throated sparrow (*Amphispiza bilineata*), Brewer's sparrow (*Spizella breweri*), juniper titmouse (*Baeolophus ridgwayi*), loggerhead shrike (*Lanius ludovicianus*), mountain bluebird,

piñon jay (*Gymnorhinus cyanocephalus*), vesper sparrow (*Pooecetes gramineus*), ferruginous hawk, prairie falcon, golden eagle, and northern harrier (*Circus cyaneus*) (Hawks Aloft 2006-2010; PNRC 2010).

3.9 Invasive and Non-Native Species

The BLM/FFO maintains a list of invasive and non-native plant species of concern (BLM 2003a). Saltcedar (*Tamarix ramosissima*) and hoary cress (*Cardaria draba*)—both Class C non-native species—have been observed during plant surveys within the permit boundary (PNRC 2010), though neither were observed within the Project Area in the January 2012 field survey. Class C species are defined as non-native plants that are widespread throughout much of the public land within the planning area for which long-term programs of management and suppression are encouraged (BLM 2003a). It should be noted that the survey was conducted before the typical growth and flowering period of hoary cress.

3.10 Threatened and Endangered Species

The ESA of 1973 (PL 93-205, as amended) requires federal agencies to ensure that the actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of any endangered or threatened species, or result in the destruction or adverse modification of their critical habitat. Data used to prepare this section are derived from extensive existing data from the El Segundo Mine (PNRC 2010), which includes the Project Area, as well as data collected during field-based habitat evaluations within the Project Area conducted in January 2012. In accordance with BLM requirements, A BSR was prepared for this project and is included as Appendix C.

The affected environment or Action Area considered for federally listed species was delineated based on consideration of all direct and indirect effects of the Proposed Action. For the Proposed Action, the affected environment included a 1-mile radius around the Project Area, based on the distance mining noise that could be heard over ambient noise. There are six federally listed threatened, endangered, proposed threatened, or candidate plant and animal species with the potential to occur in McKinley County, New Mexico (USFWS 2010). These species, their habitat associations, and the potential for each to occur in the Project and Action Areas are provided in Table 3.10.1. Based upon evaluation of habitat associations, previous data, and a recent field survey conducted in January 2012, none of the federally listed species with the potential to occur in McKinley County, or potential habitats for federally listed species, occur within the Project or Action Area.

Table 3.10-1. Species Listed by the U.S. Fish and Wildlife Service as Threatened (FT), Endangered (FE), or Candidate (FC) for McKinley County, New Mexico, and the Potential to Occur in the Project or Action Area

Species	Status	Habitat Associations	Potential Occurrence1	Notes
Mammals				
Black-footed ferret (*Mustela nigripes*)	FE	Dependent on prairie dogs and their burrows for food and shelter. Requires medium to large active prairie dog towns greater than 198 acres in size and with more than 20 burrows per 2.5 acres or a complex of towns (two or more towns within 4 miles) (USFWS 2008a).	NP	No prairie dog towns are present in the Project or Action Area.
Birds				
Mexican spotted owl (*Strix occidentalis lucida*)	FT	Nests in caves, cliffs, or trees in steep-walled canyons of mixed conifer forests. Most nests are located on northeast facing slopes between 6,000 and 8,000 feet in elevation.	NP	No nesting habitat is present in the Project or Action Areas.
Southwestern willow flycatcher (*Empidonax traillii extimus*)	FE	Breeds in dense, shrubby riparian habitats, usually in close proximity to surface water or saturated soil. Nesting habitat typically occurs in linear riparian zones greater than 30 feet wide and 2 acres.	NP	No riparian vegetation is present in the Project or Action Area.
Yellow-billed cuckoo (*Coccyzus americanus occidentalis*)	FC	Breeds in riparian woodlands with dense, understory vegetation. Requires habitat patches larger than 5 acres, but rarely nests in habitat patches less than 25 acres.	NP	No riparian vegetation is present in the Project or Action Area.
Fish				
Zuni bluehead sucker (*Catostomus discobolus*)	FC	Occupy perennial streams and rivers that are shaded and have pool and riffle habitats containing clean, coarse substrates such as gravel, cobbles, boulders, and bedrock.	NP	No perennial streams occur in the Project or Action Area.
Plants				
Zuni fleabane (*Erigeron rhizomatus*)	FT	Barren, detrital clay hillsides with soils derived from shales of the Chinle or Baca formations. Most often found on north- or east-facing slopes in open piñon-juniper woodlands (7,300 to 8,000 feet).	NP	The requisite soils do not occur in the Project or Action Area.

[1] NP = Habitat not present and species unlikely to occur.

3.11 Special Status Species

The BLM manages certain sensitive species not federally listed as threatened or endangered, including species that are candidates or proposed for listing but receive no protection under the ESA, in order to prevent them from being listed as threatened or endangered in the future (BLM 2008). Information used to prepare this section is derived from existing information (PNRC 2010; Hawks Aloft 2006-2010) and data collected during habitat evaluations within the Project Area conducted in January 2012. In accordance with BLM requirements, a BSR was prepared for this project and is included as Appendix C.

There are 10 BLM special status species listed by the BLM/FFO (BLM 2008). Special status species, their habitat associations, and potential to occur in the Project Area are listed in Table 3.11-1. Ferruginous hawk, golden eagle, and prairie falcon have all been documented as occurring in the Project Area. Suitable habitat is present for burrowing owl and mountain plover, but none have been observed during numerous survey of the Project Area.

Table 3.11-1. Bureau of Land Management, Farmington Field Office Special Status Species and their Potential to Occur in the Project Area

Species	Habitat Associations	Presence[1]	Notes
Birds			
American peregrine falcon (*Falco peregrinus anatum*)	Rugged terrain with rocky cliffs and canyons (30-1,000+ feet high), adjacent to rivers, lakes, or streams. Urban areas with towers and buildings are also inhabited.	NP	No cliffs near perennial water in Project Area
Bald eagle (*Haliaeetus leucocephalus*)	Nests in forested areas adjacent to large bodies of water.	NP	No large bodies of water in Project Area
Burrowing owl (*Athene cunicularia*)	Rarely dig their own burrows and are typically associated with prairie dog colonies. Will also use kangaroo rat burrows.	NS	Kangaroo rat and other small mammal burrows in Project Area.
Ferruginous hawk (*Buteo regalis*)	Flat or rolling terrain in grasslands, shrub-steppes, and deserts; may occur in the periphery of piñon-juniper or other forests. Badlands. Prefers elevated nest sites (e.g., buttes, utility poles, trees) but also nests on the ground.	K	Known nest in El Segundo Mine permit boundary approximately 1.2 mile northwest of Project Area. Project Area contains suitable foraging habitat.
Golden eagle (*Aquila chrysaetos*)	In the west, mostly open habitats in mountainous, canyon terrain. Nests primarily on cliffs and trees.	K	Historic nest occurs appox. 0.4 mile from the eastern border of the Project Area. Project Area contains suitable foraging habitat.
Mountain plover (*Charadrius montanus*)	Breeds in flat, open grasslands; often associated with prairie dog towns and intensive grazing.	NS	Open grasslands provide suitable habitat, but none have been observed during surveys. Additionally, no prairie dog towns observed in Project Area.
Prairie falcon (*Falco mexicanus*)	Found in arid, open grasslands and shrub-steppe habitats. Prairie falcons require cliffs for nesting.	K	Historic nest occurs 6.5 miles northwest of Project Area. Project Area provides suitable foraging habitat.
Yellow-billed cuckoo (*Coccyzus americanus occidentalis*)	Breeds in riparian woodlands with dense, understory vegetation.	NP	No riparian areas occur in Project Area.

Species	Habitat Associations	Presence[1]	Notes
Plants			
Aztec gilia (*Aliciella formosa*)	Salt desert scrub communities in soils of the Nacimiento Formation (5,000-6,000 feet).	NP	Project does not contain appropriate geological substrate.
Brack's hardwall cactus (*Sclerocactus cloveriae* ssp. *brackii*)	Sandy clay of the Nacimiento Formation in sparse shadscale scrub (5,000-6,000 feet).	NP	Project Area does not contain appropriate geological substrate.

Source: BLM 2008.

[1]Notes: **K** - Known, documented observation; **S** - Habitat suitable and species suspected to occur; **NS** - Habitat suitable but species is not suspected to occur; **NP** - Habitat not present and species unlikely to occur.

The open grassland and desert scrub vegetation communities found within the Project Area provide suitable foraging habitat for the ferruginous hawk, golden eagle, and prairie falcon. The cliffs in the Project Area provide suitable nesting and roosting habitat for these species. One historic golden eagle nest, two historic prairie falcon nests, and four historic and active ferruginous hawk nests occur within 6 miles of the Project Area, and one active ferruginous hawk nest occurs within 1 mile of the Project Area (Hawks Aloft 2006-2010). Golden eagles, ferruginous hawks, and prairie falcons have been observed during bird surveys in the El Segundo Mine permit boundary (PNRC 2010). These species likely forage or traverse through the Project Area, given the known nests in the vicinity and the presence of suitable foraging and nesting habitat.

Though no prairie dog burrows occur within the Project Area, the presence of kangaroo rat and other small mammal burrows in the Project Area and vicinity provide suitable habitat for burrowing owls. No burrowing owls have been previously documented at the mine (Hawks Aloft 2006-2010) and none were observed during the site visit in January 2012.

The grasslands in the Project Area provide suitable habitat for the mountain plover. In 2002, mountain plover surveys were conducted in and near the Project Area. No mountain plovers were identified during the field surveys (PNRC 2010). None were observed during the site visit in January 2012, which was conducted outside the breeding season.

3.12 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

3.12.1 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 3.12-1 includes the population or projected population for each county between 1990 and 2030.

Table 3.12-1. 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

3.12.2 Employment

Table 3.12-2 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).

Table 3.12-2. Number of Employees by Sector in the Each County in the Affected Region in 2011

Sector	Cibola	McKinley	Rio Arriba	San Juan	Sandoval	Region Total
Total, all industries	7,778	21,291	9,663	48,983	29,533	117,248
Health Care & Social Assistance	1,575	4,948	1,529	7,221	1,841	17,114
Retail Trade	813	3,096	1,135	6,092	3,328	14,464
Education Services	Confidential	3,416	1,523	5,033	3,584	13,556
Accommodation & Food Services	639	2,673	1,152	4,163	3,191	11,818
Public Administration	1,352	2,324	2,320	3,519	2,304	11,819
Professional, Scientific & Technical Services	75	230	119	939	833	2,196

Sector	Cibola	McKinley	Rio Arriba	San Juan	Sandoval	Region Total
Construction	311	694	337	3,907	1,857	7,106
Admin., Support, Waste Mgmt, Remediation	481	286	121	1,304	2,684	4,876
Manufacturing	41	541	150	1,310	4,308	6,350
Transportation & Warehousing	94	438	131	1,327	478	2,468
Other Services (except Public Admin.)	77	491	159	1,446	587	2,760
Finance & Insurance	88	403	155	898	791	2,335
Wholesale Trade	149	520	100	1,602	294	2,665
Mining	Confidential	360*	87	6,353	75	6,515
Arts, Entertainment, and Recreation	572	461	Confidential	1,004	1,893	3,930
Information	45	244	63	413	923	1,688
Agriculture, Forestry, Fishing & Hunting	Confidential	Confidential	44	425	51	520
Real Estate & Rental & Leasing	54	181	50	571	322	1,178
Utilities	231	213	169	1,245	138	1,996
Management of Companies & Enterprises	Confidential	40	Confidential	210	48	298
Unclassified establishments	NA	Confidential	NA	NA	Confidential	NA

Sources: LASER 2012; MSHA 2012.

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

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

Mining is an important source for employment and income. Total mining employment in the five county area is estimated to be about 6,600 jobs or about one-third of the mining employment in New Mexico. Current employment at PNRC mines is about 455 employees. Despite the overall decrease in employed persons in the state and region, in 2010 and 2011 mining added over 2,500 jobs to the New Mexican economy, the greatest number of any sector. It should be noted that the McKinley Coal Mine, operated by Pittsburg and Midway, closed in 2009, eliminating an estimated 350 jobs (NM Economic and Rural Development and Telecommunications Committee 2006). Reclamation of the site has been ongoing, and provides a limited and temporary source of employment for the county totaling 58 jobs (Arrowhead

Center 2009). Economic development proposals for the reclaimed mine site are estimated to create roughly 50 new jobs in McKinley County.

The recession of 2007-09 slowed employment growth in the five county area. The number of employed persons in the State and the region decreased measurably between 2008 and 2011. Table 3.12-3 gives the number and change in employed persons in New Mexico and the five county area for 2008 to 2011 (BBER 2012; LASER 2012).

Table 3.12-3. Employment in the Affected Region 2008-2011

State/County	Employed Persons				Change 2008-2011
	2008	2009	2010	2011	
New Mexico	920,380	885,867	880,809	786,248	-134,132
Cibola	11,836	11,528	11,385	7,778	-4,058
McKinley	25,393	25,061	24,980	21,291	-4,102
Rio Arriba	19,879	19,287	18,907	9,663	-10,216
San Juan	56,431	51,552	51,541	29,533	-26,898
Sandoval	53,611	51,709	51,102	48,983	-4,628

Table 3.12-4 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 2012; U.S. Bureau of Labor Statistics 2012).

Table 3.12-4. Average Annual Unemployment Rates for New Mexico and the Five County Affected Area, 2008-2011

State/County	Year			
	2008	2009	2010	2011
New Mexico	5.3%	7.2%	8.4%	6.4%
Cibola	4.6%	6.4%	7.8%	6.0%
McKinley	5.5%	7.8%	9.6%	7.9%
Rio Arriba	5.4%	7.1%	8.7%	7.2%
San Juan	3.9%	7.4%	9.6%	6.5%
Sandoval	5.2%	7.9%	9.3%	7.8%

3.12.3 Income

The median household income (MHI) for New Mexico in 2009 was about $43,000, which is about $7,000 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. San Juan County's MHI is notable in that it is substantially higher than both the state and the national MHI. Table 3.12-5 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 (USCB 2010; LASER 2012; NMDWS 2012).

Table 3.12-5. Median Household Income and Average Weekly Wage in 2010 for the Five County Affected Area and New Mexico

County/State	Median Household Income ($)	Average Weekly Wage ($)
New Mexico	42,186	817
Cibola	33,715	668
McKinley	29,473	624
Rio Arriba	36,570	611
San Juan	52,778	843
Sandoval	44,155	806

Sources: USCB 2010; LASER 2012; NMDWS 2012.
U.S. Bureau of Labor Statistics. Quarterly Census of Wages and Employment. Fourth Quarter 2010.

3.12.4 Government Revenues and Expenditures

In 2009, New Mexico received $38 million in revenue from coal production and sales (NM-EMNRD 2010). The production value for coal that year totaled $736 million and employed about 1,500 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 10 percent of the total mining employment (Headwaters Economics 2011) and almost 16 percent of the total revenue paid to the state in 2008 (Arrowhead Center 2009). Table 3.12-6 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 3.12-6. 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

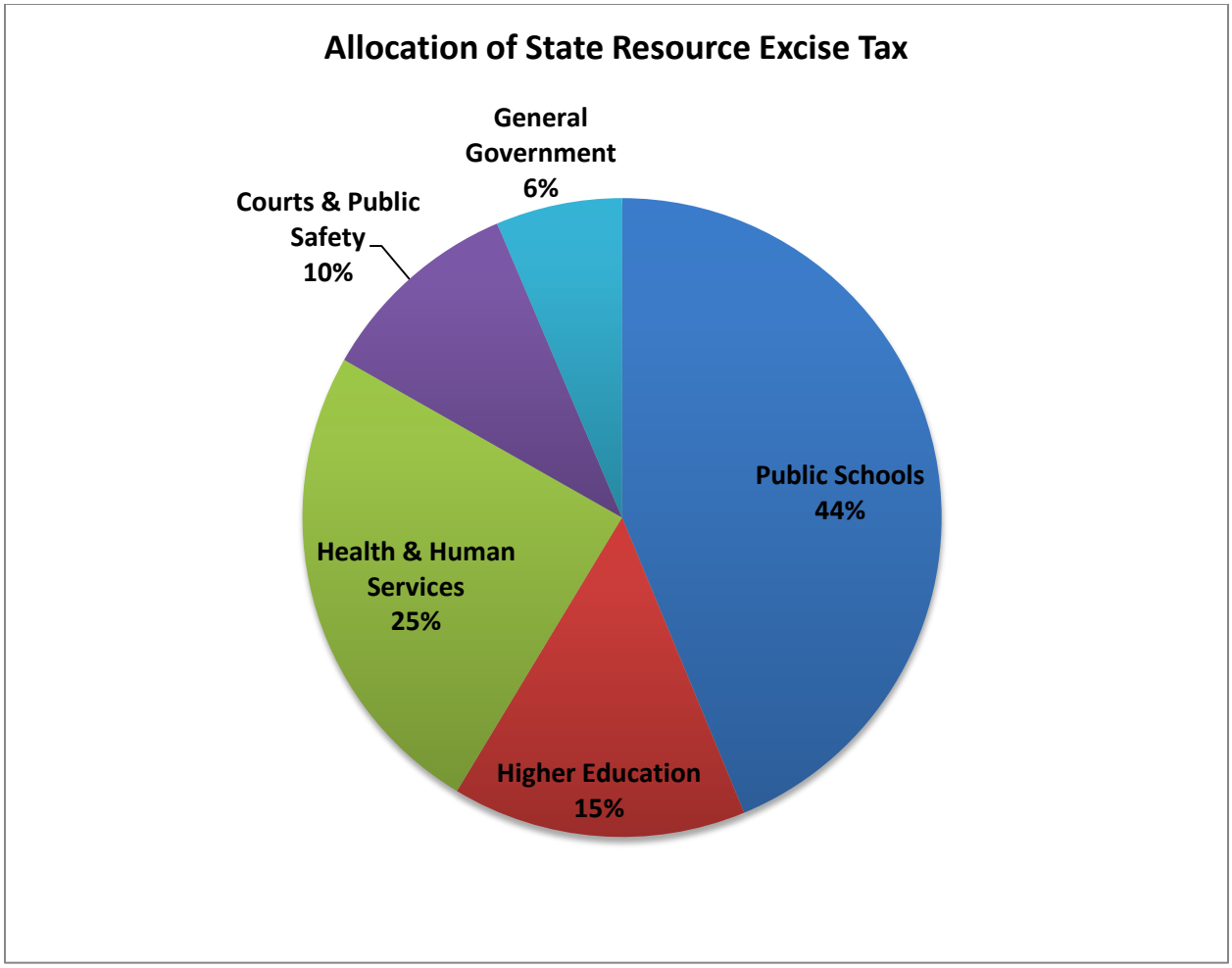
Tax	Amount	Level	Description	Average Annual Revenue Paid in $ Million
Oil & Gas Conservation Tax	0.02%	State	To compensate public for loss of natural resources and encourage conservation of resources	$0.3
Gross Receipts Tax	6.75%	State and County	To compensate state and local government for cost of services 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**

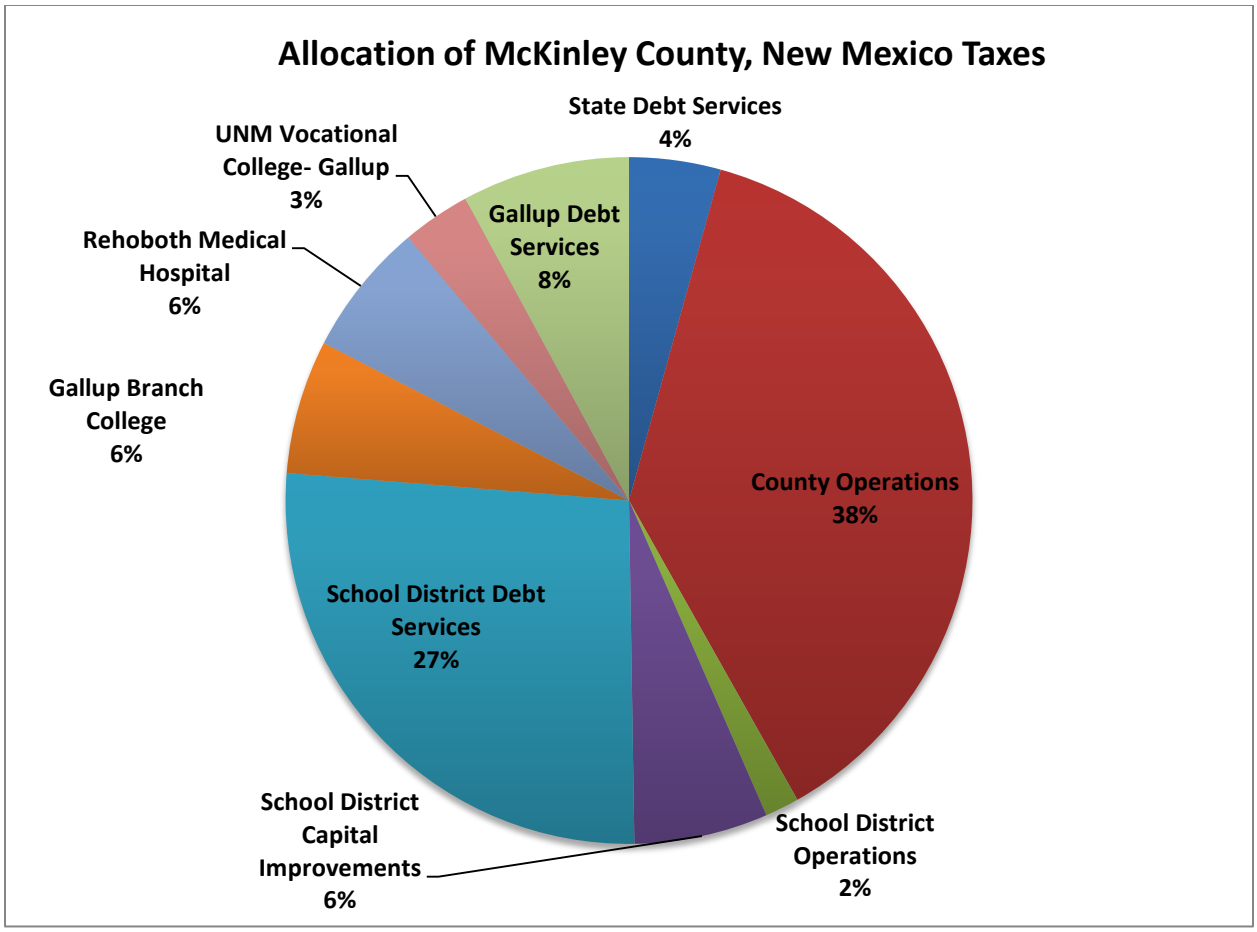
Sources: Arrowhead Center 2009; New Mexico Taxation and Revenue Department 2009; MSHA 2012.

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 3.12-1 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 3.12-1. Distribution of Tax Revenue Generated from Fossil Fuel Extraction in New Mexico and McKinley County, 2011





3.12.5 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 3.12-7 shows the total population of McKinley County, the Navajo Nation, and the Chapters located near the proposed action (USCB 2010, NW-CEDS 2009).

Table 3.12-7. 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).

3.13 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 2009 substantially surpasses the national rate (14.3 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 3.13-1 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).

Table 3.13-1. 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	63.7	16.3	0.9	19.1	14.3
New Mexico	40.5	46.3	9.4	3.8	18.2
Cibola	21.5	36.5	41	1.0	25.8
McKinley	10.3	13.3	75.5	0.5	28.4
Rio Arriba	12.8	71.3	16	0.5	18.9
San Juan	42.5	19.1	36.6	0.6	20.6
Sandoval	47.5	35.1	12.9	2.1	11.0

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.

3.14 Cultural Resources and Native American Religious Concerns

The Project Area is located within the archaeologically rich San Juan Basin of northwestern New Mexico. In general, the prehistory of the San Juan Basin can be divided into five major periods: Paleo-Indian (ca. 10000 B.C. to 5500 B.C.), Archaic (ca. 5500 B.C. to A.D. 400), Basketmaker II-III and Pueblo I-IV

periods (A.D. 1 to 1540), and the historic (A.D. 1540 to present), which includes Native American as well as later Hispanic and Euro-American settlers. Detailed descriptions of these various periods and select phases within each period are provided in the RMP/FEIS (BLM 2003a).

The Antiquities Act of 1906 (AA), the National Historic Preservation Act of 1966 (NHPA), as subsequently amended, and the Archaeological Resources Protection Act of 1979 (ARPA) are other federal laws that protect certain cultural resources. In addition, the American Indian Religious Freedom Act of 1978 (AIRFA) requires that all federal agencies take into account the effects of their actions on traditional Native American religious and cultural values and practices. Finally, the Native American Graves Protection and Repatriation Act of 1990 (NAGPRA) expressly provides for the protection of Native American human remains, funerary objects, sacred objects, and objects of cultural patrimony.

Archaeological and Historic Resources

Archaeological sites and historical properties are physical remnants of humans that have occupied the region. Since the 1970s, a number of archaeological surveys have been conducted at and adjacent to the El Segundo Mine. Except for a very small portion of undisturbed area, the mine permit area, including the Project Area, has been surveyed as part of MMD's permit requirements for the development of a new mine, and in compliance with the regulations referenced above. Surveys of the Project Area have yielded 16 sites. Table 3.14-1 lists these sites, their cultural affiliation, and determinations of eligibility (DOE) by the State Historic Preservation Office (SHPO). Testing and data recovery of potentially eligible sites is ongoing. BLM/FFO will consult with SHPO to determine the eligibility of sites designated in the table as "unevaluated" for listing on the National Register of Historic Places (National Register).

Traditional Cultural Properties

A traditional cultural property (TCP) can be defined as a property that is eligible for the National Register because of its association with cultural practices or beliefs of a living community that are rooted in that community's history, and are important in maintaining the continuing cultural identity of the community (Parker and King 1998). PNRC has consulted with the Laguna, Acoma, Zuni, Hopi, and Navajo Tribes to identify TCPs within the mine permit boundary. Within the Project Area, a single site (LA 27899) was identified as a TCP associated with Laguna Pueblo. The tribe will be consulted to determine appropriate treatment of the site.

Table 3.14-1. Summary of Findings Cultural Resources Surveys in the Project Area

Site Number	Site Type	Cultural-Temporal Affiliation	SHPO DOE
LA 27883	Corral, windbreak, cairn, petroglyph	Historic	Eligible
LA 27899	House, corral	Historic	Eligible
LA 27900	Lithics	Unknown	Eligible
LA 27927	Campsite	Historic	Eligible
LA 135439	Lithics	Archaic	Unevaluated
LA 135440	Lithics	Archaic	Eligible
LA 135441	Ceramics, Lithics	Anasazi, Pueblo II-III	Unevaluated

Site Number	Site Type	Cultural-Temporal Affiliation	SHPO DOE
LA 135442	Lithics	Archaic	Eligible
LA 135443	Petroglyphs	Navajo, Anglo	Eligible
LA135444	Lithics	Archaic	Not eligible
LA135445	Lithics	Unknown	Unevaluated
LA135446	Lithics	Archaic	Eligible
LA 165733	Lithics	Archaic	Unevaluated
LA165734	Lithics	Unknown	Unevaluated
LA165735	Lithics	Unknown	Unevaluated
LA 165736	Lithics, upright slab	Unknown	Unevaluated

3.15 Land Use

Land use impacts are related to how the proposed action will affect present and future land use at the project site and the surrounding area. The affected area for land use is McKinley County, New Mexico, because the entire proposed action is located inside McKinley County, which has jurisdiction over private land use. The land area of McKinley County is about 3.5 million acres with the majority of the land area owned by the Navajo Nation. Land ownership in McKinley County is outlined in Table 3.15-1.

Table 3.15-1. Land Ownership in McKinley County, New Mexico

Owner	Percent of Total (3,496,280 acres)
Tribal	62%
Private	20%
Bureau of Land Management	7%
U.S. Forest Service	5%
State	5%
Other	1%

Generally, land use in this region is rural, undeveloped, sparsely populated, and used for livestock grazing and to a lesser extent for timber and agricultural production (USNRC 2009). In McKinley County, more than 85 percent of the land is used for agricultural purposes and 83 percent of that land is used for livestock grazing (USNRC 1997).

The El Segundo Mine permit boundary encompasses 15,000 acres of state and privately owned land. The privately owned Project Area was leased to PNRC per the terms and conditions of a Memorandum of Surface Use Agreement signed February 1, 2002. This agreement allows the entry and use of the leased lands by PNRC for the purpose of extracting and exploiting the mineral estate (PNRC 2010 Exhibit 703-3). In accordance with landowner agreements, reclamation activities would be designed for the post-mining land use of rangeland and wildlife habitat. Livestock grazing and wildlife habitat are the historic

uses of the area. The Project Area is surrounded on three sides by areas permitted to be mined. The same pre- and post-mining land use applies to the surrounding areas.

3.16 Regulated Waste

The Resource Conservation and Recovery Act (RCRA) established a comprehensive program for managing hazardous wastes from the time they are produced until their disposal. The USEPA regulations define solid wastes as any "discarded materials" subject to a number of exclusions. A "hazardous waste" is a solid waste that (1) is listed by the USEPA as a hazardous waste, (2) exhibits any of the characteristics of hazardous wastes (ignitability, corrosivity, reactivity, or toxicity), or (3) is a mixture of solid and hazardous waste. No hazardous or solid wastes are known to be present in the Project Area and none were observed during field surveys.

The El Segundo Mine has existing procedures and requirements for handling regulated and solid wastes related to mining. Non-coal solid materials such as glass, wood, paper, cardboard, plastic, and metal are be temporarily stored in covered dumpsters at the mine office, coal lab, and shop/warehouse complex. These materials are disposed of as backfill in mine pits. Regulated wastes such as used lubrication and cleaning fluids are collected in drums and aboveground storage tanks at the shop/warehouse complex. Shop rags, paint, oil and gasoline filters, fluorescent light tubes, and pressurized paint cans are collected in appropriate containers. Regulated wastes are periodically removed by a licensed transporter and delivered to a permitted recycling center or waste disposal site. The mine's existing Spill Prevention Control and Counter Measures Plan provides guidelines for handling petroleum products and minimizing the potential for incidental spills. Soil or overburden contaminated with petroleum products caused by spills or leaks are land farmed on-site.

3.17 Health and Safety

This section focuses on the risk to the health and safety of El Segundo workers and the general public. Generally, health and safety risks would be linked to causes or exposures from activities or emissions at El Segundo Mine associated with the mining activities. In this analysis, it is assumed that worker risks are mitigated by safety regulations and operating procedures implemented at the mine that are designed to minimize worker exposure to health and safety risks. Because the mine is closed to the public, public health and safety risk is limited to exposure to air, water, and other emissions that occur outside the mine and are regulated by CAA and CWA regulations. Since there are no water emissions from the mine, the risks to public health and safety are directly related to air emissions from the mine, primarily dust and particulate matter.

Worker Health and Safety

Typical risks encountered at an industrial facility such as El Segundo Mine include exposure to dust, noise, heat stress, and chemicals, and the opportunity for accidents caused by working with or in the proximity to large equipment. At El Segundo Mine, implementation and enforcement of safety policies and procedures reduce risks to mine workers.

Numerous laws and regulations govern the policies and procedures implemented to ensure the health and safety of the mine, protect persons living in the surrounding vicinity, and regulate the use and disposal of hazardous materials and wastes. These include, but are not limited to, the following:

- The Federal Mine Safety and Health Act of 1977, 30 U.S.C. 801 et seq. as amended by Public Law 91-164, as amended by Public Law 95-164. Enforced by the Mine Health and Safety Administration (MSHA), and administered by the U.S. Department of Labor
- The Surface Mining Control and Reclamation Act of 1977 (30 U.S.C. 1201 et seq.)
- The Clean Water Act, (Federal Water Pollution Control Act [33 U.S.C. 1251 to 1387])
- The Clean Air Act of 1970, 42 U.S.C. 7401 et seq., as amended 1990
- The Comprehensive Environmental Response, Compensation and Liability Act of 1980, 42 U.S.C. 9601 et seq. also known as "Superfund"
- The Superfund Amendments and Reauthorization Act of 1986, Title III, embodying the Emergency Planning and Community Right-to-Know Act, Public Law 99-499
- Resource Conservation and Recovery Act, as amended (42 U.S.C. 6901 et seq.)

El Segundo Mine operations are under the jurisdiction of MSHA, which conducts regular health and safety inspections.

El Segundo's health and safety policies and procedures are consistent with their parent company's Health and Safety Mission. Every day, El Segundo employees strive to operate incident free (zero injuries, occupational illnesses, property damage, and accident near misses). Peabody Energy, owner of El Segundo, made remarkable progress toward the zero incident mission in 2011, reporting the safest year in Peabody's history, outperforming the industry average safety rate by 63 percent. Reportable incidents, including MSHA defined lost-time incidents and other incidents requiring medical treatment at the El Segundo Mine were three in 2010 and 2011, respectively. None resulted in a fatality, or long- or short-term disability.

Public Health and Safety

The potential public health impacts associated with air emissions from activities at El Segundo Mine would primarily be related to fugitive dust or particulate emissions. PM emissions are regulated under the Federal Clean Air Act. Specifically, the NAAQS include standards for PM_{10} and $PM_{2.5}$; referring to PM that has an aerodynamic diameter of 10 or 2.5 microns or less. In general, particles larger than 10 microns are trapped in a person's mouth, nose, and throat and do not reach a person's lungs. $PM_{2.5}$ tends to reach the deepest areas of a person's lungs, where many illnesses can originate. Generally, the PM emissions from mining and material handling operations are coarse and larger than 10 microns. Emissions from fuel-burning equipment such as combustion engines are generally smaller; less than 2.5 microns.

Public access to the El Segundo Mine is restricted by fences installed ahead of the advancing mine pits, warning and restricted access signage, and a guard shack located at the main mine access road. All visitors must receive a specified level of safety training prior to entering the mine property. The intensity of training ranges from a hazard training briefing to a full week of safety training depending upon the length of time visitors will be on-site, and the frequency of visits to the site. Visitor access to certain areas of the mine is restricted, unless accompanied by experienced mine personnel. Visitors most either provide or the mine will issue the appropriate level of personal protection equipment prior to entering the site.

Risks to public health and safety are related to exposure dust and particulate matter emissions. The airshed surrounding the mine is in attainment for PM.

3.18 Traffic and Transportation

The traffic and transportation analysis considers impacts to transportation infrastructure, including roads and railways, and the traffic patterns directly or indirectly caused by the alternatives.

The major access route to El Segundo Mine for employees and truck deliveries is State Highway 509—a paved two-lane highway (Figure A-1, Appendix A). This road bisects the mine and the mine haul road uses an overpass to cross State Highway 509 to deliver coal from the pit to the coal loading facility. The BNSF railroad serves the El Segundo Mine with a rail spur that links it to the main BNSF rail line at Grants, New Mexico (AAR 2011). Presently, this rail route is used to deliver coal to the Cholla power plant in Arizona. The BNSF rail spur to El Segundo Mine has the capacity to hold one unit train on the loop and one train on siding (BNSF Railway 2010).

The most recent traffic counts available for the route segments used to access El Segundo Mine facilities were taken in 2005 and 2006. The average annual daily traffic (AADT) count for State Highway 509 south of the mine entrance at the intersection with State Route 605 was 338 in 2005 and 330 in 2006 (USNRC 2009). These traffic counts were recorded prior to the full operation of El Segundo and Lee Ranch mines. At that time, the Lee Ranch Mine employed approximately 240 people, who used these routes to access the mine. Given present mine employment of about 500 employees, it is likely that current traffic counts are approximately double those from 2006 and the AADT for State Highway 509 is estimated to be approximately 700.

Over 90 percent of coal produced in the United States is transported by rail (Association of American Railroads 2010). Coal transport accounts for about 25 percent of total commodities transported by rail. El Segundo and Lee Ranch Mines use rail to transport coal to the Cholla Generating Station near Joseph City, Arizona; and the Springerville Generating Station near Springerville, Arizona. The average distance of rail travel to both of these stations is 150 miles. BNSF is the only rail carrier in the region, and is the sole transport provider for the two mines to the generating stations.

4. ENVIRONMENTAL CONSEQUENCES

Environmental resources may be affected in many ways during implementation of the proposed action. The effect, or impact, is defined as any change or alteration in the pre-existing condition of the environment produced by the proposed action, either directly or indirectly. This chapter analyzes the environmental consequences of the proposed action.

Impacts can be either long term (permanent, residual) or short term (incidental, temporary). Short-term impacts affect the environment for only a limited time and the environment usually reverts rapidly to the pre-disturbance condition. Short-term impacts are often disruptive and obvious. Long-term impacts are substantial and permanent alterations to the pre-project environment. For this project, short-term impacts are those confined to the duration of the mining and reclamation in the Project Area. Long-term impacts are those that would last beyond that time.

For the purpose of this EA, potential impacts have been divided into three categories:

- High – as defined in CEQ guidelines (40 CFR 1500-1508), impacts that are substantial in severity and therefore should receive the greatest attention in decision-making
- Moderate – impacts that cause a degree of change that is easy to detect
- Low/Minor – impacts that cannot be easily detected and cause little change in the existing environment

4.1 Air and Climate Resources

4.1.1 Proposed Action

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 emissions from rail transport of El Segundo coal are not analyzed because the project lease will not increase the rate of coal mined at El Segundo. The report is included as Appendix D.

A state air quality permit is required under 20.2.72 NMAC for some industrial facilities in New Mexico; however, fugitive dust emissions from coal mining operations are exempted from permitting (20.2.72.200B NMAC), but the regulation notes that new coal mining operations are “required to have an approved air pollution control plan for fugitive dust emissions by the New Mexico Surface Coal Mining Commission”. A coal mining permit is required under 19.8.9 NMAC for operations subject to the New Mexico Surface Mining Act (NMSA 1978, Section 69-25A-5). An air pollution control plan is required for all surface coal mining operations (19.8.9.904 NMAC) that includes an air quality monitoring program providing data sufficient to evaluate the effectiveness of fugitive dust control practices to comply with federal and state ambient air quality standards and a plan for fugitive dust control practices. The El Segundo Mine has an ambient monitoring program where data is submitted quarterly to the New Mexico Mining and Mineral Division and also has a fugitive dust control plan to reduce fugitive emissions.

Section 34 mining will occur in one of 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. Therefore, annual PM_{10} and $PM_{2.5}$ emissions from Section 34 during the life of mine (LOM) would be only a small fraction of total PM_{10} and $PM_{2.5}$ fugitive emissions occurring from all El Segundo Mine operations. Since the rate of production and the annual production would not increase as a result of the Proposed Action, no change in annual and short-term particulate matter emissions would occur, but emissions would persist 1-2 years longer than if the area were not mined. Annual and 24-hour particulate matter impacts will not increase with the proposed action.

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. The number of blasts per year and duration of blasts will not increase as a result of the Proposed Action, so annual blasting emissions remain the same as if the Project Area were not mined. Since annual production would not increase as a result of the Proposed Action, no change to annual and short-termed NO_x emissions would occur but emissions would persist for 1-2 years longer than if the area were not mined. Annual and 1-hour $N0_2$ impacts will not increase with the proposed action.

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 an 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. Since the rate of mining and the annual production would not increase as a result of the Proposed Action, no change to 1-hour and 8-hour CO emissions would occur but emissions would persist for 1-2 years longer than if the area were not mined. One-hour and 8-hour CO impacts will not increase with the proposed action.

Total SO_2 emissions from tailpipe and blasting range from 2.17 to 11.92 tpy for each mining year. Estimated SO_2 emissions are only 10 percent of the estimated NO_x emissions. Since the rate of mining and the annual production would not increase as a result of the Proposed Action, no change to annual SO_x emissions would occur but emissions would persist for 1-2 years longer than if the area were not mined. One-hour and 3-hour SO_2 impacts will not increase with the proposed action. Therefore, compliance with the SO_2 NAAQS would be expected given source release characteristics of tailpipe and blast emissions.

Total VOC emissions range from 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 0.075 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 in VOC emissions at the mine but emissions would persist for 1-2 years longer than if the area were not mined.

The analysis in this EA is based on assessing the relative significance of emissions estimated from Section 34 mining operations compared to mining operations in other parts of the El Segundo permit boundary. Since total annual mining emissions will not increase under the proposed action, no additional impacts to air quality are expected. Mining in the Section 34 project area would result in sustaining the annual emission levels and resultant impacts discussed above for approximately two additional years beyond the life of the mine projected without mining Section 34.

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 (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 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. Mining of the project area will span 10 years and contribute approximately 14 percent of the total estimated GHG emissions from the entire mine during that same 10-year period (estimated 1.12 MMt CO_{2e}). The Proposed Action would not result in an increase in annual production or an increase in annual greenhouse gas emissions; however, the same annual greenhouse gas emissions projected to occur under the current mine operations will occur for two years longer under the proposed action.

4.1.2 No Action Alternative

Under the No Action Alternative, the Project Area would not be mined. Surface disturbance associated with constructing water diversions, sediment ponds, and pit walls would be limited to 163 acres. Heavy equipment use would be much more limited than that anticipated under the Proposed Action, though exact numbers or types of equipment are not known at this time. Because both surface disturbance and equipment use are limited under the No Action Alternative, as with the Proposed Action, NAAQS would not be exceeded.

4.2 Geologic Resources

4.2.1 Proposed Action

Surface mining in the Project Area would permanently alter its topography and geology. Mining would involve the removal of overburden and coal bearing strata. Overburden would be used as backfill during reclamation activities. The removal of overburden and interburden material and subsequent use as backfill material would permanently remove strata from their geological context. Because the Project Area does not contain unique geological resources but rather is similar to surrounding lands, impacts to geological resources would be moderate in severity and long term Geologic formations located stratigraphically below the target coal formation would not be impacted by the Proposed Action.

During active mining, the surface topography would be modified due to removal of overburden and interburden material and coal. Drainages would be diverted around active mining. Reclamation of disturbed lands would restore topography to approximate pre-disturbance conditions while providing more stable slopes, resulting in a more gently rolling terrain than current topography. The most prominent topographical feature within the Project Area, a sandstone butte in the northwest corner of Section 34, is outside of the planned mining area and would not be affected. Impacts to the Project Area topography and surface geology would be moderate and long term.

The Proposed Action would result in the removal of overburden and interburden materials as well as any paleontological resources these layers may contain, an unavoidable adverse impact. These materials

would be returned to the mine pit as backfill. Mining would have an irreversible impact on paleontological resources that may occur in overburden and interburden layers, removing them from their geological context. The Proposed Action would result in long-term, low to moderate impacts due to the presence of similar paleontological resources outside the mine permit boundary and the lack of significant or critical paleontological resources recorded in the area (LRP 1981).

Impacts to mineral resources resulting from the leasing and subsequent mining of the Project Area include the removal of coal from up to nine seams, an irretrievable impact. No other saleable minerals are known to occur in the Project Area. The Proposed Action would result in long-term, high impacts to minerals in the Project Area due to the permanent removal of coal.

4.2.2 No Action

Under the No Action Alternative, no impacts to existing mineral resources in the Project Area would occur, as the coal would not be mined. Impacts to topography could occur on up to 163 acres disturbed by the construction of pit walls, diversions, and sediment ponds. Construction of pit walls could impact geology and paleontological resources on up to 112 acres as described above for the Proposed Action.

4.3 Soils

4.3.1 Proposed Action

Mining of the Project Area would result in removal and redistribution of Project Area soils. Soils removed prior to coal mining would be stockpiled or immediately transported to areas being reclaimed. During reclamation, suitable topsoil would be distributed above backfill material to support the establishment of vegetation. Some mixing of soils would occur during removal, transport, stockpiling, and redistribution. Erosion of topsoil by wind and water during mining while soils are stockpiled, and during reclamation prior to vegetation becoming established, would be expected to occur based on the erodibility of soils. Such impacts are expected to be short term and moderate. Erosion would be reduced to low levels by implementation of BMPs and successful reclamation.

Topsoil stockpiles would be bermed and seeded to reduce erosion. Reclamation of mined areas would result in more gently rolling terrain than existing conditions, stabilizing slopes and decreasing erosion. Newly reclaimed areas could be bermed and mulched to reduce topsoil loss. Reclamation activities are expected to have long-term positive impacts on soil stability and productivity. The establishment of vegetation consistent with the post-mining land use of rangeland would likely result in a higher percentage of vegetative cover, improve soil stability, reduce soil loss and increase productivity over pre-mining conditions. Impacts to the physical characteristics and productivity of soil are expected to be moderate and long term. Contamination of soils could result from accidental spills of fuel, oil, or other substances from mine equipment. Such impacts would be minor and short term, as they would be handled according to the El Segundo Spill Prevention Control and Counter Measures Plan. Should soil contamination occur, it would be a short-term impact.

4.3.2 No Action Alternative

Up to 163 acres of soils would be disturbed by the proposed action. The types of impacts to soils would be similar to those described for the Proposed Action. Construction of diversions and sediment ponds

would result in removal and mixing of topsoil. Use of heavy equipment could compact soils or result in accidental spills of fuel, oil or other substances. Soils removed for highwall construction would be stockpiled and eventually redistributed during reclamation. Impacts to soils are expected to be low to moderate and short term.

4.4 Surface and Groundwater Hydrology

4.4.1 Proposed Action

4.4.1.1 Surface Water

In the short term, surface disturbance associated with mining would remove the ephemeral channels and swales identified within the Project Area and would result in the containment within, or diversion of, surfaces flows around the mine until reclamation occurs and surface hydraulic functions return to mined areas. The largest source of potential runoff from the proposed mining operation is stormwater. PNRC plans two retention ponds to intercept upgradient storm-related flow above the mine pit to ensure the miners' safety, minimize the potential for water in the pits, and decrease the potential for discharges from the downgradient sediment ponds (Figure A-5, Appendix A). Mining through these minor ephemeral channels may result in minor and infrequent decreases in storm-related flows in Inditos Wash downstream at the El Segundo Mine's southern boundary (see Figure A-5, Appendix A). PNRC modeled the pre- and post-mine runoff volumes and peak flows for a variety of storm intensities and durations for certain locations within the mine. SWM #5 was one of the modeling locations and all surface water features within the Project Area drain to this location (Figure A-5, Appendix A). After reclamation, runoff volumes at SWM #5 would decrease between 14 and 27 percent depending of the storm intensity and duration. For less intense storms the runoff decrease is greater (27 percent decrease for a 2-year, 24-hour storm) while the runoff decrease is less for intense storms (14 percent decrease for a 100-year, 24-hour storm). The decreases are due to using sandier soils for reclamation (PNRC 2010). Ground disturbance associated with construction and mining has the potential to increase sediments carried by storm-related flows in the short term.

Reclamation would incrementally re-establish topography with positive drainage towards Inditos Wash. Sediment yields in runoff from the reclaimed areas would soon decline below the pre-mine conditions due to improved post-mine vegetation cover resulting from revegetation activities, including mulching and seeding. The runoff from reclaimed areas is also expected to have lower sediment yields than pre-mine conditions due to the use of topdressing materials as reclamation soils, which improve infiltration and decrease erosion rates (PNRC 2010).

Due to generally poor water quality, surface water uses in the project use are restricted to opportunistic use for stock watering. No changes in surface water uses are expected from mining the proposed Project Area. Impacts from the proposed mining operations would result in low, short-term impacts to surface water features in the proposed Project Area. Reclamation would result in re-establishment of drainage and the hydrologic balance throughout the mined area following conclusion of mining.

4.4.1.2 Groundwater

Mining would occur in the Menefee Formation, resulting in a drawdown of water within the formation. However, the Menefee Formation is generally unsaturated within El Segundo Mine and there are no

groundwater wells that target this formation near El Segundo Mine; therefore, no impacts are expected to groundwater quantity in the Menefee Formation. Significant groundwater inflows have not been encountered in the mine pits at Lee Ranch Mine and are not expected at El Segundo mine. Effects of mining the Menefee Formation are isolated from aquifers and groundwater in deeper formations by the presence of a thick shale sequence below the Menefee Formation (NM-EMNRD 2005).

Groundwater from the Menefee Formation is suitable only for stock watering. Currently, background total dissolved solids (TDS) amounts for the Menefee Formation within the area are from 250 to 800 milligrams per liter (mg/L). The maximum state criteria for TDS within stock water is 3,000 mg/L. Mining the proposed Project Area is not expected to impact groundwater quality based on experience with the Menefee Formation at Lee Ranch Mine.

Water supply for El Segundo Mine comes from a well (SJ-120) that taps three aquifers; the Dalton Sandstone, the Gallup Sandstone, and the Westwater Canyon Sandstone Member. A declaration to appropriate and use 650 acre feet per year (ac-ft/year) of groundwater per year from the SJ-120 water well was filed with the New Mexico State Engineers Office. MMD's Cumulative Hydrologic Impacts Assessment (NM-EMNRD 2005) determined whether extraction of groundwater by the SJ-120 well impacted water quantity in nearby domestic and stock watering wells that utilize the three regional aquifers. PNRC modeled groundwater use based the worst-case scenario of anticipated mining over the next 30 years and using the full declared water right associated with well SJ-120 (650 ac-ft/yr). In the Cumulative Hydrologic Impact Assessment (CHIA), PNRC assumed that a drawdown of any of the three aquifers greater than 25 percent of available water would represent a material damage to nearby domestic or stock watering wells. After 30 years of pumping, the CHIA predicted a drawdown of approximately 3 percent of the available head in the Morrison Formation, 13 percent for the Gallup Sandstone, and 22 percent for the Dalton Sandstone (NM-EMNRD 2005). Since drawdown was near the 25 percent threshold for the Dalton Sandstone, PNRC established three groundwater monitoring wells in the three aquifers tapped by SJ-120 well to monitor drawdown and the effects of extracting water from SJ-120. Results from these monitoring wells are not available at the time publication of this report. Impacts from the proposed mining operations could result in impacts to groundwater quantity in the Project Area. No impacts to groundwater quality are expected from the proposed mining operations.

4.4.2 No Action Alternative

4.4.2.1 Surface Water

Under the No Action Alternative, PNRC would construct a diversion ditch and two sediment ponds within the Project Area. The diversion ditches would bisect the Project Area and divert all water to sediment ponds in the southeast section of the Project Area (Figure A-4). The diversion ditches and sediment ponds would intercept upgradient storm-related flow above the mine pit to ensure the miners' safety, minimize the potential for water in the pits, and decrease the potential for discharges from the downgradient sediment ponds. The remainder of the ephemeral channels and swales within the Project Area would not be physically impacted but sections of the channels downstream of the diversion ditches would be dewatered.

Construction of the diversion ditches and sediment ponds has the potential to increase sediments carried by storm-related flows in the short term. The Project Area lies within PNRC's mine permit boundary and

any stormwater discharges would be controlled with the installation of BMPs. Reclamation would remove the diversion ditches and sediment ponds and reestablish the natural drainage towards Inditos Wash.

Due to generally poor water quality, surface water uses in the project use are restricted to opportunistic use for stock watering. No changes in surface water uses are expected from constructing diversion ditches and sediment ponds in the Project Area. Impacts from the diversion ditches and sediment ponds would result in low, short-term impacts to surface water features in the Project Area. Reclamation would result in re-establishment of drainage and the hydrologic balance throughout the Project Area following conclusion of mining.

4.4.2.2 Groundwater

PNRC would continue to use the SJ-120 water well to supply water for mining activities outside of the Project Area under the No Action Alternative. Water use would be similar if somewhat reduced from the estimates included for the Proposed Action and impacts would be similar to those described above.

4.5 Visual Resources

Potential effects to visual resources are determined by comparing landscape sensitivity with the degree and type of visual change being proposed. Sensitive landscapes can accommodate only a low degree of visual change without significant impacts and low-sensitivity landscapes can accommodate a higher degree of visual change before exhibiting substantial visual impacts. Adverse effects to visual resources can occur when:

- an action perceptibly changes features of the physical environment so that they no longer appear to be characteristic of existing local or regional conditions;
- an action introduces new features, colors or textures to the physical environment that are perceptibly uncharacteristic of the region and/or locale; or
- aesthetic features of the landscape become less visible (e.g., partially or totally blocked from view) or are removed.

For this EA, a modified BLM and Visual Sensitivity-Visual Change (VS-VC) method was used to assess visual impacts of the Proposed Action. This methodology evaluates the degree of change between existing conditions at sensitive receptors identified at Key Observation Points (KOPs) (Figure A-6 and Table B-2 in Appendix B) and expected views at these locations following project implementation. Under this method, it is assumed that visual resources would only be affected by actions occurring or proposed within the associated viewshed of the Project Area. In other words, only those locations from which proposed actions could be seen could experience visual effects.

The five KOPs identified during the viewshed analysis and field reconnaissance, as described in Appendix B, included locations where perceptions of future changes would likely be most focused. All of the five KOPs or important view locations identified in Figure A-6 were considered in the VS-VC analysis. Some factors used in determining potential impacts on visual resources at the KOP locations included:

- The existing visual quality of the site and vicinity
- The level of public interest in the existing landscape and concern over potential changes

- Visibility, frequency, and duration that the landscape is viewed
- Viewing distance and degree to which project components would dominate the view of the observer
- Resulting contrast of the proposed facilities or activities with existing landscape characteristics
- The extent to which project features or activities would block views of higher value landscape features

All of these factors were evaluated at each KOP location considered and impact conclusions were then developed. If a determination was made that the resulting impact would potentially be significant, the impact situation was further evaluated against the application of feasible mitigation measures in an effort to reduce the visual impact to a level of less than significant or not significant, if possible. A final conclusion on impact significance was then reached for each KOP and identified in Table B-2 of Appendix B.

Under the VS-VC methodology, the degree of impact significance is a function of overall visual sensitivity and visual change. Actual parameter determinations (e.g., visual contrast, project dominance, and view blockage) were based on analyst experience and site-specific circumstances. Tables B-2 and B-3 in Appendix B illustrate visual quality and the general interrelationship between overall visual sensitivity and visual change. These relationships were used in defining the potential impacts associated with the proposed actions as documented in Table B-1. Table B-2 (Appendix B) summarizes the factors used to analyze potential project effects for both the No Action Alternative and the Proposed Action, and how the information and conclusions were derived.

4.5.1 Proposed Action

The impacts of the Proposed Action were assessed in context with other previously permitted actions that would occur in the Project Area viewshed under the No Action Alternative during the life of the mine. Activities that could potentially affect visual resources in the Project Area viewshed under the Proposed Action include the initiation of mining in Section 34 and continuation of previously permitted mining operations.

Direct effects to visual resources would include the expansion of mining activities into previously undisturbed landscapes in Section 34 located east and north of current mining operations. KOPs 1 and 4 would have middleground views of the proposed mine activities, KOPs 2 and 3 would have background views, and KOP 5 would be in the seldom seen distance zone for proposed actions. As documented on Table B-4 (Appendix B), KOP locations 1, 3, and 4 would experience visual changes from the Proposed Action activities that are “Adverse, but not Significant,” largely due to the more dominant views of proposed mining and the continued long-term duration of visible dust from mining activities and night lighting. Dust suppression measures and the use of shielded night lighting would reduce the effects at these locations; however, due to the changes in views from proposed mining activities, effects would remain generally at the “Adverse, but not Significant” levels.

Changes in views at KOP locations 2 and 5, under the Proposed Action, would not be significant, mainly due to the distance zones (middleground to seldom seen) that these KOPs are located in or screening provided by topography at these locations.

Indirect effects, such as construction dust and haze and night lighting glare, could continue through the life of the proposed mining actions. Dust suppression and the use of shielded lighting would reduce indirect effects.

In general, areas located within 0 to 1 mile of the Project Area would experience moderate visual changes. Areas in more distant zones should experience low to no changes to visual resources.

Once mining operations are completed in select locations, reclamation in these areas would be implemented as described in Chapter 2.0 and the landscape vegetation characteristics should generally return to pre-project appearances. The topography in the Project Area would experience long-term modifications; however, in context with existing and anticipated future previously permitted mining activities, no dramatic alterations to existing visual conditions is anticipated.

Using topography and existing vegetation to screen project activities from residences, limiting disturbance areas and road cuts and fills as much as possible, achieving successful reclamation, maintaining dust suppression, using appropriate painting on permanent structures that matches the surrounding landscape, and shielding night lighting would reduce, but not completely eliminate, potential effects to visual resources in the Project Area. Topographic modifications to the landscape associated with the Proposed Action are expected to be permanent, but not significantly different from what is currently occurring at the mine. Informational kiosks describing the ongoing coal mining operations could be placed along Highway 509 and would help put current and future mining activities in perspective for the casual observer.

4.5.2 No Action Alternative

Under the No Action Alternative, changes to the visual landscape would occur as previously permitted mining at El Segundo continues to move across the Project Area viewshed. These changes would occur whether or not the proposed mining within the Project Area is approved. Under the No Action alternative, direct effects to visual resources within the proposed Project Area viewshed would include:

- Continued mining activities in the existing El Segundo Mine that would alter existing topography
- Continued presence of night lighting, dust from operations, and equipment exhaust from existing operations
- Reclamation of existing and future previously permitted mine workings
- Previously permitted alterations to undisturbed landscapes in the mine permit boundary

Since coal mining is currently occurring in the viewshed of the Project Area, the contrast with overall existing conditions and future previously permitted activities in this area should be minimal, as documented on Table B-4 (Appendix B). KOPs 1 and 4 have foreground views of the existing mine activities and middleground views of Section 34, and were considered, along with KOPs 2, 3, and 4, which have background views of existing mining activities, in the KOP analysis for the No Action Alternative. Only KOP locations 1, 3, and 4 would experience visual changes from No Action activities that are “Adverse, but not Significant,” largely due to the views of continued mining to the east and continued views of dust and night lighting. Changes in views at KOP locations 2 and 5, under the No

Action Alternative, would not be significant, mainly due to the limited views of mining activities currently visible at these sites and the background distance zone where these KOPs are located.

Indirect effects, such as operations dust and haze and night lighting, could continue through the duration of previously permitted actions. Dust suppression measures and shielded night lighting would reduce, but not completely eliminate the effects to visual resources at KOPs 1, 3, and 4.

4.6 Noise

4.6.1 Proposed Action

Noise in the Project Area and its vicinity are influenced by existing mining operations. A noise study of the Lee Ranch and El Segundo mining operations showed that for most operational sources, noise levels drop to near ambient levels at 3,000 to 7,000 feet from the noise source. The dragline produced the highest noise levels recorded and its operation remained audible above ambient conditions at 10,000 feet, the farthest distance sound measurements were taken. The study did not monitor drilling operations. Blasting operations were measured once at a distance of 2,500 feet.

Noise in the Project Area would continue to be influenced by the rail line, truck and shovel operations, dragline, drilling and blasting, and haul road traffic. As mining operations move into the Project Area, noise from operational sources would be expected to mirror those recorded in the mine noise study. Additional use of drills and blasting of overburden, interburden, and coal would introduce high-intensity, low-duration noise to the soundscape. In a recent noise study of surface coal mining noise impacts at the Navajo Mine in San Juan County, the peak noise levels from overburden drilling was demonstrated to be 81 dBA at a distance of 50 feet and peak levels from blasting at 50 feet was 110 dBA (OSM 2011).

Sensitive receptors identified near the Project Area included New Mexico State Highway 509, ranch house south of El Segundo Mine, and Chaco Culture NHP. Noise levels measured at each of these locations are given in Table 4.6-1. Noise measured during a blasting event at one receptor, State Highway 509, was measured at 57.1 dBA; however, noise levels were recorded as 2-minute L_{eq}, not directly comparable to the USEPA standards, which are expressed as 24 L_{dn}. When averaged over time, the influence of blasting activities on 24-hour noise metrics is small.

Table 4.6-1. Noise Levels at Noise Sensitive Receptors near the El Segundo Mine

Sensitive Receptor	Distance from Mine	dBA (2 minute average L_{eq})
State Highway 509/ Pre-blast	2,500 feet	44.2
State Highway 509/ Blast	2,500 feet	57.1
Ranch and Trailer	11,400 feet	37.6
Chaco Culture NHP Visitor Center	30 miles	33.3
Chaco Culture NHP Pueblo Bonita	30 miles	35.6

Noise levels in the Project Area would be expected to increase as mining operations move into the area. Impacts would be moderate and short term, given the existence of active mining surrounding the area, and

would end once mining and reclamation activities were complete. For areas surrounding the mine, including the sensitive receptors identified, no change from existing noise levels is expected.

4.6.2 No Action Alternative

Under the No Action Alternative, mining would not occur in the Project Area but activities related to mining in adjacent areas including construction of diversions, sediment ponds, and highwalls would occur. Highwalls associated with permitted mining would be constructed on the west, south, and east borders of the Project Area. Construction would employ the same equipment described above for mining including draglines, haul trucks, shovels, loaders, and dozers, resulting in noise levels described for the existing environment. Equipment utilized for the pond and diversion construction would include dozers, scrapers, loaders, and small utility trucks. Noise from these sources would be short term and, given the ambient noise levels at the mine—virtually undetectable.

4.7 Vegetation

4.7.1 Proposed Action

Mining in the Project Area would result in the removal of 448 acres of native vegetation resulting in direct impacts. Vegetation removal would result in short- or long-term impacts depending on the plant community, the extent of the impact, and the success of revegetation. Reclamation would restore vegetation in the Project Area, replacing existing plant communities with native grass, forb, and shrub species to establish a post-mining land use of rangeland and wildlife habitat, resulting in long-term low to moderate impacts to species composition and vegetative cover.

The proposed activities have the potential to spread or introduce noxious weeds, which can outcompete native plants and decrease the productivity of forage. PNRC's Invasive/Noxious Weed Management Plan (PNRC 2010, exhibit 906-1) details activities that would minimize the introduction or spread of noxious weeds. Impacts to vegetation from noxious weeds is expected to be low to moderate in the long term with implementation of weed control and eradication measures. Vegetation adjacent to surface disturbance may be affected by windborne dust that settles on plants, which can block photosynthesis, respiration, and transpiration. Impacts from dust are expected to be low and short term. Implementation of fugitive dust control measures would reduce such impacts.

4.7.2 No Action Alternative

The No Action Alternative would result in the removal of native vegetation on up to 163 acres of the Project Area, resulting in short- or long-term impacts depending on the affected plant community as described for the Proposed Action. Surface disturbance has the potential to spread or introduce noxious weeds. Reclamation would replace existing plant communities with native grass, forb, and shrub species and would employ noxious weed controls as described for the Proposed Action. Impacts are expected to be low to moderate and long term.

4.8 Wildlife and Migratory Birds

4.8.1 Proposed Action

Direct impacts to wildlife and migratory birds would include habitat loss, alteration, and fragmentation; restrictions on wildlife movement created by fences and mine pits; displacement of wildlife from the Project Area; incidental mortality from animal-vehicle collisions, vegetation clearing with heavy equipment, or mining activities; and an increase in noise, fugitive dust, light pollution, and human presence. These direct impacts would be high in the short term during active mining and low to moderate in the long term after reclamation of the mined area is complete.

Habitat loss, alteration, and fragmentation are inevitable consequences of surface disturbance when vegetation is removed. The Proposed Action would result in the removal of native vegetation. The majority of the vegetation removed would be desert grassland habitat, which supports the lowest species diversity and abundance of the habitats present in the Project Area. No trees would be planted and shrubs may be difficult to reestablish through reclamation activities. Although reclamation of the Project Area would decrease habitat for shrub- and juniper-nesting migratory bird species, grassland-nesting species would benefit with an increase in habitat.

Mine pits and fences could restrict the movement of wildlife, increasing the distance between available habitats and altering movement patterns. Habitat loss would cause displacement of wildlife including migratory birds, pushing individuals into adjacent habitat that may be occupied or in other ways less suitable. Such displacement can result in competition between displaced and established animals, increase risk of predation, and lower reproductive success of displaced individuals.

The Proposed Action would involve the use of vehicles and heavy equipment in the Project Area, which could result in mortality to individuals. Burrowing animals or animals with limited mobility such as small mammals, reptiles, young mammals and nestling birds would be most impacted. Impacts to migratory birds would be greatest during the breeding season, approximately April 15 to July 15.

Noise, dust, light pollution, and human presence during mining activities could also cause direct impacts to wildlife. Wildlife species tend to avoid humans and associated disturbances. Impacts to wildlife from noise is confounded by multiple variables such as the magnitude and duration of the noise generated, proximity to the noise source, life history of the species affected, time of year (e.g., breeding vs. non-breeding season), time of day, and the influence of other environmental stressors such as heat and prey availability. Noise can impact wildlife by changing their habitat use and activity patterns, increasing stress, reducing reproductive success, increasing predation risk, degrading communication with conspecifics, and damaging hearing. Species response to noise can range from mild annoyance or panic behavior (Fletcher 1980). Raptor species may avoid areas with increased human presence and noise, potentially altering nesting and roosting sites to avoid disturbances (Larkin 1996). Although no known raptor nests would be destroyed by mining, studies at the mine show that nest abandonment has occurred as the mining activities move toward documented nest sites (Hawks Aloft 2006-2010). The common raven and American kestrel nest sites near the Project Area could be abandoned. Ultimately, potential impacts depend upon the sensitivity of the species or individual subjected to the noise.

Fugitive dust generated by mining activities would also directly impact individual wildlife in the vicinity of mining activities by impairing visibility and possibly respiration. Indirectly, dust could reduce cover and forage quality for wildlife species by decreasing plant productivity. Fugitive dust emissions would likely be greatest near mining activities.

Light pollution from nighttime lighting may disorient bats, insects, and migratory birds (McGuire and Fenton 2010). Illuminated nights may increase prey detection by nocturnal predators such as owls and bats. Small nocturnal species including deer mice and kangaroo rats may be more susceptible to predation in illuminated areas at night. Alternatively, these mammals may reduce their nighttime activities thereby decreasing foraging and mating opportunities (Clarke 1983). Moths and other insects attracted to light sources may increase prey availability to moth-eating bats (Patriarca and Debernardi 2010).

It is important to note that noise events, nighttime lighting, and fugitive dust are part of the environmental baseline in the Project Area from ongoing mining at El Segundo Mine. Deer and elk have continued to occupy the Project Area adjacent to the El Segundo mine active mining operations, suggesting that these animals may have become habituated to noise, dust, and associated human presence disturbances. As the Proposed Action essentially maintains current coal mining, there would be no quantifiable increase in noise, nighttime lighting, or fugitive dust relative to current conditions. There would be a spatial shift in where the noise and dust is generated incrementally north through the Project Area with a commensurate reduction in noise and dust in areas currently being mined.

Indirect impacts would include a change in wildlife and migratory bird species composition and abundance in the Project Area resulting from reclamation of the Project Area. The juniper savanna would not be reclaimed and the saltbush community may be difficult to reestablish through reclamation activities, though these communities represent a small proportion of the Project Area. Wildlife species associated with these vegetation communities would be replaced by species that are more associated with grassland vegetation communities. These impacts would be low and long term, given the abundance of adjacent similar habitats.

4.8.2 No Action Alternative

Impacts to wildlife including migratory birds resulting from the No Action Alternative would be similar to those described for the Proposed Action that includes habitat loss, fragmentation and alteration; displacement of individuals; incidental mortality; and disturbance resulting from human presence, noise and dust. Impacts would be high in the short term during mining in adjacent permitted areas, construction of diversions and sediment ponds. In the long term, once reclamation is complete, impacts to wildlife are expected to be low to moderate.

4.9 Invasive and Non-Native Species

4.9.1 Proposed Action

Within the El Segundo Mine permit boundary, two BLM-listed invasive and non-native weeds—hoary cress and saltcedar—have been observed. Halogeton, also observed within the permit boundary, is on the New Mexico State Noxious Weeds list. The large-scale ground disturbance associated with surface mining creates conditions that encourage the establishment and spread of noxious weeds. Vehicles, people, wind, or water may transport seeds and deposit them in disturbed soils, or existing seeds may be

encouraged to germinate in disturbed soils. Noxious weeds that spread can degrade habitat quality and decrease productivity of native forage. Mining and reclamation activities would be conducted in accordance with PNRC's Invasive/Noxious Weed Plan (PNRC 2010, Exhibit 906-1). Implementation of the management practices described by the plan would reduce the likelihood of introducing or spreading noxious and invasive species. The proposed activities would have low to moderate long-term impact on the introduction and spread of invasive and non-native species to the Project Area.

4.9.2 No Action Alternative

As described for the Proposed Action, surface disturbance and human and vehicular activity associated with the No Action Alternative could introduce or spread of noxious weeds resulting in low to moderate long-term impacts.

4.10 Threatened and Endangered Species

4.10.1 Proposed Action

No USFWS listed species, or potential habitats, occur within the Project Area. FFO reviewed and determined that the Proposed Action is compliant with listed species management guidelines outlined in the September 2002 Biological Assessment (Cons. No. 2-22-01-I-389). No further consultation with the USFWS is required.

4.10.2 No Action Alternative

As with the Proposed Action, no impacts to USFWS listed species or their potential habitats would occur under the No Action Alternative.

4.11 Special Status Species

4.11.1 Proposed Action

The Project Area contains known habitat for the BLM/FFO special status species ferruginous hawk, golden eagle, and prairie falcon. Habitat is present for burrowing owl and mountain plover, but it is unlikely that these species occur in the Project Area. Impacts to BLM/FFO special status species from the leasing and subsequent mining of the Project Area would be high in the short term during active mining and low to moderate in the long term after reclamation of the Project Area is complete.

Direct impacts may include habitat loss, alteration, and fragmentation; displacement from the Project Area; incidental mortality from animal-vehicle collisions, vegetation clearing with heavy equipment, or mining activities; and an increase in noise, fugitive dust, and human presence. Indirect impacts may include a change in species composition and abundance in the Project Area. See Section 4.8 for a full discussion of these impacts on wildlife and migratory birds.

One historic golden eagle nest was located approximately 0.4 miles from the eastern boundary of the proposed permit boundary. This nest was last recorded active in 2002 by METRIC Corporation personnel. No golden eagle nesting activity has been recorded since 2002, although Hawks Aloft (2010) noted that the nest may have been active in 2006, based on nest condition. Two prairie falcon territories active in 2008 have been abandoned within the El Segundo Mine permit boundary with the progression of

active mining operations and most likely have moved to territories beyond the mine permit boundary (Hawks Aloft 2010). Proposed permit area would occur approximately 1.2 miles SW of a recently active ferruginous hawk nest. No known golden eagle, prairie falcon, or ferruginous hawk nests occur within the Action Area. These species may be sensitive to human disturbance, especially during the incubation and early nestling periods when the potential for nest abandonment is the highest (Jasikoff 1982). The Proposed Action would not result in any disturbance or modification of potential nesting habitat for any raptor species. The reclamation of the Project Area to grassland habitat could benefit these species in the long term by providing more suitable foraging habitat, assuming small mammals repopulate the Project Area. Given the abundance of suitable habitat in the area, habitat loss under the Proposed Action may result in impacts to individuals, but would not be expected to result in population level impacts. Impacts are expected to be moderate in the short term and low in the long term.

No adverse impacts to the burrowing owl and mountain plover are anticipated since these species have never been observed within the Project Area or the vicinity (Hawks Aloft 2006-2010, PNRC 2010). The reclamation of the Project Area to grassland habitat may benefit these species in the long term, especially if large expanses of sparse, short vegetation and bare ground occur in the Project Area post-reclamation (Knopf and Miller 1994). The seed mix for revegetation of the Project Area includes grasses such as blue grama and needle-and-thread (*Stipa comata*), both dominant grasses in mountain plover habitat (USFWS 1983).

Mitigation Measures

The historic golden eagle nest and surrounding territory east of the proposed permit area, as identified in the Biological Survey Report (Appendix C), could potentially become active in the future. Protective measures need to be taken to ensure that nesting activities are not disturbed, in accordance to the Bald and Golden Eagle Protection Act of 1940. If this nest or any golden eagle nest is active, no mining activities would be permitted within 1/3 mile of the active from Feb 1 – June 30 or until the nest is no longer active. Any exceptions would need written approval by a BLM/FFO-approved biologist.

4.11.2 No Action Alternative

As described for the Proposed Action, impacts to ferruginous hawks, golden eagle, and prairie falcons resulting from the No Action Alternative would include a short-term loss of foraging habitat and human-induced disturbance and displacement and possible benefits resulting from habitat restoration in the long term. Burrowing owls and mountain plovers may benefit from the establishment of grassland habitat following reclamation.

4.12 Socioeconomics

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.

4.12.1 Proposed Action

The socioeconomic impacts are directly related to the amount of coal that would be mined from the Project Area between 2014 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 2010, employment at El Segundo Mine was 221 and total coal production was over 6.6 million tons. Table 4.12-1 shows coal production and estimated government revenues that would be generated by coal production from the Project Area.

Table 4.12-1. 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
2014	1.42	$33.5	$5.5	$4.0	$0.4
2015	1.85	$43.7	$7.1	$5.2	$0.5
2016	1.28	$30.2	$4.9	$3.6	$0.3
2017	1.28	$30.2	$4.9	$3.6	$0.3
2018	1.02	$24.1	$3.9	$2.9	$0.3
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	11.22	$265	$43	$32	$3

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 4.12-1, 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 $43 million over a 10-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 $32 million over 10 years, also insignificant compared to total annual revenue of $1.8 billion. An estimated $3.0 million in property tax revenue, out of about $246 million, would be paid to the county over the 10-year period. This amounts to about 1 percent of McKinley County's estimated total revenue

over the 10-year period. Therefore, there would be no direct or indirect economic or social impacts for this alternative.

4.12.2 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.

4.13 Environmental Justice

4.13.1 Proposed Action

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.

4.13.2 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.

4.14 Cultural Resources and Native American Religious Concerns

4.14.1 Proposed Action

Direct effects normally include alterations to the physical integrity of a cultural resource. If a cultural resource is significant for other than its scientific information, direct effects may also include the introduction of audible, atmospheric, or visual elements that are out of character for the cultural site. Eligibility determinations have been made by the SHPO for 9 of the 16 known cultural resources sites. Of these 9, 8 have been determined to be eligible and one is ineligible for National Register listing. Two of the eligible sites would be avoided by mining activities and no additional cultural investigations are required. The BLM will consult with the SHPO on the National Register eligibility of the remaining seven sites. Minor archaeological testing may be required as part of the eligibility determination process. All of the sites determined eligible by the SHPO, except the two avoided, will require additional archaeological investigations, such as testing, with the potential for data recovery. Representatives from Laguna Pueblo will be consulted regarding the treatment of site LA 27899, a TCP.

If previously undocumented cultural resources are encountered during construction, all activities would stop near the discovery and the BLM and MMD would be immediately notified. The cultural resources would then be evaluated and documented. Mitigation measures such as data recovery may be required to prevent impacts to newly identified cultural resources. A potential indirect effect of the Proposed Action is the increase in human activity and access to the area leading to the potential of removal or alteration of cultural resources.

4.14.2 No Action Alternative

Direct impacts to cultural resources could occur as a result of construction of pit highwalls, diversions, and sediment ponds that would disturb a total of 163 acres under the No Action Alternative. As with the Proposed Action, known cultural resources in the Project Area would be evaluated in consultation with SHPO and Laguna Pueblo and treatment plans would be implemented to avoid impacting these resources. Increased human presence in the Project Area could result in the unauthorized removal or alteration of cultural resources.

4.15 Land Use

4.15.1 Proposed Action

Impacts to land use are measured in terms of whether the changes to land use caused by the alternatives are consistent with present land use regulations and if these land use changes would prevent or alter the types of future land use that would be feasible.

The Project Area is privately owned and is currently used as rangeland. A surface use agreement is in place with the landowners. In the short term, land use in the Project Area would be changed from range land and wildlife habitat to a surface coal mine. This impact would last for the duration of the coal mining in the LBA and reclamation period, after which it would return to its previous land use. Land use impact is considered moderate in the short term given that the proposed mining is not expected to affect future land use and is not inconsistent with any regulations or agreements.

4.15.2 No Action Alternative

In the short term, the surface disturbing activities that would be implemented under the No Action Alternative would temporarily change land use of range and wildlife habitat for the duration of mining around the Project Area. As with the Proposed Action, short-term impacts are considered moderate. In the long term, land use would return to baseline conditions once reclamation is completed.

4.16 Regulated Waste

4.16.1 Proposed Action

No change to the volume or type of regulated or solid wastes generated by the mine would occur if the Project Area were mined. The procedures and requirements for handling of regulated and solid wastes related to mining in the Project Area would be the same as those established for the existing El Segundo Mine as described in the mine permit (PNRC 2010) and in Section 3.16.

4.16.2 No Action Alternative

Procedures and requirements for managing regulated and solid wastes associated with the No Action Alternative would be handled as described for the Proposed Action. No change in volume or type of wastes would occur.

4.17 Public Health and Safety

4.17.1 Proposed Action

The consequences of the alternatives on health and safety focus on public exposure to air emissions from El Segundo Mine because the other potential health and safety risks are expected to be insignificant as extensive health and safety programs designed to minimize worker risk are implemented and enforced. The significance criteria for public health are based on whether the levels of PM and ozone precursor emissions from El Segundo Mine would cause exceedances of NAAQS in surrounding areas including McKinley and Sandoval Counties, NM.

The Proposed Action would not be expected to cause a measurable change in ambient PM_{10} or $PM_{2.5}$ concentrations in surrounding areas. The airshed in McKinley and Sandoval Counties near the mine is currently in "attainment" status and ambient air quality does not regularly exceed the NAAQS. Therefore, there would be no adverse public health consequences.

4.17.2 No Action Alternative

No impacts are anticipated from the No Action Alternative since ground disturbance and equipment use would be less than that utilized for the Proposed Action.

4.18 Traffic and Transportation

4.18.1 Proposed Action

Impacts to transportation are measured in terms of road and rail capacity and condition for routes that would be used by employees, equipment, or coal product to access El Segundo Mine facilities. Traffic impacts are measured in terms of traffic counts and road capacity for these access routes.

The major access route to El Segundo Mine for employees and truck deliveries is State Highway 509. The baseline estimated traffic count is 700 AADT. Given the current condition of State Highway 509, the traffic level is well within the capacity of the road and it is assumed that the road would be classified as "uncongested" if evaluated in a traffic or transportation plan.

Transportation network conditions, including use of rail lines, would not change under the Proposed Action. Traffic volumes associated with mining activity at El Segundo Mine would be the same as baseline conditions since no changes to employment numbers are proposed. Therefore, there would be no transportation or traffic impacts.

4.18.2 No Action Alternative

If mining in the Project Area were not implemented, there would be no anticipated change from baseline transportation conditions or traffic volumes described in Section 3.18.

5. CUMULATIVE IMPACTS, UNAVOIDABLE ADVERSE EFFECTS, AND IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

The cumulative impacts analysis is important in understanding how multiple actions in a particular time period and space (e.g., geographic boundaries) impact the environment. The CEQ regulation defines cumulative effects as "…the impact on the environment which results from the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such actions" (40 CFR 1508.7). Whereas, the individual impact of one project in a particular area or region may not be considered significant, the result of numerous projects in the same area or region may cumulatively result in significant impacts. Cumulative impact analysis, as applied to NEPA, is subject to interpretation in analyzing the magnitude of impacts to a particular area or region that result from the proposed action and other actions, including reasonably foreseeable actions.

This analysis of cumulative impacts considers past, present, and reasonably foreseeable federal and non-federal activities that have occurred or are expected to occur in the region. The proposed action would be one of a number of projects that have taken place or may reasonably be expected to take place in the region and are summarized in Table 5-1. These projects were compiled from New Mexico Department of Energy, Minerals and Natural Resources permits, BLM and other agency NEPA logs, Energy Information Administration data, and tribal and municipal development plans.

In considering the potential cumulative impacts of the Proposed Action, the geographic and temporal scope varies by resource depending on the characteristics of potential impacts. The temporal scope considered for cumulative impacts is as follows:

- Past actions are those that occurred between 1990-2011
- Present actions are those that occurred in 2011 and are continuing, and are considered in determining baseline conditions in the Affected Environment (Chapter 3)
- Future actions are those that are reasonably expected to occur after 2011 through 2025

5.1 Past, Present, Reasonably Foreseeable Actions in the Project Vicinity

In general, the pace and extent of development in the McKinley County and those counties immediately surrounding it (Cibola, Rio Arriba, San Juan, Sandoval) and resulting impacts will be shaped largely by resource and regulatory constraints in several key industries such as oil and gas production, coal and uranium mining, power generation, and water resource development. The most prominent factors that affect the reasonably foreseeable development (RFD) scenario include the following.

- Overall, air quality in the San Juan Basin is anticipated to be better protected with the implementation of tighter air emissions standards and NAAQS. The major rulemaking efforts include USEPA's determination of Best Available Retrofit Technology (BART) for regional haze compliance at Four Corners Power Plant and San Juan Generating Station, as well as the Four Corners Air Quality Task Force evaluation of emissions reduction options for reducing ozone levels in the San Juan Basin.

- On February 15, 2013, the Public Service of New Mexico (PNM), the New Mexico Environment Department, and the USEPA agreed to a compliance plan for San Juan Generating Station (SJGS) for the federal visibility regulations (aka haze rule). The terms of the agreement involve the retirement of Units 2 and 3 of SJGS by the end of 2017, and the installation of nitrogen-oxide reducing technology, called selective non-catalytic reduction technology, on the remaining two units in early 2016. These actions are expected to substantially reduce air emissions from SJGS including reducing NO_x emissions by 62 percent and particulate matter emissions by 50 percent. The reductions are in addition to emissions reductions achieved after a $320 million environmental upgrade in 2009. Retirement of Units 2 and 3 will reduce the generating capacity of SJGS by about half from 1800 MW to about 900 MW. Coal consumption by the plant will also be reduced by about half. PNM has not announced how the lost power capacity at SJGS will be replaced but it is expected that it will be primarily natural gas-fired generation.
- Future oil and gas development in the San Juan Basin is limited primarily by the depletion of the basin's natural gas and oil resource. Some experts estimate that oil and gas production in the San Juan Basin in New Mexico peaked in 2002 and production will be declining in the future (BBER 2005). Additionally, lower natural gas prices and higher operating costs have supported further decline in oil and gas production in the basin (E>P 2011). While new oil and gas drilling technologies make it possible to develop the less accessible resources in the San Juan Basin with a smaller footprint and lower water and air emissions, these technologies are costlier to implement and operate requiring higher prices to support development. Therefore, the future rate of oil and gas development is expected to be slower than in the past and associated surface disturbance and resulting impacts would be smaller.
- Water is a constraint on development in the region. Recent water developments, such as the Animas La Plata Project and the Navajo Gallup Water Supply Project, will increase the quantity of water used by the Navajo Nation and other Indian tribes from the San Juan River—the major surface water source in the region. As the tribes develop more of their water rights on the San Juan River, other water users in the basin may have to curtail their use to stay within their water supply constraints. However, subject to finalization of the settlement in the San Juan adjudication, the Navajo Nation may market or lease its water or water rights in the region. The Navajo Indian Irrigation Project is an ongoing tribal water development project supplying irrigation water to the Navajo Agricultural Products Industry, an 110,000-acre irrigated agriculture project. Navajo Agricultural Products Industry is scheduled to reach full size by about 2014 (USBOR 2009).
- Energy development in the region includes several proposed power plants and large transmission lines to move renewable energy generated in eastern New Mexico and Colorado to western electric markets. In general, the transmission projects—the projects most likely to have large surface impacts—would be located along existing highway or other rights-of-way. The generation projects would be required to comply with New Source Performance Standards and would be limited to air emissions levels that would not cause NAAQS exceedances.
- Projections indicate that nuclear power is expected to be an important part of the worldwide energy mix at least for the next 50 years and beyond. The growth rate for nuclear power is estimated to be 1 to 3 percent per year provided an adequate supply of uranium is available (IAEA 2001). Following the 2011 Fukushima-Daiichi nuclear accident in Japan, worldwide uranium demand decreased and prices decreased significantly. However, in response to worldwide population and energy demands,

uranium prices have rebounded (IAEA 2011). Uranium mining projects in the Project Area are listed in Table 5.1-1.

Because coal from the El Segundo mine is contracted for sale to three power plants in Arizona, the Cholla Power Plant, Springerville Generating Station, and Apache Generating Station, in addition to the Escalante Generating Station in New Mexico, the reasonably foreseeable future actions list below includes actions in the counties where these power plants are located (Apache, Cochise, and Navajo counties).

The Proposed Action would result in cumulative effects to air quality, geology, soils and paleontology, water quality, visual resources, vegetation and invasive species, wildlife and migratory birds, BLM special status species, socioeconomics, environmental justice, and cultural resources. The cumulative impacts for each of these resources for the Proposed Action are presented below. The cumulative impacts of the proposed alternative have been considered in the ROD for the PRMP/FEIS.

No cumulative effects to traffic and transportation are expected to occur, as there would be no increase in traffic levels, including use of rail lines, associated with the Proposed Action above the current baseline. The annual rate of mining for the El Segundo Mine is not increasing; therefore, no increase in annual traffic as a result of mining the Project Area is projected. Nor would there be an increase in rail transport because the annual amount of coal mined remains the same. Because there are no direct impacts to traffic and transportation, no cumulative impacts analysis is necessary, as per the BLM NEPA Handbook, Section 6.8.3.1, page 57. No change to the volume or type of regulated or solid wastes generated by the mine would occur if the Project Area were mined; therefore, there would be no cumulative effects from the Proposed Action. The Proposed Action would have no direct, indirect, or cumulative effects to federally listed threatened and endangered species. Although noise levels would increase across the landscape as the mining activities move into the Project Area, there would be no increase in noise levels above the baseline because the El Segundo Mine is currently active. Therefore, noise levels within the area would not be cumulatively affected.

For analysis within this EA, it is assumed that during construction, operation, and reclamation, current land use within the Project Area would be restricted and/or modified, but would be reinstated following reclamation and release of lands. In the long term, the surface and vegetation affected by the Proposed Action would be reclaimed and returned to a condition similar to or better than its original status. Post-mine land use would be designated for livestock grazing and wildlife habitat, and would again be open to grazing. The Project Area is surrounded on three sides by the active El Segundo Mine. Therefore, the Proposed Action is not expected to cumulatively affect land use.

Table 5.1-1. Reasonably Foreseeable Developments within the Cumulative Impacts Assessment Area

Project	Status	Description
Oil and Gas Related Projects		
Oil and Gas Drilling	Ongoing	The PRMP/FEIS for the lands managed by the BLM/FFO indicates development of 9,942 new oil and gas wells from 2003 through 2023 in the San Juan Basin, allowing for about 16,100 acres of long-term disturbance.
Oil and Gas Development	Ongoing	Gathering pipelines on lands managed by various agencies. The need for and location of these lines would vary based on production levels and carrying capacity.
Gallup Refinery	Existing	Western Refining operates the only active refinery in the Four Corners area. The crude oil throughput is approximately 23,000 barrels per day.
San Juan River Gas Plant	Existing	Anadarko owns and operates the San Juan River Plant and gathering system, which includes a 20 MMcf/d cryogenic skid, amine plant, sulfur recovery plant, sour gas injection well (5 MMcf/d capacity), and related sweet and sour gathering systems.
Bloomfield Product Terminal	Existing	A product terminal for petroleum products operated by Western Refining Southwest Inc.
Oil and Gas Development – Navajo Reservation.	Proposed	These activities would require well pads, construction areas, access roads, pipelines, or distribution power lines as needed. Western Oil and Gas has proposed approximately 600 natural gas wells in eastern Burnham Chapter extending north into Upper Fruitland and Nenahnezad/San Juan Chapters.
Oil and Gas Development	Proposed	Encana Corporation is proposing exploration wells to evaluate horizontal drilling in oil shales in Rio Arriba and San Juan County.
Adamana Natural Gas Liquids Storage Terminal	Existing	A natural gas liquids storage terminal east of Holbrook in Navajo County, AZ operated by Enterprise Products Operating LP
Holly Petroleum Terminal	Existing	A refined petroleum product terminal in Bloomfield, NM, operated by Holly Energy Partners LP.
Power Plants and Transmission Lines		
Escalante Generating Station	Existing	A single-unit, 250 MW, coal-fired power plant near Prewitt The station produces a majority of the electricity used by more than 250,000 end-use consumers. In addition to providing electric power, Escalante supplies excess steam to the adjacent McKinley Paper Co. for the manufacture of linerboard.
Four Corners Generating Station (FCGS)	Existing/Change in Operations in 2014	Sale of Southern California Edison's share of FCGS to APS. Closure of units 1, 2, 3 (680 MW) and installation of air pollution control on Units 4 and 5 – as per FIP for regional haze. Extent and timing are uncertain, and require approvals. Post-2016 Lease for FCGS with the Navajo Nation has been extended until 2041, but needs BIA approval.
San Juan Generating Station (SJGS)	Existing/Change in Operations in 2014	BART requirements for regional haze described above will result in the retirement of Units 2 and 3 of SJGS by the end of 2017, and the installation of nitrogen-oxide reducing technology on the remaining two units in early 2016.

Project	Status	Description
Navajo Generating Station	Existing	A 2250 MW, three-unit coal-fired power plant located near Page, Arizona. The plant is operated by the Salt River Project, with participants including the US Bureau of Reclamation, the Los Angeles Department of Water & Power, Arizona Public Service Company, Nevada Energy, and Tucson Electric Power. EPA issued a supplemental proposed BART rule in September 2013.
Cholla Power Plant	Existing	A four-unit 995 MW coal-fired power plant near Holbrook, Arizona operated primarily by Arizona Public Service Company, with one unit operated by PacifiCorp.
Coronado Generating Station	Existing	A two-unit, 773 MW coal-fired power plant near St. Johns, Arizona, operated by the Salt River Project.
Springerville Generating Station	Existing	A four-unit 1560 MW coal-fired plant near Springerville, Arizona, operated by Tucson Electric and Power, Tri-State Generation and Transmission, and the Salt River Project.
Snowflake Biomass Power Plant	Existing/Proposed	The paper pill located near Snowflake, AZ was closed by Catalyst in 2012, but was purchased in 2013 by Nova Power LLC. The 24 MW Snowflake Power Plant biomass-powered plant has reopened, according to an Associated Press report on 7/30/13. The adjacent 80 MW coal-fired power plant will either be converted to natural gas or have low-emission technology installed prior to restarting.
Apache Station	Existing	A 605 MW coal- and natural gas-fired power plant in Cochise, AZ operated by Arizona Electric Power Cooperative, Inc. The plant can burn coal or natural gas.
Douglas Power Plant	Existing	A 16 MW natural gas-powered power plant in Douglas, AZ, operated by Arizona Public Service Co. The combustion turbine is only put into service when demand for electricity is high in the Douglas area.
Bluffview Natural Gas Power Plant	Existing	A 65 MW natural gas-powered plant operated by the City of Farmington, NM
Animas Power Plant	Existing	An 18.6 MW natural gas-powered plant operated by the City of Farmington, NM
Milagro Cogeneration Plant	Existing	A 121.6 MW natural gas power plant operated by Williams Field Services Co.
Electric Transmission System Expansion	Proposed	Variety of projects including Navajo Transmission Project and San Juan Basin Interconnect Project proposed to expand the capacity of electric transmission across New Mexico to move renewable power, shift gas-fired compressors to electricity, and meet increased electric demand in the San Juan Basin.
Electric Power Expansion	Proposed or under consideration	Coal-fired generation for other coal-based development on Navajo reservation power, renewable generation such as solar and pumped storage hydro.
Mining		
McKinley Mine	Past, present	In 2010, the McKinley Mine focused on full reclamation activities. In 2009, the McKinley Mine donated 208 acres of adjacent, unmined land to the Navajo Code Talkers Association for a museum and future veterans' center
Lee Ranch Mine	Past, present, ongoing	Lee Ranch Mine opened in 1984 35 miles northwest of Grants in McKinley County, NM. Its customers include APS, Arizona Electric Power Cooperative and Catalyst Paper. Lee Ranch mine shipped 1.7 million tons of coal in 2010, and owns or controls approximately 145 million tons of recoverable low sulfur coal reserves.

Project	Status	Description
San Juan Coal Company La Plata Mine	Past, present	From 1986 through 2002, the La Plata Mine also supplied coal to the SJGS. The mine ceased operation in 2002 and reclamation continued through 2005. Approximately 2000 acres disturbed as of 2010.
Navajo Mine Areas I – III	Ongoing	Supplies coal to FCGS. Total of 24,550 acres mined over 50 years. Mining activities in Areas I and II have concluded. Reclamation is ongoing in Area II. Area III is actively mined in two pits with contemporaneous reclamation.
Kayenta Mine Peabody Western Coal Company	Past, present, ongoing	Kayenta Mine supplies coal to Navajo Generating Station in Page, AZ. Peabody submitted a mine plan renewal application and EA to OSM in 2010. The mine produces about 8.0 tons of coal annually for the generating station.
San Juan Coal Company San Juan Mine	Ongoing	An underground mine that is the exclusive supplier of coal to the SJGS. Surface mining at San Juan reached a depth in the early 2000s that represented an economic limit, but underground mining is feasible and the coal supply contract with SJGS extends through 2017. Approximately 5400 acres disturbed as of 2010.
Zuni Mountain Abandoned Mine Land Remediation	Proposed	Physical closures of 49 abandoned mine features within the Zuni mountains in Cibola County using various methods, such as polyurethane foam, backfilling, fencing, and or bat-friendly grates to provide for the safety of the general public.
Rio Grande Resources Corp. uranium mill	Proposed	The Mt. Taylor mine contains an in-place resource of over 100 million pounds. Presently, the deposit is being evaluated for development as an in situ leach operation.
Roca Honda mine and mill	Proposed	Underground uranium mine in McKinley located approximately 3 miles northwest of the community of San Mateo, at the southern boundary of McKinley County just north of the Cibola County line. The proposed permit area is approximately 1,920 acres in size, though not all the permit area would be disturbed.
Ree-Co Uranium	Proposed	Near Milan in McKinley County. The project would drill 28 exploratory holes for an in situ mine.
Cebolleta Uranium project	Proposed	Situated in the Laguna mining district. The project holds a mineral lease covering about 6,700 acres of privately owned surface and mineral rights. The project is currently under evaluation.
Rio Puerco Exploration Drilling	Proposed	Uranium Company of New Mexico, LLC is proposing exploration drilling in Section 18, T12N, R3W, Sandoval County. The proposal would be an underground uranium mine consisting of a 15 to 16 acre footprint on the surface.
Hydro Resources/ Uranium Resources Inc.	Proposed	The Crownpoint Uranium Solution Mining Project would consist of four uranium in situ leach mines that would be constructed in the communities of Church Rock and Crownpoint.
La Jara Mesa Mine	Proposed	Development, operation, and mine reclamation for mining claims located on National Forest lands within the Mount Taylor Ranger District about 10 miles northeast of the town of Grants. Laramide Resources proposes to tunnel two inclined adits from under the west edge of La Jara Mesa to remove 40,000 tons of uranium ore for testing and to begin development of a production mine. An EIS is being developed.
Eric #1	Proposed	Mineral exploration (uranium) consisting of drilling up to 2 drill holes from 2 drill pads; accessing sites by existing roads and overland travel.

Project	Status	Description
Renewable Energy		
Red Mesa Wind	Proposed	Red Mesa, LLC, for a 102.4-megawatt wind energy center on the eastside of Cibola County near Seboyeta. The project will occupy approximately 5,000 acres of private land 60 miles northeast of Grants.
Other Development		
McKinley Paper Mill	Ongoing	Located in Prewitt, the mill produces 220,000 tons of consistently high-grade paperboard a year and uses only recycled materials.
NIIP/NAPI Agricultural Development	Ongoing	Total irrigated agricultural land 110,000 acres. Project was about 60% complete in 2006.
Indian Health Services	Ongoing	Gallup Indian Medical Center is a 99-bed hospital in Gallup. The workload at Gallup is one of the largest in the Indian Health Service with 250,000 outpatient encounters and 5,800 inpatient admissions annually. The Crownpoint Health Care Facility serves a population of 20,000 Navajo people. The Shiprock Service Unit is the largest Service Unit and the facility has 55 beds. The Four Corners Regional Health Center is part of the Shiprock Service Unit and opened in January 2007.
Private Health Care		In Gallup, Rehoboth McKinley Christian Health Care Services consists of a 69-bed, full-service, accredited acute care hospital; three outpatient clinics; hospice/home health and behavioral health services.
Urban Development	Ongoing	Population growth is expected to continue in the five county area, while unemployment rates are anticipated to also increase.
Navajo Gallup Water Supply Project	Under construction	The project would divert water from the San Juan River downstream of Fruitland, New Mexico, treat the water, and then deliver it along Highway N36 and south to Navajo chapters along U.S. Highway 491. Water delivery would continue to Window Rock, Arizona, and to the city of Gallup, New Mexico.
Indian Gaming on Navajo Reservation	Since 2009 and ongoing	First Indian gaming operation on Navajo Reservation (Fire Rock Casino) opened near Gallup, NM in 2009. A second casino near Shiprock, NM opened in October 2010 with another (Northern Edge Casino) opening in January 2012 near Farmington, NM.
Manufacturing	Proposed	A rubber glove manufacturing facility is proposed to be located in the Church Rock Industrial Park located 6 miles east of Gallup, New Mexico. The project would include an incubator and training facility.

Notes: APS = Arizona Public Service Company; BART = Best Available Retrofit Technology; BLM = U.S. Bureau of Land Management; FCGS = Four Corners Generating Station; FEIS = Final Environmental Impact Statement; FFO = Farmington Field Office; MMcf/d = million cubic feet per day; MW = megawatt; PRMP = Proposed Resource Management Plan; SJGS = San Juan Generating Station

5.2 Air and Climate Resources

5.2.1 Temporal and Geographic Scope

The geographic scope for assessing cumulative impacts to air quality is northwestern New Mexico, including the counties where the mine is located and nearby counties (Cibola, McKinley, Rio Arriba, San Juan, and Sandoval). In addition, because coal from the El Segundo mine has been contracted to be sold to power plants located in Arizona, the counties where those power plants are located were also included. These are Apache, Cochise, and Navajo counties.

The geographic scope for assessing impacts to climate change is global, because that is the scale at which climate change impacts will occur.

5.2.2 Cumulative Effects

Air Quality

Cumulative, regional impacts on air quality are quite limited from all surface coal mining operations for two fundamental reasons. First, the only pollutant emitted in substantial quantities is particulate matter. Second, concentrations of airborne particulate matter released from surface mining operations decrease rapidly with distance from mines because they are released at near-or-below surface levels. Because concentrations decrease rapidly with distance, mining-related emissions are not likely to interact significantly with distant, regional sources, regardless of the magnitude of those sources.

For all six criteria pollutants, emissions from the El Segundo Mine will be less than one percent of the annual emissions of each pollutant in the eight-county area and the Navajo Nation (2011 NEI data; see Tables 5.2-1 and 5.2-2).

A comprehensive listing of regional permitted air emission sources for Cibola, Rio Arriba, San Juan, McKinley, and Sandoval counties in New Mexico and Apache, Cochise, and Navajo counties in Arizona is presented in Appendix F. Total estimated criteria pollutant emissions for each county are presented in Table 5.2-1.

Table 5.2-1. 2011 Criteria Pollutant Emissions[1] by County (tons)

		CO	NO_x	PM_{10}[2]	$PM_{2.5}$[2]	SO_2	VOC
New Mexico	McKinley	16,941	11,951	3,239	838	1,380	3,873
	Cibola	8,632	5,461	279	240	39	1,417
	Rio Arriba	21,930	11,952	369	327	24	17,876
	San Juan	62,381	42,190	3,647	1,582	5,541	25,935
	Sandoval	17,136	4,114	452	351	92	3,814
Arizona	Apache	20,194	21,570	4,381	3,110	13,442	2,695
	Cochise	24,727	12,583	1,707	919	3,971	4,999
	Navajo	21,601	20,541	3,833	1,439	9,749	3,507
	Navajo Nation	6,179	61,680	9,603	5,246	16,586	448
	TOTAL	199,721	192,042	27,510	14,052	50,824	64,564

[1] Emissions are from the following Tier 1 Categories: Fuel Combustion (Electric Utility, Industrial, Other); Chemical and Allied Product Manufacturing; Metals Processing, Petroleum and Related Industries; Other Industrialized Processes; Solvent Utilization; Storage and Transport; Waste Disposal and Recycling; Highway Vehicles; Off Highway Vehicles.

[2] Includes filterable and condensable emissions.

Source: US EPA 2011 National Emissions Inventory (USEPA, 2011)

Table 5.2-2. Direct El Segundo Emissions Expressed as a Percentage of total 2011 Criteria Pollutant Emissions (tons)

	CO	Nox	PM10	PM2.5	SO2	VOC	HAPs
Average Annual Emissions 2014-2023	91.91	87.56	66.61	10.21	8.57	4.47	0.05
% of 9 counties & NN[1]	0.05	0.05	0.24	0.07	0.02	0.01	0.01[4]
Maximum Annual Emission 2014-2023[2]	146.60	126.66	113.99	16.74	11.92	6.47	0.08
% of 9 counties & NN[3]	0.07	0.07	0.41	0.12	0.02	0.01	0.01[4]

[1] The percentage of average annual emissions relative to the total emissions from the 8 counties and the Navajo Nation, as per the 2011 National Emissions Inventory (data in Table 5.2-1).

[2] The highest annual emission of each criteria pollutant or HAPs from the El Segundo Mine projected between 2014 and 2023.

[3] The percentage of maximum annual emissions relative to the total emissions from the 8 counties and the Navajo Nation, as per the 2011 National Emissions Inventory (data in Table 5.2-1).

[4] For HAPs, the percentage is of the total HAP emissions in Arizona, New Mexico, and the Navajo Nation in 2011 (see Table 5.2-4).

Cumulative Effects of Combustion of El Segundo Lease Tract Coal by Power Plants

The number and location of coal customers from the El Segundo Mine vary annually and over time. Coal is a commodity, and the use of the coal from this particular 640 acres will depend on a number of factors including demand, price, quality, and transportation, among others. El Segundo coal is also sold on the spot market, where prices are set by the current market value. The private rail spur that connects to the coal load out facility at the El Segundo Mine runs south to Grants, New Mexico, where it connects to the main BNSF rail line that travels east-west. From there, the coal train can be delivered virtually anywhere along the network of rail lines. Table 5.2-2 contains information on existing contracts with power plants currently burning El Segundo coal. For these reasons, it is difficult to project exactly how much coal from the El Segundo mine, or from the lease tract, will be burned in any particular power plant at any given time in the future.

Table 5.2-3. El Segundo Coal Contracts Overview

Plant	Contract Expiration	Coal Purchased Annually (thousand tons)
Cholla Power Plant, Joseph, AZ	2024	3,600-4,000
Springerville Generating Station, Springerville, AZ	2020	2,900
Escalante Generating Station, Prewitt, NM	2014	500
Apache Generating Station, Cochise, AZ	2015	650

Coal-fired power plants enter into contracts with one or more coal mines to provide the coal necessary to meet generation demands. While the project coal lease would not result in additional emissions from

client power plants, criteria pollutant emissions from combustion of coal within the project coal lease can be calculated based on EPA emissions information for the above power plants. These calculations were done and are discussed below on p. 5-32. Note that some of the current contracts will expire in the near future, and it is uncertain where mined coal might be transported upon expiration of a contract. Power plant emissions are analyzed and regulated by state and tribal governments to determine whether impacts will cause or contribute to violations of federal and state/tribal ambient air quality standards. Federal and state rules for power plant emissions address hazardous and toxic air pollution from power plants to protect public health and the environment.

El Segundo coal is less competitive over a broad regional market then coals from other western producing states that sell into the market on a spot or contract basis. There are two principle reasons for this. First, the El Segundo coal is inherently high in moisture and ash relative to coals from other western states. Second, the mining ratios at El Segundo tend to be much greater than other western surface mines, resulting in increased mining costs and subsequent costs at the point of destination. In summary, the market for El Segundo coal is necessarily limited to the southwest due to quality constraints that make the coal less competitive and increased mining costs that drive the costs up.

Even though the BLM cannot determine where the coal is ultimately going to be burned, it is still possible to do emissions calculations to estimate the associated CO_2 emissions from the combustion of coal. The specific information required—the number of tons of coal produced per year from the tract—and the heat content of that coal in British thermal units (Btu), is reasonably known for the proposed lease tract. This calculation is based on an average Btu value of 9,300 Btu per pound of coal occurring on the tract, and using a CO_2 emission factor of 208.8 pounds of CO_2 per million Btu for sub-bituminous coal (U.S. Energy Information Administration 1994). The result of the calculation is that combustion of 1 ton of coal from the tract will produce 1.76 metric tons of CO_2.

Globally, CO_2 emissions in 2008 from all human sources were estimated to be 29,000 MMt (International Energy Agency 2010), and 5,945 MMt for the United States (USEPA 2013). If all of the coal occurring on the proposed lease tract (9.21 million tons) were burned in 1 year, 16.2 MMt of CO_2 would be produced. This represents approximately 0.055 percent of the 2008 global emissions, and 0.27 percent of the 2008 United States CO_2 emissions. Regional data are not available for comparison.

The coal that would be mined from the proposed lease tract will not be produced in 1 year, but will be mined over a 10-year period, resulting in an average annual production rate of 0.92 million tons per year. The burning of this volume of coal would cause annual average emissions of 1.62 MMt of CO_2, contributing 0.0055 percent to global emissions, and 0.027 percent to United States CO_2 emissions.

Similarly, criteria pollutant emissions calculations were completed for combustion of the project lease coal. The maximum coal produced on the federal tract is 1.30 million tons in 2016, so this maximum production was used to conservatively estimate criteria pollutant emissions. Data from EPA's Air Markets Program Database (http://ampd.epa.gov/ampd) for 2012 was used to determine the NO_x emission rate per heat input at the four facilities where El Segundo coal is currently used. These rates may vary significantly from year to year, but are useful for determining a general estimate of criteria pollutant emissions. The Escalante Plant has the highest NO_x emission rate of the four facilities, so assuming all the coal from the project tract for 2016 is burned at Escalante conservatively results in 4,144.5 tons/year of NO_x emissions, which is approximately 2% of the regional NO_x NEI total (see table 5.2-2). Using the

NO_x to SO_2 ratio at the Escalante Plant (most conservative) results in an upper-end estimate of 1,444.1 tons/year of SO_2 emissions from the project tract coal, which is approximately 3% of the regional SO_2 NEI total. Finally, using the Apache unit NO_x to CO ratio (most conservative) results in an upper-end estimate of 4,659.8 tons/year of CO emissions from the project tract coal, which is approximately 2% of the regional CO NEI total. Other years will have lower emission rates, and, should other client power plants contract with El Segundo in the future, emissions may vary significantly.

A total HAP emission from coal combustion for electrical generation for 2011 in the United States was estimated to be 93,007 tons and 47.49 tons in New Mexico (http://www.epa.gov/ttn/net/2011 inventory.html). The portion of estimated total HAP emissions attributed to mercury for the United States in 2011 was 25.59 tons and only 0.004 tons for mercury in New Mexico. A summary of these emissions is presented in Table 5.2-3.

Table 5.2-4. Mercury and HAP Emissions (tons) – 2011

	United States	New Mexico	Arizona	Navajo Nation
Mercury	25.59	0.004	0.60	0.17
HAPs[2]	93,006.82	47.49	550.47	384.45

Source: http://www.epa.gov/ttn/chief/net/2011inventory.html

[1] NEI Sector: Fuel Comb - Electric Generation – Coal pom/pah

[2] HAPs pollutant categories include mercury, acid gases, glycol ethers, metals, other, pm, voc, pcbs, and pom/pah

If all of the coal on the proposed lease tract (9.21 million tons) were burned in 1 year, 1.87 tons of total HAPs and 0.0005 tons (1.02 lb.) of mercury would be emitted. These emission estimates represent approximately 0.0020 percent of the United States 2011 total HAP emissions and 0.31 percent of 2011 New Mexico, Arizona, and Navajo Nation total HAP emissions.

Assuming that total coal from the proposed tract is produced in a 10-year period, the annual average production rate of 0.921 million tons combusted for electrical generation would cause annual average emissions of total HAPs of 0.187 tons and 0.00005 tons (0.102 lb.) of mercury. These emission estimates represent approximately 0.0002 percent of the United States 2011 total HAP emissions and 0.03 percent of 2011 New Mexico, Arizona, and Navajo Nation total HAP emissions, both negligible contributions (see Table 5.2-2).

Climate

Attempts to disaggregate global climate models in order to predict the future of local or regional weather patterns is highly uncertain and speculative. Virtually all scientific sources agree, however, that it is not possible to attribute complex global climate change reactions within the environment to a particular source of GHG emissions.

As previously documented, the International Energy Agency estimated global emissions of CO_{2e} to be 29,000 MMT in 2008. The EPA's Inventory of U. S. Greenhouse Gas Emissions and Sinks (EPA 2009) estimated in 2007 that the total CO_{2e} emissions for the United States was 7,150 million metrics tons. CO_{2e} sink emissions were estimated to be 1,063 million metric tons for a net CO_{2e} emissions of 6,087 million

metric tons. New Mexico Environmental Department's Inventory of New Mexico Greenhouse Gas Emissions: 2000 - 2007 (NMED 2010) estimated the total CO_{2e} emissions in 2007 to be 76.2 million metric tons. Current GHG emissions estimated for 2012 from all of El Segundo's Mine's stationary and mobile facilities and activities are approximately 112,000 metric tons per year of CO_{2e}. Estimated El Segundo Mine CO_{2e} emissions for 2012 are only 0.0004 percent of estimated global emissions, 0.0018 percent of estimated United States net emissions, 0.15 percent of estimated New Mexico emissions, and 0.14 percent of estimated Arizona emissions. The contribution of Section 34 mining operations to El Segundo's total GHG emissions would be small and total GHG emissions from all future El Segundo operations would not change.

5.3 Geologic Resources

5.3.1 Temporal and Geographic Scope

The geographic scope for assessing cumulative impacts on geological and paleontological resources is the extent of the soils and geological materials in the San Juan Basin. The coal would be mined from the Menefee Formation. Outcrop areas of the Menefee Formation extend along the southwestern boundary of the San Juan Basin in a broad arc from Cuba extending west to Gallup and then northward to the New Mexico/Colorado State Line. The width of the outcrop area is highly variable ranging from hundreds of feet to 45 to 50 miles, depending on the dip of the formation and adjacent topography. The soil types found within the assessment area are present throughout the western San Juan Basin. Impacts to geological and paleontological resources are considered in both the short and long term, based on the existence of direct and indirect impacts on these time scales.

5.3.2 Cumulative Effects

Other mining activities throughout the extent of the San Juan Basin could be expected to have similar long-term effects on geological resources as those described in Section 4.2. However, given the extent of the San Juan Basin, the impact of the Proposed Action, even when considered along with similar activities, is expected to be minor. Mining activities at El Segundo Mine have impacted approximately 9.1 square miles, or an estimated 0.03 percent, of the 30,000 square mile San Juan Basin. The Proposed Action would add about 640 acres to the El Segundo Mine. The lower Menefee coal zone was projected to contain about 1 billion short tons of coal between the depths of 250 and 4,000 feet and the Hogback Mountain Tongue of the Menefee about 11.3 billion short tons of coal (Fassett undated). There would be an irreversible commitment of resources from the extraction of approximately 11.22 million tons of coal from the Project Area. This equates to approximately 0.07 percent of the total estimated Menefee Formation coal reserve in the San Juan Basin. Therefore, when added to past, present, and reasonable foreseeable projects within the San Juan Basin, cumulative impacts to geological resources are not expected to be significant.

Past, present, and future developments are expected to result in a range of short- and long-term impacts to soils including disturbance, temporarily or permanently increasing erosion in areas where BMPs or reclamation are not employed, and reducing soil loss to erosion where reclamation and revegetation occurs. Given the 448 acres of soil that would be disturbed by mining and the large extent of those soils in the San Juan Basin, any impact from the Proposed Action is not expected to contribute appreciably to

cumulative impacts to soils when added to past, present, and reasonably foreseeable actions. No permanent, irreversible, or irretrievable impacts to soils would result from the Proposed Action.

The Proposed Action would result in cumulative effects to paleontological resources mining disturbance to the stratigraphic context in which they are located. Indirect impacts could occur by changing erosion patterns and through an increase in human activity in the area, which could increase the possibility of looting, or vandalism activities to paleontological resources in the Project Area. However, no sites classified by BLM as significant or critical are known to occur within the Project Area and the Project Area, like all parts of the mine would be secured. Other reasonably foreseeable actions in the San Juan Basin that would impact paleontological resources include natural gas and oil extraction, coal and uranium mining, community development, and transportation corridors. Given the low probability of significant paleontological resources being impacted, the Proposed Action is not expected to contribute appreciably to cumulative impacts when added to past, present, and reasonably foreseeable actions. There would be an irreversible commitment of paleontological resources occurring within the Project Area resulting from the Proposed Action.

5.4 Water Resources

5.4.1 Temporal and Geographic Scope

The geographic scope and temporal parameters for the water resources cumulative impact analysis varies between surface water resources and groundwater resources. The geographic extent of the cumulative impact area for surface water resources is somewhat larger, but the temporal effects are shorter than those for groundwater resources because of the nature of surface flow in the Project Area. The geographic extent of the cumulative impact area for surface water resources is the Arroyo Chico Watershed. The geographic extent of the cumulative impact area for groundwater resources is quite limited but the temporal effects are long, approximately 50 years and longer for water level recovery after mining.

5.4.2 Cumulative Effects

5.4.2.1 Surface Water

Cumulative effects associated with surface water resources for the Proposed Action are limited, and should they occur, are anticipated to develop during the period of mining and reclamation. Surface mining may result in capture of surface flows within the mine, diversion of flows around the mine, and mining through smaller ephemeral tributary channels as pit development proceeds across the Project Area. About 1 square mile of watershed within the 17.96 square mile Arroyo Chico Watershed is located within the Project Area. This is 5.6 percent of the Arroyo Chico watershed and reflects a low impact.

Long term cumulative surface water impacts are not likely following bond release for reclamation of areas disturbed by mining. Any cumulative impacts would be related to short-term sedimentation or flow changes. Mining impacts on surface waters occur only during mining. Reclamation requirements result in re-establishment of drainage and the hydrologic balance throughout the mined area following conclusion of mining. The reclaimed topography would reestablish a similar drainage density to the original topography, and gentler slopes, covered with suitable topdressing materials should yield a more stable surface with more infiltration and lower peak flows from storm events.

Surface-disturbing activities other than the Proposed Action that may cause accelerated erosion include, but are not limited to, mining, construction of buildings, roads, other facilities, and installation of trenches for utilities; road maintenance such as grading or ditch-cleaning; public recreational activities; vegetation manipulation and management activities; prescribed and natural fires; and livestock grazing. Because the Proposed Action would have a negligible impact to downstream surface water quality, the cumulative impact, when added to potential downstream RFD, would also be negligible. No permanent, irreversible, or irretrievable cumulative impacts to surface water resources would result from the Proposed Action.

5.4.2.2 Groundwater

There would be no adverse cumulative effects to groundwater quality. Significant groundwater inflows have not been encountered in the mine pits at Lee Ranch Mine and are not expected in the Project Area. Effects of mining the Menefee Formation are isolated from aquifers and groundwater in deeper formations by the presence of a thick shale sequence below the Menefee Formation

Water supply for El Segundo Mine comes from a well (SJ-120) that taps three aquifers; the Dalton Sandstone, the Gallup Sandstone, and the Westwater Canyon Sandstone Member. PNRC modeled groundwater use assuming that a drawdown of any of the three aquifers greater than 25 percent of available water would represent a material damage to nearby domestic or stock watering wells. After 30 years of pumping, the CHIA predicted a drawdown of approximately 3 percent of the available head in the Morrison Formation, 13 percent for the Gallup Sandstone, and 22 percent for the Dalton Sandstone (NM-EMNRD 2005).

Past, current, and proposed mining has and is expected to continue to result in a local drawdown of groundwater levels in the Morrison Formation, Dalton Sandstone, Gallup Sandstone, and Westwater Canyon Sandstone aquifers. The drawdown effects would begin to diminish quickly once mining and reclamation activities have completed.

5.5 Visual Resources

5.5.1 Temporal and Geographic Scope

The temporal scope for visual resources includes the period through completion of successful reclamation of the Project Area, a period of at least 20 years. The geographic area evaluated for cumulative effects to visual resources includes the viewshed of the Project Area (as identified in Figure A-6) and overlaps with the viewsheds of other applicable projects.

Cumulative impacts to visual resources can occur when projects are visible within the same field of view as other developments or impacted landscapes. Only those portions of each activity that would be expected to occur within the boundaries of the Proposed Action cumulative analysis area and only the areas that overlap with the viewshed of the Project were considered. This was done to ensure that only those areas with potential effects from the proposed action were being considered. Based on the summary provided in Table 5.1-1, ongoing or future projects with activities that are expected to have viewsheds that could overlap to some extent with the views of the Project Area were reviewed.

5.5.2 Cumulative Effects

Within the 20-mile radius that encompasses the viewshed for the Project Area, only two current or reasonably foreseeable future actions were identified as having viewsheds that overlap with the proposed Project. These currently ongoing projects include the existing El Segundo Mine operations and operations at the Lee Ranch Mine, a Peabody property located approximately 3 miles southeast of the proposed Project Area. Effects associated with existing views of activities associated with the El Segundo Mine have been previously discussed under Sections 3.5 and 4.5. The viewshed for current El Segundo operations is similar to that identified for the proposed action and all of the KOPs identified for the proposed action would have views of El Segundo activities similar to what they currently experience as described under Section 3.5.

Viewshed modeling indicated that less than 5 percent of the Project Area viewshed would overlap with the viewshed of the Lee Ranch Mine. None of the KOPs previously examined in Section 4.5 would lie in an overlap zone with views of the Lee Ranch operations; however, approximately 2 miles along State Highway 509 north of KOP 4 and south of the community of Hospah would have views of all three project operations. In addition, travelers along the highway may have views of construction associated with widening of the existing haul road between the Lee Ranch Mine and the El Segundo Mine that may be required to accommodate transport of dragline machinery. Certain ongoing conditions, such as night lighting, would continue for an indefinite period of time with the continuation of current and projected actions.

Criteria considered in assessing the cumulative impacts of the Proposed Action combined with potential effects from past, present, and reasonably foreseeable future projects on visual resources were similar to those described in Table B-4 (Appendix B). Based upon these criteria and that views of future actions in the area will be generally similar to those that are currently occurring in the area, the combination of past, present, and reasonably foreseeable future actions is not expected to generate cumulative impacts to visual resources in excess of those identified for the Proposed Action.

5.6 Vegetation and Invasive Species

5.6.1 Temporal and Geographic Scope

Vegetation resource impacts are analyzed using a period of 20 years for the past and future impacts. The Project Area is located within the Great Basin desert scrub community, which occupies roughly 23,000 square miles at elevations generally between 3,900 and 7,200 feet (Brown 1994). Within the BLM/FFO, there are approximately 435,500 acres of Great Basin desert scrub habitat types (BLM 2003a, page 3-31). The geographic scope of the cumulative analysis for vegetation is the BLM/FFO.

5.6.2 Cumulative Effects Vegetation and Invasive Species

Direct impacts to vegetation in the Project Area include the short-term removal of vegetation and, once reclamation occurs, long-term changes in species composition. The use of native seed in revegetation efforts would reduce impacts to changes in species composition. Surface disturbance in the Project Area could result in the spread of invasive species or the introduction of new species. In the long term, reclamation of the site would include invasive species management in accordance with PNRC's Invasive/Noxious Weed Plan.

These impacts are similar to the effects of past activities including natural resources extraction, transportation, and community development projects, which have permanently removed or modified natural vegetation. Vegetation has also been affected by livestock grazing, agriculture, the introduction of non-native invasive species, mechanical and chemical vegetation treatments, as well as naturally occurring events such as wildfires and drought. Residential and commercial development would likely continue to concentrate around existing population centers, and transportation and river corridors. Oil and gas development would continue to occur primarily in the central and eastern portion of the extent of the BLM/FFO. All of these surface disturbing activities, future development and activities would continue to alter naturally occurring vegetation communities and increase the incidence of spreading invasive species. Given the project's relatively small footprint, the degree of direct and indirect impacts, and the extent of the Great Basin desert scrub, the Proposed Action is not expected to contribute appreciably to cumulative vegetation impacts resulting from past, present, and reasonably foreseeable activities. No permanent, irreversible, or irretrievable impacts to vegetation would result from the Proposed Action.

5.7 Wildlife and Migratory Birds

5.7.1 Temporal and Geographic Scope

The temporal scope of cumulative impacts to which the Proposed Action may contribute is limited to the short term, during which wildlife use of the area may be disturbed by vegetation removal, human presence, mining construction-related noise, and reclamation activities. The Project Area is located within the Great Basin Desert scrub community. Within the BLM/FFO planning area there are approximately 435,500 acres of Great Basin desert scrub habitat types (BLM 2003a, page 3-31). The geographic scope of the cumulative analysis for vegetation is the FFO planning area.

5.7.2 Cumulative Effects

The past, present, and reasonably foreseeable projects identified in the RFD have affected and are expected to continue to affect wildlife through habitat loss and fragmentation and impacts from noise and human disturbance. Impacts would vary depending upon species' life history strategies, habitat requirements, and the availability of suitable habitats. Given the abundance of the available adjacent available habitats, the extent of the ranges of the species that inhabit the Project Area, and the relatively small project footprint, the Proposed Action is not expected to contribute appreciably to wildlife impacts resulting from past, present, and reasonably foreseeable activities. No permanent, irreversible, or irretrievable impacts to wildlife or migratory birds would result from the Proposed Action.

5.8 Special Status Species

5.8.1 Temporal and Geographic Scope

The scope of cumulative impacts on sensitive species is based on population-level impacts on individual species and the effect these impacts have on the population within the BLM/FFO.

5.8.2 Cumulative Effects

BLM special status species with the potential to occur in the Project Area are golden eagle, ferruginous hawk, and prairie falcon, which could use the area for foraging. Direct and indirect impacts to BLM special status species are largely limited to the loss of potential foraging habitat. Other activities described

in the RFD have contributed and would continue to contribute to the loss of foraging and, potentially, breeding habitat for these species. Given the small area of the desert scrub community that would be affected by mining activities relative to the extent of this community type across the arid southwest, the contribution of the Proposed Action to cumulative impacts to these species is expected to be small. No permanent, irreversible, or irretrievable impacts to special status species would result from the Proposed Action.

5.9 Socioeconomics

5.9.1 Temporal and Geographic Scope

The area that would be affected by socioeconomic impacts of the alternatives is comprised of the five counties surrounding El Segundo Mine—Cibola, McKinley, Rio Arriba, San Juan, and Sandoval Counties (see Figure A-8).

The total population living in the five county area has grown from about 275,000 in 1990 to over 400,000 in 2010. Future population estimates for the area forecast the population to be more than 530,000 in 2030. (University of New Mexico 2008). Unemployment in the region has fluctuated during the past 20 years, but recent unemployment rates for McKinley County, New Mexico, are representative of the region. In 2008, before the recent recession, the unemployment rate was less than 6 percent. In July 2010, the unemployment rate hit a high of 10.9 percent. Future unemployment rates for McKinley County will likely be within this range and higher than New Mexico overall. The labor forces and unemployment rates for each county are displayed in Tables 3-12.3 and 3.12-4. In considering income in the region, it is important to note that mining wages are substantially higher than the average wage in the region as shown in Table 3.12-5.

5.9.2 Cumulative Effects

There would be no significant direct or indirect socioeconomic impacts associated with the Proposed Action because coal production and employment would be similar to baseline conditions. Therefore, there would be no cumulative socioeconomic effects for the Proposed Action.

There would be no significant direct or indirect socioeconomic impacts associated with the No Action Alternative because annual coal production and employment would be similar to baseline conditions. Under the No Action Alternative, the coal in the Project Area would not be mined and the coal sales and government revenues estimated in Table 4.12.1 would not be realized. However, as noted in Section 4.12, these unrealized government revenues are insignificant compared to the total revenues for federal, state, and county governments. Therefore, there would be no cumulative socioeconomic effects for the No Action Alternative.

5.10 Environmental Justice

5.10.1 Temporal and Geographic Scope

Based on the census data for the five counties in the affected area shown in Table 3.13-1, the percentage of Native American population and individual poverty rate is substantially higher in those counties than in New Mexico overall. Therefore, the cumulative impact analysis must consider the disproportionate

cumulative impacts and any "special" exposures to these vulnerable populations due to cultural or traditional use of resources such as ceremonial food or medicine gathering as well as vulnerabilities.

5.10.2 Cumulative Effects

There would be no disproportionate adverse direct or indirect impacts to these vulnerable populations in the affected area for the Proposed Action or No Action Alternative because annual employment and government revenues generated by the mine would not change. Special exposures related to cultural or traditional use of resources near the Project Area would not be significant because the El Segundo Mine permit boundary would not change under the Proposed Action. There is no opportunity for traditional cultural resource use in the Project Area because the El Segundo Mine is excluded from public access and use. Therefore, there would be no special exposures or disproportionate adverse impacts to vulnerable populations associated with ceremonial or traditional resource use.

5.11 Cultural Resources and Native American Religious Concerns

5.11.1 Temporal and Geographic Scope

For the cumulative impact analysis, cultural resource impacts are analyzed using a period of 20 years for the past and future impacts. The geographic area of analysis is the Arroyo Chico Watershed within the BLM/FFO planning area. It should be noted that cultural resources at all proposed developments must be recorded and mitigated according to NHPA and other regulations. Therefore, direct cultural resource impacts for the development included in the RFD would be mitigated.

5.11.2 Cumulative Effects

The cumulative impacts of deterioration, weathering, and erosion of the tangible aspects of cultural resources accumulate over time. Prior, ongoing, and future man-made developments of various types also have degraded and destroyed cultural resources near the Project Area, and will continue to do so.

Known cultural resources in the Project Area would be evaluated in coordination with SHPO and Laguna Pueblo and prescribed testing and treatment plans would be implemented to ensure impacts to sites are appropriately mitigated. There are 16 known cultural resources sites in the Project Area. This number is small compared to the estimated 1,700 eligible sites located in the Arroyo Chico watershed. The RMP/FEIS determined that no cultural sites would be affected by oil and gas activities within the Arroyo Chico watershed (BLM 2003, page 4-42). While there could be unique cultural resources affected by future development in the Arroyo Chico watershed, the cultural resources that would be affected by the Proposed Action are not unique when compared to cultural resources throughout the BLM/FFO planning area. Therefore, there would be no adverse cumulative impacts to cultural resources for the Proposed Action.

5.12 Health and Safety

The cumulative impacts of health and safety focuses on the potential public health impacts associated with air emissions at El Segundo Mine. The Proposed Action would not increase PM emissions in McKinley County.

5.12.1 Temporal and Geographic Scope

The cumulative public health impacts consider air quality and respiratory health status of residents of McKinley County in 1990, 2010, and 2030. In 1990 and 2010, McKinley County was in “attainment” status of the NAAQS for all criteria air pollutants including PM and ozone. Attainment status means that ambient air quality in did not regularly exceed levels that protect public health. The USEPA regularly evaluates and updates the NAAQS based on new scientific evidence.

5.12.2 Cumulative Effects

The cumulative public health effects of the Proposed Action depend on the ambient air quality in McKinley County and the respiratory health status of county residents. Given current regulatory trends, it is likely that allowable PM and ozone precursor emissions for all sources in McKinley County, would be reduced to meet tighter ambient air quality standards for PM and ozone. As a result, ambient air concentrations of PM and ozone in McKinley County would be lower. Overall, there would be no cumulative public health effects of the Proposed Action because there would be no measureable change to ambient air quality compared to baseline conditions.

Health and safety risks to workers are not expected to be substantial as extensive health and safety programs designed to minimize worker risk are implemented and enforced at El Segundo Mine.

6. CONSULTATION AND PREPARERS

6.1 Consultation and Coordination

Contact	Title	Organization
Brian P. Dunfee	Environmental Services, SW/CO	Peabody Energy
Mark Hiles	Environmental Affairs Manager	Peabody Natural Resources Company
Sarah Seigfreid	Environmental Engineer Supervisor	Peabody Natural Resources Company
Mike Nicholson	Senior Engineer for El Segundo & Lee Ranch Mines	Peabody Natural Resources Company
Julie Cummings	Manager	Antelope Private Lands Use System, Wildlife Management Division, New Mexico Game and Fish Department
Sarah Seigfreid	Environmental Engineer	Peabody Energy

6.2 List of Preparers

Name/Title	Project Role
Bureau of Land Management – Farmington Field Office	
Shannon Hoefeler	Mining Engineer
Barney Wegener	Visual Specialist/ Recreation Planner
Amanda Nisula	NEPA Coordinator
Jim Copeland	Archaeologist
Peggy Gaudy	Archaeologist
Joe Galluzzi	Geologist, Solid Minerals
Ecosphere Environmental Services	
Mike Fitzgerald Principal	Project Manager
Elizabeth Burak Sr. Project Manager	Project Manager
Janet Wolf Sr. Project Manager	Issues Identification, Public Involvement
Cindy Lancaster Sr. Technical Editor	Document Production, Quality Assurance
Matthew Smith, Ecologist	Water Resources
Karen Caddis Environmental Specialist	Visual Resources
Heidi Hanson Biologist	Biological Resources Paleontology
Lucas Phipps GIS Analyst	Geological Resources GIS Analysis

Joey Herring Project Manager Sr. Biologist	Cumulative Impacts
Carolyn Dunmire Senior Project Manager Socioeconomic Specialist	Socioeconomics Environmental Justice Traffic and Transportation Health and Safety
Team Members	
Michele Weidner TetraTech	Noise Baseline and Analysis
Sean Kite TetraTech	Noise Fieldwork
Tom Hormel Vice President	Air Quality Analysis Manager
John Gilpin Sr. Project Manager	Air Quality Technical Support
Michele Weidner TetraTech	Noise Baseline and Analysis

7. REFERENCES

Arizona Department of Environmental Quality. 2006. Climate Change Action Plan. Available online at http://www.azclimatechange.gov/docs.html. Accessed January 3, 2014.

Arrowhead Center at NMSU. 2009.The Economic Impact of Coal Mining in New Mexico. Issued June 2009. Available online at http://arrowhead.nmsu.edu/arrowheadcenter/prosper/documents/coal-mining-impact-report.pdf. Accessed January 31, 2012.

Association of American Railroads (AAR). 2011. Rail Fast Facts for 2009. Freight Railroads in New Mexico. April.

Bureau of Business and Economic Research (BBER). 2005. Oil and Gas Industry Contribution to the San Juan Basin. Prepared for the San Juan Basin Oil and Gas Industry Group. University of New Mexico. April 2005.

BNSF Railway. 2010. Coal Business Unit. Guide to Coal Mines Served by BNSF Railway. Fort Worth, Texas 76161-0051. April 21.

Bureau of Business and Economic Research (BBER) at UNM. 2010. Data and Data Bank. Available online at http://bber.unm.edu/bber_data.html.

BBER. 2012. New Mexico Women's Agenda Lobbying Workshop: State of the Economy: US, New Mexico. Presentation given January 6, 2012. Available online at http://bber.unm.edu/bber_presentations.htm.

Bureau of Land Management (BLM). 2003a. Farmington Proposed Resource Management Plan/Final Environmental Impact Statement. March 2003.

BLM. 2003b. Record of Decision Farmington Proposed Resource Management Plan and Final Environmental Impact Statement. September 2003.

BLM. 2005. Procedures for Performing Cultural Resources Fieldwork on Public Lands in the Area of New Mexico BLM Responsibilities, BLM Handbook Supplement H-8001-1. March 2005.

BLM. 2008. Special status species management for the Bureau of Land Management. Instruction Memorandum No. NM-200-2008-001. Bureau of Land Management, Farmington Field Office, Farmington, New Mexico.

BLM. 2009. United States Department of the Interior, Bureau of Land Management Farmington Field Office, Farmington, New Mexico. Visual Resources Inventory. 2009. Unpublished Data.

BLM. 2011a. Environmental Assessment for Peabody Natural Resources Company Proposed El Segundo/Lee Ranch Coal Exploration Project.

BLM. 2011b. Interim VRM Office Policy 2011, Instruction Memorandum No. IM-NMF000-2011-006. June 21, 2011.

Brown, D. E. (Ed.) 1994. Biotic Communities: Southwestern United States and Northwestern Mexico. University of Utah Press. Salt Lake City, Utah.

City of Gallup. 2009. Growth Management Master Plan Update. August 2009. Available online at http://ci.gallup.nm.us/planning/2009%20GMMP_Master/Gallup%20EconDev%20VII.pdf. Accessed on January 25, 2012.

Clarke, J.A. 1983. Moonlight's influence on predator/prey interactions between short-eared owls (*Asio tlammeus*) and deer mice (*Peromyscus maniculatus*). Behavioral Ecology and Sociobiology 13:205-209.

Council on Environmental Quality (CEQ). 1997. Environmental Justice Guidance Under the National Environmental Policy Act. Council on Environmental Quality, Office of the President. December 10, 1997.

Cummings, Julie (Manager, Antelope Private Lands Use System). 17 January 2012. Personal Communication. New Mexico Game and Fish Department, Wildlife Management Division.

Dick-Peddie, D.B., W. H. Moir, and R. Spellenberg. 1993. New Mexico vegetation: past, present and future. University of New Mexico Press, Albuquerque.

U.S. Department of Interior. 2008a. Report of the Subcommittee on Science: An integrated DOI Science Plan for addressing the effects of climate change on natural systems. Task Force on Climate Change, 34pp. Available online at: http://www.usgs.gov/global_change/doi_taskforce.asp.

E>P Committee. San Juan County Economic Base Analysis. Final Report. Prepared by Economic and Planning Systems, Inc. January 2011.

Fassett, J. E. Undated. Geology and Coal Resources of the Upper Cretaceous Fruitland Formation, San Juan Basin, New Mexico and Colorado. Chapter Q of Geologic Assessment of Coal in the Colorado Plateau: Arizona, Colorado, New Mexico, and Utah. U.S. Geological Survey Professional Paper 1625–B. Denver, Colorado.

Federal Reserve Bank of Kansas City. 2009. McKinley County, New Mexico: Crownpoint. Available online at http://www.frbsf.org/cpreport/docs/mckinley_co_nm.pdf. Accessed January 20, 2012.

Fletcher, J.L. 1980. Effects of noise on wildlife: a review of relevant literature 1971-1978. Pages 611-620 in J.V. Tobias, G. Jansen, and W.D. Ward, eds. Proceedings of the Third International Congress in Noise as a Public Health Problem. Am. Speech-Language-Hearing Assoc., Rockville, Maryland.

Gaudy, Peggy. 2012. Bureau of Land Management Farmington Field Office. Personal communication regarding cultural resources and traditional cultural properties in the Project Area. June 8, 2012.

Hawks Aloft, Inc. 2006 – 2010. Annual Raptor Nest Survey Reports, Lee Ranch Coal Co., El Segundo Coal Mine. Prepared for Lee Ranch Coal Co., El Segundo Mine, McKinley County, New Mexico.

Headwaters Economics. 2011. Fossil Fuel Extraction and Western Economies. April 2011. Available online at http://headwaterseconomics.org/energy/western/maximizing-benefits. Accessed January 20, 2012.

International Atomic Energy Agency (IAEA). 2001. Analysis of Uranium Supply to 2050. Vienna, Austria.

IAEA. 2011. Nuclear Technology Review. September. Vienna, Austria.

International Energy Agency (IEA). 2010. IEA Statistics: CO2 emissions from fuel combustion: Highlights. 9rue de la Federation 75739 Paris Cedex 15, France, 130 pp.

Intergovernmental Panel on Climate Change. 2007. Climate Change 2007: The Physical Science Basis, Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, United Kingdom and New York, 996pp. Available online at http://www.ipcc.ch/publications_and_data/publications_ipcc_fourth_assessment_report_wgl_report_the_physical_science_basis.htm.

International Energy Agency. 2010. IEA Statistics: CO_2 emissions from fuel combustion: Highlights. 9rue de la Federation 75739 Paris Cedex 15, France, 130 pp.

Jasikoff, T.M. 1982. Habitat suitability index models: ferruginous hawk. Unpublished report. U.S. Fish and Wildlife Service, Biological Services Program, Fort Collins, CO.

Kentucky Educational Television (KET). 2012. Types of Coal. Available online at: http://www.ket.org/Trips/coal/agsmm/agsmmtypes.html. Available January 31, 2012.

Knopf, F.L. and B.J. Miller. 1994. *Charadrius montanus* – Montane, grassland, or bare-ground plover? Auk 111:504-506.

Larkin, Ronald. 1996. “Effects of Military Noise on Wildlife: A Literature Review.” USA CERL Technical Report.

Lee Ranch Coal Company (LRCC). 2011. Lee Ranch Coal Company Permit 19-2P, Chapter IV, Paleontology.

Lee Ranch Permit (LRP). 1981. Peabody Natural Resources Company, Lee Ranch Mine Permit.

McGuire, L.P. and M.B. Fenton. 2010. Hitting the Wall: Light Affects the Obstacle Avoidance Ability of Free-Flying Little Brown Bats (*Myotis lucifugus*). Acta Chiropterologica 12:247-250.

McKinley County Assessor. 2012. Personal communication on January 30, 2012.

McKinley County. 2003. McKinley County Comprehensive Plan. Accessed online in January 2012 at: http://www.co.mckinley.nm.us/comprehensive_plan.htm.

McKinley Community Health Alliance. 2009. Data Compilation Summary: a White Paper. Prepared by Joyce Planning and Development on December 28, 2009. Available online at http://nmhealth.org/. Accessed January 18, 2012.

Mine Safety and Health Administration (MSHA). 2012. Mine Quarterly Report Production Information Lee Ranch and El Segundo Coal Mines. Available online at http://www.msha.gov/drs/ASP/MineAction70002.asp.

National Park Service (NPS). 2005. Geology of Mesa Verde. U.S. Department of Interior, Mesa Verde National Park. Available online at: http://www.nps.gov/meve/planyourvisit/upload/geology_web.pdf. Accessed February 2, 2012.

Natural Resource Conservation Service (NRCS) 2001. Soil Survey of McKinley County Area, New Mexico.

Natural Resource Conservation Service Ecological Site Information System (NRCS ESIS). 2011. Ecological Site Description. Available at: http://esis.sc.egov.usda.gov/ESIS/About.aspx.

New Mexico Bureau of Geology and Mineral Resources (NMBGMR). 2003. Geologic Map of NM, 1:500,000. NM Bureau of Geology and Mineral Resources.

New Mexico Bureau of Mine Safety. 2010. The State Mine Inspector's 2010 Report to the Governor. Available online at: http://www.bmi.state.nm.us/2010%20Governors%20Report.pdf.

New Mexico Division of Workforce Solutions (NMDWS). 2012. Bureau of Economic Research and Analysis Occupational Employment Statistics (OES). Available online at http://www.dws.state.nm.us/eds/index.html. Accessed January 19, 2011.

New Mexico Economic and Rural Development and Telecommunications Committee. 2006. Minutes of the Second Meeting on July 24-25, 2006. Available online at http://www.nmlegis.gov/lcs/minutes/erdtminjul24.06.pdf. Accessed on January 31, 2012.

New Mexico Environmental Department (NMED). 2010. New Mexico Environmental Department. 2010. Inventory of New Mexico Greenhouse Gas Emissions: 2000-2007. Available online at: http://www.nmenv.state.nm.us/cc/documents/GHGInventoryUpdate3_15_10.pdf.

New Mexico Energy, Minerals, and Natural Resources Department (NM-EMNRD). 2010. Annual Report. Available online at http://www.emnrd.state.nm.us/main/index.htm. Accessed January 15, 2012.

NM-EMNRD. 2005. Cumulative Hydrologic Impact Assessment (CHIA) for the El Segundo Mine.

New Mexico Labor Analysis Statistical and Economic Research (LASER) website. 2012. Labor, wage, and industry data analysis. Available online at http://laser.state.nm.us/default.asp. Accessed January 20, 2012.

New Mexico Partners in Flight (NMPIF). 2007. New Mexico Bird Conservation Plan. Version 2.1. C. Rustay and S. Norris, compilers. Albuquerque, New Mexico.

New Mexico Taxation and Revenue Department. 2009. Taxation of Coal and Other Energy Resources. Available online at http://www.tax.newmexico.gov/SiteCollectionDocuments/Tax-Library/Economic-and-Statistical-Information/Mineral%20Extraction%20Taxes/taxation_of_coal_and_other_energy_resources.pdf. Accessed January 31, 2012.

Northwest New Mexico Comprehensive Development Strategy (NW-CEDS). 2009. Five-Year Regional Plan: 2009-2014. Northwest Council of Governments. Prepared June 30, 2009. Available online at http://www.nwnmcog.com/uploads/2/7/9/8/2798127/ceds_nwnm_2009-2014_final.pdf. Accessed January 20, 2012.

Office of Surface Mining Reclamation and Enforcement (OSM). 2011. BNCC Area IV North Mine Plan Revision Draft Environmental Assessment. December 2011.

PANTONE for Architecture and Interiors Color Guide. 2003. Provided by BLM Fluid Minerals or BLM Recreation Divisions, Washington, D.C. Office. March 2007.

Parker, Patricia L. and Thomas F. King. 1998. Guidelines for Evaluating and Documenting Traditional Cultural Properties. National Park Service, National Register Bulletin 38. Washington.

Patriarca E. and P. Debernardi. 2010. Bats and Light Pollution. Available online at: http://www.centroregionalechirotteri.org/download/eurobats/Bats%20and%20light%20pollution.pdf. Accessed February 13, 2012.

Peabody Natural Resources Company (PNRC). 2010. El Segundo Mine Permit Application Package NM-2010-1 (as revised).

PNRC. 2011. 2009 El Segundo Mine Greenhouse Gas Production Memorandum. July 22, 2011.

PNRC 2012. El Segundo Sound Level Monitoring, 2012: El Segundo and Lee Ranch Areas, McKinley County, New Mexico. Unpublished report.

Scheick, C.L. 2012. Combined Cultural Resources Survey for Section 34, T17N, R9W on El Segundo Mine, McKinley County, NM. Southwest Archaeological Consultants. Research Series 548A. March 12, 2012.

Solomon S., K.H. Rosenlof, R.W. Portmann, J.S. Daniel, S.M. Davis, T.J. Sanford, and Gian-Kasper Plattner. 2010. Contribution of Stratospheric Water Vapor to Decadal Changes in the Rate of Global Warming. 327:1219-1233 accessed from http://www.sciencemag.org/cgi/rapidpdf/science.1182488v1.pdf.

State of New Mexico, Historic Preservation Division, Department of Cultural Affairs (State of New Mexico). 2009. News release - Collaboration Results in New Mount Taylor State Register Listing TCP Nomination Addresses Tribal and Landowner Concerns. June 5, 2009.

U.S. Census Bureau (USCB). 2010. County Level Data. Available online at http://2010.census.gov/2010census/data/. Accessed January 20, 2012.

U.S. Bureau of Labor Statistics. 2012. Employment, Wage, and Industry Databases, Tables, and Calculators. Available online at http://www.bls.gov/data. Accessed January 12, 2012.

U.S Bureau of Reclamation (USBOR). 2009. U.S. Bureau of Reclamation. Navajo Gallup Water Supply Project Final Environmental Impact Statement. September.

U.S. Department of the Interior (USDOI). 2008. Guidance on the Applicability of the Endangered Species Act's Consultation Requirement to Proposed Actions Involving Emissions of Greenhouse Gases. Memo from Office of the Solicitor. October 3, 2008.

U.S. Department of the Interior, Bureau of Reclamation. 2011. SECURE Water Act Section 9503(c) – Reclamation Climate Change and Water. Report to Congress, 206 pp.

U.S. Environmental Protection Agency (USEPA). 1974. Press Release: EPA Identifies Noise Levels Affecting Health and Welfare.

U.S. Fish and Wildlife Service (USFWS). 1983. Impacts of Coal Surface Mining on 25 Migratory Bird Species of High Federal Interest. J.S. Armbruster, Ed.

USFWS. 2008a. Black-footed Ferret (*Mustela nigripes*) 5-Year Status Review: Summary and Evaluation. Available at http://ecos.fws.gov/docs/five_year_review/doc2364.pdf. Accessed December 23, 2011.

USFWS. 2008b. Birds of Conservation Concern 2008. United States Department of Interior, Fish and Wildlife Service, Division of Migratory Bird Management, Arlington, Virginia. 85 pp.

USFWS. 2010. Listed and Sensitive Species in McKinley County. Endangered species lists. U.S. Fish and Wildlife Service, Southwest Region Ecological Services. Available online at http://www.fws.gov/southwest/es/NewMexico/SBC_view.cfm?spcnty=McKinley. Accessed on December 19, 2011.

U.S. Geological Survey (USGS). 2006. Southwest Regional Gap Analysis Project; Colorado Plateau Pinyon-Juniper Woodland. Available online at: http://fws-nmcfwru.nmsu.edu/swregap/habitatreview/EcoSysSummary/S039.pdf. Accessed January 30, 2012.

USGS. 2008. National Hydrography Dataset, Medium Resolution. Reston, Virginia, USA: U.S. Geological Society.

USGS. 2010. Geology and Environmental Change Science Center. Available online at: http://esp.cr.usgs.gov/info/meve/. Accessed February 1, 2012.

U.S. Nuclear Regulatory Commission (USNRC). 1997. Final Environmental Impact Statement To Construct and Operate the Crownpoint Uranium Solution Mining Project, Crownpoint, New Mexico. February 1997.

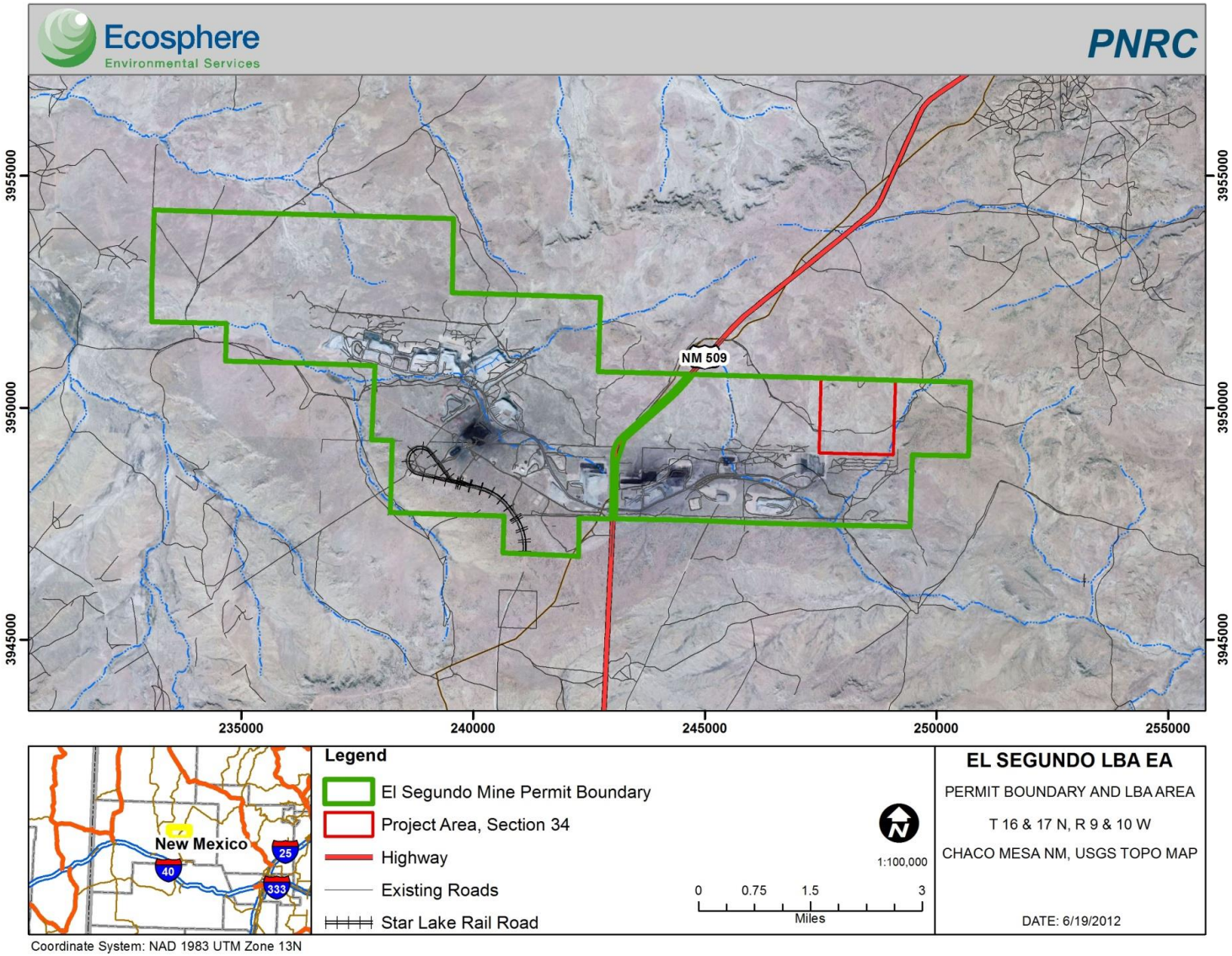
USNRC. 2009. Office of Federal and State Materials and Environmental Management Programs. Generic Environmental Impact Statement for In-Situ Leach Uranium Milling Facilities: Chapters 1–4

(NUREG-1910, Volume 1). Available online at http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1910/v1/.

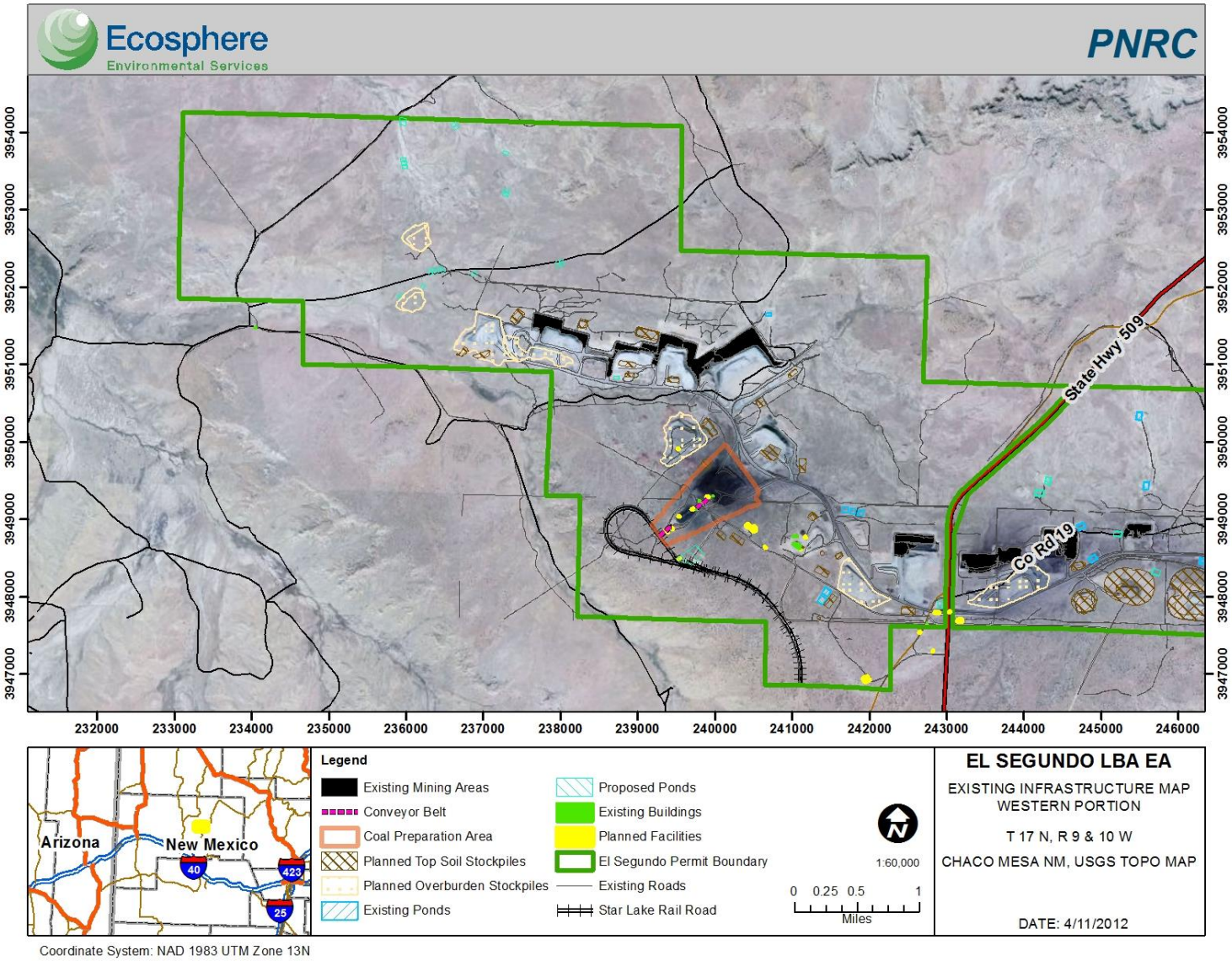
Wegener, B. 2011. Visual Resource Recreation Lead for BLM-FFO. VRM insert for EA affected environment text provided in October 31, 2011 email to K. Caddis, Ecosphere.

Appendix A—Map Figures

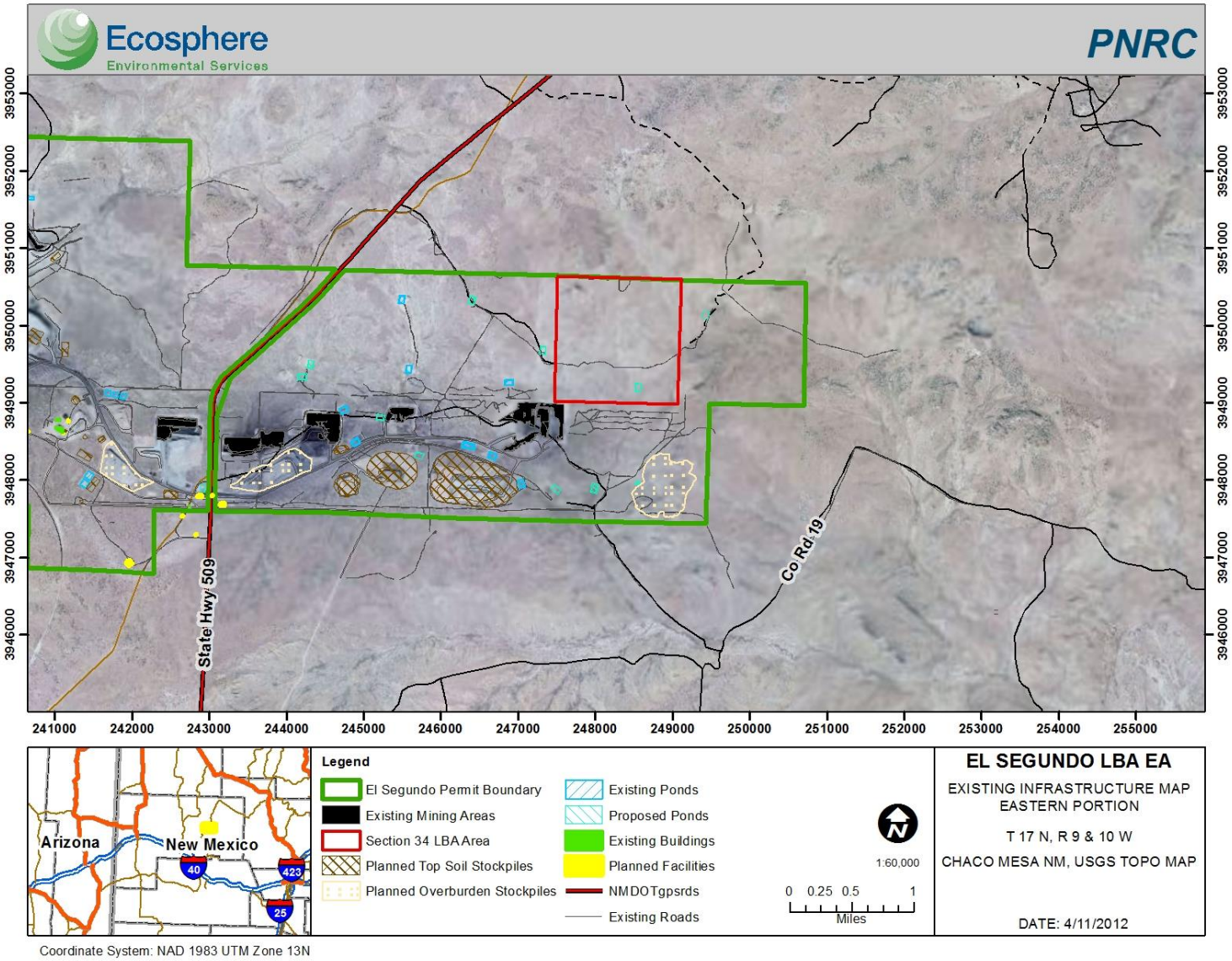
Map A-1. Permit Boundary and Project Area



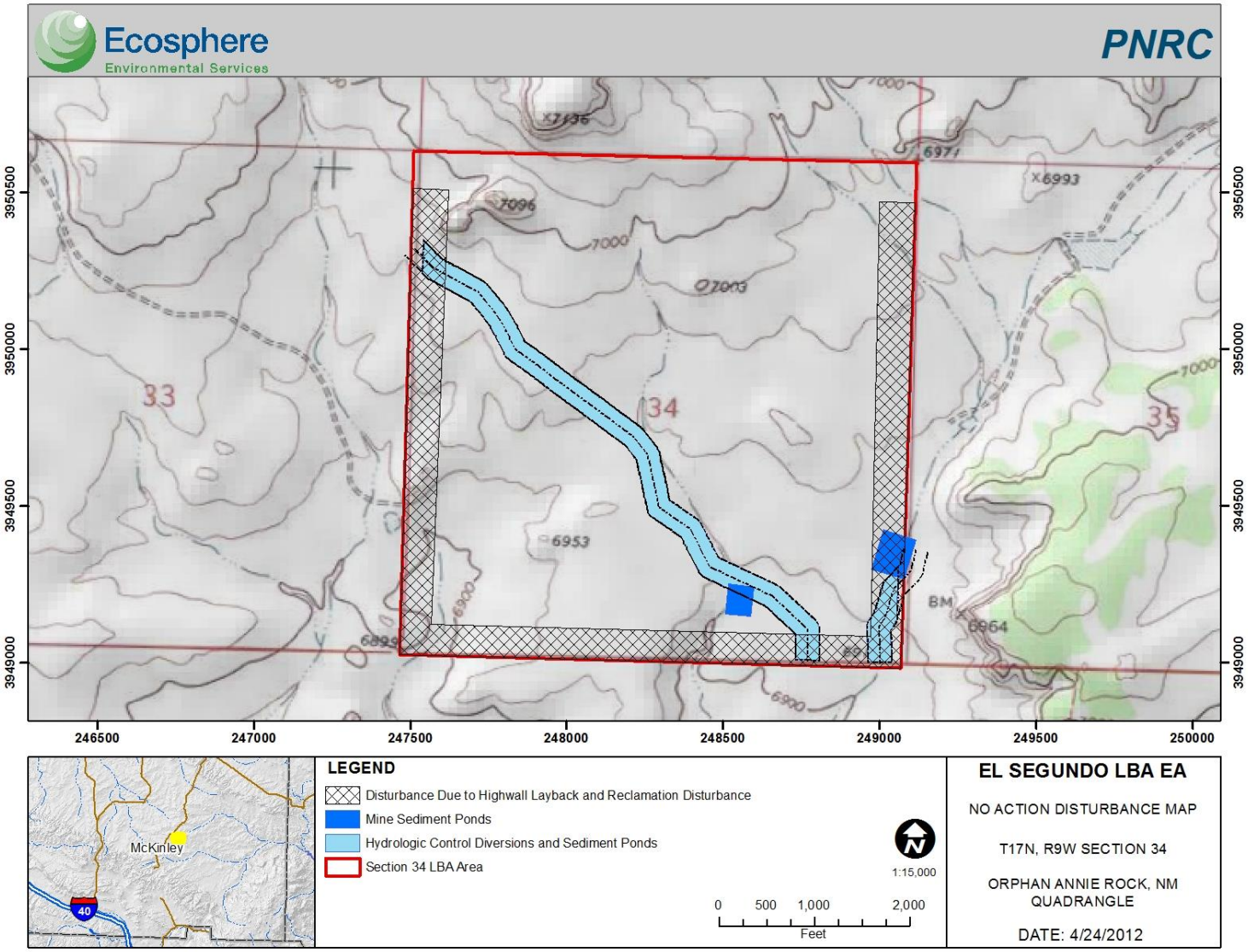
Map A-2. El Segundo Mine West



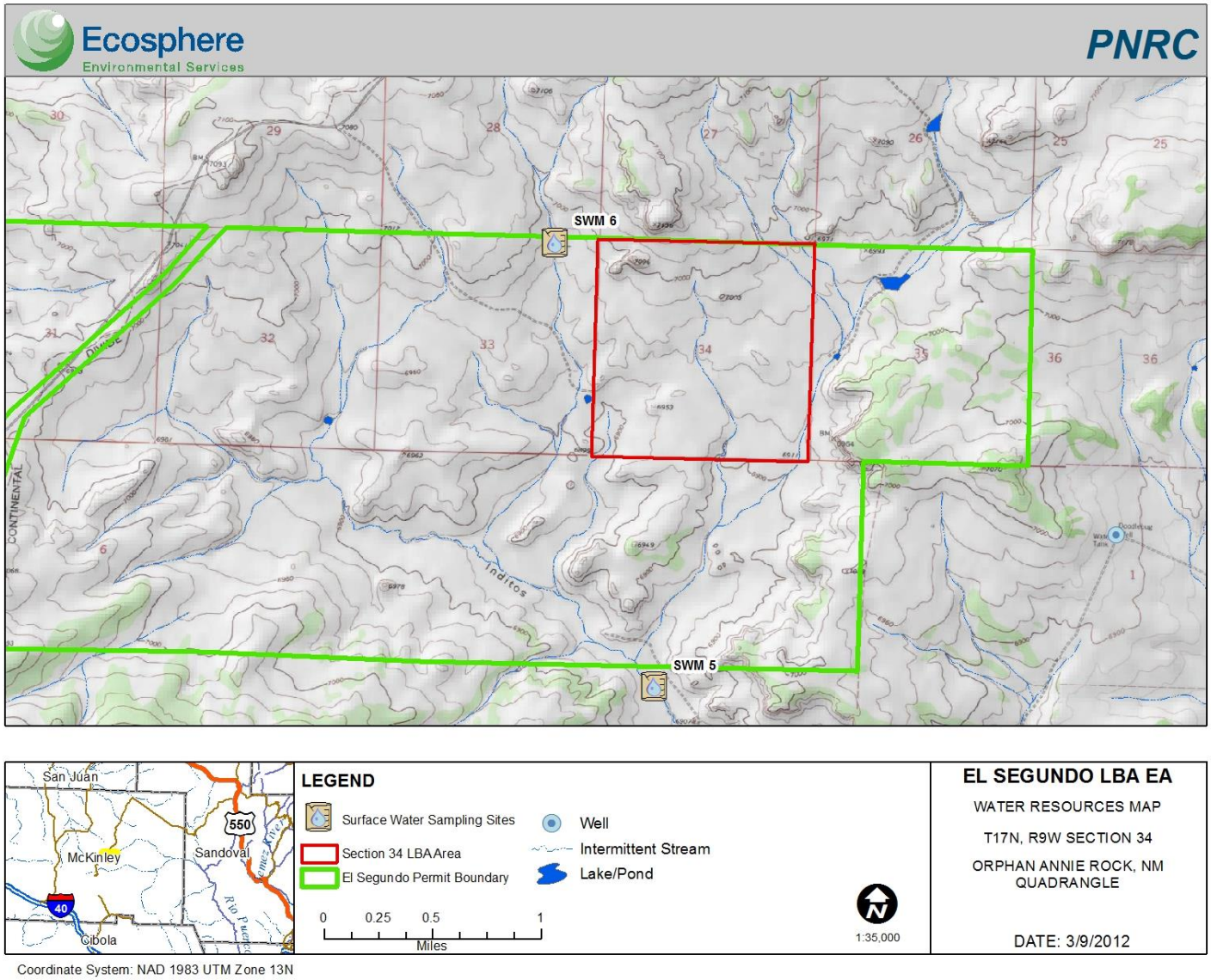
Map A-3. El Segundo Mine East



Map A-4. No Action Disturbance

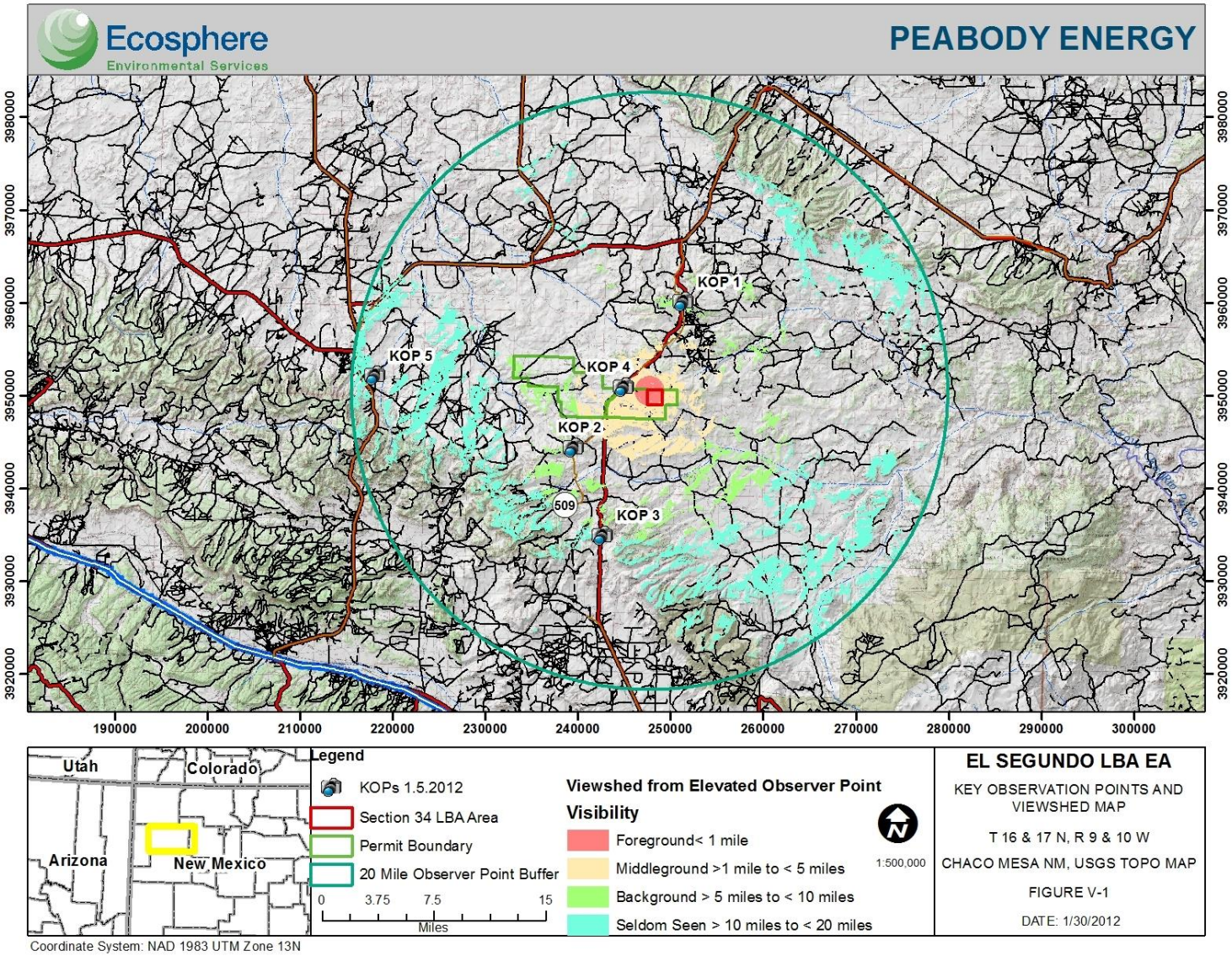


Map A-5. Water Resources

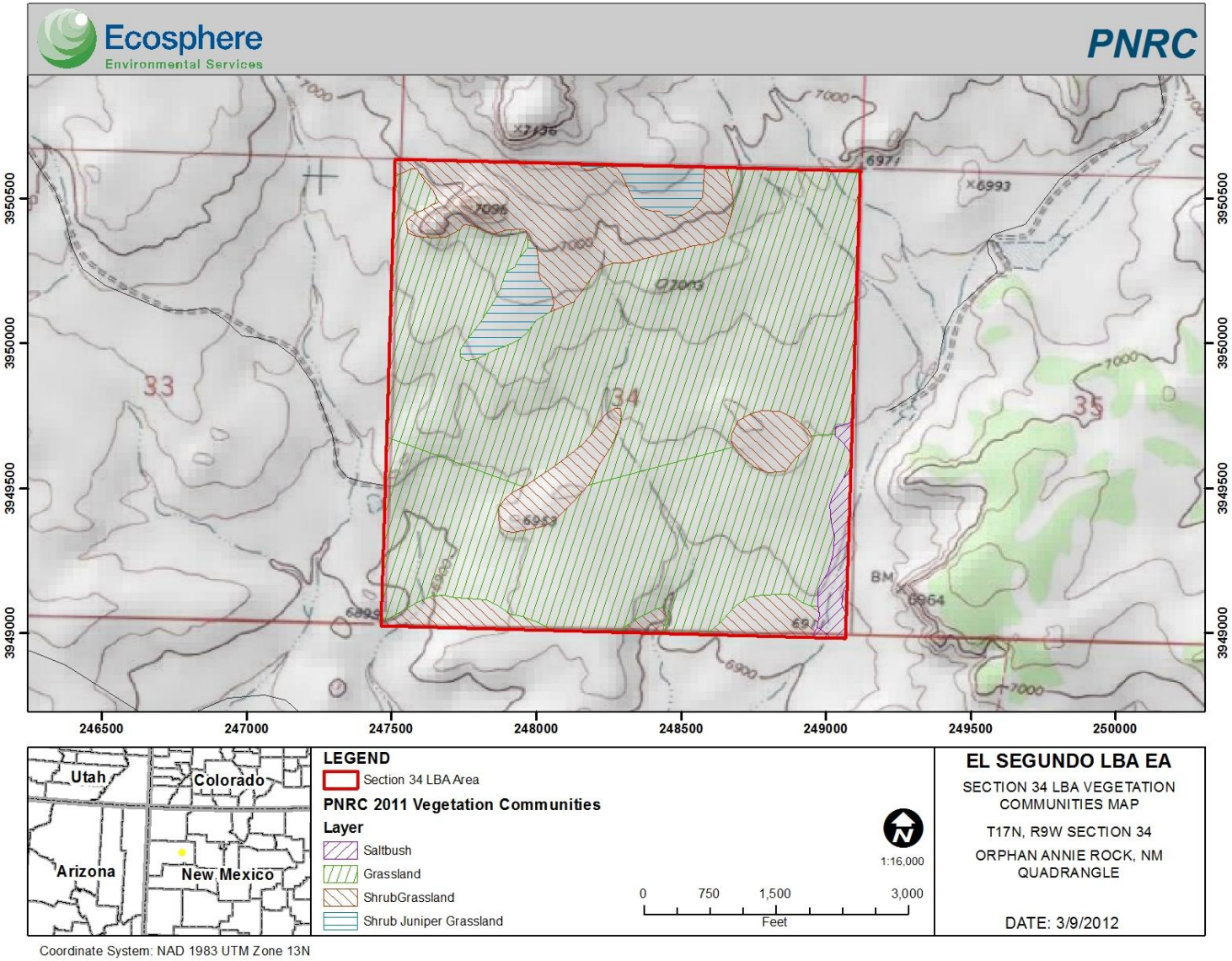


Coordinate System: NAD 1983 UTM Zone 13N

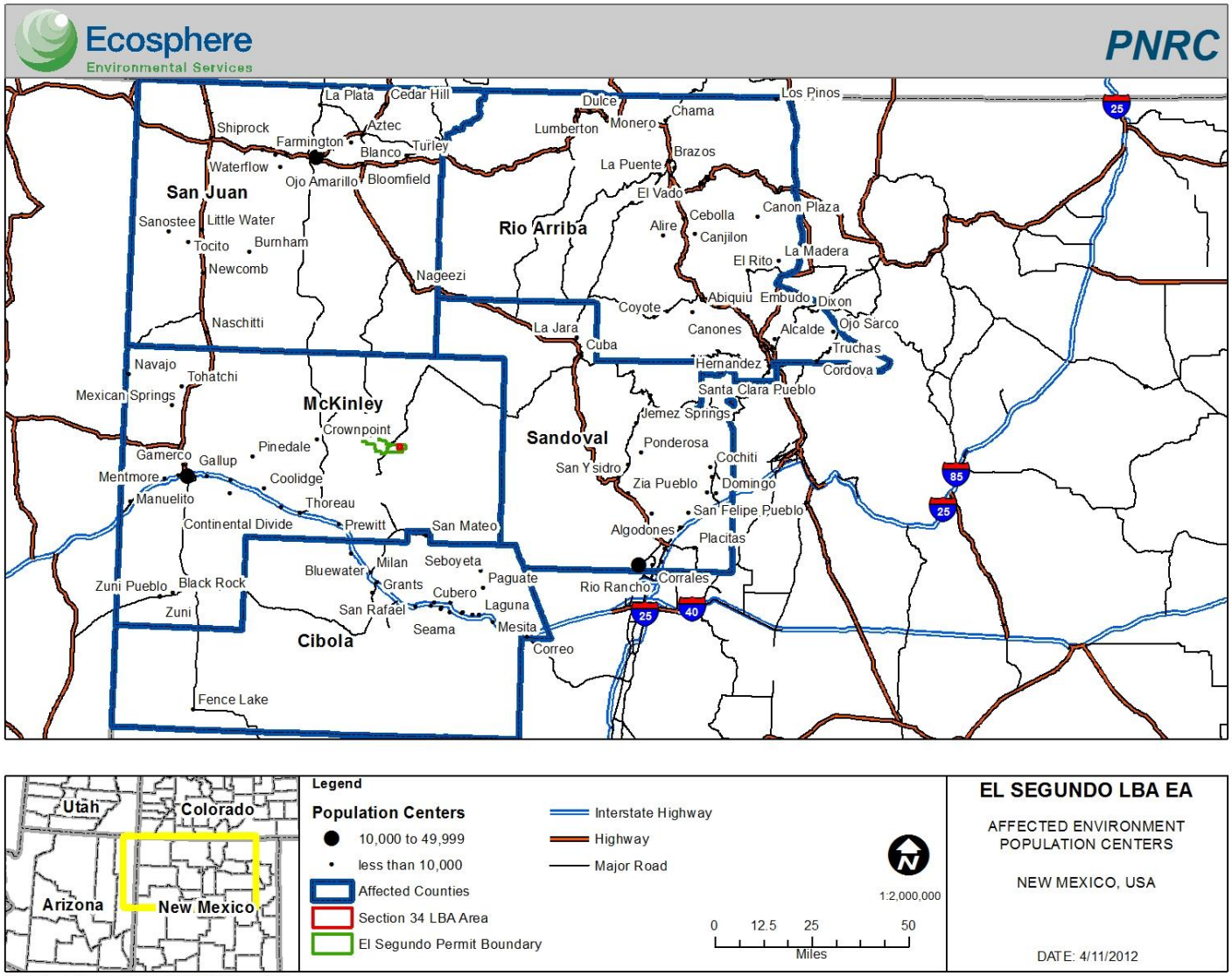
Map A-6. Key Observation Points and Viewshed



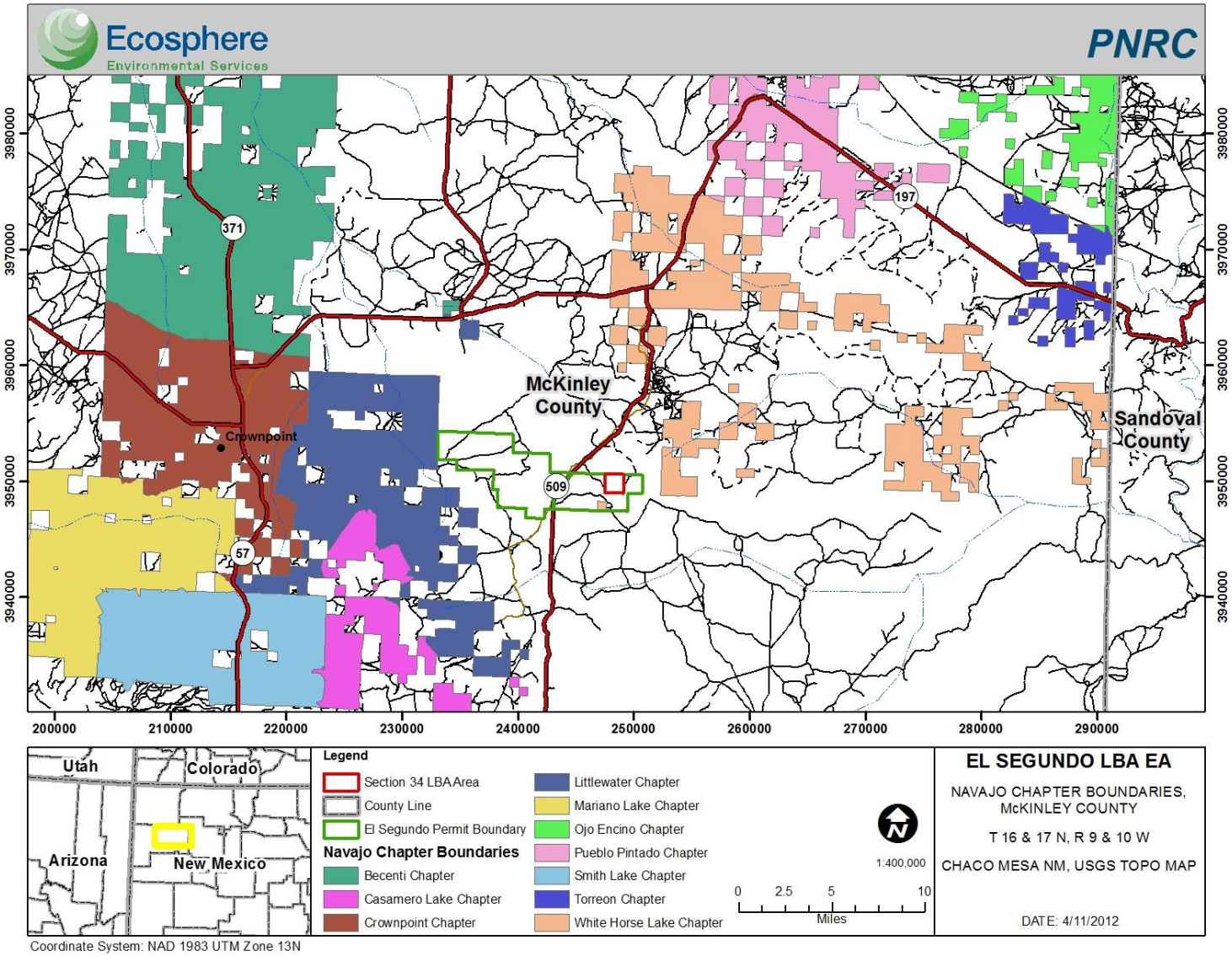
Map A-7. Vegetation Communities



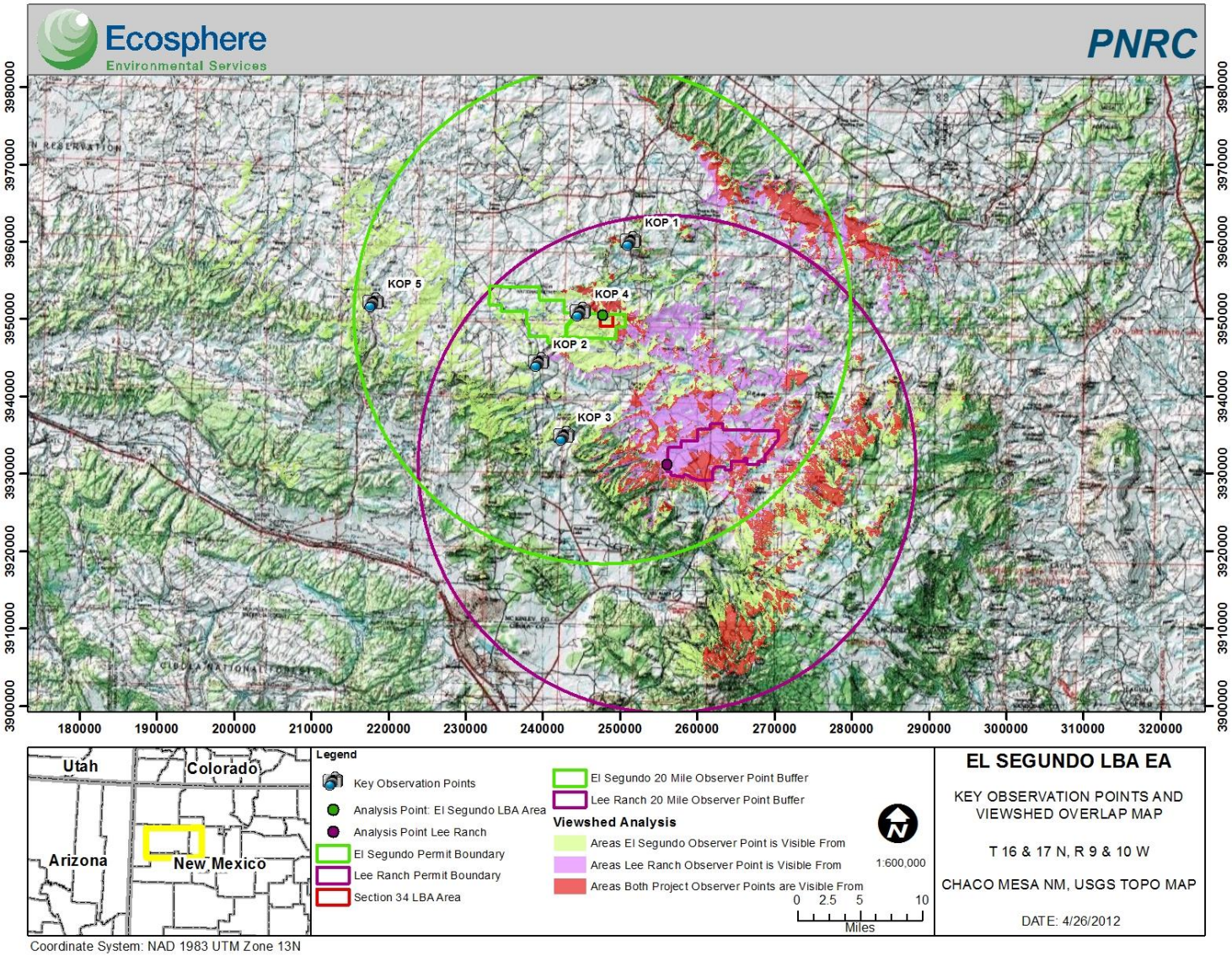
Map A-8. Affected Environment Population Centers



Map A-9. Navajo Chapter Boundaries



Map A-10. Cumulative Key Observation Points and Viewshed Overlap



Appendix B—Visual Resources

VISUAL ANALYSIS METHODOLOGY

Identifying the Area of Effect for Visual Resources

The area of effect was identified by establishing the boundaries of the project's viewshed, or areas where the project may be visible from in the long term (greater than 5 years). This viewshed was defined using a 30-meter grid Digital Elevation Model (DEM) program, which identified areas that would be located within line-of-sight of proposed mine activities. The visible areas were categorized into distance zones on the map as outlined below:

- Foreground—this zone is located within 0 to 1 mile from the Project Area boundaries. Existing coal mine infrastructure is readily visible in this zone.
- Middleground—this is the area that is located from 1 to 5 miles away from the Project Area boundary. The outer boundary of this distance zone is defined as the point where the texture and form of individual plants are no longer apparent in the landscape.
- Background—this zone includes the area greater than approximately 5 miles away, but less than 15 miles that can be seen from travel routes or key observation points (KOP). It does not include areas in the background that are so far distant that the only thing discernible is the form or outline. In order to be included within this distance zone, vegetation must be visible at least as patterns of light and dark.
- Seldom Seen—this zone includes areas greater than 15 miles away where views of the Project Area may still be faintly visible under excellent atmospheric conditions.

The DEM viewshed program analyzed whether each cell in the DEM grid would be in the line of sight of the project. In the program, the most visible proposed project components (assumed to be the overburden piles or a dragline) were given a height offset of 150 feet from the ground elevation of their location on the DEM; this represents the general overall estimated height of the proposed overburden piles and dragline. The projected location was placed on the highest elevation within the proposed Project Area. All other cells were given a 6-foot-offset to simulate the view from a standing adult. The viewshed modeling performed for this project also considered the line-of-sight from the proposed mining actions to all lands located within 20 miles of the Project Area boundary.

The model took into account the existing topography between the active Project Area and selected view points as well as the curvature of the earth. It did not include vegetative or atmospheric screening. Additional local factors such as vegetation height (which is relatively minimal in the Project Area), micro-topographic features not represented in the DEM, time of day, atmospheric conditions, and distance from the project site ultimately determine how visible the project would be from locations within the modeled line of sight. The model also does not consider lighting that may be visible at night from the existing mine operations and the proposed action.

To assist in identifying existing visual conditions near the Project Area, important view locations were identified through review of the viewshed analysis mapping generated for the project, consideration of the cultural landscape, and discussions with agency representatives. A summary of these locations or key observation points is provided in Table B-1 in Appendix B, and the locations are mapped on Figure A-6. These important view locations identified for the Project Area included two residences located within 5 miles of the Project Area, viewing areas along State Highway 509 where existing mine operations are

visible to commuters on the highway, and a Chaco Culture National Historical Park (NHP) outlier located east of Crownpoint. The important view locations were visited on January 5, 2012, by an Ecosphere Environmental Services visual resource specialist, who documented existing conditions of form, line, color, and texture at each location. Summaries of existing conditions at each location and representative panoramic photographs are provided in Appendix B. In total, five important view locations were identified and evaluated during the field reconnaissance session for existing visual conditions. Distance zones, utilized in this project for the purposes of classifying relative visibility based on distance, were confirmed in the field for each of the sensitive view locations in relation to the proposed action. KOPs were chosen from these important view locations to conduct impact analyses.

VISUAL BASELINE DATASHEETS

Existing Visual Conditions

Project Name: Peabody El Segundo LBA Section 34 Coal Mine Expansion Surveyors: K. Caddis, L. Phipps

Key Observation Point (KOP) Identification Number: KOP P-1; Highway 509 and intersection to residence north of Hospah	**Site Visit Date/Time:** 01/05/2012, 9:30 am **Photo Date/Time:** 01/18/2012, 4:49 pm	**Coordinates (include datum):** NAD 83 Zone 13S 0251393 E, 3959927 N

Location and Reason for Analysis Point (e.g. residence within 500 feet of KOP):
On Highway 509, approximately 1 mile north of Hospha, New Mexico, on a rise above the "town". Proposed project is located in background views (5 to 10 miles). An active residence occurs approximately 0.5 mi. due east of the KOP location down dirt roadway.

Existing Landscape/Character Description:
During the site visit, a blast cloud (red dust plume) was visible from the KOP, centered on the highway. The mine itself is not visible. The landscape is characterized by open piñon-juniper woodland sloping to the south. Mt. Taylor is visible to the SE. Snow cover was evident during site visit; cover was approximately 85%. Dominant colors consist of light brown vegetation (grama grasses, snakeweed, 4-wing saltbush), dark green piñon-juniper. Generally horizontal lines; conical and rectangular shapes of Mt. Taylor occur to SE, and mesas to SW. Rounded shapes of piñon-juniper. Rough textures of vegetation. Generally, a natural landscape. Some rectangular buildings at residence are visible as well as parallel lines of highway and dirt roadway.

Observer Position: Vehicle on highway	**GPS Point Name:** P-1
Period of Visibility: Approximately 1 minute	**Compass Bearing:** 210 degrees SSW, centered on dust plume

Distance Zone(s) Visible from KOP: Check one:

☐ Immediate Foreground	☐ Foreground	☐ Middleground	☒ Background	☐ Seldom Seen
0-300 Feet	300 Feet –1 Mile	1 Mile to 5 Miles	5 Miles – 15 Miles	15 Miles or Further

Existing Visual Conditions

Project Name: Peabody El Segundo LBA Section 34 Coal Mine Expansion Surveyors: K. Caddis, L. Phipps

Key Observation Point (KOP) Identification Number: KOP # P-2. Active Residence	**Site Visit Date/Time:** 01/05/2012, 10:30 am **Photo Date/Time:** 01/18/2012, 4:04 pm	**Coordinates (include datum):** NAD 83 Zone 13S 0239545 E, 3944196 N

Location and Reason for Analysis Point (e.g. residence within 500 feet of KOP):
Southeast of the existing mine on the alignment of the old Highway 509, at an active residence located on the south side of the roadway.

Existing Landscape/Character Description:
Residence with trailers, tank, barn. Mt. Taylor to south (not in photo). House sits on a rise with slight slope to E/NE. Loading arm at mine is visible to north, as well as 3 cylindrical tanks and 1 powerpole. Dust plume from a blast to northeast was visible during site visit. Existing pit not visible. "Mesa" of proposed area visible on horizon. Landscape is characterized by horizontal lines and open piñon-juniper woodland. Snow cover was approximately 85% at the site visit. Generally, a natural landscape, although residence and associated rectangular outbuildings visible to south of roadway. Parallel lines of dirt road also visible. Rough textures from vegetation.

Observer Position: Residence	**GPS Point Name:** P-2
Period of Visibility: > 10 minutes	**Compass Bearing:** 50 degrees NE

Distance Zone(s) Visible from KOP: Check one:

☐ Immediate Foreground	☐ Foreground	☒ Middleground	☒ Background	☐ Seldom Seen
0-300 Feet	300 Feet –1 Mile	1 Mile to 5 Miles	5 Miles – 15 Miles	15 Miles or Further

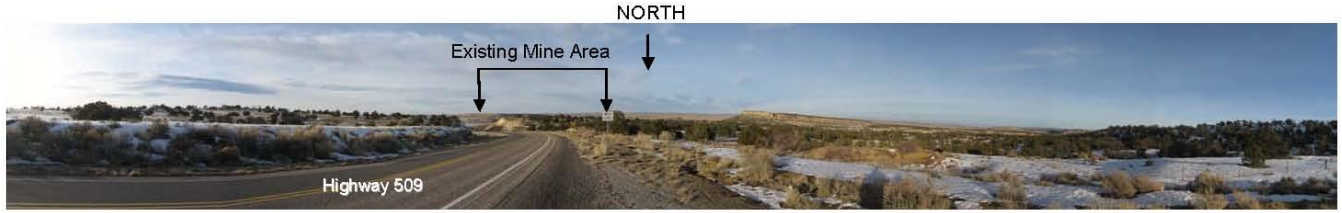
Existing Visual Conditions

Project Name: Peabody El Segundo LBA Section 34 Coal Mine Expansion Surveyors: K. Caddis, L. Phipps

Key Observation Point (KOP) Identification Number: KOP #P-3. Highway 509 south of project area.	**Site Visit Date/Time:** 01/05/2012, 12:30 pm **Photo Date/Time:** 01/18/2012, 4:25 pm	**Coordinates (include datum):** NAD 83 Zone 13S 0242744 E, 3934909 N
Location and Reason for Analysis Point (e.g. residence within 500 feet of KOP): On Highway 509 approximately 6 miles south of mine area. Hoping to capture cumulative effects area.		
Existing Landscape/Character Description: Expansive views to north and east from Highway 509. Landscape is characterized by horizontal lines of slopes and rectangular mesas, and clumps of piñon-juniper vegetation. Landscape slopes to north. Terrain has rough texture. Blue-gray mountain range in background. Snow cover was approximately 80% at the site visit. Generally, a natural landscape, with only parallel lines of Highway 509 visible.		
Observer Position: Vehicle on Highway 509	**GPS Point Name:** P-3	
Period of Visibility: < 1 minute	**Compass Bearing:** 350 degrees North, to existing mine location.	

Distance Zone(s) Visible from KOP: Check one:

☐ Immediate Foreground	☐ Foreground	☐ Middleground	☒ Background	☐ Seldom Seen
0-300 Feet	300 Feet –1 Mile	1 Mile to 5 Miles	5 Miles – 15 Miles	15 Miles or Further



Existing Visual Conditions

Project Name: Peabody El Segundo LBA Section 34 Coal Mine Expansion Surveyors: K. Caddis, L. Phipps

Key Observation Point (KOP) Identification Number: KOP # P-4; Highway 509, foreground view of active mine	**Site Visit Date/Time:** 01/05/2012, 1:15pm **Photo Date/Time:** 01/18/2012, 4:39 pm	**Coordinates (include datum):** NAD 83 Zone 13S 0245040 E, 3950837 N
Location and Reason for Analysis Point (e.g. residence within 500 feet of KOP): Highway 509, approximately 1 mile north of active mine. Good open view to the east of the proposed mine site and of existing mine area.		
Existing Landscape/Character Description: Landscape is characterized by level or gently sloping topography to the east, with scattered piñon-juniper vegetation. Mt. Taylor lies to the southeast. Active mine spoil piles to the south include rectangular and conical shapes. Highway 509 contributes bold, converging lines (axis). Snow cover was approximately 40% at this location during site visit. Grasses contribute a light brown color, with blue-gray mountains in background. Dark green piñon-juniper (Yuma Green color) also provide rough texture to landscape.		
Observer Position: vehicle on Highway 509	**GPS Point Name:** P-4	
Period of Visibility: < 1 minute	**Compass Bearing:** 105 degrees East, toward mine site. Highway points approximately 45 degrees northeast.	

Distance Zone(s) Visible from KOP: Check one:

☐ Immediate Foreground	☐ Foreground	☒ Middleground	☐ Background	☐ Seldom Seen
0-300 Feet	300 Feet –1 Mile	1 Mile to 5 Miles	5 Miles – 15 Miles	15 Miles or Further

Existing Visual Conditions

Project Name: Peabody El Segundo LBA Section 34 Coal Mine Expansion Surveyors: K. Caddis, L. Phipps

Key Observation Point (KOP) Identification Number: KOP # P-5; View from Chaco Canyon National Monument outlier	**Site Visit Date/Time:** 01/05/2012, 2:30 pm **Photo Date/Time:** 01/18/2012, 5:31 pm	**Coordinates (include datum):** NAD 83 Zone 12S 0764071 E, 3951107 N

Location and Reason for Analysis Point (e.g. residence within 500 feet of KOP):
On unpaved road at east boundary of a Chaco Canyon National Monument disjunct outlier area, located approximately 0.5 mile east of the town of Crownpoint, New Mexico.

Existing Landscape/Character Description:
Landscape is characterized by badlands to the west in Chaco Canyon National Monument parcel. Flat, level, horizontal lines to east, and mesas to north and south. Vegetation consists of light brown grasses and gray shadscale. A dark "plume" of coal dust or exhaust from the existing mine was visible to the east during the site visit. Light-colored coal loading silos (4) are visible to the east. Snow cover was 50% at time of site visit. The town of Crownpoint lies to the west of the KOP. An active residence / ranch lies to the south, with rectangular shapes of structures. Dirt roads create parallel and converging lines in this area.

Note: Lights from the loading area and night glow from active mining may be visible from this location.

Observer Position: Vehicle on Chaco Canyon Nat'l Monument road, or hiker on Nat'l Monument outlier lands	**GPS Point Name:** P-5
Period of Visibility: > 1 minute	**Compass Bearing:** 70 degrees East

Distance Zone(s) Visible from KOP: Check one:

☐ Immediate Foreground	☐ Foreground	☐ Middleground	☐ Background	☒ Seldom Seen
0-300 Feet	300 Feet –1 Mile	1 Mile to 5 Miles	5 Miles – 15 Miles	15 Miles or Further

VISUAL TABLES

Table B-1. Key Observation Locations Used for Identifying Existing Conditions in the Project Region

KOP ID	Description	UTM Coordinates			KOP View Compass Bearing Angles	Approximate Bearing at Center Point towards Project Area	Observer Position	General Type of Viewer	Amount of Use**	Duration of Visibility	Distance Zone in Relation to Project Areas	Surrounding Land Ownership
		Datum/ Zone	Easting	Northing								
KOP P-1	Highway 509 and intersection to residence north of Hospah	NAD 83 Zone 13S	251393	3959927	100-300	210	Vehicle on roadway, residence	Residents, livestock managers, mine workers, travelors to and from Grants	Low	Approximately 1-2 minutes in car; greater than 5 minutes at residence.	Middleground (1-5 miles)	Navajo Nation
KOP P-2	Active residence located on the south side of CR 19	NAD 83 Zone 13S	239545	3944196	0-160	50	Vehicle on roadway, residence	Residents, livestock managers, mine workers	Low	Approximately 1-2 minutes in car; greater than 5 minutes at residence.	Background (5-15 miles)	Navajo Nation
KOP P-3	Highway 509 south of project area on BLM lands	NAD 83 Zone 13S	242744	3934909	240-90	0 (due North)	Vehicle on roadway	Residents, livestock managers, mine workers, travelors to and from Grants	Low	Approximately 1-2 minutes	Background (5-15 miles)	BLM
KOP P-4	Highway 509; foreground view of active mine	NAD 83 Zone 13S	245040	3950837	0-180	105	Vehicle on roadway	Residents, livestock managers, mine workers, travelors to and from Grants	Low	Approximately 1-2 minutes in car	Middleground (1-5 miles)	Navajo Nation
KOP P-5	Chaco Canyon National Monument outlier	NAD 83 Zone 12S	764071	3951107	0-180	70	Vehicle or hiking	Residents, livestock managers, visitors to Monument outlier	Low	Varies - typically greater than 5 minutes	Seldom seen (greater than 15 miles)	NPS/Navajo Nation

** Measured relative to overall use within the project region.

Table B-2. Viewpoint Sensitivity and Visual Change Analysis

		Existing Visual Setting								Visual Change (No Action)					Impact Potential (No Action)		Visual Change (Preferred Alternative)					Impact Potential (Preferred Alternative)	
				Viewer Exposure																			
Viewpoint Identifier[1]	Description[2]	Viewer Sensitivity[3]	Visual Quality[4]	Visibility[5]	Distance Zone[6]	Number of Viewers[7]	Duration of View[8]	Overall Viewer Exposure[9]	Overall Visual Sensitivity[10]	Description of Visual Changes[11]	Visual Contrast[12]	Relative Dominance[13]	Feature Modifications[14]	Overall Visual Change[15]	Before Mitigation / After Mitigation[16]	Mitigation[17]	Description of Visual Changes[11]	Visual Contrast[12]	Relative Dominance[13]	Feature Modifications[14]	Overall Visual Change[15]	Before Mitigation / After Mitigation[16]	Mitigation[17]
KOP P-1	Highway 509 and intersection to residence north of Hospah	Low to Moderate	Moderate	Moderate	Middleground (1-5 miles)	Moderate	Brief to Extended. Approximately 1-2 minutes in car; greater than 5 minutes at residence	Moderate	Moderate	Previously permitted mine operations will continue and extend gradually to east towards Section 34. Existing mine activities, including dust plumes, and nightglow will continue through permitted actions to 2024.	Low	Subordinate	Low to Moderate	Low	Adverse but Less Than Significant/ Adverse but Less than Significant	Dust suppression; shielded night lights	Section 34 would be leased; mining would occur in area. Earthmoving may be visible in Section 34. Other previously permitted mining actions would also continue as described in No Action.	Low to Moderate	Co-dominant	Low to Moderate	Low to Moderate	Adverse but Less Than Significant/ Adverse but Less Than Significant	Dust suppression, night light shielding
KOP P-2	Active residence located on the south side of CR 19	Low	Low to Moderate	Moderate	Background (5-15 miles)	Low	Brief to Extended. Approximately 1-2 minutes in car; greater than 5 minutes at residence	Low to Moderate	Low to Moderate	Views of existing rail loading facilities, and dust plumes and nightglow from currently permitted mine activities will continue to 2024.	Low	Subordinate	Low	Low	Not Significant/ Not Significant	Dust suppression; shielded night lights	Section 34 would be leased; mining would occur in area, but should not be visible. Other previously permitted mining actions would also continue as described in No Action.	Low	Subordinate	Low	Low	Not Significant/ Not Significant	Dust suppression, night light shielding
KOP P-3	Highway 509 south of project area on BLM lands	Low to Moderate	Moderate to High	Low to Moderate	Background (5-15 miles)	Moderate	Brief. Approximately 1-2 minutes	Low to Moderate	Moderate	Brief views of dust plumes and nightglow of currently permitted mine activities would continue through close of permitted mine actions in 2024.	Low	Subordinate	Low	Low	Adverse but Less Than Significant/ Adverse but Less Than Significant	Dust suppression; shielded night lights	Mining at Section 34 should not be visible, but dust plumes and night glow may increase. Previously permitted mine operations would continue as described under No Action in this viewscape.	Low	Subordinate	Low to Moderate	Low to Moderate	Adverse but Less Than Significant/ Adverse but Less Than Significant	Dust suppression, night light shielding
KOP P-4	Highway 509; foreground view of active mine	Low to Moderate	Low	High	Middleground (1-5 miles)	Moderate	Brief. Approximately 1-2 minutes	Moderate to High	Moderate	Previously permitted mine operations will continue and extend gradually to east towards Section 34. Existing mine activities, including dust plumes, and nightglow will continue through permitted actions to 2024.	Low	Dominant	Low to Moderate	Moderate	Adverse but Less Than Significant/ Adverse but Less Than Significant	Dust suppression; shielded night lights	Mining in Section 34 would be visible. Previously permitted current operations would also continue.	Moderate	Co-dominant	Moderate	Moderate	Adverse but Less Than Significant/Adverse but Less Than Significant	Dust suppression, night light shielding, informational kiosks
KOP P-5	Chaco Canyon National Monument outlier	Low to Moderate	Moderate	Low	Seldom seen (greater than 15 miles)	Low	Varies - typically greater than 5 minutes	Low	Low to Moderate	Night glow, dust plumes, and rail loading structures would be visible in distance from currently permitted mining activities to 2024.	Low	Subordinate	Low	Low	Not Significant/ Not Significant	Dust suppression; shielded night lights	Mining in Section would not be visible. Dust plumes and night glow may increase. Existing mine operations would continue.	Low	Subordinate	Low	Low	Not Significant/ Not Significant	Dust suppression, night light shielding

Table B-2 Notes:

1. Viewpoint Identifier. Unique identification number for viewpoints analyzed.	5. Visibility. Rated from low to high based on field evaluation of several factors, including viewing proximity to project area, seasonal variations, air quality, lighting, screening features (e.g.; vegetation, topography), etc. Ultimately determined by analyst judgement.	9. Overall Viewer Exposure. Summation of Viewer Exposure factors (e.g. 5+6+7+8) and analyst interpretation.	13. Relative Dominance. Rated from subordinate, co-dominant, to dominant. Project dominance is a qualitative assessment made by the analyst and measures the project apparent size in relation to other visible landscape features within the total field of view.
2. Description. Describes the location of the viewpoint and direction of view with reference to roads or other landmarks.	6. Distance Zone. Assigned as foreground (0-1 mile), middleground (1-5 mile) or background (greater than 5 miles) as determined from viewshed mapping.	10. Overall Visual Sensitivity. Summation of Factors 3+4+9 from the Existing Visual Setting and analyst interpretation.	14. Feature Modifications. Rated from low to high and is a qualitative assessment made by the analyst. Describes the extent that existing landscape features are either blocked from view or impaired as a result of the project's scale or location.
3. Viewer Concern. Assigned a rating from low to high based on current concerns at viewpoint. Based on information about the sensitivity of the viewing population, existing land uses or other designations indicating public importance or concern. Ultimately based on analyst judgement.	7. Number of Viewers. Rated from low to high. Number of viewers is generally a qualitative assessment made by the analyst though it can draw from quantitative data such as traffic data.	11.Description of Visual Change. General description of the anticipated change to the viewshed based upon simulations or analyst extrapolation.	15. Overall Visual Change. Summation of Visual Contrast, Project Dominance, and Feature Modification (12+13+14). Determination based on analyst judgment using matrix values.
4. Visual Quality. Visual quality currently existing at viewpoint. Rated from low to high using criteria identified in Table B-3. Ultimately based on analyst judgement.	8. Duration of View. Denotes the relative length of time the view is in sight (e.g.; brief, moderate, extended). Qualitative assessment made by the analyst.	12. Visual Contrast. Rated from low to high. Describes the degree that the anticipated project view would differ from the existing view.	16. Impact Potential. Comparison of the Overall Visual Sensitivity (10) and Overall Visual Change (15) ratings (Table B-4) and analyst judgment. Impact potential is identified without and with mitigation.
			17. Mitigation. Mitigation measures that may be applied to reduce potential significant effects to visual resources from project actions.

Table B-3 Visual Quality Rating Guide

Visual Quality Rating	Visual Quality Criteria
High	• Landscape elements (landforms, vegetative patterns, water characteristics and cultural features) have high visual appeal • Landscape has high degrees of variety, vividness, intactness, harmony, and uniqueness (attributes) • Distinctive landscape that attracts people to view
Moderate-to-High	• Landscape elements have moderate-to-high visual appeal • Landscape attributes have a mix of moderate and high values • Landscape may contain built features that neither complement nor detract from overall visual quality
Moderate	• Landscape elements are moderately appealing • Landscape attributes have common or ordinary values • Landscape may contain discordant built features but they are subordinate
Low-to-Moderate	• Landscape elements have low-to-moderate appeal • Landscape has weak or missing attributes • Landscape may have prominent, though not dominant, discordant built features
Low	• Landscape elements have low-to-no appeal • Landscape is missing some attributes • Landscape is dominated by discordant build features

Table B-4: Visual Resource Impact Potential Ranking Guide

OVERALL VISUAL SENSITIVITY	OVERALL VISUAL CHANGE			
	Low	Low to Moderate	Moderate	Moderate to High
Low	Not Significant	Not Significant	Adverse but Less Than Significant	Adverse but Less Than Significant
Low to Moderate	Not Significant	Adverse but Less Than Significant	Adverse but Less Than Significant	Adverse but Less Than Significant
Moderate	Adverse but Less Than Significant	Adverse but Less Than Significant	Adverse but Less Than Significant	Adverse and Potentially Significant
Moderate to High	Adverse but Less Than Significant	Adverse but Less Than Significant	Adverse and Potentially Significant	Adverse and Potentially Significant
High	Adverse but Less Than Significant	Adverse and Potentially Significant 3	Adverse and Potentially Significant	Significant

Not Significant—may or may not be perceptible but are considered minor in context of existing landscape characteristics and view opportunities.

Adverse but Less Than Significant Impacts—perceived as negative but do not exceed environmental thresholds.

Adverse and Potentially Significant—perceived as negative and may exceed environmental thresholds

Significant—Without mitigation, exceeds environmental thresholds.

Appendix C—Biological Survey Report

Biological Survey Report
Peabody Natural Resources Company
El Segundo Mine Section 34 LBA

Prepared For:

Bureau of Land Management—Farmington Field Office

March 2012

TABLE OF CONTENTS

1. Introduction **1**

2. Project Description **1**

2.1 Location 1

2.2 Disturbance 1

2.3 Previous Disturbance 1

3. Methodology **2**

3.1 Off-Site Methods 2

3.2 On-Site Methods 2

4. Action Area **2**

4.1 Action Area 2

4.2 Physical Description 2

4.3 Biological Description 3

4.4 Specially Designated Areas 4

5. Survey Results **5**

5.1 USFWS Threatened and Endangered Species 5

5.2 BLM Special Management Species 6

6. DISCUSSION **7**

7. CERTIFICATION **10**

8. Literature Cited and References **11**

1. INTRODUCTION

This report describes the potential for U.S. Fish and Wildlife Service (USFWS) and Bureau of Land Management (BLM) threatened, endangered, candidate, and other designated sensitive flora and fauna to occur in the Project and Action areas. The BLM defines the Action Area as any area that may be directly or indirectly impacted by the Proposed Action. This report is prepared in accordance with the BLM's biological survey guidelines and is intended to provide the agency with information to make determinations of effect on species with special conservation status.

2. PROJECT DESCRIPTION

2.1 Location

The project area is located on 640 acres within the permit boundaries of and adjacent to active mining at the El Segundo Mine. The area subject to the Lease by Application (LBA) (Project Area) is located in McKinley County, New Mexico on the Orphan Annie Rock 7.5' USGS topographic quadrangle in Section 34 of Township 17 North and Range 9 West of the New Mexico Principal Meridian (NMPM) (Figure 1).

The nearest small community is Hospah, New Mexico located approximately 2 miles north of the Project Area. The nearest town is Crownpoint, New Mexico located approximately 17 miles west of the Project Area. Highway 509, a public roadway, travels north from Grants, New Mexico through the El Segundo mine lease area. The Project Area would be located on privately owned surface with the mineral estate federally administered by the BLM Farmington Field Office (FFO).

2.2 Disturbance

The Proposed Action is to least the Project Area and to mine its federal coal reserves as a part of the permitted El Segundo Mine. The proposed mining in the Project Area is anticipated to begin in 2014. Total surface disturbance associated with mining in the El Segundo LBA may be up to 640 acres. El Segundo is a terraced, advancing open pit mine. Coal would be recovered from up to nine seams, which range in thickness from 1 to 17 feet. The mining methods employed in the Project Area would be the same as those currently used at the El Segundo Mine and include removal of vegetation, topdressing removal, drilling and blasting of overburden/interburden, excavation of overburden/interburden, drilling and blasting of coal (if necessary), and recovery of coal. Following removal of coal, the Project Area would be reclaimed to the pre-mining land use of rangeland.

The mining activities would utilize existing mine equipment and infrastructure. Noise and vehicle traffic would increase for this area during mining and reclamation activities.

2.3 Previous Disturbance

The Proposed Action would occur on previously undisturbed rangeland. Signs of disturbance observed during the January 2012 field surveys included evidence of exploratory drilling, a two-track dirt road

crossing the central portion of the Project Area, and evidence of livestock grazing, including sign and browsed plants. Total new surface disturbance would be approximately 640 acres.

3. METHODOLOGY

3.1 Off-Site Methods

Prior to conducting fieldwork, Ecosphere Environmental Services (Ecosphere) biologists compiled a list of USFWS and BLM species with special conservation status that occur or have the potential to occur in McKinley County, New Mexico. USFWS listed species (Table 1) were obtained from the USFWS Southwest Region Endangered Species List (USFWS 2010). BLM special status species (Table 2) were compiled from the BLM/FFO Instruction Memorandum (IM) No. IM-NM-200-2008-01 (BLM 2008) and the Farmington Resource Management Plan (BLM 2003).

3.2 On-Site Methods

A pedestrian survey of the Project Area was conducted by biologists from Ecosphere Environmental Services (Ecosphere) on January 18, 2012. The weather was partly cloudy with ambient temperatures near 30° F. Less than 5 percent of the Project Area was covered by snow. All plant and wildlife species and signs of wildlife observed in the project area were recorded and digital photographs of the project area were taken. Binoculars were used to survey for raptors and potential nest habitat. The habitat was evaluated for all USFWS threatened and endangered species and BLM species with special conservation status that have the potential to occur in the Project Area or Action Area (Tables 1 and 2).

4. ACTION AREA

4.1 Action Area

The action area consists of the Project Area and surrounding terrain within a 1-mile radius of the Project Area.

4.2 Physical Description

The Project Area is approximately 3 miles east of the Continental Divide on a gently rolling, southeast facing slope above Inditos Draw. Topography in the Project Area is elevated to the north with a prominent hill and sandstone outcrop with approximately 75 foot rock faces in the northwest corner. A vegetated swale evenly bisects the Project Area, running north to south. Similar swales enter and exit the Project Area near the southwest and southeast corners. The surrounding area includes rock outcrops to the north and east protruding from rolling plains. Dominant surface features surrounding the project area include the 500 foot high cliffs and raised plateau of the Chacra Mesa complex in the northeast, Mt Taylor (11,305 feet in elevation) to the southeast, and the Zuni uplift to the southwest. Elevations in the project area vary slightly from 7,096 feet on the summit of the rock outcrop in the northeast part of the LBA area to approximately 6,900 feet in the southern portion of the project area. Slopes within the

Project Area range from 1 percent to 90 percent at the sandstone outcrop. The average slope is near 5 percent.

The primary geologic formations of the San Juan Basin near the El Segundo mine belong to the Mesa Verde group. The proposed project area surficial geology is dominated by Menefee Formation beds dipping northeast at less than 1 degree (PNRC 2011). Composed of mudstone, shale, and sandstone from the Mesozoic Era, the upper portion of overburden belongs to the Allison Member, while the lower portion is comprised of the coal and shale bearing strata belonging to the Cleary Member. Portions of the project area, on the far eastern and western edges, are comprised of recent unconsolidated surficial alluvium from the upper and middle Quaternary Period (New Mexico Bureau of Geology and Mineral Resources 2003).

The predominant soil mapping unit, the Fajada-Huerfano-Benally complex, comprises 37 percent of the Project Area. The Marionlake-Skyvillage complex and Doak-Shiprock complex soil mapping units each comprise approximately 20 percent of the Project Area. Other soil mapping units that occur in the Project Area include the Starlake Clay (10 percent of the Project Area), Sparank-San Mateo-Zia complex (10 percent of the Project Area), and the Hospah-Skyvillage-Rock Outcrop (1 percent of the Project Area) (NRCS 2001). Small patches of biological soil crusts occur near the rock outcrops in the northeast corner of the Project Area.

Three unnamed ephemeral drainages flow south through the Project Area into the Inditos Arroyo and ultimately into the Rio Puerco 35 miles east of the Project Area. These drainages either originate within the Project Area or just north of the Project Area near the Continental Divide and have little to no channel development in the northern portion of the Project Area. As the drainages flow off the southern portion of the Project Area, they exhibit defined channels that range in width from one to two feet and in depth from one to three inches. No perennial surface water resources in the form of rivers, lakes, ponds or streams, nor any wetlands, springs, or riparian habitats occur within the Project Area.

4.3 Biological Description

Four natural vegetation community types occur within the Project Area including Great Basin desert scrub, desert grassland, juniper savanna, and saltbush (Dick-Peddie et al. 1993, PNRC 2011). Grasses constitute the largest component of each of these communities. The dominant plant species in the Project Area include blue grama (*Bouteloua gracilis*), alkali sacaton (*Sporobolus airoides*), fourwing saltbush (*Atriplex canescens*), broom snakeweed (*Gutierrezia sarothrae*), and James' galleta (*Pleuraphis jamesii*). Scattered one-seed juniper (*Juniperus monosperma*) trees occur in the juniper savanna vegetation communities located in the northern portion of the Project Area. All plant species identified during the pedestrian survey of the Project Area are included as Attachment B.

Ground cover in the Project Area ranges from 50 percent (juniper savanna) to 70 percent (grassland). Grasses comprised approximately 25 percent of the cover in the saltbush and juniper savanna communities, 40 percent in the desert scrub community, and 60 percent in the grassland community. Shrubs constituted approximately 15 percent of the cover in the desert scrub and juniper savanna communities and 30 percent in the saltbush community. Very few shrubs were present in the grassland community. The remainder of the cover consists of bare ground (approximately 50 percent), litter, and

forbs. The vegetation communities within the Project Area are representative of the surrounding vegetation communities.

The Project Area supports a wide diversity of wildlife characteristic of the Great Basin desert scrub, desert grassland, juniper savanna, and saltbush vegetation communities. The El Segundo Mine permit area and the Project Area have been extensively surveyed in compliance with the mine's SMCRA permit (Hawks Aloft 2006-2010, PNRC 2010 subpart 809). During the wildlife monitoring surveys, 99 bird species, 22 mammal species, and seven amphibian and reptile species were recorded in the permit area (PNRC 2010).

Bird species commonly recorded in the grassland, shrub grassland, and juniper savanna vegetation communities within the Project Area include common raven (*Corvus corax*), horned lark (*Eremophila alpestris*), mountain bluebird (*Sialia currucoides*), chipping sparrow (*Spizella passerina*), and loggerhead shrike (*Lanius ludovicianus*) (PNRC 2010). Horned larks and common ravens were observed during the site visit in January 2012. According to Hawks Aloft, nesting habitat for common raven (*Corvus corax*), American kestrel (*Falco sparverius*), ferruginous hawk (*Buteo regalis*), golden eagle (*Aquila chrysaetos*), great-horned owl (*Bubo virginianus*), long-eared owl (*Asio otus*), prairie falcon (*Falco mexicanus*), and red-tailed hawk (*Buteo jamaicensis*) have been documented within six miles of the Project Area. Active nests documented in 2010 within one mile of the Project Area include common raven, American kestrel, ferruginous hawk, and great-horned owl. A common raven nest occurs in the northwestern corner of the Project Area (Hawks Aloft 2006-2010). No raptors were observed in the Project or Action Areas during the field survey.

Mammal species commonly recorded in every habitat within the Project Area include deer mouse (*Peromyscus maniculatus*), northern grasshopper mouse (*Onychomys leucogaster*), Ord's kangaroo rat (*Dipodomys ordii*), and plain's pocket mouse (*Perognathus flavescens*). Black-tailed jackrabbits (*Lepus townsendii*) and desert cottontails (*Sylvilagus auduboni*) were regularly observed during the surveys. These species are likely important prey species to carnivores such as coyotes (*Canis latrans*) and raptors. (PNRC 2010). Mule deer (*Odocoileus hemionus*), pronghorn antelope (*Antilocapra americana*), and elk (*Cervus elaphus*) have been documented in the permit area.

In 1980, a small Gunnison's prairie dog (*Cynomys gunnisoni*) town with 52 burrows was reported within the El Segundo Mine permit area. An intensive search of this and other prairie dog towns in the vicinity of the permit area was conducted for signs of black-footed ferrets (*Mustela nigripes*); none were observed. This area is now being actively mined. Since that time, no prairie dog towns have been observed within the mine permit area including the Project Area (PNRC 2010) nor were any observed during the January 2012 biological survey. Several Ord's kangaroo rat (*Dipodomys ordii*) burrows and unidentified small mammal burrows, inactive and active, were observed scattered throughout the Project Area. A complete list of plants and wildlife observed during the field survey is included as Attachment B.

4.4 Specially Designated Areas

The proposed project site is not located in a specially designated area.

5. SURVEY RESULTS

5.1 USFWS Threatened and Endangered Species

According to the USFWS, there are six federally listed threatened, endangered, or candidate species with potential to occur in McKinley County, New Mexico (USFWS 2010). Table 1 lists these species, their conservation status, habitat associations, and potential to occur in the project or action area. No federally listed species or suitable habitat was identified during the field survey.

Table 1. Species listed by the U.S. Fish and Wildlife Service as Threatened (FT), Endangered (FE), or Candidate (FC) for McKinley County, New Mexico, and the Potential to Occur in the Project or Action Area.

Species	Status	Habitat Associations	Potential Occurrence[1]	Notes
Mammals				
Black-footed ferret (*Mustela nigripes*)	FE	Dependent on prairie dogs and their burrows for food and shelter. Requires medium to large active prairie dog towns greater than 198 acres in size and with more than 20 burrows per 2.5 acres or a complex of towns (two or more towns within 4 miles) (USFWS 2008a).	NP	No prairie dog towns are present in the Project or Action Area.
Birds				
Mexican spotted owl (*Strix occidentalis lucida*)	FT	Nests in caves, cliffs, or trees in steep-walled canyons of mixed conifer forests. Most nests are located on northeast facing slopes between 6,000 and 8,000 feet in elevation.	NP	No nesting habitat is present in the Project or Action Areas.
Southwestern willow flycatcher (*Empidonax traillii extimus*)	FE	Breeds in dense, shrubby riparian habitats, usually in close proximity to surface water or saturated soil. Nesting habitat typically occurs in linear riparian zones greater than 30 feet wide and 2 acres.	NP	No riparian vegetation is present in the Project or Action Area.
Yellow-billed cuckoo (*Coccyzus americanus occidentalis*)	FC	Breeds in riparian woodlands with dense, understory vegetation. Requires habitat patches larger than 5 acres, but rarely nests in habitat patches less than 25 acres.	NP	No riparian vegetation is present in the Project or Action Area.
Fishes				
Zuni bluehead sucker (*Catostomus discobolus*)	FC	Occupy perennial streams and rivers that are shaded and have pool and riffle habitats containing clean, coarse substrates such as gravel, cobbles, boulders, and bedrock.	NP	No perennial streams occur in the Project or Action Area.
Plants				
Zuni fleabane (*Erigeron rhizomatus*)	FT	Barren, detrital clay hillsides with soils derived from shales of the Chinle or Baca formations. Most often found on north- or east-facing slopes in open piñon-juniper woodlands (7,300 to 8,000 feet).	NP	The requisite soils do not occur in the Project or Action Area.

[1] **NP =** Habitat not present and species unlikely to occur.

Source: USFWS 2010

5.2 BLM Special Management Species

Of the 10 species warranted for special management consideration by the BLM/FFO (BLM 2008), the Project and Action Area contain known habitat for ferruginous hawk, golden eagle, and prairie falcon. Habitat is present for burrowing owl (*Athene cunicularia*) and mountain plover (*Charadrius montanus*), but it is unlikely that these species occur in the Project or Action Area. Species listed by the BLM/FFO and their potential to occur in the Project or Action areas are summarized in Table 2. None of the BLM special management species were observed during the field survey; their potential to occur is based on evaluation of the Project and Action Area habitats and the known habitat associations of the listed species.

Table 1. Bureau of Land Management, Farmington Field Office Special Status Species and their Potential to Occur in the Project Area.

Species	Habitat Associations	Presence[1]	Notes
BIRDS			
American peregrine falcon (*Falco peregrinus anatum*)	Rugged terrain with rocky cliffs and canyons (30-1,000+ feet high), adjacent to rivers, lakes, or streams. Urban areas with towers and buildings are also inhabited.	NP	No cliffs near perennial water in Project Area
Bald eagle (*Haliaeetus leucocephalus*)	Nests in forested areas adjacent to large bodies of water.	NP	No large bodies of water in Project Area
Burrowing owl (*Athene cunicularia*)	Rarely dig their own burrows and are typically associated with prairie dog colonies. Will also use kangaroo rat burrows.	NS	Kangaroo rat and other small mammal burrows in Project Area.
Ferruginous hawk (*Buteo regalis*)	Flat or rolling terrain in grasslands, shrub-steppes, and deserts; may occur in the periphery of piñon-juniper or other forests. Badlands. Prefers elevated nest sites (e.g., buttes, utility poles, trees) but also nests on the ground.	K	Known nest in El Segundo Mine permit area approximately 1 mile northwest of Project Area. Project Area contains suitable foraging habitat.
Golden eagle (*Aquila chrysaetos*)	In the west, mostly open habitats in mountainous, canyon terrain. Nests primarily on cliffs and trees.	K	Historic nest occurs less than ¼ mile from the eastern border of the Project Area. Project Area contains suitable foraging habitat.
Mountain plover (*Charadrius montanus*)	Breeds in flat, open grasslands; often associated with prairie dog towns and intensive grazing.	NS	Open grasslands provide suitable habitat, but none have been observed during surveys. Additionally, no prairie dog towns observed in Project Area.
Prairie falcon (*Falco mexicanus*)	Found in arid, open grasslands and shrub-steppe habitats. Prairie falcons require cliffs for nesting.	K	Historic nest occurs 6.5 miles northwest of Project Area. Project Area provides suitable

Species	Habitat Associations	Presence[1]	Notes
			foraging habitat.
Yellow-billed cuckoo (*Coccyzus americanus occidentalis*)	Breeds in riparian woodlands with dense, understory vegetation.	NP	No riparian areas occur in Project Area.
PLANTS			
Aztec gilia (*Aliciella formosa*)	Salt desert scrub communities in soils of the Nacimiento Formation (5,000-6,000 feet).	NP	Project does not contain appropriate geological substrate.
Brack's hardwall cactus (*Sclerocactus cloveriae* ssp. *brackii*)	Sandy clay of the Nacimiento Formation in sparse shadscale scrub (5,000-6,000 feet).	NP	Project Area does not contain appropriate geological substrate.

Source: BLM 2008.

Notes: [1]**K** - Known, documented observation within ; **S** - Habitat suitable and species suspected to occur; **NS** - Habitat suitable but species is not suspected to occur; **NP** - Habitat not present and species unlikely to occur.

6. DISCUSSION

The open grassland and desert scrub vegetation communities found within the Project and Action Area provide suitable foraging habitat for the ferruginous hawk, golden eagle, and prairie falcon. The cliffs in the Action Area provide suitable nesting and roosting habitat for these species. One historic golden eagle nest, two historic prairie falcon nests, and four historic and active ferruginous hawk nests occur within six miles of the Project Area. The closest ferruginous hawk nest occurs just over one mile west of the Project Area (Hawks Aloft 2010). Golden eagles, ferruginous hawks, and prairie falcons have been observed during bird surveys in the El Segundo mine permit boundary (PNRC 2010). Given the known nests in the vicinity and the presence of suitable foraging and nesting habitat in the Project and Action Areas, these species likely forage or traverse through the Project Area.

Though no prairie dog burrows occur within the Project or Action Area, the presence of kangaroo rat and other small mammal burrows in the Project Area and vicinity provide suitable habitat for burrowing owls. No burrowing owls have been previously documented in the mine permit area (Hawks Aloft 2006 - 2010) and none were observed during the site visit in January 2012. The grasslands in the Project Area provide suitable habitat for the mountain plover. In 2002, mountain plover surveys were conducted in and near the Project Area. No mountain plovers were identified during the surveys (PNRC 2010). None were observed during the site visit in January 2012.

The direct impacts to BLM/FFO special management species may include habitat loss, alteration, and fragmentation; displacement from the Project Area; incidental mortality from animal-vehicle collisions, vegetation clearing with heavy equipment, or mining activities; and an increase in noise, fugitive dust, and human presence. Indirect impacts may include a change in species composition and abundance in the Project Area once reclamation is complete. Impacts would be high in the short-term during active mining and low to moderate in the long-term after reclamation of the mined area is complete.

A golden eagle nest active in 2006 and two prairie falcon territories active in 2008 have since been abandoned within the El Segundo Mine permit boundary with the progression of active mining operations and have most likely moved to territories beyond the permit area (Hawks Aloft 2006-2010). Active mining of the Project Area would occur just over one mile east of an active ferruginous hawk nest. No

known golden eagle, prairie falcon, or ferruginous hawk nests occur within the Project Area. These species are sensitive to human disturbance, especially during the incubation and early nestling periods when the potential for nest abandonment is the highest (Jasikoff 1982). The Proposed Action would not result in any disturbance or modification of potential raptor nesting habitat. The reclamation of the Project Area to grassland habitat could benefit these species in the long term by providing more suitable foraging habitat, assuming small mammals repopulate the area. Given the abundance of suitable habitat in the area, habitat loss under the Proposed Action may result in impacts to individuals, but would not be expected to result in population level impacts. Impacts are not likely to result in a loss of species viability range-wide.

No adverse impacts to the burrowing owl and mountain plover are anticipated since these species have never been observed within the Project Area or the vicinity (Hawks Aloft 2006-2010, PNRC 2010). The reclamation of the Project Area to grassland habitat may benefit these species in the long term, especially if large expanses of sparse, short vegetation and bare ground occur in the Project Area post-reclamation (Knopf and Miller 1994). The seed mix for revegetation of the Project Area includes grasses such as blue grama and needle-and-thread (*Stipa comata*), both dominant grasses in mountain plover habitat (USFWS 1983).

Direct impacts to wildlife and migratory birds would include habitat loss, alteration, and fragmentation; restrictions on wildlife movement created by fences and mine pits; displacement of wildlife from the Project Area; incidental mortality from animal-vehicle collisions, vegetation clearing with heavy equipment, or mining activities; and an increase in noise, fugitive dust, light pollution, and human presence. These direct impacts would be high in the short term during active mining and low to moderate in the long term after reclamation of the mined area is complete.

Habitat loss, alteration, and fragmentation are inevitable consequences of surface disturbance when vegetation is removed. The Proposed Action would result in the removal of approximately 640 acres of native vegetation. The majority of the vegetation removed would be desert grassland habitat, which supports the lowest species diversity and abundance of the habitats present in the Project Area. No trees would be planted and shrubs may be difficult to reestablish through reclamation activities. Although reclamation of the Project Area would decrease habitat for shrub- and juniper-nesting migratory bird species, grassland-nesting species would benefit with an increase in habitat.

Mine pits and fences could restrict the movement of wildlife, increasing the distance between available habitats and altering patterns of movement. Habitat loss would cause displacement of wildlife including migratory birds, pushing individuals into adjacent habitat that may be occupied or in other ways less suitable. Such displacement can result in competition between displaced and established animals, increased risk of predation, and lower reproductive success of displaced individuals.

The Proposed Action would involve the use of vehicles and heavy equipment in the Project Area, resulting in mortality to individuals. Burrowing animals or animals with limited mobility such as small mammals, reptiles, young mammals and nestling birds would be most impacted. Impacts to migratory birds would be greatest during the breeding season, approximately April 15 to July 15.

Noise, dust, light pollution, and human presence during mining activities could also cause direct impacts to wildlife. Wildlife species tend to avoid humans and associated disturbances. Impacts to wildlife from noise is confounded by multiple variables such as the magnitude and duration of the noise generated,

proximity to the noise source, life history of the species affected, time of year (e.g., breeding vs. non-breeding season), time of day, and the influence of other environmental stressors such as heat and prey availability. Noise can impact wildlife by changing their habitat use and activity patterns, increasing stress, reducing reproductive success, increasing predation risk, degrading communication with conspecifics, and damaging hearing. Species response to noise can range from mild annoyance to panic behavior (Fletcher 1980). Raptor species may avoid areas with increased human presence and noise, potentially altering nesting and roosting sites to avoid disturbances (Larkin 1996). Although no known raptor nests would be destroyed by mining, studies at the mine show that nest abandonment has occurred as the mining activities move toward documented nest sites (Hawks Aloft 2006-2010). The common raven and American kestrel nest sites near the Project Area would likely be abandoned. Ultimately, potential impacts depend upon the sensitivity of the species or individual subjected to the noise.

Fugitive dust generated by mining activities would also directly impact individual wildlife in the vicinity of mining activities by impairing visibility and possibly respiration. Indirectly, dust could reduce cover and forage quality for wildlife species by decreasing plant productivity. Fugitive dust emissions would likely be greatest near mining activities. Light pollution from nighttime lighting may disorient bats, insects, and migratory birds (McGuire and Fenton 2010). Illuminated nights may increase prey detection by nocturnal predators such as owls and bats. Small nocturnal species including deer mice and kangaroo rats may be more susceptible to predation in illuminated areas at night. Alternately, these mammals may reduce their nighttime activities thereby decreasing foraging and mating opportunities (Clarke 1983). Moths and other insects attracted to light sources may increase prey availability to moth-eating bats (Patriarca and Debernardi 2010).

It is important to note that noise events, nighttime lighting, and fugitive dust are part of the environmental baseline in the Project Area from ongoing mining at El Segundo Mine. Deer and elk have continued to occupy the Project Area adjacent to the El Segundo mine active mining operations, suggesting that these animals may have become habituated to noise, dust, and associated human presence disturbances. As the Proposed Action essentially maintains current coal mining, there would be no quantifiable increase in Action Area noise, nighttime lighting, or fugitive dust relative to current conditions. There would be a spatial shift in where the noise and dust is generated incrementally north through the Project Area with a commensurate reduction in noise and dust in areas currently being mined.

Indirect impacts would include a change in wildlife and migratory bird species composition and abundance in the Project Area resulting from reclamation of the Project Area. The juniper savanna would not be reclaimed and the saltbush community may be difficult to reestablish through reclamation activities, though these communities represent a small proportion of the Project Area. Wildlife species associated with these vegetation communities would be replaced by species that are more associated with grassland vegetation communities. These impacts would be low and long term, given the abundance of adjacent similar habitats.

7. CERTIFICATION

Conclusions are based on actual field examinations and are correct to the best of my knowledge.

Signature of Field Biologist: Heidi Hansen Date: 3/23/2012

Heidi Hansen
Ecosphere Environmental Services
776 East 2nd Avenue
Durango, CO 81301
(970) 382-7256

8. LITERATURE CITED AND REFERENCES

Bechard, M.J., R.L. Knight, D.G. Smith, and R.E. Fitzner. 1990. Nest sites and habitats of sympatric hawks (*Buteo* spp.) in Washington. Journal of Field Ornithology 61:159-170.

Bureau of Land Management (BLM). 2008. Special status species management. Instruction Memorandum No. NM-200-2008-001. Bureau of Land Management, Farmington Field Office, Farmington, New Mexico.

BLM. 2003. Farmington proposed resource management plan and final environmental impact statement. Bureau of Land Management, Farmington Field Office, Farmington, NM.

BLM. 1998. Endangered, threatened and sensitive plant field guide. Bureau of Land Management, Albuquerque, NM and Ecosphere Environmental Services, Farmington, NM.

Clarke, J.A. 1983. Moonlight's influence on predator/prey interactions between short-eared owls (*Asio flammeus*) and deer mice (*Peromyscus maniculatus*). Behavioral Ecology and Sociobiology 13:205-209.

Dick-Peddie, D.B., W. H. Moir, and R. Spellenberg. 1993. New Mexico vegetation: past, present and future. University of New Mexico Press, Albuquerque.

Ehrlich, P.R., D.S. Dobkin, and D. Wheye. 1988. The birder's handbook. Simon & Schuster Inc., New York, NY.

Elmore, Francis H. 1976. Shrubs and Trees of the Southwest Uplands. Southwest Parks and Monuments Association. U.S.A.

Fisher, C., D. Pattie, and T. Hartson. 2000. Mammals of the Rocky Mountains. Lone Pine Publishing, Vancouver, BC.

Fletcher, J.L. 1980. Effects of noise on wildlife: a review of relevant literature 1971-1978. Pages 611-620 in J.V. Tobias, G. Jansen, and W.D. Ward, eds. Proceedings of the Third International Congress in Noise as a Public Health Problem. Am. Speech-Language-Hearing Assoc., Rockville, Maryland.

Hawks Aloft, Inc. 2006 – 2010. Annual Raptor Nest Survey Reports, Lee Ranch Coal Co., El Segundo Coal Mine. Prepared for Lee Ranch Coal Co., El Segundo Mine, McKinley County, New Mexico.

Jasikoff, T.M. 1982. Habitat suitability index models: ferruginous hawk. Unpublished report. U.S. Fish and Wildlife Service, Biological Services Program, Fort Collins, CO.

Knopf, F.L. and B.J. Miller. 1994. *Charadrius montanus* – Montane, grassland, or bare-ground plover? Auk 111:504-506.

Larkin, Ronald. 1996. "Effects of Military Noise on Wildlife: A Literature Review." USA CERL Technical Report.

McGuire, L.P. and M.B. Fenton. 2010. Hitting the Wall: Light Affects the Obstacle Avoidance Ability of Free-Flying Little Brown Bats (*Myotis lucifugus*). Acta Chiropterologica 12:247-250.

Natural Resource Conservation Service (NRCS). 2001. Soil Survey of McKinley County Area, New Mexico.

New Mexico Rare Plant Technical Council. 2002. New Mexico rare plants homepage. Version 15. New Mexico Rare Plants Technical Council, Albuquerque, NM. Available at http://nmrareplants.unm.edu.

New Mexico Bureau of Geology and Mineral Resources (NMBGMR). 2003. Geologic Map of NM, 1:500,000. NM Bureau of Geology and Mineral Resources.

Patriarca E. and P. Debernardi. 2010. Bats and Light Pollution. Available online at: http://www.centroregionalechirotteri.org/download/eurobats/Bats%20and%20light%20pollution.pdf. Accessed February 13, 2012.

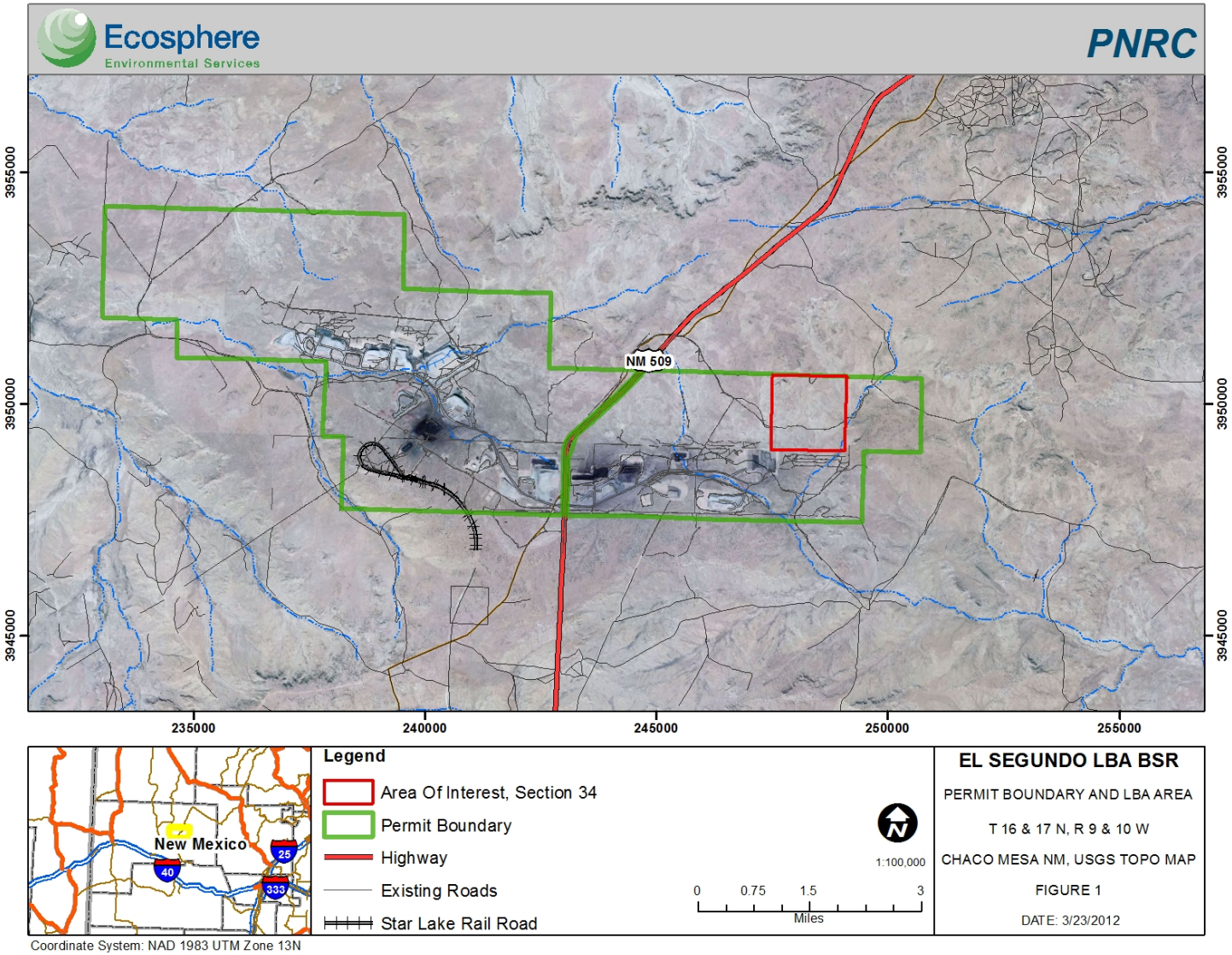
Peabody Natural Resources Company (PNRC). 2010. El Segundo Mine Permit Application Package NM-2010-1 (as revised).

USFWS. 2010. Listed and Sensitive Species in McKinley County. Endangered species lists. U.S. Fish and Wildlife Service, Southwest Region Ecological Services. Available at http://www.fws.gov/southwest/es/NewMexico/SBC_view.cfm?spcnty=McKinley. Accessed on December 19, 2011.

USFWS. 1983. Impacts of Coal Surface Mining on 25 Migratory Bird Species of High Federal Interest. J.S. Armbruster, Ed.

Wheeler, B.K. 2003. Raptors of Western North America. Princeton University Press, Princeton, NJ.

ATTACHMENT A – PROJECT MAP


Ecosphere
Environmental Services
PNRC
NM 509
3955000
3950000
3945000
235000
240000
245000
250000
255000
New Mexico
40
25
333
Legend
Area Of Interest, Section 34
Permit Boundary
Highway
Existing Roads
Star Lake Rail Road
1:100,000
0
0.75
1.5
3
Miles
EL SEGUNDO LBA BSR
PERMIT BOUNDARY AND LBA AREA
T 16 & 17 N, R 9 & 10 W
CHACO MESA NM, USGS TOPO MAP
FIGURE 1
DATE: 3/23/2012
Coordinate System: NAD 1983 UTM Zone 13N

ATTACHMENT B – PLANTS AND WILDLIFE OBSERVED IN THE PROJECT AREA

GRASSES

Achnatherum hymenoides	Indian ricegrass
Bouteloua gracilis	blue grama
Bromus tectorum	cheatgrass
Elymus elymoides	squirreltail
Eremopyrum triticeum	annual wheatgrass
Hesterostipa comata	needle and thread
Muhlenbergia torreyi	ring muhly
Pascopyrum smithii	western wheatgrass
Pleuraphis jamesii	James' galleta
Sporobolus airoides	alkali sacaton
Sporobolus cryptandrus	sand dropseed

HERBACEOUS FORBS

Ambrosia acanthicarpa	flatspine bur ragweed
Asclepias sp.	milkweed
Bassia scoparia	burningbush
Brassica sp.	mustard
Dimorphocarpa wislizeni	touristplant
Eriogonum sp.	buckwheat
Eriogonum leptophyllum	slenderleaf buckwheat
Halogeton glomerotus	saltlover
Helianthus sp.	sunflower
Heterotheca villosa	hairy false goldenaster
Mentzelia albicaulis	whitestem blazingstar
Rumex sp.	dock
Sphaeralcea sp.	scarlet globemallow

SHRUBS

Artemisia bigelovii	Bigelow sagebrush
Artemisia frigida	prairie sagewort
Atriplex canescens	fourwing saltbush
Chrysothamnus viscidiflorus	yellow rabbitbrush
Ephedra torreyana	Torrey's jointfir
Ericameria nauseosa	rubber rabbitbrush
Gutierrezia microcephala	threadleaf snakeweed
Gutierrezia sarothrae	broom snakeweed
Krascheninnikovia lanata	winterfat

CACTI

Coryphantha sp.	beehive cactus
Cylindropuntia whipplei	whipple cholla
Opuntia polyacantha	plains pricklypear

TREES

Juniperus monosperma	oneseed juniper

MAMMALS

Canis latrans	coyote
Cervus elaphus	elk
Dipodomys ordii	Ord's kangaroo rat
Lepus californicus	black-tailed jackrabbit
Neotoma sp.	woodrat
Odocoileus hemionus	mule deer
Sylvilagus audubonii	desert cottontail

BIRDS

Corvus corax	common raven
Eremophila alpestris	horned lark

Appendix D—Air Quality

APPENDIX D

AIR QUALITY RESOURCES

IMPACT ASSESSMENT METHODS AND RESULTS

APPENDIX D - AIR QUALITY RESOURCES

IMPACT ASSESSMENT METHODS AND RESULTS

EL SEGUNDO MINE

D.1 Introduction

OSM authorizes surface coal mining and reclamation activities to provide an opportunity to conduct such activities on a Federal Coal Lease. Two of the criteria which allow OSM to deny a request to conduct mining on a Federal Coal Lease are:

(1) Present surface coal mining and reclamation operations are not in compliance with the environmental protection standards of the SMCRA and the regulatory program; or

(2) The requested renewal substantially jeopardizes the operator's continuing ability to comply with the Act and the regulatory program on existing permit areas.

With respect to air quality protection standards, the predominant consideration with surface coal mining is whether impacts of particulate matter emissions from mining and reclamation activities comply with applicable NAAQS. In addition, air quality impacts due to emissions of nitrogen oxides from blasting and from exhausts of mining equipment and vehicles are frequently evaluated for compliance.

This analysis was prepared to demonstrate mining and reclamation activities in the Section 34 Federal Coal Lease area will comply with the NAAQS for PM_{10}, $PM_{2.5}$ and NO_2.

D.2 Source Representation

The El Segundo Mine has a variety of fugitive and process fugitive particulate sources. The only significant sources of nitrogen oxides are blasting and tailpipe emissions from large mining equipment.

Fugitive emission sources at Section 34 of the El Segundo Mine include excavation, haulage and land reclamation activities. Specifically, overburden removal by dragline, coal removal by shovel or front-end loader, dozer activity on spoil and coal piles, natural wind erosion of disturbed areas and stockpiles, and truck haulage of coal are among the significant activities falling under this category of sources.

Process fugitive emissions include primary crushing, secondary crushing, screening, unloading and loading at the preparation plant. Also included are various conveyor transfer points. However, these operations are located nearly five miles west of Section 34. Emissions from the coal preparation plant are minimally affected by the mining activities in Section 34 as they are a small fraction of total mining activities occurring within El Segundo's permit boundary.

Mining activities at surface coal mines are not fixed at a single location from year-to-year, as they move with progression of the pits, roads, backfill and reclamation areas. Emission rates vary as well with the varying quantities of overburden, disturbed acreages, haul distances, etc., encountered through the Life-of-Mine (LOM). Tables 3.2-1 and 3.2-2 present the operating parameters for the 10 years examined for this analysis. A map depicting mine progression location during the LOM is presented in Figure 3.2-1.

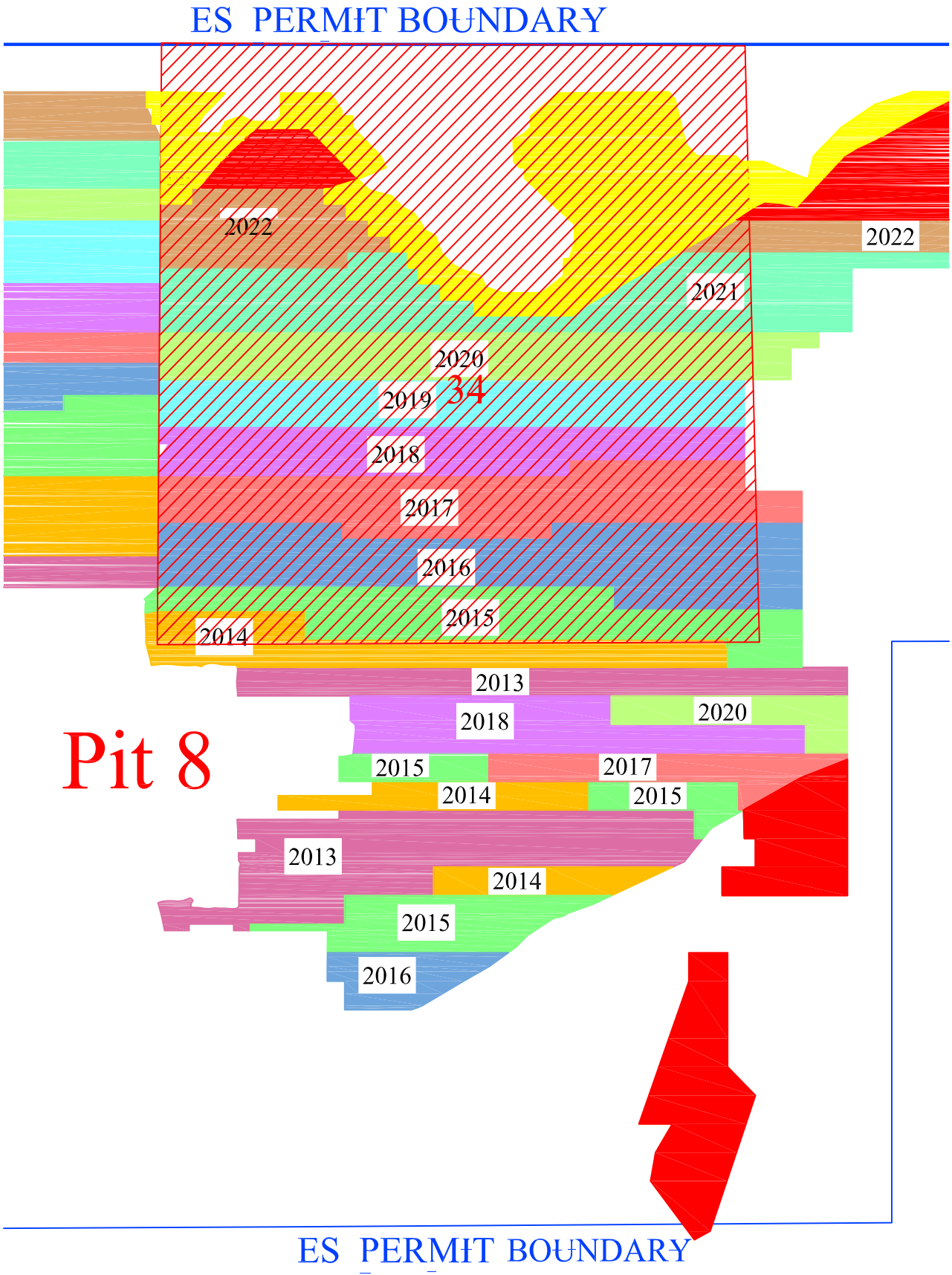
Table 3.2-1
Mine Operating Parameters

	2014	2015	2016	2017	2018
Disturbed Acres	13	43	69	64	47
Topsoil Yards	40,656	137,133	223,608	206,507	151,331
Bank Yards	2,649,391	7,209,900	13,883,486	15,480,746	12,743,997
Cast Yards	147,121	489,968	2,790,092	2,687,710	2,125,943
D11 Dozer Yards	290,799	879,468	1,628,374	1,469,699	1,157,907
Shovel Yards	2,121,577	5,504,021	1,680,204	2,804,182	2,678,656
CAT 994 Loader yards	89,893	336,442	578,622	636,173	664,666
BI 1570 Dragline Yards	-	-	7,206,193	7,882,982	6,116,824
BI 1570 Dragline Rehandle Yards	-	-	851,230	832,657	592,289
BI 1570 Dragline Total Yards	-	-	8,057,424	8,715,639	6,709,113
Total Yards	2,690,047	7,347,033	14,958,324	16,519,910	13,487,617
Tons mined	414,886	850,121	1,278,271	1,280,227	1,016,693
Coal Haul Dist. Ft. - one way	30,509	31,176	31,559	32,168	32,712
Shovel Haul Dist. Ft. - one way	2,020	2,020	2,020	2,020	2,020
Loader Haul Dist. Ft. - one way	750	750	750	750	750
	2019	2020	2021	2022	2023
Disturbed Acres	53	52	65	35	9
Topsoil Yards	169,077	166,173	209,411	111,320	29,040
Bank Yards	16,248,428	19,292,851	14,850,602	8,486,104	1,127,011
Cast Yards	2,375,776	2,297,182	2,606,910	1,434,991	255,370
D11 Dozer Yards	1,275,451	1,186,853	1,427,037	782,646	142,817
Shovel Yards	5,127,370	8,192,154	2,595,577	1,908,589	-
CAT 994 Loader yards	734,095	677,016	716,588	283,906	44,389
BI 1570 Dragline Yards	6,735,736	6,939,647	7,504,490	4,075,972	684,436
BI 1570 Dragline Rehandle Yards	678,590	814,738	890,265	457,504	22,315,565
BI 1570 Dragline Total Yards	7,414,325	7,754,385	8,394,755	4,533,476	23,000,000
Total Yards	17,096,095	20,273,762	15,950,278	9,054,928	23,471,616
Tons mined	1,170,231	1,218,837	1,259,184	609,279	114,997
Coal Haul Dist. Ft. - one way	33,146	33,660	34,022	34,363	34,527
Shovel Haul Dist. Ft. - one way	2,020	2,020	2,020	2,020	2,020
Loader Haul Dist. Ft. - one way	750	750	750	750	750

Table 3.2-2
Equipment Operating Hours

Equipment Description	2014	2015	2016	2017	2018
Dragline Hours	-	--	2,238	2,421	1,864
Shovel Hours	801	2,180	4,437	4,901	4,002
Loader Hours	513	1,229	1,934	2,004	1,779
Haul Truck Hours	6,310	15,524	28,412	30,511	25,114
Dozer Hours	1,174	3,207	5,724	5,364	4,250
Grader Hours	401	1,090	2,219	2,450	2,001
Water Truck Hours	657	1,705	3,186	3,452	2,890
Blasting Explosives Usage (tons/yr)	460	1,215	2,291	2,535	2,082
Equipment Description	**2019**	**2020**	**2021**	**2022**	**2023**
Dragline Hours	2,060	2,154	2,332	1,259	6,389
Shovel Hours	5,072	6,019	4,732	2,686	6,906
Loader Hours	2,011	1,991	2,078	931	165
Haul Truck Hours	30,712	34,942	29,813	15,987	30,197
Dozer Hours	4,795	4,738	5,215	2,808	501
Grader Hours	2,536	3,010	2,366	1,343	3,453
Water Truck Hours	3,542	4,005	3,405	1,809	3,536
Blasting Explosives Usage (tons/yr)	2,637	3,108	2,436	1,377	188

Figure 3.2-1 Mine Progression Map in Section 34



D.3 Emission Estimates - Mining Activities

Emission factors endorsed by the Wyoming Department of Environmental Quality (WDEQ) were used to determine fugitive particulate emissions from the mining activities.[1] A summary of PM_{10} and $PM_{2.5}$ emissions by activity type are provided in Tables 3.3-1 and 3.3-2, respectively. Mine-wide inventories of nitrogen oxides (NO_x), particulate matter < 30 µm in diameter (PM), carbon monoxide (CO), sulfur dioxide (SO2) and volatile organic compounds (VOCs) from vehicle tailpipes and blasting are also presented in Tables 3.3-3 through 3.3-7.

Table 3.3-1
PM_{10} Emission Summary from Mining Activities (tons/yr)

Mining Operation	2014	2015	2016	2017	2018
Drilling (Overburden)	0.36	1.21	1.97	1.82	1.34
Drilling (Coal)	0.05	0.18	0.30	0.27	0.20
Blasting (Overburden)	0.01	0.04	0.07	0.06	0.05
Blasting (Coal)	0.07	0.07	0.04	0.08	0.07
Topsoil Removal	0.53	1.79	2.92	2.69	1.97
Overburden Removal (Dragline)	0.00	0.00	36.26	39.22	30.19
Overburden Removal (Shovel)	9.07	23.53	7.18	11.99	11.45
Shovel Haul	0.37	0.96	0.29	0.49	0.47
Loader Haul	0.07	0.26	0.45	0.49	0.51
Coal Haul Roads	1.44	3.02	4.60	4.70	3.79
Dozers and Loaders	0.63	1.67	2.88	2.77	2.27
Graders	0.75	2.04	4.16	4.59	3.75
Water Trucks	0.33	0.85	1.59	1.73	1.44
Wind Erosion - Disturbed Area	1.12	3.78	6.17	5.70	4.17
	14.81	**39.41**	**68.88**	**76.60**	**61.68**

Table 3.3-1 (Continued)
PM_{10} Emission Summary from Mining Activities (tons/yr)

Mining Operation	2019	2020	2021	2022	2023
Drilling (Overburden)	1.49	1.47	1.85	0.98	0.26
Drilling (Coal)	0.22	0.22	0.28	0.15	0.04
Blasting (Overburden)	0.05	0.05	0.06	0.06	0.03
Blasting (Coal)	0.06	0.08	0.06	0.06	0.03
Topsoil Removal	2.21	2.17	2.73	1.45	0.38
Overburden Removal (Dragline)	33.36	34.89	37.78	20.40	103.50
Overburden Removal (Shovel)	21.92	35.02	11.10	8.16	0.00
Shovel Haul	0.89	1.42	0.45	0.33	0.00
Loader Haul	0.57	0.52	0.55	0.22	0.03
Coal Haul Roads	4.43	4.68	4.89	2.39	0.45
Dozers and Loaders	2.56	2.53	2.74	1.41	0.25
Graders	4.75	5.64	4.43	2.52	6.47
Water Trucks	1.77	2.00	1.70	0.90	1.77
Wind Erosion - Disturbed Area	4.68	4.58	5.78	3.07	0.80
	78.97	**95.29**	**74.41**	**42.07**	**113.99**

[1] Collins, Charles A., "Fugitive Dust Emission Factors," Wyoming Department of Environmental Quality, Jan. 1979.

Table 3.3-2
$PM_{2.5}$ Emission Summary from Mining Activities (tons/yr)

Mining Operation	2014	2015	2016	2017	2018
Drilling (Overburden)	0.04	0.12	0.20	0.18	0.13
Drilling (Coal)	0.01	0.02	0.03	0.03	0.02
Blasting (Overburden)	0.00	0.00	0.00	0.00	0.00
Blasting (Coal)	0.00	0.00	0.00	0.00	0.00
Topsoil Removal	0.08	0.27	0.44	0.40	0.30
Overburden Removal (Dragline)	0.00	0.00	5.44	5.88	4.53
Overburden Removal (Shovel)	1.36	3.53	1.08	1.80	1.72
Shovel Haul	0.04	0.10	0.03	0.05	0.05
Loader Haul	0.01	0.03	0.04	0.05	0.05
Coal Haul Roads	0.14	0.30	0.46	0.47	0.38
Dozers and Loaders	0.35	0.92	1.58	1.52	1.25
Graders	0.08	0.20	0.42	0.46	0.37
Water Trucks	0.03	0.09	0.16	0.17	0.14
Wind Erosion - Disturbed Area	0.17	0.57	0.93	0.85	0.63
	2.30	**6.14**	**10.81**	**11.88**	**9.57**

Table 3.3-2 (Continued)
$PM_{2.5}$ Emission Summary from Mining Activities (tons/yr)

Mining Operation	2019	2020	2021	2022	2023
Drilling (Overburden)	0.15	0.15	0.18	0.10	0.03
Drilling (Coal)	0.02	0.02	0.03	0.01	0.00
Blasting (Overburden)	0.00	0.00	0.00	0.00	0.00
Blasting (Coal)	0.00	0.00	0.00	0.00	0.00
Topsoil Removal	0.33	0.33	0.41	0.22	0.06
Overburden Removal (Dragline)	5.00	5.23	5.67	3.06	15.53
Overburden Removal (Shovel)	3.29	5.25	1.66	1.22	0.00
Shovel Haul	0.09	0.14	0.05	0.03	0.00
Loader Haul	0.06	0.05	0.06	0.02	0.00
Coal Haul Roads	0.44	0.47	0.49	0.24	0.05
Dozers and Loaders	1.41	1.39	1.51	0.77	0.14
Graders	0.48	0.56	0.44	0.25	0.65
Water Trucks	0.18	0.20	0.17	0.09	0.18
Wind Erosion - Disturbed Area	0.70	0.69	0.87	0.46	0.12
	12.15	**14.50**	**11.54**	**6.49**	**16.74**

Table 3.3-3
NO_X Emission Summary from Mining Activities (tons/yr)

Equipment Description	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Drills	0.29	0.99	1.61	1.49	1.09	1.22	1.20	1.51	0.80	0.21
Shovels	0.68	1.84	3.75	4.14	3.38	4.29	5.09	4.00	2.27	5.84
Loaders	0.48	1.16	1.83	1.89	1.68	1.90	1.88	1.96	0.88	0.16
Haul Trucks	13.14	32.34	59.18	63.55	52.10	63.97	72.78	62.10	33.30	62.90
Dozers	2.45	6.68	11.92	11.17	8.85	9.99	9.87	10.86	5.85	1.04
Graders	0.14	0.39	0.79	0.87	0.71	0.90	1.07	0.84	0.48	1.23
Water Trucks	1.37	3.55	6.64	7.19	6.02	7.38	8.34	7.09	3.77	7.36
Blasting	3.91	10.33	19.47	21.55	17.69	22.41	26.42	20.71	11.70	1.59
	22.47	**57.28**	**105.20**	**111.86**	**91.54**	**112.07**	**126.66**	**109.08**	**59.05**	**80.34**

Table 3.3-4
PM Emission Summary from Mining Activities (tons/yr)

Equipment Description	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Drills	0.02	0.08	0.13	0.12	0.09	0.10	0.10	0.12	0.07	0.02
Shovels	0.06	0.15	0.31	0.34	0.28	0.35	0.42	0.33	0.19	0.48
Loaders	0.04	0.11	0.17	0.17	0.15	0.17	0.17	0.18	0.08	0.01
Haul Trucks	0.81	1.99	3.64	3.91	3.20	3.93	4.47	3.82	2.05	3.87
Dozers	0.15	0.41	0.73	0.69	0.54	0.61	0.61	0.67	0.36	0.06
Graders	0.01	0.03	0.07	0.07	0.06	0.08	0.09	0.07	0.04	0.11
Water Trucks	0.08	0.22	0.41	0.44	0.37	0.45	0.51	0.44	0.23	0.45
Blasting	0.28	0.37	0.37	0.47	0.40	0.36	0.43	0.43	0.31	0.14
	2.45	**3.36**	**5.82**	**6.21**	**5.10**	**6.07**	**6.80**	**6.05**	**3.32**	**5.13**

Table 3.3-5
CO Emission Summary from Mining Activities (tons/yr)

Equipment Description	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Drills	0.12	0.40	0.64	0.60	0.44	0.49	0.48	0.60	0.32	0.08
Shovels	0.27	0.74	1.50	1.65	1.35	1.71	2.03	1.60	0.91	2.33
Loaders	0.15	0.35	0.55	0.57	0.51	0.58	0.57	0.59	0.27	0.05
Haul Trucks	5.66	13.93	25.49	27.37	22.44	27.55	31.34	26.74	14.34	27.09
Dozers	1.05	2.88	5.13	4.81	3.81	4.30	4.25	4.68	2.52	0.45
Graders	0.03	0.08	0.17	0.19	0.15	0.19	0.23	0.18	0.10	0.26
Water Trucks	0.59	1.53	2.86	3.10	2.59	3.18	3.59	3.05	1.62	3.17
Blasting	15.43	40.71	76.75	84.92	69.74	88.34	104.11	81.60	46.13	6.28
	23.29	**60.60**	**113.09**	**123.20**	**101.02**	**126.33**	**146.60**	**119.05**	**66.20**	**39.71**

Table 3.3-6
SO_2 Emission Summary from Mining Activities (tons/yr)

Equipment Description	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Drills	0.08	0.27	0.43	0.40	0.29	0.33	0.32	0.41	0.22	0.06
Shovels	0.18	0.49	1.01	1.11	0.91	1.15	1.37	1.07	0.61	1.57
Loaders	0.05	0.11	0.18	0.18	0.16	0.18	0.18	0.19	0.08	0.02
Haul Trucks	1.43	3.52	6.45	6.93	5.68	6.97	7.93	6.77	3.63	6.85
Dozers	0.27	0.73	1.30	1.22	0.96	1.09	1.08	1.18	0.64	0.11
Graders	0.02	0.05	0.10	0.11	0.09	0.11	0.13	0.10	0.06	0.15
Water Trucks	0.15	0.39	0.72	0.78	0.66	0.80	0.91	0.77	0.41	0.80
Blasting	0.001	0.004	0.007	0.008	0.006	0.008	0.009	0.007	0.004	0.001
	2.17	**5.56**	**10.19**	**10.74**	**8.75**	**10.64**	**11.92**	**10.50**	**5.65**	**9.56**

Table 3.3-7
VOC Emission Summary from Mining Activities (tons/yr)

Equipment Description	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Drills	0.03	0.09	0.15	0.13	0.10	0.11	0.11	0.14	0.07	0.02
Shovels	0.06	0.17	0.34	0.37	0.30	0.39	0.46	0.36	0.20	0.52
Loaders	0.06	0.15	0.24	0.25	0.22	0.25	0.25	0.26	0.12	0.02
Haul Trucks	0.61	1.49	2.73	2.93	2.40	2.95	3.35	2.86	1.53	2.90
Dozers	0.11	0.31	0.55	0.51	0.41	0.46	0.45	0.50	0.27	0.05
Graders	0.01	0.02	0.04	0.05	0.04	0.05	0.06	0.05	0.03	0.07
Water Trucks	0.06	0.16	0.31	0.33	0.28	0.34	0.38	0.33	0.17	0.34
Blasting	0.21	0.55	1.03	1.14	0.94	1.19	1.40	1.10	0.62	0.08
	1.15	**2.94**	**5.38**	**5.72**	**4.69**	**5.73**	**6.47**	**5.59**	**3.02**	**4.00**

Total estimated emissions of individual hazardous air pollutants from tailpipe exhaust for each mining year and total estimated hazardous air pollutant emissions are presented in Table 3.3-8.

Table 3.3-8
Hazardous Air Pollutant Emission Summary from Mining Activities (tons/yr)

Hazardous Air Pollutant	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Benzene	0.0031	0.0078	0.0143	0.0153	0.0125	0.0153	0.0172	0.0149	0.0080	0.0107
Toluene	0.0013	0.0034	0.0063	0.0067	0.0055	0.0067	0.0076	0.0065	0.0035	0.0047
Xylenes	0.0009	0.0024	0.0044	0.0047	0.0038	0.0047	0.0053	0.0046	0.0025	0.0033
Formaldehyde	0.0039	0.0099	0.0182	0.0194	0.0159	0.0194	0.0219	0.0189	0.0102	0.0136
Acetaldehyde	0.0025	0.0064	0.0118	0.0125	0.0103	0.0126	0.0142	0.0122	0.0066	0.0088
Naphthalene	0.0003	0.0057	0.0108	0.0119	0.0098	0.0124	0.0146	0.0115	0.0065	0.0009
Total HAP Emissions	**0.0120**	**0.0358**	**0.0658**	**0.0705**	**0.0577**	**0.0710**	**0.0808**	**0.0686**	**0.0373**	**0.0418**

Per the Mandatory Greenhouse Gas (GHG) Reporting Rule, GHG emissions were estimated for mining operations in 2012. A summary of GHG emission estimates is presented in Table 3.3-9.

Table 3.3-9
Greenhouse Gas Emissions from Mining Activities – 2012 (tons/yr)

Total CO_{2e}	Total CO_2			Total CH_4 (GWP 21)			Total N_2O (GWP 310)			Total CH_4 – Coal Mining	
All	Electricity	Mobile Fuel	Facility Fuel	Electricity	Mobile Fuel	Facility Fuel	Electricity	Mobile Fuel	Facility Fuel	Surface Mining	Post Mining
155,635	**9,623**	**80,840**	**2.2**	**2.69**	**98.9**	**0.001**	**40.821**	**1,107.7**	**0.012**	**54,895**	**9,024**

Detailed summary tables on development of emission estimates including emission factor references, operating assumptions and engineering assumptions are presented in Attachment D-1.

D.4 Significance of Section 34 Emissions From Mining/Reclamation Activities

The assessment of air-quality impacts is based on an emissions inventory of predominant criteria pollutant emissions from Section 34 mining operations at the El Segundo Mine and previously monitored ambient air quality from mining operation emissions in other areas within the permit boundary.

The analysis in this Environmental Assessment (EA) is based on assessing the relative significance of emissions estimated from Section 34 mining operations compared to mining operations in other parts of the El Segundo permit boundary. 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 Section 34 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. Detailed summary tables of regional air quality are presented in Attachment D-2. A map showing the relative location of Section 34 to the mine property boundary is also presented in Attachment D-2.

D.5 Air Quality Impacts Correlated with Emissions and Proximity to Ambient Air

A fundamental principle of air quality analysis is that the ambient air concentration of an air pollutant discharged from a source is proportional to the rate at which that pollutant is emitted from that source. Total fugitive PM_{10} and $PM_{2.5}$ emissions estimated in Tables 3.3-1 and 3.3-2 for each year of the LOM are quite small when compared to estimated fugitive PM_{10} and $PM_{2.5}$ emissions for a typical surface coal mine. Maximum mining year emissions are estimated for 2023 when coal mining is nearly completed in Section 34 and a significantly larger volume of overburden than prior mining years (i.e., nearly twice the amount during the next highest year in 2020) is handled. Total estimated PM_{10} and $PM_{2.5}$ emissions for 2023 are 114.0 and 16.7 tpy, respectively, 20% greater than the total emissions estimated in 2020. Impacts during LOM years when coal is mined at near peak production (i.e., 2015 – 2021) would be smaller because total PM_{10} emissions range from 39 to 95 tpy. Total $PM_{2.5}$ emissions will range from only 6 to 15 tpy.

The ambient air concentration of an air pollutant from a source is also highly dependent upon proximity of its emissions to the ambient air boundary. Figure 3.2-1 shows that initial mining operations in 2014 in Section 34 are nearly one mile (i.e., 1,610 meters) from the northern permit boundary and more than one mile from the southern permit boundary. Because Section 34 is one section west of the eastern boundary of the permit boundary, the nearest eastern ambient air boundary will be at least one mile from mining

operations in Section 34. As mining progresses northward during the LOM, the nearest distance to the northern ambient air boundary will be approximately 300 meters during reclamation activities conducted in 2023. Therefore, Section 34 mining operations during the LOM will range from 300 to 1,600 meters from the nearest ambient air boundary.

D.6 Qualitative Impact Assessment

As described in Section D.3, emission inventories for PM_{10} and $PM_{2.5}$ were developed for the coal mining operations in Section 34 using emission factors endorsed the WDEQ and operational parameters provided by PNRC. Mine-wide inventories of nitrogen oxides (NO_x), carbon monoxide (CO), sulfur dioxide (SO_2), and volatile organic compounds (VOCs) from vehicle tailpipes and blasting were also developed based on emission factors from Volume II of AP-42 for mobile sources. A qualitative assessment of PM_{10}, $PM_{2.5}$, NO_2 , CO, SO_2 and VOC impacts are presented below.

D.6.1 PM_{10} and $PM_{2.5}$

Table D-7 in Section D.2.7 shows monitored annual average PM_{10} concentrations at three sites (i.e., SHO-1, SHO-2 and SHO-3) in vicinity of nearby mining operations during 2008 – 2010 ranging from 19 to 33 $\mu g/m^3$. The only exception was the 2010 average at SHO-3, highly biased by a small number of 24-hour events with high winds and transport of off-site wind erosion combined with drought-like conditions. Fugitive particulate matter emissions from mining operations during these years were comparable to those expected during the Section 34 LOM mining years.

Section 34 mining will occur in one of 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. Therefore, annual PM_{10} and $PM_{2.5}$ emissions from Section 34 during the LOM will be only a small fraction of total PM_{10} and $PM_{2.5}$ fugitive emissions occurring from all El Segundo Mine mining areas. Because of the relatively small annual fugitive PM_{10} and $PM_{2.5}$ emissions expected from Section 34 and the distance from the nearest ambient air boundary will be at least 300 meters away (more typically 1,000 to 1,600 meters), anticipated PM_{10} and $PM_{2.5}$ impacts would not be expected to exceed applicable NAAQS. 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 most recent modeling for PM_{10} and $PM_{2.5}$ at El Segundo Mine was for the coal preparation plant in 2009. Total modeled PM_{10} and $PM_{2.5}$ emissions were 26.3 and 7.1 tpy, respectively. The nearest ambient air boundary to the coal preparation plant was approximately 2,000 meters away. Maximum modeled PM_{10} and $PM_{2.5}$ impacts were considerably below their 24-hour and annual NAAQS and were no more than about ten percent of the NAAQS. Estimated emissions for the coal preparation plant are approximately one-half of the estimated annual PM_{10} and $PM_{2.5}$ fugitive emissions from Section 34. Although the nearest ambient air boundary to Section 34 is about one-half of the distance modeled for the coal preparation plant, the increase in modeled impacts would not be sufficient to approach the PM_{10} and $PM_{2.5}$ NAAQS.

D.6.2 NO_2

The current NAAQS for NO_2 is 188 $\mu g/m^3$ for the one-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 NO_x emissions estimated from mining equipment tailpipes and blasting range from 22.5 to 126.7 tpy for each mining year during the LOM. The release height of these emission sources will be elevated, rather than ground-level, because of buoyancy associated with tailpipe emissions and mechanical turbulence associated with blasting. This source characteristic in combination with the relatively small NO_x estimated emissions and distance to nearest ambient air boundary would be expected to result in NO_2 ambient air impacts not exceeding the 1-hour NAAQS.

D6.3 CO, SO_2 and VOC

Tables 3.3-5 through 3.3-7 present tailpipe and blasting emissions for CO, SO_2 and VOC. 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 one-hour and three-hour averaging periods, respectively. The SO2 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 eight-hour averaging period.

Total CO emissions from tailpipe and blasting range from 23.3 to 146.9 tpy for each mining year during the LOM. These emissions are similar to estimated NOx emissions. However, the CO NAAQS are much higher than the 1-hour NO2 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 SO2 emissions are only ten percent of the estimated NOx 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. The insignificance of these emissions would also be expected to result in ozone impacts well below the eight-averaged NAAQS of 0.08 ppm or 157 µg/m^3.

D.7 Summary

Mining operations in Section 34 will result in emissions that are relatively small when compared to total fugitive emissions from the El Segundo Mine. The distance to the nearest ambient air boundary will be at least 300 meters and will more typically range from 1,000 to 1,600 meters. Consequently, ambient air impacts due to the Section 34 mining operations will not approach or exceed applicable NAAQS for PM_{10}, $PM_{2.5}$ and NO_2. Similarly, tailpipe and blasting emissions from mining operations in Section 34 will also relatively small compared to corresponding from the El Segundo Mine. Therefore, ambient air impacts from tailpipe and blasting emissions will not approach or exceed applicable NAAQS for CO, SO_2 and VOCs as ozone. In summary, qualitative analyses of expected ambient air impacts from mining operations in Section 34 demonstrate that El Segundo's ability to comply with the NAAQS based on estimated emissions and proximity to the ambient air boundary will not be jeopardized.

D.8 Mitigation

For obvious reasons, fugitive dust controls at El Segundo focus on those substantive sources of particulate emissions which typically contribute the most to ambient levels of that pollutant, e.g., draglines, shovels and haul roads. Accordingly, design of the particulate monitoring network focuses on a general orientation of ambient monitors upwind and downwind of those activities which constitute major dust

sources. Differences in measured upwind and downwind concentrations provide a relative indication of the "emissions strength" of the subject activities and success of the dust control practices being employed at those activities. Downwind measured concentrations likewise suggest whether ambient impacts from those activities might possibly cause or contribute to exceedances of the ambient standards. Should monitoring data indicate the effectiveness of associated control practices for fugitive dust is inadequate, PNRC can enhance the scope and frequency of its dust control measures as appropriate to further reduce downwind, ambient particulate concentrations.

The fugitive dust control plan for El Segundo currently utilizes the following activities, practices and equipment to ensure that the mining operations do not result in a pattern of ambient impacts in excess of the applicable NAAQS:

- Exposed surface areas are protected and stabilized to control erosion and attendant fugitive dust by timely revegetation, stabilization of topsoil stockpiles, and revegetation management;
- Rills and gullies which form in regraded and topsoiled areas are filled, regraded or otherwise stabilized;
- Exposed surface areas are minimized to the extent practicable;
- Before or during loading, shot coal is watered as necessary;
- The drop height from earth excavating equipment is minimized to the extent feasible;
- Haulage and ancillary mine roads are watered at frequencies dependent upon the amount and timing of use, condition of the roads, and the amount of dust observed when in use;
- Frequently used haul roads and light-duty roads are chemically treated at least twice per year with a dust suppressant (35% magnesium chloride or equivalent at a chemical-to-water ratio of approximately 5:1);
- Magnesium chloride is stored year-round on site for use in spot treatment of roads, when necessary;
- Some light-duty roads and parking lots are paved;
- Haul truck speeds are mechanically limited to 30 mph, and all other vehicles are limited to 45 mph, or as posted;
- Spoil and coal fires are suppressed and extinguished as soon as reasonably and safely possible;

In summary, El Segundo implements fugitive dust control measures as necessary to ensure that environmental requirements associated with fugitive dust and ambient standards are satisfied. A comprehensive meteorological and ambient PM_{10} monitoring program at El Segundo is used to determine the effectiveness of those dust control practices. Should monitoring data indicate that ambient particulate standards are being threatened by impacts from mining operations, El Segundo can adjust the nature, extent and frequency of its various, available dust control measures as necessary to reduce those impacts in order to maintain compliance with the applicable NAAQS.

El Segundo Mine Fugitive Dust PM_{10} Emission Calculations
Using Wyoming Emission Factors Where Available

Mining Operation	Operations Parameter Units	Operations Parameters by Year									
		2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Drilling (Overburden)	holes/yr	1,840	6,207	10,121	9,347	6,850	7,653	7,522	9,479	5,039	1,314
Drilling (Coal)	holes/yr	1,631	5,502	8,972	8,286	6,072	6,784	6,668	8,402	4,467	1,165
Blasting (Overburden)	blasts/yr	2	7	12	11	8	9	9	11	6	2
Blasting (Coal)	blasts/yr	18	18	11	20	19	15	20	16	15	8
Topsoil Removal	tons/yr	60,984	205,700	335,412	309,760	226,996	253,616	249,260	314,116	166,980	43,560
Overburden Removal (Dragline)	yd^3/yr	0	0	8,057,424	8,715,639	6,709,113	7,414,325	7,754,385	8,394,755	4,533,476	23,000,000
Overburden Removal (Shovel)	tons/yr	4,030,996	10,457,641	3,192,388	5,327,945	5,089,447	9,742,004	15,565,093	4,931,597	3,626,319	0
Shovel Haul	VMT/yr	7,379	19,143	5,844	9,753	9,316	17,833	28,492	9,027	6,638	0
Loader Haul	VMT/yr	1,386	5,189	8,924	9,811	10,251	11,321	10,441	11,051	4,378	685
Coal Haul	VMT/yr	19,256	40,318	61,368	62,648	50,593	59,006	62,410	65,170	31,849	6,040
Dozers and Loaders	hr/yr	1,687	4,436	7,658	7,367	6,029	6,806	6,730	7,292	3,739	666
Graders	hr/yr	401	1,090	2,219	2,450	2,001	2,536	3,010	2,366	1,343	3,453
Water Trucks	VMT/yr	6,568	17,049	31,856	34,522	28,901	35,417	40,053	34,046	18,088	35,357
Wind Erosion - Disturbed Area	acres	13	43	69	64	47	53	52	65	35	9

Mining Operation	PM_{10} Emission Factor Equations	Control Factor %	Uncontrolled PM_{10} Emission Factor	Units	Annual Controlled PM_{10} Emissions (tons/yr)									
					2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Drilling (Overburden)[1]	1.3 * 0.3		0.3900	lb/hole	0.36	1.21	1.97	1.82	1.34	1.49	1.47	1.85	0.98	0.26
Drilling (Coal)[1]	0.22 * 0.3		0.0660	lb/hole	0.05	0.18	0.30	0.27	0.20	0.22	0.22	0.28	0.15	0.04
Blasting (Overburden)[2]	50 * 0.75 * 0.3		11.2500	lb/blast	0.01	0.04	0.07	0.06	0.05	0.05	0.05	0.06	0.03	0.01
Blasting (Coal)[2]	35 * 0.75 * 0.3		7.8750	lb/blast	0.07	0.07	0.04	0.08	0.07	0.06	0.08	0.06	0.06	0.03
Topsoil Removal[1]	0.058*0.3		0.0174	lb/ton	0.53	1.79	2.92	2.69	1.97	2.21	2.17	2.73	1.45	0.38
Overburden Removal (Dragline)[2]	0.04 * 0.75 * 0.3		0.0090	lb/yd^3	0.00	0.00	36.26	39.22	30.19	33.36	34.89	37.78	20.40	103.50
Overburden Removal (Shovel)[2]	0.02 * 0.75 * 0.3		0.0045	lb/ton	9.07	23.53	7.18	11.99	11.45	21.92	35.02	11.10	8.16	0.00
Shovel Haul[2]	0.81*s*(S/30) * C * 0.62 * 0.3		0.1000	lb/VMT	0.37	0.96	0.29	0.49	0.47	0.89	1.42	0.45	0.33	0.00
Loader Haul[2]	0.81*s*(S/30) * C * 0.62 * 0.3		0.1000	lb/VMT	0.07	0.26	0.45	0.49	0.51	0.57	0.52	0.55	0.22	0.03
Coal Haul Roads[2]	0.81*s*(S/30) * C * 0.62 * 0.3	50	0.3000	lb/VMT	1.44	3.02	4.60	4.70	3.79	4.43	4.68	4.89	2.39	0.45
Dozers and Loaders[3]	$1.0*s^{1.5}/M^{1.4}*0.75$		0.7528	lb/hr	0.63	1.67	2.88	2.77	2.27	2.56	2.53	2.74	1.41	0.25
Graders[2]	32 * C * 0.3	50	7.4959	lb/hr	0.75	2.04	4.16	4.59	3.75	4.75	5.64	4.43	2.52	6.47
Water Trucks[2]	0.81*s*(S/30) * C * 0.62 * 0.3	50	0.2000	lb/VMT	0.33	0.85	1.59	1.73	1.44	1.77	2.00	1.70	0.90	1.77
Wind Erosion - Disturbed Area[1]	0.38 * C * 0.3		0.0890	ton/acre/year	1.12	3.78	6.17	5.70	4.17	4.68	4.58	5.78	3.07	0.80
					14.81	**39.41**	**68.88**	**76.60**	**61.68**	**78.97**	**95.29**	**74.41**	**42.07**	**113.99**

Mining Operation	24-Hr Controlled PM_{10} Emissions (lb/hr)									
	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Drilling (Overburden)[1]	0.10	0.35	0.58	0.53	0.39	0.44	0.43	0.54	0.29	0.07
Drilling (Coal)[1]	0.02	0.05	0.09	0.08	0.06	0.07	0.06	0.08	0.04	0.01
Blasting (Overburden)[2]	0.00	0.01	0.02	0.02	0.01	0.02	0.01	0.02	0.01	0.00
Blasting (Coal)[2]	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.01
Topsoil Removal[1]	0.16	0.52	0.85	0.79	0.58	0.65	0.63	0.80	0.42	0.11
(Dragline)[2]	0.00	0.00	10.60	11.47	8.83	9.76	10.20	11.05	5.97	30.26
Overburden Removal (Shovel)[2]	2.65	6.88	2.10	3.51	3.35	6.41	10.24	3.24	2.39	0.00
Shovel Haul[2]	0.11	0.28	0.09	0.14	0.14	0.26	0.42	0.13	0.10	0.00
Loader Haul[2]	0.02	0.08	0.13	0.14	0.15	0.17	0.15	0.16	0.06	0.01
Coal Haul Roads[2]	0.42	0.88	1.35	1.37	1.11	1.29	1.37	1.43	0.70	0.13
Dozers and Loaders[3]	0.19	0.49	0.84	0.81	0.66	0.75	0.74	0.80	0.41	0.07
Graders[2]	0.22	0.60	1.22	1.34	1.10	1.39	1.65	1.30	0.74	1.89
Water Trucks[2]	0.10	0.25	0.47	0.50	0.42	0.52	0.59	0.50	0.26	0.52
Wind Erosion - Disturbed Area[1]	0.33	1.11	1.80	1.67	1.22	1.37	1.34	1.69	0.90	0.23
	4.33	**11.52**	**20.14**	**22.40**	**18.04**	**23.09**	**27.86**	**21.76**	**12.30**	**33.33**

Constants:	
Wind speed, U (mph)[4] =	11.7
Water truck average speed, S (mph)=	10.0
Haul truck average speed, S (mph)=	15.0
Shovel and Loader average speed, S (mph)=	5.0
Number of wet days, W (> 0.01")=	80
C = ((365-W)/365) =	0.781
Silt content of road bed, s (%) =	5.1
Overburden silt content s (%) =	6.9
Overburden moisture content M (%) =	7.9
Overburden density (tons/yd^3) =	1.9
Topsoil density (tons/yd^3) =	1.5

[1] Emission Factor Equation from AP-42 Table 11.9-4, July 1998.
[2] Emission Factor Equation from Wyoming Fugitive Dust Emission Factors, January 1979.
[3] Emission Factor Equation from AP-42 Table 11.9-1, July, 1998.
[4] Wind speed value is from 2005 on-site meteorological data

El Segundo Mine Fugitive Dust $PM_{2.5}$ Emission Calculations
Using Wyoming Emission Factors Where Available

Mining Operation	Operations Parameter Units	Operations Parameters by Year 2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Drilling (Overburden)	holes/yr	1,840	6,207	10,121	9,347	6,850	7,653	7,522	9,479	5,039	1,314
Drilling (Coal)	holes/yr	1,631	5,502	8,972	8,286	6,072	6,784	6,668	8,402	4,467	1,165
Blasting (Overburden)	blasts/yr	2	7	12	11	8	9	9	11	6	2
Blasting (Coal)	blasts/yr	18	18	11	20	19	15	20	16	15	8
Topsoil Removal	tons/yr	60,984	205,700	335,412	309,760	226,996	253,616	249,260	314,116	166,980	43,560
Overburden Removal (Dragline)	yd^3/yr	0	0	8,057,424	8,715,639	6,709,113	7,414,325	7,754,385	8,394,755	4,533,476	23,000,000
Overburden Removal (Shovel)	tons/yr	4,030,996	10,457,641	3,192,388	5,327,945	5,089,447	9,742,004	15,565,093	4,931,597	3,626,319	0
Shovel Haul	VMT/yr	7,379	19,143	5,844	9,753	9,316	17,833	28,492	9,027	6,638	0
Loader Haul	VMT/yr	1,386	5,189	8,924	9,811	10,251	11,321	10,441	11,051	4,378	685
Coal Haul	VMT/yr	19,256	40,318	61,368	62,648	50,593	59,006	62,410	65,170	31,849	6,040
Dozers and Loaders	hr/yr	1,687	4,436	7,658	7,367	6,029	6,806	6,730	7,292	3,739	666
Graders	hr/yr	401	1,090	2,219	2,450	2,001	2,536	3,010	2,366	1,343	3,453
Water Trucks	VMT/yr	6,568	17,049	31,856	34,522	28,901	35,417	40,053	34,046	18,088	35,357
Wind Erosion - Disturbed Area	acres	13	43	69	64	47	53	52	65	35	9

Mining Operation	$PM_{2.5}$ Emission Factor Equations	Control Factor %	Uncontrolled $PM_{2.5}$ Emission Factor	Units	Annual Controlled $PM_{2.5}$ Emissions (tons/yr) 2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Drilling (Overburden)[1]	1.3 * 0.3*0.1		0.0390	lb/hole	0.04	0.12	0.20	0.18	0.13	0.15	0.15	0.18	0.10	0.03
Drilling (Coal)[1]	0.22 * 0.3*0.1		0.0066	lb/hole	0.01	0.02	0.03	0.03	0.02	0.02	0.02	0.03	0.01	0.00
Blasting (Overburden)[2]	50 * 0.75 * 0.3 * (0.03/0.052)		0.6490	lb/blast	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Blasting (Coal)[2]	35 * 0.75 * 0.3 * (0.03/0.052)		0.4543	lb/blast	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Topsoil Removal[1]	0.058*0.3 * 0.15		0.0026	lb/ton	0.08	0.27	0.44	0.40	0.30	0.33	0.33	0.41	0.22	0.06
Overburden Removal (Dragline)[2]	0.04 * 0.75 * 0.3 * 0.15		0.0014	lb/yd^3	0.00	0.00	5.44	5.88	4.53	5.00	5.23	5.67	3.06	15.53
Overburden Removal (Shovel)[2]	0.02 * 0.75 * 0.3 * 0.15		0.0007	lb/ton	1.36	3.53	1.08	1.80	1.72	3.29	5.25	1.66	1.22	0.00
Shovel Haul[2]	0.81*s*(S/30) * C * 0.62 * 0.3 * 0.1		0.0100	lb/VMT	0.04	0.10	0.03	0.05	0.05	0.09	0.14	0.05	0.03	0.00
Loader Haul[2]	0.81*s*(S/30) * C * 0.62 * 0.3 * 0.1		0.0100	lb/VMT	0.01	0.03	0.04	0.05	0.05	0.06	0.05	0.06	0.02	0.00
Coal Haul Roads[2]	0.81*s*(S/30) * C * 0.62 * 0.3 * 0.1	50	0.0300	lb/VMT	0.14	0.30	0.46	0.47	0.38	0.44	0.47	0.49	0.24	0.05
Dozers and Loaders[3]	$5.7*s^{1.2}/M^{1.3}$ *0.105		0.4138	lb/hr	0.35	0.92	1.58	1.52	1.25	1.41	1.39	1.51	0.77	0.14
Graders[2]	32 * C * 0.3 * 0.1	50	0.7496	lb/hr	0.08	0.20	0.42	0.46	0.37	0.48	0.56	0.44	0.25	0.65
Water Trucks[2]	0.81*s*(S/30) * C * 0.62 * 0.3 * 0.1	50	0.0200	lb/VMT	0.03	0.09	0.16	0.17	0.14	0.18	0.20	0.17	0.09	0.18
Wind Erosion - Disturbed Area[1]	0.38 * C * 0.3 * 0.15		0.0134	ton/acre/year	0.17	0.57	0.93	0.85	0.63	0.70	0.69	0.87	0.46	0.12
					2.30	**6.14**	**10.81**	**11.88**	**9.57**	**12.15**	**14.50**	**11.54**	**6.49**	**16.74**

Mining Operation	24-Hr Controlled $PM_{2.5}$ Emissions (lb/hr) 2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Drilling (Overburden)[1]	0.01	0.04	0.06	0.05	0.04	0.04	0.04	0.05	0.03	0.01
Drilling (Coal)[1]	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00
Blasting (Overburden)[2]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Blasting (Coal)[2]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Topsoil Removal[1]	0.02	0.08	0.13	0.12	0.09	0.10	0.10	0.12	0.06	0.02
(Dragline)[2]	0.00	0.00	1.59	1.72	1.32	1.46	1.53	1.66	0.89	4.54
Overburden Removal (Shovel)[2]	0.40	1.03	0.32	0.53	0.50	0.96	1.54	0.49	0.36	0.00
Shovel Haul[2]	0.01	0.03	0.01	0.01	0.01	0.03	0.04	0.01	0.01	0.00
Loader Haul[2]	0.00	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.01	0.00
Coal Haul Roads[2]	0.04	0.09	0.13	0.14	0.11	0.13	0.14	0.14	0.07	0.01
Dozers and Loaders[3]	0.10	0.27	0.46	0.45	0.36	0.41	0.41	0.44	0.23	0.04
Graders[2]	0.02	0.06	0.12	0.13	0.11	0.14	0.16	0.13	0.07	0.19
Water Trucks[2]	0.01	0.02	0.05	0.05	0.04	0.05	0.06	0.05	0.03	0.05
Wind Erosion - Disturbed Area[1]	0.05	0.17	0.27	0.25	0.18	0.21	0.20	0.25	0.13	0.04
	0.67	**1.80**	**3.16**	**3.47**	**2.80**	**3.55**	**4.24**	**3.37**	**1.90**	**4.90**

Constants:	
Wind speed, U (mph)[4] =	11.7
Water truck average speed, S (mph)=	10.0
Haul truck average speed, S (mph)=	15.0
Shovel and Loader average speed, S (mph)=	5.0
Number of wet days, W (> 0.01")=	80
C = ((365-W)/365) =	0.781
Silt content of road bed, s (%) =	5.1
Overburden silt content s (%) =	6.9
Overburden moisture content M (%) =	7.9
Overburden density ($tons/yd^3$) =	1.9
Topsoil density ($tons/yd^3$) =	1.5

[1] Emission Factor Equation from AP-42 Table 11.9-4, July 1998.
[2] Emission Factor Equation from Wyoming Fugitive Dust Emission Factors, January 1979.
[3] Emission Factor Equation from AP-42 Table 11.9-1, July, 1998.
[4] Wind speed value is from 2005 on-site meteorological data

Tailpipe NO_x CO, SO_2, PM and VOC Emissions from Section 34 Mining Equipment

Equipment Description	NO_x Emission Factor[1] (lb/operating-hr)	2014 NO_x (tons/yr)	2015 NO_x (tons/yr)	2016 NO_x (tons/yr)	2017 NO_x (tons/yr)	2018 NO_x (tons/yr)	2019 NO_x (tons/yr)	2020 NO_x (tons/yr)	2021 NO_x (tons/yr)	2022 NO_x (tons/yr)	2023 NO_x (tons/yr)
Drills	1.691	0.29	0.99	1.61	1.49	1.09	1.22	1.20	1.51	0.80	0.21
Shovels	1.691	0.68	1.84	3.75	4.14	3.38	4.29	5.09	4.00	2.27	5.84
Loaders	1.89	0.48	1.16	1.83	1.89	1.68	1.90	1.88	1.96	0.88	0.16
Haul Trucks	4.166	13.14	32.34	59.18	63.55	52.10	63.97	72.78	62.10	33.30	62.90
Dozers	4.166	2.45	6.68	11.92	11.17	8.85	9.99	9.87	10.86	5.85	1.04
Graders	0.713	0.14	0.39	0.79	0.87	0.71	0.90	1.07	0.84	0.48	1.23
Water Trucks	4.166	1.37	3.55	6.64	7.19	6.02	7.38	8.34	7.09	3.77	7.36
Blasting[2]	17	3.91	10.33	19.47	21.55	17.69	22.41	26.42	20.71	11.70	1.59
		22.47	**57.28**	**105.20**	**111.86**	**91.54**	**112.07**	**126.66**	**109.08**	**59.05**	**80.34**

Equipment Description	PM Emission Factor[1] (lb/operating-hr)	2014 PM (tons/yr)	2015 PM (tons/yr)	2016 PM (tons/yr)	2017 PM (tons/yr)	2018 PM (tons/yr)	2019 PM (tons/yr)	2020 PM (tons/yr)	2021 PM (tons/yr)	2022 PM (tons/yr)	2023 PM (tons/yr)
Drills	0.139	0.02	0.08	0.13	0.12	0.09	0.10	0.10	0.12	0.07	0.02
Shovels	0.139	0.06	0.15	0.31	0.34	0.28	0.35	0.42	0.33	0.19	0.48
Loaders	0.172	0.04	0.11	0.17	0.17	0.15	0.17	0.17	0.18	0.08	0.01
Haul Trucks	0.256	0.81	1.99	3.64	3.91	3.20	3.93	4.47	3.82	2.05	3.87
Dozers	0.256	0.15	0.41	0.73	0.69	0.54	0.61	0.61	0.67	0.36	0.06
Graders	0.061	0.01	0.03	0.07	0.07	0.06	0.08	0.09	0.07	0.04	0.11
Water Trucks	0.256	0.08	0.22	0.41	0.44	0.37	0.45	0.51	0.44	0.23	0.45
Blasting[3]	--	0.28	0.37	0.37	0.47	0.40	0.36	0.43	0.43	0.31	0.14
		1.45	**3.36**	**5.82**	**6.21**	**5.10**	**6.07**	**6.80**	**6.05**	**3.32**	**5.13**

Equipment Description	CO Emission Factor[1] (lb/operating-hr)	2014 CO (tons/yr)	2015 CO (tons/yr)	2016 CO (tons/yr)	2017 CO (tons/yr)	2018 CO (tons/yr)	2019 CO (tons/yr)	2020 CO (tons/yr)	2021 CO (tons/yr)	2022 CO (tons/yr)	2023 CO (tons/yr)
Drills	0.675	0.12	0.40	0.64	0.60	0.44	0.49	0.48	0.60	0.32	0.08
Shovels	0.675	0.27	0.74	1.50	1.65	1.35	1.71	2.03	1.60	0.91	2.33
Loaders	0.572	0.15	0.35	0.55	0.57	0.51	0.58	0.57	0.59	0.27	0.05
Haul Trucks	1.794	5.66	13.93	25.49	27.37	22.44	27.55	31.34	26.74	14.34	27.09
Dozers	1.794	1.05	2.88	5.13	4.81	3.81	4.30	4.25	4.68	2.52	0.45
Graders	0.151	0.03	0.08	0.17	0.19	0.15	0.19	0.23	0.18	0.10	0.26
Water Trucks	1.794	0.59	1.53	2.86	3.10	2.59	3.18	3.59	3.05	1.62	3.17
Blasting[2]	67	15.43	40.71	76.75	84.92	69.74	88.34	104.11	81.60	46.13	6.28
		23.29	**60.60**	**113.09**	**123.20**	**101.02**	**126.33**	**146.60**	**119.05**	**66.20**	**39.71**

Equipment Description	SO_2 Emission Factor[1] (lb/operating-hr)	2014 SO_2 (tons/yr)	2015 SO_2 (tons/yr)	2016 SO_2 (tons/yr)	2017 SO_2 (tons/yr)	2018 SO_2 (tons/yr)	2019 SO_2 (tons/yr)	2020 SO_2 (tons/yr)	2021 SO_2 (tons/yr)	2022 SO_2 (tons/yr)	2023 SO_2 (tons/yr)
Drills	0.454	0.08	0.27	0.43	0.40	0.29	0.33	0.32	0.41	0.22	0.06
Shovels	0.454	0.18	0.49	1.01	1.11	0.91	1.15	1.37	1.07	0.61	1.57
Loaders	0.182	0.05	0.11	0.18	0.18	0.16	0.18	0.18	0.19	0.08	0.02
Haul Trucks	0.454	1.43	3.52	6.45	6.93	5.68	6.97	7.93	6.77	3.63	6.85
Dozers	0.454	0.27	0.73	1.30	1.22	0.96	1.09	1.08	1.18	0.64	0.11
Graders	0.086	0.02	0.05	0.10	0.11	0.09	0.11	0.13	0.10	0.06	0.15
Water Trucks	0.454	0.15	0.39	0.72	0.78	0.66	0.80	0.91	0.77	0.41	0.80
Blasting[2, 4]	0.006	0.001	0.004	0.007	0.008	0.006	0.008	0.009	0.007	0.004	0.001
		2.17	**5.56**	**10.19**	**10.74**	**8.75**	**10.64**	**11.92**	**10.50**	**5.65**	**9.56**

Equipment Description	VOC Emission Factor[1] (lb/operating-hr)	2014 VOC (tons/yr)	2015 VOC (tons/yr)	2016 VOC (tons/yr)	2017 VOC (tons/yr)	2018 VOC (tons/yr)	2019 VOC (tons/yr)	2020 VOC (tons/yr)	2021 VOC (tons/yr)	2022 VOC (tons/yr)	2023 VOC (tons/yr)
Drills	0.152	0.03	0.09	0.15	0.13	0.10	0.11	0.11	0.14	0.07	0.02
Shovels	0.152	0.06	0.17	0.34	0.37	0.30	0.39	0.46	0.36	0.20	0.52
Loaders	0.250	0.06	0.15	0.24	0.25	0.22	0.25	0.25	0.26	0.12	0.02
Haul Trucks	0.192	0.61	1.49	2.73	2.93	2.40	2.95	3.35	2.86	1.53	2.90
Dozers	0.192	0.11	0.31	0.55	0.51	0.41	0.46	0.45	0.50	0.27	0.05
Graders	0.040	0.01	0.02	0.04	0.05	0.04	0.05	0.06	0.05	0.03	0.07
Water Trucks	0.192	0.06	0.16	0.31	0.33	0.28	0.34	0.38	0.33	0.17	0.34
Blasting[2, 5]	0.9	0.21	0.55	1.03	1.14	0.94	1.19	1.40	1.10	0.62	0.08
		1.15	**2.94**	**5.38**	**5.72**	**4.69**	**5.73**	**6.47**	**5.59**	**3.02**	**4.00**

[1] Emission factors from Table II-7.1 of the Compilation of Air Pollutant Emission Factors, Volume II, Mobile Sources, AP-42, Fourth Edition, September 1985

[2] Blasting emission factors from Table 13.3-1 of AP-42; emission factor units is lb/ton

[3] ANFO emission factor not available in Table 13.3-1 of AP-42; fugitive dust PM emission estimates from coal and overburden blasting for PM $\leq$ 30 μm in diameter are presented

[4] Table 13.3-1 of AP-42 emission factor adjusted by lower sulfur content in ultralow sulfur fuel oil (i.e, 15 ppm) divided by 5000 ppm (i.e., typical sulfur content when AP-42 emission factors published)

[5] ANFO emission factor not available in Table 13.3-1 of AP-42; total non-methane hydrocarbons emission factor for Amatol (50% TNT, 50% AN) referenced from explosives model (OBODM) database

Tailpipe Hazardous Air Pollutant Emissions from Section 34 Mining Equipment

Equipment Description	Benzene Emission Factor[1] (lb/operating-hr)	2014 Benzene (tons/yr)	2015 Benzene (tons/yr)	2016 Benzene (tons/yr)	2017 Benzene (tons/yr)	2018 Benzene (tons/yr)	2019 Benzene (tons/yr)	2020 Benzene (tons/yr)	2021 Benzene (tons/yr)	2022 Benzene (tons/yr)	2023 Benzene (tons/yr)
Drills	4.052E-04	7.033E-05	2.372E-04	3.868E-04	3.572E-04	2.618E-04	2.925E-04	2.875E-04	3.623E-04	1.926E-04	5.024E-05
Shovels	4.052E-04	1.623E-04	4.418E-04	8.990E-04	9.929E-04	8.107E-04	1.028E-03	1.219E-03	9.586E-04	5.442E-04	1.399E-03
Loaders	6.664E-04	1.708E-04	4.096E-04	6.444E-04	6.676E-04	5.927E-04	6.701E-04	6.636E-04	6.923E-04	3.103E-04	5.497E-05
Haul Trucks	5.118E-04	1.615E-03	3.973E-03	7.271E-03	7.808E-03	6.401E-03	7.860E-03	8.942E-03	7.630E-03	4.091E-03	7.728E-03
Dozers	5.118E-04	3.005E-04	8.207E-04	1.465E-03	1.373E-03	1.088E-03	1.227E-03	1.213E-03	1.334E-03	7.185E-04	1.283E-04
Graders	1.066E-04	2.136E-05	5.813E-05	1.183E-04	1.306E-04	1.067E-04	1.352E-04	1.605E-04	1.261E-04	7.161E-05	1.841E-04
Water Trucks	5.118E-04	1.681E-04	4.363E-04	8.152E-04	8.834E-04	7.396E-04	9.063E-04	1.025E-03	8.713E-04	4.629E-04	9.048E-04
Blasting[2]	2.399E-03	5.524E-04	1.458E-03	2.748E-03	3.041E-03	2.497E-03	3.163E-03	3.728E-03	2.922E-03	1.652E-03	2.249E-04
		0.0031	**0.0078**	**0.0143**	**0.0153**	**0.0125**	**0.0153**	**0.0172**	**0.0149**	**0.0080**	**0.0107**

Equipment Description	Toluene Emission Factor[1] (lb/operating-hr)	2014 Toluene (tons/yr)	2015 Toluene (tons/yr)	2016 Toluene (tons/yr)	2017 Toluene (tons/yr)	2018 Toluene (tons/yr)	2019 Toluene (tons/yr)	2020 Toluene (tons/yr)	2021 Toluene (tons/yr)	2022 Toluene (tons/yr)	2023 Toluene (tons/yr)
Drills	1.776E-04	3.083E-05	1.040E-04	1.696E-04	1.566E-04	1.148E-04	1.282E-04	1.260E-04	1.588E-04	8.442E-05	2.202E-05
Shovels	1.776E-04	7.115E-05	1.937E-04	3.941E-04	4.353E-04	3.554E-04	4.505E-04	5.346E-04	4.202E-04	2.386E-04	6.134E-04
Loaders	2.921E-04	7.486E-05	1.796E-04	2.825E-04	2.927E-04	2.598E-04	2.937E-04	2.909E-04	3.035E-04	1.360E-04	2.410E-05
Haul Trucks	2.244E-04	7.079E-04	1.742E-03	3.187E-03	3.423E-03	2.806E-03	3.445E-03	3.920E-03	3.345E-03	1.793E-03	3.388E-03
Dozers	2.244E-04	1.317E-04	3.598E-04	6.421E-04	6.017E-04	4.768E-04	5.379E-04	5.316E-04	5.850E-04	3.150E-04	5.623E-05
Graders	4.674E-05	9.362E-06	2.548E-05	5.185E-05	5.727E-05	4.676E-05	5.927E-05	7.034E-05	5.529E-05	3.139E-05	8.071E-05
Water Trucks	2.244E-04	7.368E-05	1.913E-04	3.574E-04	3.873E-04	3.242E-04	3.973E-04	4.493E-04	3.819E-04	2.029E-04	3.966E-04
Blasting[2]	1.052E-03	2.421E-04	6.390E-04	1.205E-03	1.333E-03	1.095E-03	1.387E-03	1.634E-03	1.281E-03	7.241E-04	9.860E-05
		0.0013	**0.0034**	**0.0063**	**0.0067**	**0.0055**	**0.0067**	**0.0076**	**0.0065**	**0.0035**	**0.0047**

Equipment Description	Xylenes Emission Factor[1] (lb/operating-hr)	2014 Xylenes (tons/yr)	2015 Xylenes (tons/yr)	2016 Xylenes (tons/yr)	2017 Xylenes (tons/yr)	2018 Xylenes (tons/yr)	2019 Xylenes (tons/yr)	2020 Xylenes (tons/yr)	2021 Xylenes (tons/yr)	2022 Xylenes (tons/yr)	2023 Xylenes (tons/yr)
Drills	1.238E-04	2.148E-05	7.246E-05	1.182E-04	1.091E-04	7.997E-05	8.934E-05	8.781E-05	1.107E-04	5.882E-05	1.535E-05
Shovels	1.238E-04	4.958E-05	1.349E-04	2.746E-04	3.033E-04	2.476E-04	3.139E-04	3.725E-04	2.928E-04	1.662E-04	4.274E-04
Loaders	2.036E-04	5.217E-05	1.251E-04	1.968E-04	2.039E-04	1.810E-04	2.047E-04	2.027E-04	2.115E-04	9.480E-05	1.679E-05
Haul Trucks	1.563E-04	4.933E-04	1.214E-03	2.221E-03	2.385E-03	1.955E-03	2.401E-03	2.731E-03	2.331E-03	1.250E-03	2.361E-03
Dozers	1.563E-04	9.179E-05	2.507E-04	4.474E-04	4.193E-04	3.323E-04	3.748E-04	3.704E-04	4.076E-04	2.195E-04	3.918E-05
Graders	3.257E-05	6.524E-06	1.776E-05	3.613E-05	3.991E-05	3.258E-05	4.130E-05	4.901E-05	3.853E-05	2.187E-05	5.624E-05
Water Trucks	1.563E-04	5.135E-05	1.333E-04	2.490E-04	2.699E-04	2.259E-04	2.769E-04	3.131E-04	2.661E-04	1.414E-04	2.764E-04
Blasting[2]	7.329E-04	1.687E-04	4.453E-04	8.395E-04	9.288E-04	7.628E-04	9.662E-04	1.139E-03	8.926E-04	5.046E-04	6.871E-05
		0.0009	**0.0024**	**0.0044**	**0.0047**	**0.0038**	**0.0047**	**0.0053**	**0.0046**	**0.0025**	**0.0033**

Equipment Description	Formaldehyde Emission Factor[1] (lb/operating-hr)	2014 Formaldehyde (tons/yr)	2015 Formaldehyde (tons/yr)	2016 Formaldehyde (tons/yr)	2017 Formaldehyde (tons/yr)	2018 Formaldehyde (tons/yr)	2019 Formaldehyde (tons/yr)	2020 Formaldehyde (tons/yr)	2021 Formaldehyde (tons/yr)	2022 Formaldehyde (tons/yr)	2023 Formaldehyde (tons/yr)
Drills	5.146E-04	8.933E-05	3.013E-04	4.913E-04	4.537E-04	3.325E-04	3.715E-04	3.651E-04	4.601E-04	2.446E-04	6.380E-05
Shovels	5.146E-04	2.061E-04	5.611E-04	1.142E-03	1.261E-03	1.030E-03	1.305E-03	1.549E-03	1.218E-03	6.912E-04	1.777E-03
Loaders	8.464E-04	2.169E-04	5.202E-04	8.185E-04	8.479E-04	7.528E-04	8.511E-04	8.428E-04	8.792E-04	3.942E-04	6.982E-05
Haul Trucks	6.501E-04	2.051E-03	5.046E-03	9.235E-03	9.917E-03	8.130E-03	9.982E-03	1.136E-02	9.690E-03	5.196E-03	9.815E-03
Dozers	6.501E-04	3.816E-04	1.042E-03	1.860E-03	1.743E-03	1.381E-03	1.559E-03	1.540E-03	1.695E-03	9.125E-04	1.629E-04
Graders	1.354E-04	2.712E-05	7.382E-05	1.502E-04	1.659E-04	1.355E-04	1.717E-04	2.038E-04	1.602E-04	9.095E-05	2.338E-04
Water Trucks	6.501E-04	2.135E-04	5.541E-04	1.035E-03	1.122E-03	9.394E-04	1.151E-03	1.302E-03	1.107E-03	5.879E-04	1.149E-03
Blasting[2]	3.047E-03	7.016E-04	1.851E-03	3.491E-03	3.862E-03	3.172E-03	4.018E-03	4.735E-03	3.711E-03	2.098E-03	2.857E-04
		0.0039	**0.0099**	**0.0182**	**0.0194**	**0.0159**	**0.0194**	**0.0219**	**0.0189**	**0.0102**	**0.0136**

Equipment Description	Acetaldehyde Emission Factor[1] (lb/operating-hr)	2014 Acetaldehyde (tons/yr)	2015 Acetaldehyde (tons/yr)	2016 Acetaldehyde (tons/yr)	2017 Acetaldehyde (tons/yr)	2018 Acetaldehyde (tons/yr)	2019 Acetaldehyde (tons/yr)	2020 Acetaldehyde (tons/yr)	2021 Acetaldehyde (tons/yr)	2022 Acetaldehyde (tons/yr)	2023 Acetaldehyde (tons/yr)
Drills	3.331E-04	5.782E-05	1.950E-04	3.180E-04	2.937E-04	2.152E-04	2.404E-04	2.363E-04	2.978E-04	1.583E-04	4.130E-05
Shovels	3.331E-04	1.334E-04	3.632E-04	7.390E-04	8.162E-04	6.665E-04	8.448E-04	1.002E-03	7.880E-04	4.474E-04	1.150E-03
Loaders	5.479E-04	1.404E-04	3.367E-04	5.298E-04	5.488E-04	4.872E-04	5.509E-04	5.455E-04	5.691E-04	2.551E-04	4.519E-05
Haul Trucks	4.208E-04	1.327E-03	3.266E-03	5.977E-03	6.419E-03	5.262E-03	6.461E-03	7.351E-03	6.272E-03	3.363E-03	6.353E-03
Dozers	4.208E-04	2.470E-04	6.747E-04	1.204E-03	1.128E-03	8.942E-04	1.009E-03	9.968E-04	1.097E-03	5.906E-04	1.054E-04
Graders	8.766E-05	1.756E-05	4.778E-05	9.724E-05	1.074E-04	8.769E-05	1.112E-04	1.319E-04	1.037E-04	5.887E-05	1.514E-04
Water Trucks	4.208E-04	1.382E-04	3.587E-04	6.702E-04	7.263E-04	6.080E-04	7.451E-04	8.426E-04	7.162E-04	3.805E-04	7.438E-04
Blasting[2]	1.972E-03	4.541E-04	1.198E-03	2.259E-03	2.500E-03	2.053E-03	2.600E-03	3.065E-03	2.402E-03	1.358E-03	1.849E-04
		0.0025	**0.0064**	**0.0118**	**0.0125**	**0.0103**	**0.0126**	**0.0142**	**0.0122**	**0.0066**	**0.0088**

Equipment Description	Naphthalene Emission Factor[1] (lb/operating-hr)	2014 Naphthalene (tons/yr)	2015 Naphthalene (tons/yr)	2016 Naphthalene (tons/yr)	2017 Naphthalene (tons/yr)	2018 Naphthalene (tons/yr)	2019 Naphthalene (tons/yr)	2020 Naphthalene (tons/yr)	2021 Naphthalene (tons/yr)	2022 Naphthalene (tons/yr)	2023 Naphthalene (tons/yr)
Drills	3.683E-05	6.392E-06	2.156E-05	3.516E-05	3.247E-05	2.379E-05	2.658E-05	2.613E-05	3.293E-05	1.750E-05	4.566E-06
Shovels	3.683E-05	1.475E-05	4.015E-05	8.171E-05	9.024E-05	7.368E-05	9.340E-05	1.108E-04	8.713E-05	4.946E-05	1.272E-04
Loaders	6.057E-05	1.552E-05	3.723E-05	5.857E-05	6.068E-05	5.387E-05	6.090E-05	6.031E-05	6.292E-05	2.821E-05	4.996E-06
Haul Trucks	4.652E-05	1.468E-04	3.611E-04	6.608E-04	7.097E-04	5.818E-04	7.144E-04	8.127E-04	6.934E-04	3.718E-04	7.024E-04
Dozers	4.652E-05	2.731E-05	7.459E-05	1.331E-04	1.248E-04	9.886E-05	1.115E-04	1.102E-04	1.213E-04	6.530E-05	1.166E-05
Graders	9.691E-06	1.941E-06	5.283E-06	1.075E-05	1.187E-05	9.695E-06	1.229E-05	1.458E-05	1.146E-05	6.508E-06	1.673E-05
Water Trucks	4.652E-05	1.528E-05	3.965E-05	7.409E-05	8.030E-05	6.722E-05	8.238E-05	9.316E-05	7.919E-05	4.207E-05	8.224E-05
Blasting[2]	2.181E-04	5.020E-05	1.325E-04	2.498E-04	2.764E-04	2.270E-04	2.875E-04	3.388E-04	2.656E-04	1.501E-04	2.044E-05
		0.0003	**0.0057**	**0.0108**	**0.0119**	**0.0098**	**0.0124**	**0.0146**	**0.0115**	**0.0065**	**0.0009**
Total HAP Emissions from Tailpipe Exhaust:		**0.0120**	**0.0358**	**0.0658**	**0.0705**	**0.0577**	**0.0710**	**0.0808**	**0.0686**	**0.0373**	**0.0418**

[1] HAP emission factors estimated by multiplying the exhaust hydrocarbon emission factor from Table II-7.1 of the Compilation of Air Pollutant Emission Factors, Volume II, Mobile Sources, AP-42 by the ratio of the HAP emission factor in Table 3.3-2 and the exhaust TOC emission factor in Table 3.3-1 of AP-42, Volume I, for Uncontrolled Diesel Industrial Engines Fourth Edition, September 1985

[2] ANFO emission factor for exhaust hydrocarbons not available in Table 13.3-1 of AP-42; total non-methane hydrocarbons emission factor for Amatol (50% TNT, 50% AN) referenced from explosives model (OBODM) database

BLASTING	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Totals
P&H 4100 Shovel Prebench Blasts											
Blasts per year	1.5	5.0	8.1	7.5	5.5	6.1	6.0	7.6	4.0	1.1	53
Surface area shot per year ft²	526,902	1,777,248	2,897,960	2,676,326	1,961,245	2,191,242	2,153,606	2,713,962	1,442,707	376,358	18,717,558
Surface area shot per blast ft²	356,400	356,400	356,400	356,400	356,400	356,400	356,400	356,400	356,400	356,400	3,564,000
Drill holes per blast	695	695	695	695	695	695	695	695	695	695	
BI 1570 Dragline Blasts											
Blasts per year	0.7	2.5	4.1	3.8	2.8	3.1	3.0	3.8	2.0	0.5	26
Surface area shot per year ft²	526,902	1,777,248	2,897,960	2,676,326	1,961,245	2,191,242	2,153,606	2,713,962	1,442,707	376,358	18,717,558
Surface area shot per blast ft²	712,800	712,800	712,800	712,800	712,800	712,800	712,800	712,800	712,800	712,800	7,128,000
Drill holes per blast	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	
Coal Blasts											
Blasts per year	17.9	17.7	10.8	19.8	18.5	14.6	20.0	16.2	15.1	8.1	159
Surface area shot per year ft²	526,902	1,777,248	2,897,960	2,676,326	1,961,245	2,191,242	2,153,606	2,713,962	1,442,707	376,358	18,717,558
Surface area shot per blast ft²	29,394	100,591	268,398	135,287	105,743	150,075	107,924	168,015	95,743	46,468	1,207,639
Drill holes per blast	91	311	831	419	327	465	334	520	296	144	
Drill Hours Per Year	347	1171	1909	1763	1292	1444	1419	1788	951	248	12332

(Assume 0.1 hr/hole)

EQUIPMENT OPERATING HOURS	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Totals
BI 1570 Dragline Hours	-	-	2,238	2,421	1,864	2,060	2,154	2,332	1,259	6,389	20,716
Shovel Hours	801	2,180	4,437	4,901	4,002	5,072	6,019	4,732	2,686	6,906	41,737
CAT 994 Loader Hours	513	1,229	1,934	2,004	1,779	2,011	1,991	2,078	931	165	14,634
Waste Haul truck Hours	4,276	11,357	22,146	24,235	20,030	24,976	28,967	23,641	13,000	29,633	202,261
Coal Haul Trucks Hours	2,034	4,167	6,266	6,276	4,984	5,736	5,975	6,172	2,987	564	45,160
D11 Dozer Hours	1,174	3,207	5,724	5,364	4,250	4,795	4,738	5,215	2,808	501	37,775
Motor Grader Hours	401	1,090	2,219	2,450	2,001	2,536	3,010	2,366	1,343	3,453	20,869
Water Truck Hours	657	1,705	3,186	3,452	2,890	3,542	4,005	3,405	1,809	3,536	28,186

Report for Year : 2012

Mid Year Peabody U.S. GHG Footprint by Operating Surface Mine Facility

Operating Surface Mine Facility	Total CO_2e (st)	Total CO_2 (st)			Total CH_4 (st CO_2e) (GWP 21)			Total N_2O (st CO_2e) - (GWP 310)			Total CH_4 - Coal Mining Emissions (st CO2e) -(GWP 21)		Scope 1 (st COe)	Scope 2 (st Coe)	Total Units Produced	LBS CO2e/Unit
		Electricity	Mobile Fuel	Facility Fuel	Electricity	Mobile Fuel	Facility Fuel	Electricity	Mobile Fuel	Facility Fuel	Surface Mining	Post Mining				
20103 - El Segundo Mine	155,635	9623.025	80840.008	2.177	2.690	98.881	0.001	40.821	1107.693	0.012	54,895	9,024	145,968	9,667	71,163,690	4.37

MATERIAL MOVEMENT	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Totals
Disturbed Acres	13	43	69	64	47	53	52	65	35	9	448
Topsoil Yards	40,656	137,133	223,608	206,507	151,331	169,077	166,173	209,411	111,320	29,040	1,444,256
Bank Yards	2,649,391	7,209,900	13,883,486	15,480,746	12,743,997	16,248,428	19,292,851	14,850,602	8,486,104	1,127,011	111,972,516
Cast Yards	147,121	489,968	2,790,092	2,687,710	2,125,943	2,375,776	2,297,182	2,606,910	1,434,991	255,370	17,211,063
D11 Dozer Yards	290,799	879,468	1,628,374	1,469,699	1,157,907	1,275,451	1,186,853	1,427,037	782,646	142,817	10,241,052
Shovel Yards	2,121,577	5,504,021	1,680,204	2,804,182	2,678,656	5,127,370	8,192,154	2,595,577	1,908,589	-	32,612,331
CAT 994 Loader yards	89,893	336,442	578,622	636,173	664,666	734,095	677,016	716,588	283,906	44,389	4,761,790
BI 1570 Dragline Yards	-	-	7,206,193	7,882,982	6,116,824	6,735,736	6,939,647	7,504,490	4,075,972	684,436	47,146,280
BI 1570 Dragline Rehandle Yards	-	-	851,230	832,657	592,289	678,590	814,738	890,265	457,504	22,315,565	27,432,838
BI 1570 Dragline Total Yards	-	-	8,057,424	8,715,639	6,709,113	7,414,325	7,754,385	8,394,755	4,533,476	23,000,000	74,579,117
Total Yards	2,690,047	7,347,033	14,958,324	16,519,910	13,487,617	17,096,095	20,273,762	15,950,278	9,054,928	23,471,616	140,849,610
Tons mined	414,886	850,121	1,278,271	1,280,227	1,016,693	1,170,231	1,218,837	1,259,184	609,279	114,997	**9,212,727**
Coal Haul Dist. Ft. - one way	30,509	31,176	31,559	32,168	32,712	33,146	33,660	34,022	34,363	34,527	
Shovel Haul Dist. Ft. - one way	2,020	2,020	2,020	2,020	2,020	2,020	2,020	2,020	2,020	2,020	
Loader Haul Dist. Ft. - one way	750	750	750	750	750	750	750	750	750	750	

Explosives Usage for Blasting (tons/yr)	460	1,215	2,291	2,535	2,082	2,637	3,108	2,436	1,377	188	18,328

Appendix E—Comment/Response Matrix

The following comments were received on the April 2013 preliminary Environmental Assessment for the El Segundo Mine Lease by Application.

Number/Source	Comment	Response
1 /Wild Earth Guardians	Coal burning impacts are not addressed. Although the EA recognizes that "end use of coal" impacts are an important issue (see EA at 1-6), there is no actual analysis or assessment of the potentially significant impacts associated with the end use of the coal from the El Segundo mine. Such impacts are not speculative. The EA itself discloses that coal from El Segundo is burned in the nearby Cholla and Springerville power plants. Data from the U.S. Energy Information Administration shows that in 2011, coal from the mine was burned in the Apache Station in Arizona, the Catalyst Paper Snowflake Mill in Arizona, the Cholla Power Plant in Arizona, the Coronado Power Plant in Arizona, and the Springerville Power plant in Arizona. See Exhibit 2, Energy Information Administration, Form EIA-923-Schedule 2 data for 2011, available at http://www.eia.gov/electricity/data/eia923/. Coal is mined for one reason: to be burned. In this case, it is clear that coal from El Segundo will be burned in power plants in eastern Arizona. This is a reasonably foreseeable indirect impact that must be analyzed and assessed by the BLM. Unfortunately, the EA does not do so. We are particularly troubled that the EA does not address the air emissions impacts associated with burning coal at power plants in eastern Arizona, including impacts to national ambient air quality standards under the Clean Air Act, does not address the water impacts, including discharge from the power plants into nearby streams and any water quality impacts associated with coal ash disposal, does not address greenhouse gas emissions associated with coal burning, and does not address the impacts that releases into the air and water from these power plants have on fish and wildlife in the region. Such data is available on U.S. Environmental Protection Agency ("EPA") websites and is likely available from the coal lease applicant, Peabody Energy. We request the BLM revise the EA and/or prepare an environmental impact statement ("EIS") in order to fully address the potentially significant impacts associated with burning coal mined from the El Segundo mine. Such an analysis is critical under NEPA in order to ensure a reasoned decision and to ensure that the BLM is taking a hard look at the potential environmental implications of its actions.	Indirect effects are those effects "which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable." (40 CFR 1508.8(b)). Thus, to be considered, the effect must be reasonably foreseeable and caused by the proposed action. Courts have concluded that NEPA requires agencies to analyze effects that bear a "reasonably close causal relationship" to the proposed action. The BLM has determined that this coal lease would not result in additional coal emissions from client power plants for reasons listed below; however, an estimate of emissions caused by the burning of coal mined from the lease tract has been included in the EA in Section 5.2.1. The power plants in question were in operation before the El Segundo mine began production, and are projected to continue to operate after the reserves at El Segundo are depleted. These power plants have, and will continue to operate with or without the existence of the El Segundo mine, using coal from varied sources. Furthermore, most, if not all of the plants in question blend coal from various sources. None of the plants has consistently burned coal solely from the El Segundo mine over a period of years. Emissions from the power plants that can affect the quality of air and water are regulated by the States of Arizona and New Mexico, subject to oversight by the EPA, to ensure that permitted activities do not exceed or violate any state or federal quality standards. It is assumed that emissions will be regulated, and, if necessary, controlled to satisfy both federal and state standards regardless of the source of the fuel. The number and location of coal customers from the El Segundo Mine vary annually and over time. Coal is a commodity, and the use of the coal from this particular 640 acres will depend on a number of factors, including demand, price, quality, and transportation, among others.

Number/Source	Comment	Response
		The private rail spur that connects to the coal load out facility at the El Segundo Mine runs south to Grants, New Mexico, where it connects to the main BNSF rail line that travels east-west. From there, the coal train can be delivered virtually anywhere along the network of rail lines. Contracts at power plants currently burning El Segundo coal expire in 2014, 2020, and 2024. El Segundo coal is also sold on the spot market. For this reason, it is difficult to project exactly how much coal from the El Segundo mine, or from the lease tract, will be burned in any particular power plant at any given time in the future. Nonetheless, criteria pollutant, greenhouse gas, and hazardous air pollutant emissions were calculated for the estimated amount of coal from this lease that would eventually be combusted. These calculations can be found in Section 5.2.
2/Wild Earth Guardians	Air Quality Impacts are not Adequately Addressed and FLPMA Standards do not Appear to have Been Considered. The EA does not adequately analyze and assess the potentially significant air quality impacts of the proposed coal lease. We are particularly concerned that the EA does not adequately analyze and assess the impacts of emissions from the mining operations to national ambient air quality standards that are in place to protect public health and welfare. These standards are set forth at 40 C.F.R. §§ 50.1-50.17. Appendix D to the EA does present some disclosure of air emissions, but it does not actually analyze impacts to ambient air quality standards. For example, the analysis does not address the impacts of mining operations at the El Segundo mine to ambient air quality standards for ground-level ozone, the key ingredient of smog, which are set forth at 40 C.F.R. § 50.15. And although the EA claims to analyze and assess the potentially significant impacts to recently adopted nitrogen dioxide ambient air quality standards, which are set forth at 40 C.F.R. § 50.11, the EA's analysis is hardly even qualitative; it simply asserts that because of low nitrogen oxide emissions and low emission heights, that the standards will be protected. There is no support for this assertion and even this qualitative statement lacks a reasonable foundation. It is especially critical that the EA	Air quality sections have been revised to include emissions. See discussion of direct and indirect impacts in sections 4.1, and cumulative impacts in section 5.2. Modeling of ground-level ozone formation is not necessary because the annual emissions of volatile organic compounds and oxides of nitrogen will not increase as a result of leasing the coal.

Number/Source	Comment	Response
	adequately address ozone and nitrogen dioxide impacts given that the Farmington Resource Management Plan was adopted prior to the promulgation of these standards. Therefore, the BLM has never undertaken a programmatic analysis and assessment of direct, indirect, and cumulative field office-wide impacts to these particular air quality standards. This raises concerns that the Agency is not adequately analyzing or assessing the potentially significant cumulative air quality impacts. To this end, we are concerned that the BLM has not demonstrated that the proposed coal lease will comply with the Federal Land Policy and Management Act ("FLPMA"). FLPMA requires the BLM to comply with federal air quality standards. See 43 U.S.C. § 1712(c)(8). Without an adequate analysis and assessment of the direct, indirect, and cumulative impacts of the El Segundo mine to relevant air quality standards, the BLM cannot demonstrate that its actions comply with FLPMA. A more robust analysis and demonstration of compliance with the Agency's substantive FLPMA obligations is necessary.	
3/Wild Earth Guardians	The BLM Must Consult over the Impacts to Threatened and Endangered Species We are concerned that the EA appears to overlook addressing the potentially significant direct, indirect, and cumulative impacts of issuing the El Segundo coal lease to the razorback sucker and Colorado pikeminnow, two endangered fish species that exist in the Colorado River drainage. We are particularly concerned over the fact that the indirect impacts of coal burning to these endangered fish species were overlooked. Consequently, it does not appear that the BLM has met its substantive obligations under Section 7 of the Endangered Species Act to ensure that it consults where its actions "may affect" listed species. See 16 U.S.C. §§ 1536(a)(1) and (a)(2). We are particularly concerned because the U.S. Fish and Wildlife Service has found the razorback sucker and Colorado pikeminnow in particular are being significantly adversely affected by selenium and mercury contamination in streams in the region. Coal-fired power plants in the region discharge mercury and selenium into the air and water of the region, posing potentially detrimental impacts to the Colorado pikeminnow and razorback sucker. The BLM must address such impacts.	A Biological Survey Report was prepared for the project. This included an assessment of potential impacts to federally threatened and endangered species. Neither the razorback sucker or Colorado pikeminnow is known to occur in McKinley County. Impacts of coal burning are discussed in the response to comment 1 above.
4/U.S. EPA, Region 6	The purpose and need statement in the EA states "The purpose of the proposed action is to determine whether to lease the federal coal reserves in response to Peabody Natural Resources Company's (PNRC) lease by application (LBA)". The previous sentence seems to define the	Purpose and Need statement was developed in coordination by BLM FFO staff and follows guidance in the BLM NEPA Handbook (H-1790-1). No change to the EA.

Number/Source	Comment	Response
	preparation of an EA by the Bureau of Land Management (BLM) as the proposed action. The proposed action is for PNRC to lease the land and mine the coal underneath. The (BLM) decision to lease the federal coal reserves is the purpose of preparing the EA. Please modify the purpose and need statement to adequately state the purpose and need of the proposed action.	
5/U.S. EPA, Region 6	Table 3.14-1 lists historical and cultural sites that require consultation for eligibility determinations with the New Mexico State Historic Preservation Officer (SHPO) and the Laguna Pueblo Tribe. Include all consultation correspondence and determinations of eligibility or concurrence from the SHPO and Laguna Pueblo Tribe in a dedicated section of the Final EA.	Compliance with regulations that protect cultural resources, including determinations of eligibility for the NRHP, is conducted as a separate process, overseen by BLM. The BLM provide the cultural survey report and archaeological site records to the Department of Cultural Affairs Historic Preservation Division. The State Historic Preservation Office (SHPO) letter of October 5, 2012 concurred with the BLM's determination that mining of federal coal in Section 34 will have No Adverse Effect on cultural properties in accordance with the Protocol Agreement between the BLM and the New Mexico SHPO. No change made to the EA.
6/U.S. EPA, Region 6	This section states that direct project impacts to ambient air quality will be temporary and localized, primarily due to equipment emissions and airborne particulate matter/fugitive dust. EPA recommends that, in addition to all applicable local, state, or federal requirements, the following mitigation measures be included in a emissions mitigation plan or similar document in order to reduce air quality impacts associated with emissions of NOx, CO, PM, S02, and other pollutants project activities. Fugitive Dust Source Controls: stabilize open storage piles and disturbed areas by covering and/or applying water or chemical/organic dust palliative where appropriate at active and inactive sites during workdays, weekends, holidays, and windy conditions; install wind fencing and phase grading operations where appropriate, and operate water trucks for stabilization of surfaces under windy conditions; and prevent spillage when hauling material and operating non-earthmoving equipment and limit speeds to 15 miles per hour. Limit speed of earth-moving equipment to 10 mph. Mobile and Stationary Source Controls: plan scheduling to minimize vehicle trips; limit idling of heavy equipment to less than 5 minutes and verify through unscheduled inspections; maintain and tune engines per manufacturer's specifications to perform at EPA certification levels, prevent tampering, and conduct unscheduled inspections to ensure these measures are	The recommendations to mitigate/manage fugitive emissions were thoroughly reviewed. Some of the recommendations are already in practice as a result of the fugitive emissions control plan approved by the New Mexico Mining and Minerals Division (e.g., prevention/mitigation of spillage resulting from material haulage, vehicle speed limitations in concert with haulage road dust control practices). Other recommendations are already in place as a result of applying best business practices (i.e., minimizing vehicle trips by using buses to transport personnel to and from working areas, managing traffic and vehicle parking in paved lots, maintaining a complete equipment inventory, conserving energy and fuel usage, and equipment that meets or exceeds applicable federal and state emission standards). Some recommendations are infeasible or not necessary (stabilization of open pile because most open piles are constantly being disturbed, wind fence/watering of grading area because it is not necessary due to the texture of the materials being graded). There are no sensitive receptors in the vicinity of the mine due to its remote location. No

Number/Source	Comment	Response
	followed; if practicable, utilize new, clean equipment meeting the most stringent of applicable Federal or State Standards. In general, commit to the best available emissions control technology. Tier 4 engines should be used for project equipment to the maximum extent feasible; lacking availability of non-road equipment that meets Tier 4 engine standards, the responsible agency should commit to using EPA-verified particulate traps, oxidation catalysts and other appropriate controls where suitable to reduce emissions of diesel particulate matter and other pollutants at the construction site; and consider alternative fuels and energy sources such as natural gas and electricity (plug-in or battery). Administrative controls: prepare an inventory of all equipment prior to project commencement and identify the suitability of add-on emission controls for each piece of equipment before groundbreaking; develop a traffic and parking management plan that maintains traffic flow and plan construction to minimize vehicle trips; and identify sensitive receptors in the project area, such as children, elderly, and infirmed, and specify the means by which impacts to these populations will be minimized (e.g. locate equipment and staging zones away from sensitive receptors and building air intakes).	change made to the EA.
7/U.S. EPA, Region 6	This section states "The Proposed Action would involve the use of vehicles and heavy equipment in the Project Area, which could result in mortality to individuals. Impacts to migratory birds would be greatest during the breeding season, approximately April 15 to July 15". In accordance with the Memorandum of Understanding (MOU) between BLM and the United States Fish and Wildlife Service (USFWS) pertaining to Executive Order (EO) 13186 and the Migratory Bird Treaty Act of 1918 (MBTA); the BLM and USFWS are to take a collaborative approach to promote the conservation of migratory bird populations. According to the MBTA it is illegal to harass, injure, or kill over 1,000 species of birds protected by this act. EPA recommends BLM consult with USFWS to determine the best strategies to avoid or minimize the impacts of the proposed action on migratory birds.	The BLM manages migratory birds in according to Instruction Memorandum No. NM-F00-2010-001, which states that for projects that disturb 4 or more acres, where disturbance would occur during the May 15 to July 31 breeding season, pre-construction nest searches are required. PNRC would comply with these requirements as a part of standard BLM mitigation. No change is made to the EA.
8/U.S. EPA, Region 6	Although the EA describes the socioeconomic baseline of the proposed project and addresses potential impacts of the alternatives upon the socioeconomics of the area, it does not link this to the potential environmental impacts of the proposed project. In addition to the analysis of potential direct impacts, BLM should address potential indirect and cumulative impacts. An analysis of indirect and cumulative	The mine is located in a remote area, far from population centers. Boundaries of the mine will not change. No economic impact or environmental impacts are anticipated; therefore, there would be no disproportionate impacts to protected groups. No changes were made to the EA.

Number/Source	Comment	Response
	impacts would take into account any impacts of past actions in the area on minority and low-income communities. In order to perform an environmental justice (EJ) analysis, BLM needs to link the socioeconomics of the area(% minority, low income) with the potential environmental impacts of the project (i.e., air, waste, water impacts to these communities), and then determine whether there is a resulting disproportionate EJ impact.	
9/U.S. EPA, Region 6	The EA indicates that Tribes were identified and contacted for the limited purpose of discussing the National Historic Preservation Act (NHPA), or other concerns of a limited scope. For example, in the section identified as Traditional Cultural Properties (TCP), it states that PNRC consulted with Laguna, Acoma, Zuni Hopi, and Navajo Tribes. There is, however, a lack of documentation that Government to Government consultation, under EO 13175, occurred for the proposed project. Due to the nature of the project, it appears it could affect tribal resources (including natural resources), citizens, or government services. OEJTA recommends that BLM contact and, as appropriate, initiate consultation with Tribes under EO 13175 concerning the potential effects of its actions and provide documentation of consultation.	BLM sent letters to Pueblo of Acoma, Navajo Nation Historic Preservation Department, Casamero Lake Chapter, Whitehorse Lake Chapter, Littlewater Chapter, Hopi Tribal Council, Pueblo of Zuni, and Pueblo of Laguna requesting input on review of this proposal. Two letters were received in response to this request. The Pueblo of Laguna August 14, 2012 response letter stated this undertaking would not have a significant impact at this time. The Hopi Tribe September 5, 2012 response letter requested copies of previous BLM-Hopi correspondence on this proposal and a copy of the draft EA. BLM has completed consultation.
10/U.S. EPA, Region 6	This section states that there would be no change in the amount of solid or regulated waste generated by the mine. Section 3.16 states that regulated waste would be taken off site by a licensed contractor, and that solid waste will be used as backfill in the mine pits. The information in section 3.16 directly contradicts the information in section 4.16. Amend sections 3.16 and 4.16 to correctly state if there will be wastes generated by the mine, and how the waste will be disposed or treated.	There would be no change in the volume or rate of generation of solid and regulated waste at the mine as stated in Chapter 4, and wastes would be handled according to existing procedures, as described in Chapter 4. No change to the EA.

The following comments were received on the November 2013 preliminary Environmental Assessment for the El Segundo Mine Lease by Application.

Number/Source	Comment	Response
1/Wild Earth Guardians	BLM's analysis does not demonstrate that the impacts of the proposed lease will be insignificant and given a number of uncertainties around the impacts that the BLM has inadequately addressed.	No changes to document made because the BLM has determined that the analysis is adequate and that the impacts are not significant. Please see the Finding of No Significant Impact (FONSI).
2/Wild Earth Guardians	BLM has never before analyzed or assessed the impacts of the El Segundo coal mine under the National Environmental Policy Act ("NEPA"), raising serious concerns that an EA is not the appropriate level of NEPA analysis. BLM's own NEPA manual indicates that "approval of any mining operation where the area to be mined, including any area of disturbance, over the life of the mining plan is 640 acres or larger in size" normally requires the preparation of an EIS. BLM NEPA Handbook, Section 7.2.	Citing 516 DM 11.8(B) and (C), the BLM NEPA Handbook, Section 7.2, page 70 states, "If, for any of these actions it is anticipated that an EIS is not needed based on potential impact significance, an environmental assessment will be prepared." The Environmental Assesment (EA) and FONSI disclose that significant impacts are not anticipated, making the preparation of an environmental assessment the appropriate document for the proposed project. The portion of the mine on private land is pre-existing and is therefore part of the affected environment.
3/Wild Earth Guardians	We are concerned that the BLM has not adequately assessed the fair market value of the proposed coal lease in accordance with the Mineral Leasing Act, 30 U.S.C. § 201(a). Indeed, under the BLM's Economic Evaluation of Coal Properties Handbook at H-3070-1, the BLM appraises coal property based on either the "Comparable Sales" approach or the "Income" approach. BLM Handbook, H-3070-1.III. Given the lack of adequate comparable lease sales in the area (not only have there not been recent lease sales in the region, but all other subbituminous coal mines feed only one coal-fired power plant), it would appear that the BLM would be obligated to follow the income approach. Among other factors that must be considered under the income approach are, "Capitol Cost Elements," which include, among other things, "premining studies" on "environmental" expenditures related to the "cost of developing baseline environmental data and establishing mitigation protocol and monitoring activities to ensure compliance with Federal and State regulations." BLM Handbook, H-3070-1, Section III.B.4.a.1. In other words, environmental costs matter in assessing fair market value. The fact that the BLM is presuming fair market value prior to adequately analyzing and assessing environmental impacts is a strong indication that the Agency is not ensuring it is recovering	BLM has adequately assessed the fair market value of the tract. In this case, both the Comparable Sales approach and Income approach were used. The fact that there have been no recent sales in the immediate area of the subject tract does not preclude the use of the comparable sales approach. Sales from outside of the immediate area were examined for comparability to the subject tract based on a number of factors, including coal quantity and quality, productivity, mining costs and net revenues. In the use of the Income approach, all major cost items were considered. The commenter seems to be implying that underestimation of environmental costs would cause the tract to be undervalued. In fact, the opposite is true. Every additional cost included in a cash flow calculation tends to reduce the net present value of the proposed project.

	fair market value for the El Segundo coal lease in accordance with the Mineral Leasing Act.	
4/Wild Earth Guardians	The BLM's competitive coal leasing handbook states that the Agency must request comments and schedule a public hearing on a draft environmental analysis for a coal lease by application, and that notices of a public hearing "must be published in the Federal Register." BLM Handbook, H-3070-1, Chapter 3, Section III.B.4.a.1; see also 43 C.F.R. § 3425.3(a). Here, it does not appear that the BLM is intending to schedule a public hearing on its draft EA or to public notice of the public hearing in the Federal Register. Although the BLM is soliciting public comment, the Agency appears to be falling short of its duty to ensure an adequate public hearing and adequate public notice in the Federal Register. Before the BLM can take any action on the proposed lease by application, it must follow its coal leasing handbook and provide adequate notice and opportunity for public comment.	The initial draft EA was released on May 28, 2012. An informal public hearing was held on July 26, 2012, at the Cibola County Convention Room in Grants, and the draft EA was made available at the meeting. After receiving a letter from Wild Earth Guardians (September 7, 2012) pointing out that we should hold a hearing on the EA, Maximum Economic Recovery (MER) and Fair Market Value (FMV), a formal public hearing was held on February 8, 2013 (FRN NOA January 9, 2013, 78 FR 1880), with a comment period ending March 11, 2013. After further revision, the EA was again released for public comment on November 19, 2013, with the comment period ending on December 19, 2013.
5/Wild Earth Guardians	BLM is required to apply four key criteria to assessing whether lands should be made available for leasing within a planning area. These criteria include "development potential," an assessment of suitability, a multiple use analysis, and surface owner consultation. See BLM Handbook, H-3070-1, Chapter 1, Section I. Although these criteria should normally be applied during land use planning (i.e., in the preparation of a resource management plan ("RMP"), 43 C.F.R. § 3420.1-4(e), in this case it does not appear that the BLM fully applied these four criteria in the development of the 2003 Farmington Field Office RMP. In fact, at the time the RMP was adopted, the BLM stated, "no new coal mines are currently proposed[.]" Farmington RMP Final Environmental Impact Statement at 4-40. Yet the El Segundo coal mine, which began operation in 2008 (see EA at 1-2), clearly is a new mine and the proposed lease is clearly meant to facilitate the expansion of this new mine. Here, the BLM must not only assess whether leasing is appropriate under the four criteria, but it also appears that the Agency must supplement the RMP Final Environmental Impact Statement in light of its failure to adequately analyze and assess coal mining impacts at the planning level, in accordance with 40 C.F.R. § 1502.9(c).	The December 2003 Farmington Resource Manage Plan with Record of Decision, did include consideration of the El Segundo Lease by Application (LBA) tract. The Decision contains the statement "The decision is hereby made to approve the Proposed Farmington Resource Management Plan as described in the Preferred Alternative (Alternative D) in the Farmington PRMP/FEIS, published April 4, 2003. In addition that portion of Alternative B regarding oil and gas leasing in the Negro Canyon SDA is approved". The part of Alternative D in the PRMP/FEIS pertinent to the LBA states "The two Peabody and BHP coal tracts identifying federal lands suitable for coal leasing described under Alternative B would be considered under this alternative. These lands are in the vicinity of Lee Ranch, Twin Peaks, and East Piñon areas (see Map 2-4) for the location of these tracts. The 20 unsuitability criteria would be applied during the leasing process (PRMP/FEIS at 2-246)". This is acceptable, since 43 CFR 3461.3-1(b), Application of criteria on unleased land, states "(b) The unsuitability criteria shall be initially applied either: (1) During land use planning or the environmental assessment conducted for a specific lease application; or (2) During land use planning under the provisions of § 3420.1–4 of this title". In the case of the El Segundo LBA, the applicable unsuitability criteria were analyzed in the Environmental Analysis (EA) for the LBA, and are restated in the Decision Record.

		The applicable portion of the RMP, Chapter 2, Management Decisions, states "In a preliminary application of the unsuitability criteria for the EIS, approximately 378,875 acres were determined to be suitable for future leasing and development in the FFO area. The remainder of the FFO boundary can be considered if there are (1) commercial quantities, (2) areas with a coal transportation system, and (3) when there is a viable market for the coal". The last sentence applies to the El Segundo LBA tract. Exploration conducted by Peabody has shown that commercial quantities exist, the existing El Segundo mine has a transportation system, and there is obviously a viable market for the El Segundo coal. These factors are directly related to, and demonstrate a part of "development potential". The other consideration of "development potential" relates to reclaimability of the lands. Reclaimability is addressed in the EA for the LBA tract. Elements relating to multiple use analysis were included as part of the considerations addressed in the EA for the LBA. The regulations governing surface owner consent at 43 CFR 3427.2(a) (1), Procedures, provide in part "For lands offered for lease sale pursuant to subpart 3425 of this title, consents or written evidence thereof shall be filed prior to the posting of the lease sale notice". Subpart 3425 governs lease by application. Peabody submitted surface owner consent documents for the LBA tract in April 2013.
6/Wild Earth Guardians	It does not appear the BLM assessed the appropriateness of leasing based on the unsuitability criteria as required by 43 C.F.R. § 3420.1-4(e)(2). These criteria, set forth at 43 C.F.R. § 3461.5, prohibit leasing in a number of circumstances, including where bald and golden nest sites and concentration areas, where there are falcon nest sites, where there exists high priority habitat for migratory birds, where there exists high interest wildlife and plant species, and where mining would "materially damage" the quantity or quality of water in surface or underground systems that would supply alluvial valley floors. The EA does not assess whether the lands proposed for leasing are suitable in accordance with these criteria.	See response to comment 5.
7/Wild Earth Guardians	We are particularly troubled by the EA's disclosure that current mining activities have caused golden eagles and prairie falcons to	The EA mistakenly states that there was an active golden eagle nest in 2006 in the Action Area. This nest was last documented as active

	abandon nest sites within the permit boundary for the El Segundo coal mine. See EA at 4-15. This indicates that already, the El Segundo mine has impacted lands that should be unsuitable for mining. Furthermore, this disclosure indicates that Peabody has violated Surface Mining Control and Reclamation Act ("SMCRA") rules at 30 C.F.R. § 816.97(c), which prohibit the taking of golden eagles, as well as the Bald and Golden Eagle Protection Act, which also prohibits the taking of golden eagles, including their nests, 16 U.S.C. § 668(a).	in 2002. See Section 4.10.1. Mitigation measures were added to ensure that this nesting territory (as well as any other golden eagle nest found in the future) would not be impacted by mine activities. No other raptor nest is known to occur with the Action Area.
8/Wild Earth Guardians	A key example is with water quality impacts. If BLM limits it analysis assessment of direct and indirect water quality impacts only to the effects of developing the El Segundo coal lease, then the Agency would completely overlook the water quality impacts associated with coal combustion as they would not be "cumulative" in nature. Indeed, water quality impacts associated with the operation and maintenance of the Springerville power plant would not contribute to cumulative impacts in the direct vicinity of the El Segundo lease area. In fact, water quality impacts associated with development of the lease area would impact the Rio Grande watershed, while impacts associated with coal combustion at Springerville would impact the Little Colorado watershed. It is notable that the EA does not address the water quality impacts associated with coal combustion.	Potential water quality impacts associated with coal combustion are outside the scope of the EA for the El Segundo mine because the impacts are speculative. Whereas assumptions can be made to estimate the emissions resulting from coal combustion based on standard emissions factors, a comparable method, to our knowledge, is not available for water quality analysis. Furthermore, impacts to water quality associated with coal combustion are the purview of the state environmental regulatory agencies where power plants are located, and it is a reasonable assumption that those agencies ensure that power plants comply with applicable water quality standards. Impacts to water resources can be found in section 4.4 (direct and indirect impacts) and section 5.4 (cumulative impacts).
9/Wild Earth Guardians	The EA makes no effort to disclose emissions associated with coal combustion activities or to actually analyze and assess impacts to pollutant concentrations, such as ozone, particulate matter, sulfur dioxide, and nitrogen dioxide.	Page 3-1 states "Inventories of these emissions are given in Appendix D." Appendix D was inadvertently not posted with the draft EA in November 2013. Appendix D had emissions inventory for criteria pollutants and VOCs, HAPs and GHGs. A discussion of air resource impacts is included in Appendix D.
10/Wild Earth Guardians	The BLM asserts in the EA that "The coal lease would not result in additional coal emission from client power plants for reasons listed below[.]" EA at 5-9. Although it is unclear what the "reasons listed below" are, BLM's assertion defies reality.	See 5.2.2. This paragraph has been modified to clarify that power plants enter into contracts with mines to provide coal necessary for generation demands. While the project lease coal will not result in "additional" emissions at power plants, it is possible to estimate the emissions that will result from the combustion of the project lease coal, and those estimates are provided in this section of the EA.
11/Wild Earth Guardians	If coal is burned, it produces emissions, and although the BLM may believe coal burning will happen regardless of whether the El Segundo lease is issued, this does not change the fact that the El Segundo coal will not be burned if it is not leased. In essence, no burning means no emissions. Unless the BLM demonstrates the El Segundo coal will somehow spontaneously combust in place	See 5.2.2. Emissions for criteria pollutants and greenhouse gases were estimated for combustion of the project lease coal.

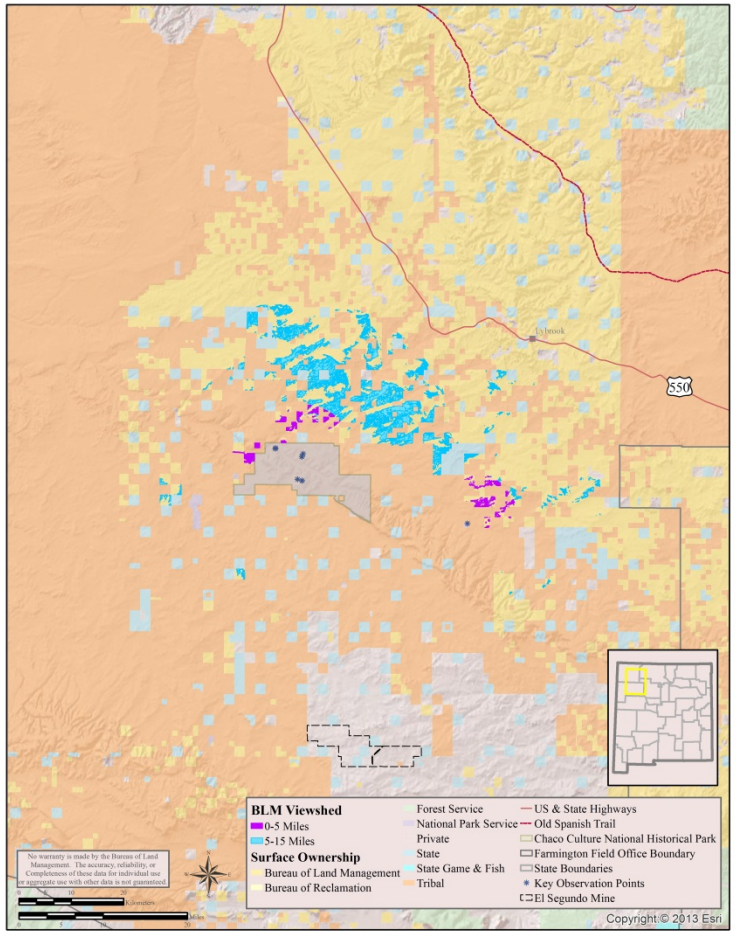
	and produce emissions, regardless of whether or not it is issued, the BLM has no basis for asserting that issuance of the El Segundo coal lease will not result in air emissions from coal combustion facilities.	
12/Wild Earth Guardians	Although the BLM claims that it is difficult to determine how much coal from the El Segundo lease will be burned in any given power plant at any given time, the BLM can reasonably estimate emissions based on Peabody's projected production rates for the El Segundo lease (set forth in Table 2.2-3 of the EA), as well as by assessing emissions from power plants that have long-term contracts with Peabody...the U.S. Environmental Protection Agency ("EPA") has emissions data for all U.S. coalfired power plants available on its Air Markets Program Database website, http://ampd.epa.gov/ampd/, and Environment and Compliance History Online database, http://echo.epa.gov/.	See 5.2.2. Criteria pollutant emissions were estimated for combustion of project lease coal.
13/Wild Earth Guardians	The BLM has no basis for asserting that simply because something is regulated, such as air pollution, that the impacts are not significant. With regards to air pollution, facilities, such as power plants, are often allowed to release pollution in amounts that can still negatively impact public health and the environment and pose potentially significant impacts. Power plants frequently release air pollution that can cause or contribute to exceedances or violations of national ambient air quality standards, or that otherwise can endanger public health.	See 5.2.2. This section was clarified to remove language that would imply that regulation of air pollution would lead to insignificant impacts.
14/Wild Earth Guardians	The EA does not even address the impacts of coal combustion by-product production, disposal, and management. This is a major oversight as available information indicates that the coal-fired power plants in Arizona dispose of large amounts of coal combustion waste, often in ponds that are rated as "high" to "significant" hazards. See Exhibit 1, Earthjustice, "Arizona and Coal Ash Disposal in Ponds and Landfills."	The EA analyzes impacts to regulated waste (see Sections 3.16 and 4.16). Because no changes to the volume or type of waste would occur, it is not necessary to analyze the cumulative impacts on this issue (BLM NEPA Handbook, Section 6.8.3.1, page 57). Furthermore, regulation of solid and hazardous wastes are the purview of the state environmental regulatory agencies where power plants are located, and it is a reasonable assumption that those agencies ensure that power plants comply with applicable standards.
15/Wild Earth Guardians	The BLM finally seems to assert that coal combustion activities somehow pose insignificant impacts by virtue of the fact that they are ongoing. For example, the EA notes that, "The power plants in question were in operation before the El Segundo mine began production[.]" EA at 5-9. The fact that coal-fired power plant operation may be ongoing has no bearing on the potentially significant impacts of power plant operation. An action may be ongoing, yet still pose significant impacts. If the impacts of a	See 5.2.2. This section was clarified to remove language that would imply that ongoing coal combustion activities would lead to insignificant impacts.

	significant action somehow became "insignificant" simply because of the passage of time, then no significant impacts would ever occur. We are skeptical that this simplistic assessment holds true.	
16/Wild Earth Guardians	The EA provides no emissions data from indirect activities related to the development of the El Segundo coal lease, including locomotive emissions, coal dust emissions from coal trains, emissions from conveyors, emissions from crushers, emissions from coal silos and train loading, vehicle traffic to and from the mine (both of heavy equipment and worker traffic), emissions from stationary internal combustion engines on-site (e.g., generators, conveyor engines, etc.), and emissions from mining activities in other parts of the coal mine. The EA does not address emissions from these activities raising concerns that the BLM has not adequately analyzed and assessed the direct and indirect air quality impacts of the El Segundo coal lease.	All of these emissions are calculated in Appendix D, except for locomotive emissions and coal dust emissions from coal trains. Emissions from existing mining activities (and other emissions in the region) are listed in Appendix F. While the duration of mining may be prolonged, the annual rate of mining will remain unchanged. Therefore, the annual emissions from transport of the coal via locomotive will remain unchanged, and calculation of emissions from transport would not assist in making a reasoned choice among alternatives.
17/Wild Earth Guardians	The EA asserts that NAAQS will be protected, yet discloses that a number of PM10 exceedances have occurred over the years. See EA at 3-3. The BLM, however, disregards these exceedances as "exceptional events." While it is unclear on what basis the BLM has concluded that these exceedances were somehow "exceptional," the Agency's claims appear dubious given that these exceedances have occurred so frequently. In fact, as the EA discloses, between 2008 and 2010, 15 exceptional events occurred, including 11 in 2010. The reasons cited include "high winds" and "temperature inversion." Given the frequently that these events occurs, it appears that they are not "exceptional," but rather normal. Regardless, the EPA has promulgated rules and detailed guidance regarding the handling of air quality data influenced by "exceptional events." It does not appear as if BLM's assessment of whether the disclosed PM10 exceedances were truly "exceptional events" was guided by these rules and guidance. For example, EPA rules state that exceptional events do not include "stagnation of air masses or meteorological inversions, a meteorological event involving high temperatures or lack of precipitation, or air pollution relating to source noncompliance." 40 C.F.R. § 50.1(j). Here, according to the EA, two of the claimed "exceptional events" were due to inversions, which the EPA's	See Section 3.1. This section was changed to remove discussion of exceptional events. Exceptional events designations are made by USEPA in coordination with local, state and tribal governments. A regulated entity cannot claim exceptional events. The table at 3.1-2 was renamed to remove the reference to exceptional events.

	rules explicitly state cannot be considered an "exceptional event." Furthermore, there is no disclosure in the EA as to whether the source was complying with any and all particulate matter control requirements. EPA rules also require that for an "exceptional event" to be valid, a state must solicit public comment on the claimed event and prohibits the submission of an "exceptional event" claim later than three years following the end of the calendar quarter in which the exceedance was recorded. See 40 C.F.R. § 50.14(c)(3). In this case there is no indication that New Mexico provided any public notice or opportunity to comment on any claimed "exceptional event" at the El Segundo coal mine, meaning that, contrary to the BLM's assertions otherwise, the recorded PM10 exceedances are not excusable.	
18/Wild Earth Guardians	The EA does not adequately analyze and assess impacts to the 1-hour nitrogen dioxide NAAQS because the BLM did not model the impacts to NO2 concentrations. In the EA, the BLM simply asserts that impacts to the 1-hour NO2 will "not increase." EA at 4-2. This is not an analysis or assessment of impacts. For one thing, it fails to shed any light on how current activities are affecting the 1-hour NO2 NAAQS. For all we know, exceedances and/or violations of the 1-hour NO2 NAAQS may already be occurring; simply "not increasing" these impacts does not mean that such impacts are insignificant. Furthermore, BLM's assertion is belied by the fact that mining the El Segundo lease will lead to more mining activity than would otherwise occur, meaning there would, in fact, be increased impacts to NO2 concentrations. BLM's assertion otherwise defies its own disclosures in the EA. The EA clearly states that more mining will occur as a result of the El Segundo lease being issued, in some cases by more than a million tons annually.	A qualitative analysis of 1-hour NO2 impacts is included in Appendix D. Because the rate of mining is not increasing overall, 1-hour NO2 impacts will not change due to mining in the project area.
19/Wild Earth Guardians	Although the EA cites 1-hour NO2 monitoring data showing compliance with the NAAQS, these monitors are all more than 100 miles away and provide no insight into the local impacts of mining operations to 1-hour NO2 concentrations. As a short-term standard, the 1-hour NO2 NAAQS is meant to assess health impacts near sources, not far. This is especially the case where stack heights, or the source of the emissions, are close to the ground. Here, it is highly unlikely that NO2 emissions from the El Segundo mine will impact monitors more than 100 miles away. This further underscores the need for the BLM to conduct	Because the rate of mining is not increasing overall, 1-hour NO2 impacts will not change due to mining in the project area.

	dispersion modeling. This should be not be a difficult task. The Forest Service recently prepared dispersion modeling to analyze the NO2 impacts of oil and gas leasing and development on the Fishlake National Forest in Utah. See Exhibit 2, U.S. Forest Service, "Fishlake National Forest Oil and Gas Leasing Final Environmental Impact Statement, Supplemental Air Quality Modeling Report: 1-hr NO2 and 1-hr SO2" (Sept. 2012).	
20/Wild Earth Guardians	We are especially concerned over the impacts of blasting activities to the 1-hour NO2 NAAQS. The EA indicates that blasting emissions just related to the development of the El Segundo coal lease could amount to 26.42 tons per year in 2020. Given that the EA estimates 12 blasts in the El Segundo coal lease area in 2020, this would mean a total of 2.2 tons of NO2 for every blast that year. Given that blasts likely last an hour or less, this is an extremely large amount of air pollution in a very short amount of time, raising concerns that short-term impacts to ambient NO2 concentrations could easily exceed the NAAQS. To put this into context, the Cholla power plant, which burns coal from the El Segundo mine, released 9,299 tons of nitrogen oxides in 2012. See Exhibit 3, EPA, "Emissions—Unit Level Data Report, Cholla" (Dec. 18, 2013). Assuming that the plant operated 8,760 hours that year (the maximum possible for the entire year), this would amount to 1.06 tons of nitrogen oxides per hour, more than 50% less nitrogen oxides per hour than what blasting produces. In other words, on an hourly basis, blasting produces more nitrogen oxides, including nitrogen dioxide, than coal-fired power plants.	The number of blasts per year and the duration of each blast will not increase as a result of the proposed action; therefore, there will be no increase in annual emissions. This was clarified in section 4.1.1.
21/Wild Earth Guardians	The Cumulative Impacts Assessment Area does not appear to encompass the area that will be directly and indirectly impacted by the El Segundo coal lease. Specifically, this area appears only to encompass the area of northwestern New Mexico. It does not encompass areas in Arizona that will be impacted directly, indirectly, and cumulatively by coal transport and coal combustion. This is a significant flaw as the direct and indirect impacts of BLM's leasing action will not be confined just to northwestern New Mexico. As explained above, the direct and indirect impacts will extend to coal combustion activities in Arizona. Even the BLM acknowledges this in the EA. Without addressing potentially significant cumulative impacts in this area as well, the BLM has no basis to assert that, cumulatively, the impacts of the El Segundo coal lease will not be significant.	Appendix F has been revised to Include Arizona sources in Apache, Navajo, and Cochise counties, as well as Navajo Nation sources. In addition, criteria pollutant emissions from these counties and the Navajo Nation are reported in Table 5.2-1 and HAP and mercury emissions for Arizona and the Navajo Nation are reported in Table 5.2-4. Additional reasonably foreseeable future actions in Arizona were included in Table 5.1-1.

	Among the cumulative actions in Arizona that must be addressed are the operation and maintenance of power plants (including the Apache, Cholla, Coronado, Navajo, and Springerville power plants) and other industrial facilities (including natural gas compressor stations and the Catalyst paper mill).	
22/Wild Earth Guardians	The BLM asserts in the EA that, "No cumulative effects to traffic and transportation are expected to occur, as there would be no increase in traffic levels, including use of rail lines, associated with the Proposed Action above the current baseline." EA at 5-7. It is specious for the BLM to argue that impacts will not be "increased." The EA itself discloses that development of the El Segundo coal lease will lead to the additional mining of up more than one million tons of coal annually by 2016. In 2017, it is expected the mine will reach a peak production rate of nearly 10 million tons annually. Development of the El Segundo coal lease will clearly lead to the transport of more coal than would otherwise be transported, as well as greater traffic and other impacts associated with the development of this added coal. Regardless, even if the El Segundo coal lease did not "increase" impacts, this does not mean there are no cumulative impacts associated with transportation, traffic, and other activities. We find it difficult to believe that coal is not currently being transported from the El Segundo mine to power plants in the southwest, and that this activity poses absolutely no impacts to the environment. Even if the El Segundo coal lease serves only to maintain existing and ongoing activities, this is an impact that must be addressed in the context of analyzing and assessing cumulative impacts.	Although authorization of the federal El Segundo coal tract would allow mining of that coal, the rate of mining would be the same. That is, mining of other areas of the larger mine will be foregone while the federal tract is mined. Hence, there would be no increase in traffic congestion as a result of mining the federal El Segundo tract, nor would there be an increase in the rate of locomotive transport of coal away from the mine. Because there are no direct impacts to traffic and transportation, no cumulative impacts analysis is necessary, as per the BLM NEPA Handbook, Section 6.8.3.1, page 57. The EA discloses that coal is being transported from the mine via rail in Section 3.18, Traffic and Transporation.
23/Wild Earth Guardians	The EA appears to not adequately analyze and assess visual impacts as observed from Chaco Canyon and the outliers, as well as analyze and assess how the proposed lease may impact the night skies of Chaco in light of the fact that the National Historical Park was recently certified as an International Dark Sky Park. See Exhibit 3, National Park Service, "International Dark Sky Park," website available at http://www.nps.gov/chcu/naturescience/darkskypark.htm (last accessed Dec. 18, 2013). Lights from the El Segundo coal mine would seem to pose potentially significant impacts to the ability of Chaco Culture to maintain its dark skies certification, as well as to continue to provide unmatched stargazing opportunities. The	No additional lighting will be installed as part of the proposed action. Mining activities on private lands began in 2008 and were ongoing during the evaluation and designation of Chaco Cultural National Historical Park (CCNHP) as an International Dark Sky Park. Any light emanating from the existing mine operations was accounted for in that certification. In 2011, CCNHP identified several key observation points (KOPs) from which visitors could overlook BLM-managed lands. BLM conducted a viewshed analysis, which reveals the El Segundo Mine is not visible from those KOPs.

	EA must at least address this new information and analyze and assess how mining of the El Segundo coal lease, including ongoing mining operations, will affect the dark skies around Chaco Culture National Historical Park.	
24/Wild Earth Guardians	We are concerned that the BLM has not accurately analyzed the fair market value of the proposed lease. When the BLM originally sold the El Segundo coal lease, it accepted a bid of approximately 25 cents per ton. However, it appears that this bid is significantly lower than the actual value of the coal. According to data from the Energy Information Administration ("EIA"), coal from the El Segundo mine has been selling for an average of $2.195 per mmBtu. This is based on the average of	The bonus bid is the amount a leasee can pay for the coal after subtracting from the sales price all costs related to mining of the coal, including labor, operating and capital costs, royalties , taxes, and return on investment. Bonus bids for coal are generally a few percent of the sales price. The BLM is aware of the information available from the EIA, and has used it in the appraisal of the tract. The EIA is the price of the coal as delivered to the power plant. This number has two

	fuel cost reports available from EIA form 923 for 2012 and 2013. These forms are available at http://www.eia.gov/electricity/data/eia923/. Given that the average Btu content of the El Segundo coal lease is 9,300 per pound (see EA at 5-9), and that the amount of coal comprising the lease is 9.2 million tons, this means the value of the coal may be as high as $375,608,400.3 This amounts to around a value of around $40.83 per ton for the El Segundo coal lease. This is 162 times higher than Peabody's bid on the El Segundo lease. In light of this, it is difficult to understand how 25 cents per ton represents fair market value, or how 25 cents per ton ensures maximum economic recovery. To put this into context, 25 cents per ton is 162 times lower than the actual value of the coal. Although it is unclear what the cost of producing the coal is, Peabody has indicated that El Segundo is one of the most productive mines in the southwestern U.S. given its low overburden ratios. See http://www.peabodyenergy.com/content/277/Publications/Fact-Sheets/El-Segundo-Mine. It is unclear how 25 cents per ton amounts to fair market value given that the coal sells for 162 times more than this price and given the productivity of the El Segundo mine. To this end, we request the BLM reassess the fair market value of the proposed coal lease and reassess whether 25 cents per ton truly ensures a fair return for the American public and maximum economic recovery.	components, (1) the price of the coal at the mine, and (2) the cost to transport the coal from the mine to the plant. Transportation costs can be a significant fraction of the delivered price, and must be subtracted from the delivered price to determine the selling price at the mine. The commenter did not consider this, making their calculation of the revenue to Peabody, and the ratio of the bonus bid to coal value, inaccurate. As to the productivity and low overburden ratio attributed to El Segundo, what the commenter states is true at the present time. However, as mining proceeds over time, the coal seams become deeper and therefore, the overburden becomes thicker and the mining costs increase. The economic limit to mining occurs when the cost to mine a ton of coal equals the selling price of that ton of coal. The mining of all of the coal to this limit is, by definition, maximum economic recovery. This has been considered in the mine plan. The determination of bonus bid considers mining of the entire deposit to the economic limit, not just the mining of the shallowest portions of the deposit.

Appendix F—Emissions Sources in Eight-County Region

Appendix F - 2011 Criteria Pollutant Emissions in Cumulative Impact Area for Air Resources

Table F-1. Annual criteria pollutant emissions from facilities in New Mexico (Cibola, McKinley, Rio Arriba, San Juan, and Sandoval counties), Arizona (Apache, Cochise, and Navajo counties), and the Navajo Nation in 2011 (EPA, 2013). CO, carbon monoxide; VOC, volatile organic compounds; NO_x, nitrogen oxide compounds; SO_2, sulphur dioxide; $PM_{2.5}$, particulate matter less than 2.5 microns in diameter; PM_{10}, particulate matter less than 10 microns in diameter. Note that although NO_2 is the EPA-regulated criteria pollutant, it is NO_x.

	Tons					
Emission Source	**CO**	**VOC**	**NO_x**	**SO_2**	**$PM_{2.5}$**	**PM_{10}**
Apache County, Arizona - Total	**6,851.64**	**313.12**	**15,878.00**	**13,402.12**	**2,700.38**	**3,683.67**
Chinle Municipal Airport	18.66	1.34	1.00	0.20	0.89	0.99
Coronado Generating Plant	5125.99	98.90	9017.48	7352.00	594.26	767.99
St Johns Industrial Airport	46.03	1.27	0.54	0.11	0.75	0.96
Town Of Springerville Municipal Airport	13.05	0.39	0.18	0.04	0.23	0.29
Tucson Electric Power Co - Springerville	1,633.17	210.83	6,858.63	6,049.74	2,104.01	2,913.13
White Mountain Airport	0.57	0.01	0.00	0.00	0.01	0.01
Window Rock Airport	14.17	0.38	0.17	0.03	0.23	0.30
Cochise County, Arizona - Total	**1,470.84**	**93.51**	**4,768.01**	**3,922.18**	**272.13**	**482.46**
AEPCO - Apache Generating Station	299.30	40.75	4,558.29	3,920.39	128.60	276.28
Ammon Airport	0.54	0.01	0.00	0.00	0.01	0.01
Apache Nitrogen Fertilizer Plant	19.21	1.26	157.52	0.14	121.09	177.86
APS - Fairview Generating Station	0.02	0.41	1.90	0.10	0.04	0.04
Ash Creek Airport	0.01	0.00	0.00	0.00	0.00	0.00
Benson Airport	0.39	0.01	0.01	0.00	0.01	0.01
Benson Municipal Airport	23.92	0.72	0.27	0.05	0.40	0.50
Bisbee Douglas International Airport	79.61	3.07	0.70	0.12	1.47	1.69
Bisbee Municipal Airport	13.88	0.37	0.17	0.03	0.22	0.29
Circle H Ranch Airport	0.01	0.00	0.00	0.00	0.00	0.00
Cochise College Airport	133.17	3.54	1.61	0.33	2.14	2.78
Cochise County Airport	26.18	0.78	0.29	0.06	0.44	0.55

Emission Source (Cochise Co., Cont'd)	CO	VOC	NO_x	SO_2	$PM_{2.5}$	PM_{10}
Cochise County Western Regional Landfill	0.64	--	--	--	0.06	3.78
Copper Queen Hospital Airport	0.27	0.01	0.01	0.00	0.01	0.01
Douglas Municipal Airport	31.17	0.83	0.38	0.08	0.50	0.65
EPNG - Bowie Compressor Station	27.04	1.30	40.75	0.24	0.59	0.59
EPNG - San Simon Compressor Station	0.01	0.95	0.03	0.00	0.00	0.00
EPNG - Willcox Compressor Station	0.01	0.95	0.80	0.00	0.01	0.01
Evelyn Field	0.54	0.01	0.00	0.00	0.01	0.01
Fort Omotse Airport	0.27	0.01	0.01	0.00	0.01	0.01
Four Pillars Airport	1.14	0.01	0.01	0.00	0.02	0.02
Inde Motorsports Ranch Airport	0.54	0.01	0.00	0.00	0.01	0.01
Leroy Airport	1.02	0.01	0.01	0.00	0.01	0.02
Lizzy Lizard Airport	0.54	0.01	0.00	0.00	0.01	0.01
Lone Mountain International Airport	0.01	0.00	0.00	0.00	0.00	0.00
Mystery Well Ranch Airport	0.58	0.01	0.00	0.00	0.01	0.01
Northern Cochise Community Hospital Airport	0.27	0.01	0.01	0.00	0.01	0.01
Rancho Relaxo Airport	0.54	0.01	0.00	0.00	0.01	0.01
Rancho San Marcos Airport	0.01	0.00	0.00	0.00	0.00	0.00
Sierra Vista Community Hospital Airport	0.27	0.01	0.01	0.00	0.01	0.01
Sierra Vista Muni-Libby Airport	801.76	38.25	5.15	0.61	16.34	17.14
Stronghold Airport	0.54	0.01	0.00	0.00	0.01	0.01
Thompson International Aviation	0.54	0.01	0.00	0.00	0.01	0.01
Tombstone Municipal Airport	0.96	0.03	0.01	0.00	0.02	0.02
Tribal Air	0.01	0.00	0.00	0.00	0.00	0.00
Whetstone Airport	5.95	0.16	0.07	0.01	0.10	0.12
Navajo County, Arizona - Total	**1,850.31**	**55.17**	**13,753.36**	**9,704.24**	**569.01**	**618.60**
APS - Cholla Power Plant	1,350.30	2.25	10,995.40	6,738.30	361.26	378.29
Catalyst Paper (Snowflake) Inc	95.50	13.24	2,183.58	2,896.09	110.29	133.26
Cibecue Airport	0.06	0.00	0.00	0.00	0.00	0.00
Holbrook Railyard	11.07	6.21	99.58	0.75	2.48	2.56

Emission Source (Navajo Co., Cont'd)	CO	VOC	NOx	SO2	PM 2.5	PM 10
Holbrook Municipal Airport	10.29	0.27	0.12	0.03	0.17	0.21
Kayenta Airport	5.37	0.22	0.13	0.03	0.14	0.16
Mogollon Airpark	2.74	0.03	0.01	0.00	0.04	0.05
Navapache Rgnl Medical Center Airport	0.27	0.01	0.01	0.00	0.01	0.01
Painted Desert Landfill (Pen-Rob)	1.94	6.12	0.63	0.10	5.91	14.31
Peabody Bedard Field	0.01	0.00	0.00	0.00	0.00	0.00
Polacca Airport	0.57	0.02	0.01	0.00	0.01	0.01
Rocky Ridge Airport	0.01	0.00	0.00	0.00	0.00	0.00
Show Low Municipal Airport	56.91	7.27	4.98	0.60	0.75	0.92
Snowflake White Mountain Power Plant	208.89	1.40	211.97	66.24	80.30	80.60
Taylor Airport	10.65	0.31	0.16	0.03	0.19	0.24
White Mountain Lake Airport	0.37	0.01	0.01	0.00	0.01	0.01
Whiteriver Airport	11.33	0.31	0.13	0.03	0.18	0.24
Winslow Airport	28.45	15.97	255.99	1.92	6.38	6.57
Winslow-Lindbergh Regional Airport	55.59	1.52	0.66	0.13	0.90	1.16
Wisky Ranch/Chevlon Airport	0.01	0.00	0.00	0.00	0.00	0.00
Cibola County, New Mexico - Total	**25.37**	**0.87**	**0.46**	**0.09**	**0.54**	**0.66**
Cubero Airport	0.52	0.01	0.00	0.00	0.01	0.01
Grants-Milan Municipal Airport	23.80	0.85	0.45	0.09	0.52	0.63
High Lonesome Airport	0.52	0.01	0.00	0.00	0.01	0.01
Mystic Bluffs Airport	0.53	0.01	0.00	0.00	0.01	0.01
McKinley County, New Mexico - Total	**488.85**	**237.42**	**3,954.31**	**1,310.13**	**44.55**	**77.92**
Black Rock Airport	0.25	0.02	0.02	0.00	0.01	0.02
Bluewater Compressor Station	13.85	1.28	64.66	0.95	0.70	0.70
Crownpoint Airport	1.24	0.08	0.05	0.01	0.05	0.06
Gallup Airport	10.22	5.74	91.97	0.69	2.29	2.36
Gallup Municipal Airport	13.69	1.36	3.00	0.32	0.43	0.48
Gallup Refinery	107.52	34.29	330.99	48.79	23.09	35.12
Prewitt Escalante Generating Station	249.26	29.80	3,370.95	1,256.92	15.12	36.33

Emission Source (McKinley Co., Cont'd)	CO	VOC	NOx	SO2	PM 2.5	PM 10
Star Lake Compressor Station	65.34	6.27	55.15	2.22	1.05	1.05
Thoreau No5 Compressor Station	0.08	0.37	1.01	--	0.00	0.00
Wingate Fractionating Plant	27.40	158.21	36.51	0.23	1.80	1.80
Rio Arriba County, New Mexico - Total	**2,192.36**	**895.09**	**1,769.47**	**8.06**	**51.41**	**51.44**
29-6 No2 Central Delivery Point	76.60	38.70	65.70	--	1.80	1.80
29-6 No4 CDP Compressor Station	94.20	36.10	53.90	--	1.70	1.70
30-5 CDP Compressor Station	233.60	84.60	75.90	--	3.40	3.40
31-6 CDP Compressor Station	186.60	118.70	133.60	--	5.90	5.90
Carracas CDP Compressor Station	17.60	22.50	91.60	--	2.40	2.40
Chama Land & Cattle Co. Airport	0.01	0.00	0.00	0.00	0.00	0.00
Dogie Canyon Compressor Station	184.30	38.90	196.70	1.40	2.80	2.80
Eastside Airport	0.01	0.00	0.00	0.00	0.00	0.00
El Cedro Gas Treating Plant	334.80	113.50	250.30	2.80	10.50	10.50
Esenada Airport	0.01	0.00	0.00	0.00	0.00	0.00
Espinosa Canyon Amine Plant	63.33	21.37	105.43	0.45	0.01	0.01
Frances Mesa Compressor Station	121.11	31.53	76.30	--	1.76	1.76
Gobernador/Manzanares Compressor Station	55.24	27.44	34.07	0.10	1.75	1.75
Jicarilla Apache Nation Airport	1.98	0.05	0.02	0.00	0.03	0.04
La Jara Compressor Station	134.50	49.90	109.90	2.00	3.90	3.90
Laguna Seca Compressor Station	84.10	50.70	87.00	--	3.60	3.60
Lindrith Airpark	0.85	0.02	0.01	0.00	0.01	0.02
Lybrook Gas Plant	215.30	86.00	274.20	1.30	5.30	5.30
San Juan Pueblo Airport	2.83	0.08	0.03	0.01	0.05	0.06
Sims Mesa Compressor Station	35.00	23.30	19.60	--	0.50	0.50
Trunk L Compressor Station	282.00	125.50	155.90	--	5.00	5.00
Trunk M Compressor Station	68.40	26.20	39.30	--	1.00	1.00
San Juan County, New Mexico - Total	**20,610.72**	**1,904.76**	**24,425.70**	**5,468.64**	**651.37**	**713.79**
32-7 CDP Compressor Station	145.40	70.00	107.70	--	4.60	4.60
32-8 No2 CDP Compressor Station	208.90	86.40	101.50	--	4.40	4.40

Emission Source (San Juan Co., Cont'd)	CO	VOC	NOx	SO2	PM 2.5	PM 10
32-8 No3 CDP Compressor Station	106.80	42.30	60.30	--	1.60	1.60
32-9 Central Delivery Point (CDP)	113.20	43.30	64.30	--	1.70	1.70
Animas Power Plant	14.70	1.54	59.10	--	4.84	4.84
Aztec Central Delivery Point (CDP) No1327	68.50	29.50	38.70	--	1.00	1.00
Aztec Municipal Airport	29.10	0.77	0.35	0.07	0.47	0.61
Blanco Compressor C and D Station	59.95	47.86	1,105.34	4.76	19.60	19.60
Blanco Compressor Station A	62.84	20.83	486.55	0.11	8.73	8.73
Bloomfield Compressor Station	9.61	1.58	82.85	1.07	2.11	2.11
Bloomfield Products Terminal	3.20	37.56	7.00	6.30	0.29	0.29
Bluffview Power Plant	11.90	1.57	40.76	0.05	1.42	1.42
Cedar Hill Central Delivery Point	56.20	22.30	32.20	--	0.90	0.90
Cedar Hill Compressor Station	127.12	32.97	79.50	0.00	1.79	1.79
Chaco Compressor Station	43.30	6.00	95.90	1.00	1.80	1.80
Chaco Gas Plant	509.27	164.10	2,268.24	33.51	49.76	51.71
Decker Junction Central Delivery Point	20.90	8.00	11.90	0.78	0.30	0.30
Four Corners Regional Airport	154.04	16.81	4.43	--	1.74	2.21
Hart Canyon Compressor Station	110.25	21.19	50.93	--	1.08	1.08
Horse Canyon Central Delivery Point	105.00	45.40	60.30	--	1.60	1.60
Huerfano Pump Station	64.49	19.32	52.86	0.83	1.60	1.60
Kutz Canyon Gas Plant	618.20	337.90	799.90	3.90	13.80	13.80
Lateral N30 Compressor Station	67.60	27.90	38.50	--	1.00	1.00
Manzanares Compressor Station	34.60	17.20	19.70	--	0.50	0.50
Middle Mesa Central Delivery Point	210.90	97.80	138.30	--	3.60	3.60
Middle Mesa Compressor Station	98.01	43.55	58.34	0.07	1.25	1.25
Milagro Cogeneration and Gas Plant	237.80	33.30	209.10	7.70	32.80	32.80
Navajo State Park Airport	0.57	0.02	0.01	0.00	0.01	0.01
North Crandell Compressor Station	20.30	30.30	44.20	--	1.10	1.10
PNM - San Juan Generating Station	16,263.40	192.21	17,104.00	4,740.50	437.61	495.98
Pump Canyon Compressor Station	193.23	31.24	115.02	--	2.47	2.47

Emission Source (San Juan Co., Cont'd)	CO	VOC	NOx	SO2	PM 2.5	PM 10
Rattlesnake Canyon Compressor Station	58.99	16.05	64.00	0.15	2.07	2.07
Rosa No1 Compressor Station	126.40	50.20	72.20	--	1.80	1.80
San Juan Basin Gas Plant	75.20	47.34	503.90	16.36	14.00	14.00
San Juan County Regional Landfill	--	5.67	--	--	3.03	4.51
San Juan River Gas Plant	87.30	59.33	104.90	621.43	3.91	3.91
Sanostee Airport	0.01	0.00	0.00	0.00	0.00	0.00
Shiprock Airstrip	1.42	0.04	0.02	0.00	0.02	0.03
San Juan Regional Medical Center Airport	0.27	0.01	0.01	0.00	0.01	0.01
Thompson Compressor Station	47.10	11.30	29.00	0.20	0.40	0.40
Trunk A Booster Compressor Station	26.30	10.30	14.90	--	0.50	0.50
Trunk B Compressor Station	7.00	2.80	4.00	--	--	--
Trunk N Compressor Station	137.60	49.70	44.70	--	2.00	2.00
Val Verde Treatment Plant	125.35	57.50	166.50	29.83	15.86	15.86
WFC - Pump Mesa Central Delivery Point	148.50	63.80	83.80	--	2.30	2.30
Sandoval County, New Mexico - Total	**150.47**	**21.25**	**127.69**	**2.48**	**11.07**	**25.09**
American Gypsum - Bernalillo (Wallboard) Plant	--	--	--	--	0.37	0.37
Espejo Compressor Station	42.96	10.67	26.83	0.77	0.77	0.77
Rio Rancho Landfill	4.36	0.10	1.19	0.60	5.02	7.91
San Luis Pump Station	83.91	6.02	68.77	0.59	1.14	1.14
San Ysidro Pump Station	18.94	3.49	30.74	0.51	1.00	1.00
Sandoval (County of) - Landfill	0.03	0.96	0.15	0.01	2.76	13.89
Sheraton Inn Airport	0.27	0.01	0.01	0.00	0.01	0.01
Navajo Nation; AZ, NM, UT - Total	**6,179.20**	**447.54**	**61,679.65**	**16,586.05**	**5,245.89**	**9,603.07**
BHP Navajo Coal Company (BNCC)	--	--	--	--	164.33	672.25
Conoco Wingate Fractionating Plant	3.65	7.30	1.80	0.05	0.01	0.01
El Paso Natural Gas, Dilkon Compressor Station	3.86	0.09	3.29	0.14	0.32	0.32
El Paso Natural Gas, Gallup Compressor Station	0.77	53.61	0.90	--	--	--
El Paso Natural Gas, Leupp Compressor Station	177.41	0.40	1,588.52	0.90	26.08	229.51
El Paso Natural Gas, Navajo Compressor Station	16.20	0.37	91.41	0.67	1.53	1.53

El Paso Natural Gas, White Rock Compressor Station	2.21	72.73	6.03	0.05	0.10	0.10
El Paso Natural Gas, Window Rock Compressor Station	1,177.87	--	1,354.14	0.52	27.85	29.58
Four Corners Power Plant	2,698.44	15.33	38,729.12	11,822.48	1,859.15	3,116.93
Navajo Generating Station	1,960.00	31.00	19,840.01	4,642.52	2,832.86	4,108.11
Peabody Western Coal Company - Black Mesa Complex	--	8.24	--	--	323.22	1,433.20
Resolute Natural Resources Company - Aneth Unit	122.70	254.60	22.60	118.10	8.82	9.91
Transwestern Pipeline Co., Compressor Station	0.02	0.09	0.08	0.00	0.00	0.00
Transwestern Pipeline Co., Leupp Compressor Station	16.07	3.78	41.75	0.62	1.62	1.62

US Environmental Protection Agency. 2011. National Emissions Inventory. Washington, DC: US EPA. Available on the internet: http://www.epa.gov/ttn/chief/net/2011inventory.html; accessed 1/2/14.