This CD contains the
Toquop Energy Project
Draft Environmental Impact Statement (EIS)
October 2007

United States Department of the Interior
Bureau of Land Management
Ely Field Office

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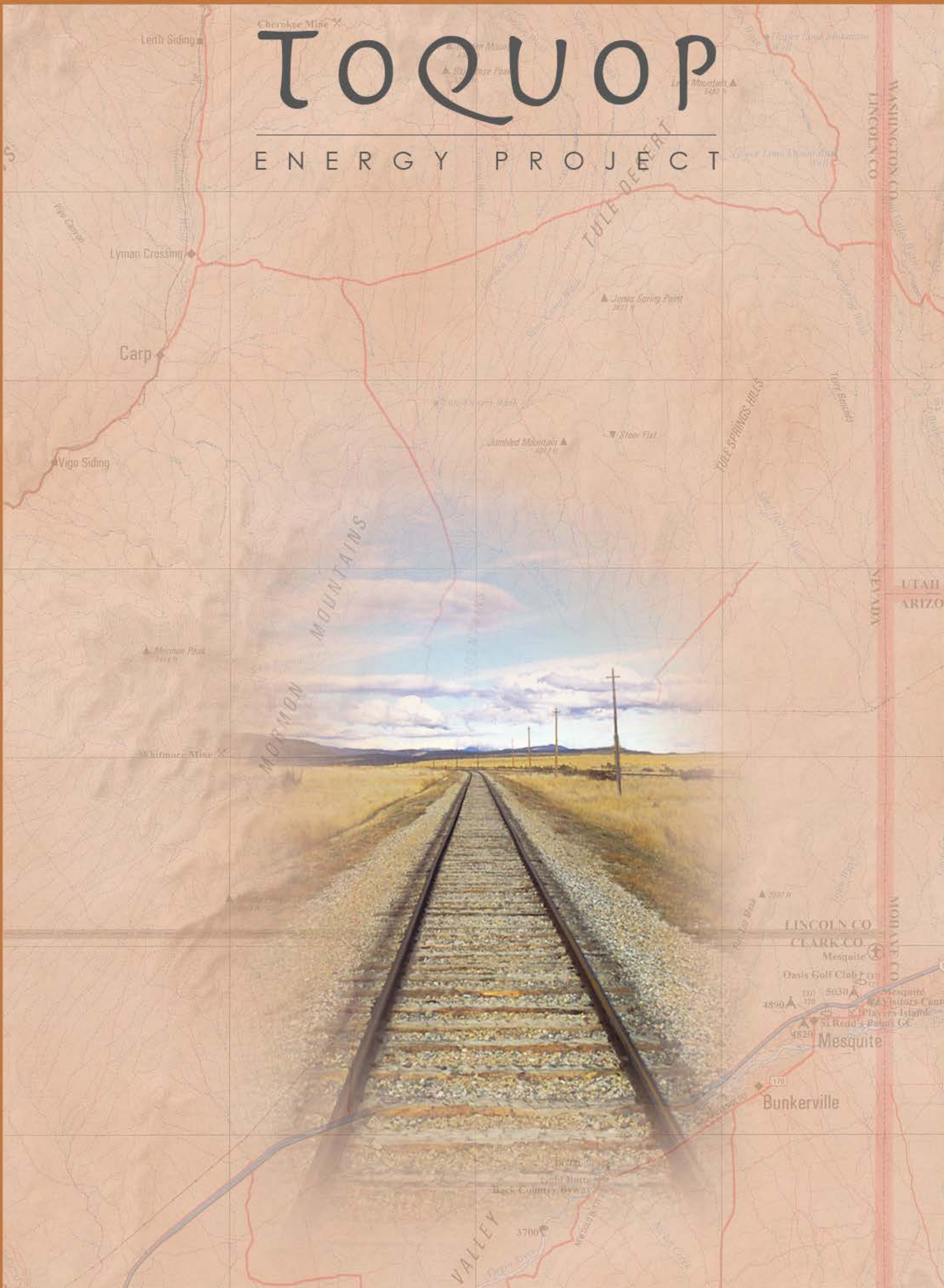
TOQUOP

ENERGY PROJECT



APPENDIX A - CONSTRUCTION OF THE PROPOSED ACTION ALTERNATIVE

APPENDIX A
CONSTRUCTION OF THE PROPOSED ACTION ALTERNATIVE

1.0 INTRODUCTION

Chapter 2 of this Environmental Impact Statement (EIS) provides a summary description of the Proposed Action Alternative. The intent of this appendix is to provide further description of the construction of the Proposed Action Alternative. The sections below describe aspects of the planning and development for the proposed project, summarize construction and operations activities, and provide information about project abandonment.

2.0 CONSTRUCTION-RELATED ACTIVITIES ASSOCIATED WITH THE POWER PLANT

A primary contractor would be responsible for all project-related engineering, procurement, and construction activities. Specific plans or proposed measures for fugitive-dust control, erosion and sedimentation control, site reclamation, stormwater-runoff control, and natural and cultural resources protection would be implemented as part of the construction process.

2.1 Use of Access Roads

Construction vehicles would access the site via the permitted access road, which would be improved in accordance with an approved Plan of Development. Among other things, improvements would widen the road, straighten turns, and level grades to make the route safe for passage by vehicles up to a gross vehicle weight (GVW) of 80,000 pounds. Routes for heavy vehicles and wide loads would include the following:

- ***From Las Vegas:*** Vehicles would travel Interstate 15 N (I-15N) for 68 miles and exit at Riverside Road (exit 112), turning under the overpass to the southbound on-ramp of I-15. They would then travel 3 miles on I-15S and exit at Halfway Wash Road (exit 109), cross over the cattle guard (or cattle guard bypass gate), and then travel approximately 14.3 miles to the Toquop Energy Project.
- ***From Mesquite****:* Vehicles would travel I-15S for 6 miles, exit at 109, cross over the cattle guard (or cattle guard bypass gate) to access the beginning of Halfway Wash Road, and travel approximately 14.3 miles to the Toquop Energy Project.
- ***From the power plant site:*** Vehicles would enter I-15 at exit 109 and travel south to Glendale or on to Las Vegas. If going east or north, they would exit Glendale and travel under the overpass and return the opposite direction on I-15N.

If material exceeds a GVW of 80,000 pounds, actual routes would be dictated by the Nevada Department of Transportation based upon conditions and road-work at the time of movement.

I-15 is a National Defense Highway and capable of oversize load transfers. Once a specific material list has been generated, a specific routing guide for inland movement would be developed. These are based on anything, physical or otherwise, that would restrict the normal or standard movement and delivery of material; normally, these include project site restrictions, local route restrictions and limitations, highways, and railways leading to the project site.

Routes for passenger cars and smaller trucks would include the following:

- ***From Las Vegas****:* Vehicles would travel I-15N for 65 miles, exit at exit 109, cross the cattle guard and travel through the single-lane tunnel under I-15 to the beginning of Halfway Wash Road, and then continue 14.3 miles to the Toquop Energy Project.
- ***From Mesquite***: Vehicles would travel I-15S, exit at exit 109, cross the cattle guard and proceed to the beginning of Halfway Wash Road, then continue 14.3 miles to the Toquop Energy Project.
- ***From the power plant site***: North- and east-bound traffic would be able to cross under I-15 and enter traffic flow at milepost 109. West- and south-bound traffic would be able to enter I-15S at milepost 109 on the north side of the highway.

A center median crossover at milepost 109 is established for emergency use. Special situations for tall loads may allow crossing over the center median with police escort or special permission from the Nevada Department of Transportation.

Escorts would be provided for trucks in accordance with Nevada guidance or that of other applicable states.

Material Deliveries

Trucks delivering material to the site would be issued assigned time slots with predetermined date and time to deliver their material. This process controls traffic, ensures timely discharge, and permits equipment availability in order to discharge the load(s), thereby eliminating stand-by time.

The percent increase of vehicles in the area would be based on the number of employees that cannot use the Park and Ride program.

Highway 93 from Clark County into Glendale averaged 1,600 vehicles per day in 2004; this would likely increase to about 1,700 vehicles per day at the peak of construction (in 2008), with the additional 100 vehicles attributed to construction and deliveries.

I-15 at Mesquite averaged 23,815 vehicles per day in 2004; this would likely increase to about 30,115 vehicles per day at the peak of construction (in 2008), with the additional 300 vehicles attributed to construction and deliveries.

I-15 at Las Vegas averaged 23,824 vehicles per day in 2004; this would likely increase to about 32,424 vehicles per day at the peak of construction (in 2008), with the additional 600 vehicles attributed to construction and deliveries.

2.2 Site Preparation

The construction contractor would provide topographic survey data and generate a balanced “cut-and-fill” site grading design. The amount of cut and fill would be determined as part of the final detailed design, pending approval of rights-of-way and acquisition of required permits. Throughout site preparation activities and beyond, the contractor would practice the principle of environmental responsibility, and remain committed to support thoughtful stewardship of the environment. The contractor would strive for avoidance of impacts on communities and natural and historic resources, coordination with resource agencies, and incorporation of environmental concerns in the decision-making process. Specific plans or proposed measures for fugitive-dust control, erosion and sedimentation control, site reclamation, stormwater-runoff control, and natural and cultural resources protection would be implemented as identified through the National Environmental Policy Act or other permitting processes.

Construction equipment used for site preparation would include scrapers, rippers, bulldozers (up to size D-8), as well as back hoes, track hoes, loaders, graders, etc. During equipment erection, numerous cranes (up to size 150 T.), would be used along with loaders, hydraulic cranes, man lifts, back hoes, etc., depending on requirements.

Power Supply

The contractor would be responsible for providing all construction power throughout the project. The project's permanent diesel generators would perhaps be installed early to generate construction power, later to be supplemented as required by portable generation equipment until the 345 kilovolt transformers would be installed, at which time back feed would provide construction and station service. Permanent generators would be 1,200 kilowatt diesel driven; physical dimension are 40-feet long by 10-feet high by 12-feet wide with weight of 35,000 pounds.

Dust Control

The contractor would require use of water trucks to dampen earthen roadways by dispensing water to hold down dust. Further, establishment of multiple park-and-ride facilities also would contribute to dust control by reducing number of vehicles driven to the site. To further assist in controlling dust, the contractor would consider using berms as an effective means to control sediment and/or a silt fence to minimize dust.

Mud Control

The contractor would take appropriate steps to install base or aggregate in order to ensure a safe environment for vehicular traffic to the site.

2.3 General Description of Construction Equipment and Materials

During construction, space would be required within the 640-acre power plant site for the following activities and facilities:

- Laydown areas (40 acres)
- Aggregate, sand, and cement storage (100,000 square feet [sf], or about 2.3 acres)
- Diesel generator(s) (4,000 sf or about 0.1 acre)
- Fabrication and storage area (70,000 sf or about 1.6 acres)
- Offices (owner, contractor, and subcontractors)
- Concrete batch plant (several local quarries are available and would provide concrete for the project)
- Employee Parking (approximately 30 acres would be required during the peak of construction)
- Craft areas
- Vehicle maintenance shop
- De-watering and site draining

- Pre-fabrication storage and assembly area
- Entry, egress, and delivery staging area

Laydown Yards and Onsite Fabrication

Normal warehouse procedures would be employed for handling material at the project site. Site laydown areas would be stylized or modified based on specific contour of the site, terrain, entry and exit points, preventative maintenance and material storage requirements, etc. The most direct route from laydown areas to the construction site would be used. Route selection would be based on consideration of material deliveries to the project as well as internal work and movement of pieces from the laydown area to the construction site. Specific scopes relative to fabrication yards would be developed for use once suppliers have been selected and their needs have been identified.

The contractor would use pre-fabricated construction schemes where possible in order to improve safety conditions by working on the ground versus in the air and accelerate erection by having various elements of plants built, then lifted into place. This capability improves safety while enabling sectional erection (heavier single lift) placement and construction, rather than single piece, single-lift work processes. This allows for construction activities to work on concurrent headings outside the prime work area, potentially improving construction performance. Local fabricators/shops/subcontractors/suppliers would be used to implement this process should onsite fabrication not be feasible.

2.4 General Description of Management and Construction Labor Required

The contractor would strongly support and become actively engaged/involved in community actions/activities, and endeavor to employ as many local residents as possible for the labor force. Whenever possible, the contractor would employ qualified, disadvantaged, minority- or women-owned businesses from the local community to ensure maximum use of the local labor force.

The project would likely peak slightly above a thousand employees on site over the approximate four-year construction period.

Work Hours

The contractor would mitigate noise by structuring work hours around the local time zone. Heavy equipment operation would commence at 7:00 a.m. and terminate at 5:00 p.m. Monday through Friday. Should climatic conditions or weather preclude completion of construction milestones, work on Saturdays or Sundays might be required (as an exception, not the rule).

Construction Employee Parking

Due to the large volume of personal vehicles and related traffic control concerns, construction workers would be required to park in a designated parking area. Contractors and their employees would park in a 20-to-30-acre space on the site property adjacent to the project area. The onsite parking area would be as close as possible to the work site to allow personnel to walk to the site.

To reduce the area required on site to accommodate employee parking, the contractor would look into the feasibility of establishing an recreational-vehicle (RV) park along with a park-and-ride program in proximity to the park, or (for example) parking on a casino parking lot near Mesquite, Nevada (off I-15). The number of buses and frequency for the program would be based on the number of riders, locations, and transit time. Multiple locations and/or routes might be established to serve imported labor as well as local residents. The contractor would monitor the program to ensure maximum ridership, and reduce onsite traffic and parking. The contractor would:

- Conduct an analysis of the traffic load periodically, making adjustments as necessary
- Work with the city of Mesquite to install 500 RV parking slots in the area of the park or other location specified by the city, etc. At the end of the construction, the contractor would turn over all improvements to the city
- Initiate a Park-and-Ride Program off-site rally point (especially during construction peaks)
- Develop a Park-and-Ride Program outside the peaks, as well as tribal routes (to be determined by number of employees)
- Evaluate and adjust low-passenger routes
- Examine lot locations and identify potential alternate sites, subtractions, and additions
- Work with local city and businesses that could accommodate and support off-site employee parking

Should an employee become ill or have to leave the site, a vehicle would take him or her to the parking area, hospital, doctor, etc., as necessary.

If necessary, the contractor would consider hiring local traffic control personnel at the designated park-and-ride areas to ensure the safety of personnel and the security of vehicles at designated parking areas.

2.5 Clean Up and Reclamation

The contractor would restore to its natural condition any land that was disturbed as a result of project work.

2.6 Site Management

For security and safety purposes, a fence would enclose the site. Normal access to the site would be through a primary gate with security controls. Locked gates would be installed in the perimeter fencing for emergency, operations, and maintenance access.

DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE TOQUOP ENERGY PROJECT

Draft (X) Final ( )

LEAD AGENCY: **U.S. Department of the Interior, Bureau of Land Management**

COOPERATING AGENCIES: **Nevada Department of Wildlife**
Surface Transportation Board

JURISDICTION: **Lincoln and Clark Counties, Nevada**

CONTACT INFORMATION: **Correspondence on this Draft Environmental Impact Statement should be directed to:**

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Date Draft EIS was filed with the U.S. Environmental Protection Agency: October 12, 2007
Date by which comments on this Draft EIS must be received to considered in the Final EIS: December 11, 2007

ABSTRACT

This Draft Environmental Impact Statement (EIS) evaluates the impacts on the environment that would result from the construction and operation of the proposed Toquop Energy Project. The proposed project would be located on public land in Lincoln County, Nevada about 12 miles northwest of Mesquite, Nevada. The Toquop Energy Project would include the construction of a 750 megawatt coal-fired generation facility and a 31-mile rail line. The location of the power plant site is the same site that was permitted by BLM in 2003 for a 1,100 megawatt, natural-gas fired power plant and associated facilities. The focus of this EIS is to articulate the impacts that would result from the shift to coal-fired generation on this site.

Several alternatives are evaluated in this EIS. The No-Action Alternative assumes that the natural-gas generation project that was permitted in 2003 would be constructed. The Proposed Action Alternative includes the coal-fired generation project, including a rail line that would be needed to deliver coal to the site.

Federal actions addressed in the accompanying document are (1) the BLM's issuance of an amendment to the right-of-way grant to authorize additional acreage and change of use for the power plant site, (2) issue a new right-of-way grant for construction, operation and maintenance of a new rail line to transport coal to the power plant, and (3) facilitate the sale of the 640-acre parcel for the power plant site. This Draft EIS satisfies the National Environmental Policy Act, which mandates that federal agencies analyze the environmental consequences of major undertakings.

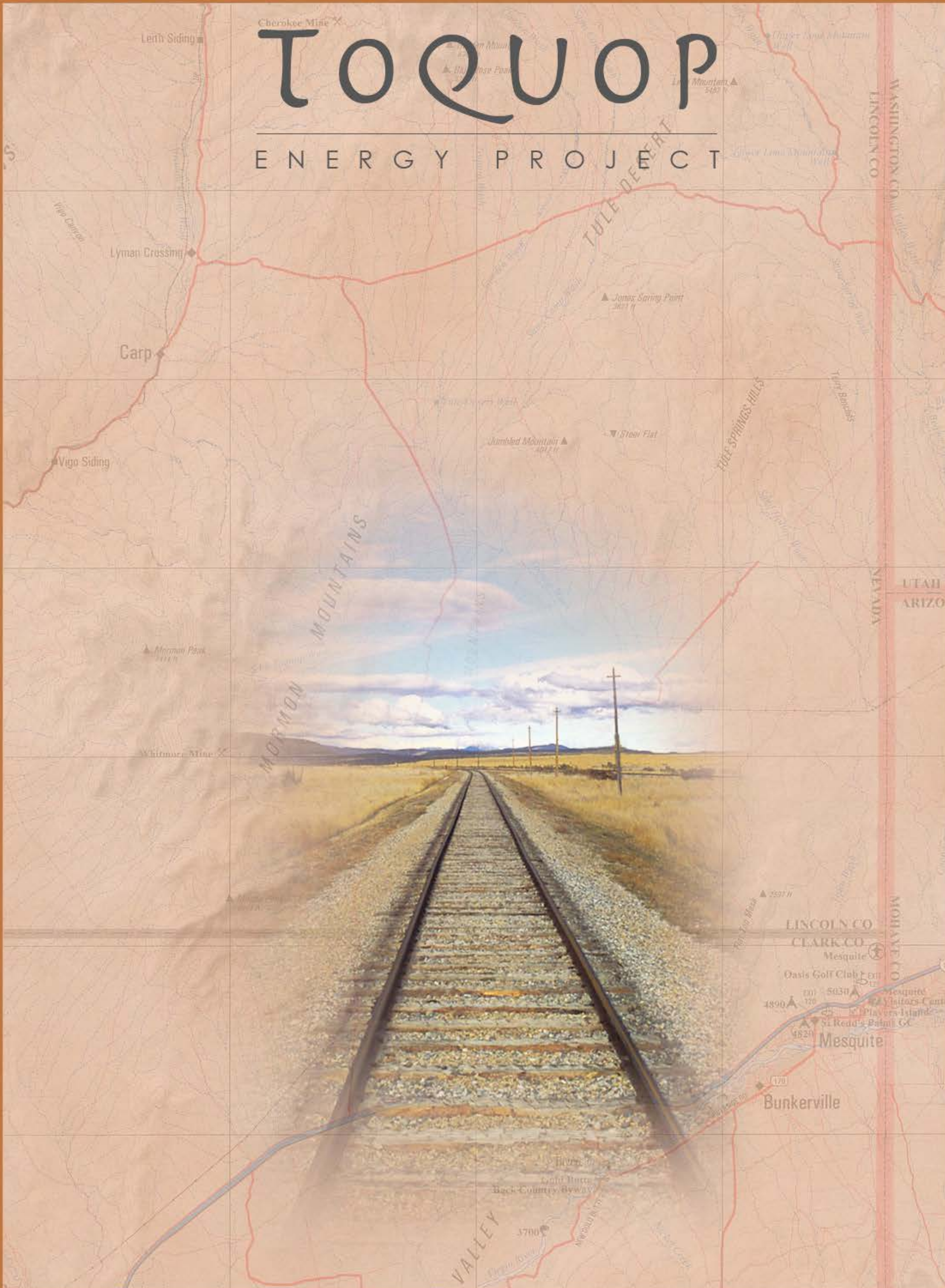
Official Responsible for the Environmental Impact Statement:

John E. Kuhs
Ely Field Manager

9/21/07
Date

TOQUOP

ENERGY PROJECT



APPENDIX B - VISUAL RESOURCES

APPENDIX B
VISUAL RESOURCES

This appendix provides additional information to supplement the visual resources analysis, including thje Bureau of Land Management's (BLM's) definitions of scenic quality, scenic quality map and evaluation forms for the Toquop Energy Project area, and visual simulations.

1.0 SCENIC QUALITY CLASS DEFINITIONS

Scenic quality is a measure of the naturalness and uniqueness of visual resources in an area. The three scenic quality classes are defined as follows:

Class A: Outstanding areas where characteristic features of landform, rock, water, and vegetation are distinctive or unique in the context of the surrounding region. These features exhibit considerable variety in form, line, color and texture.

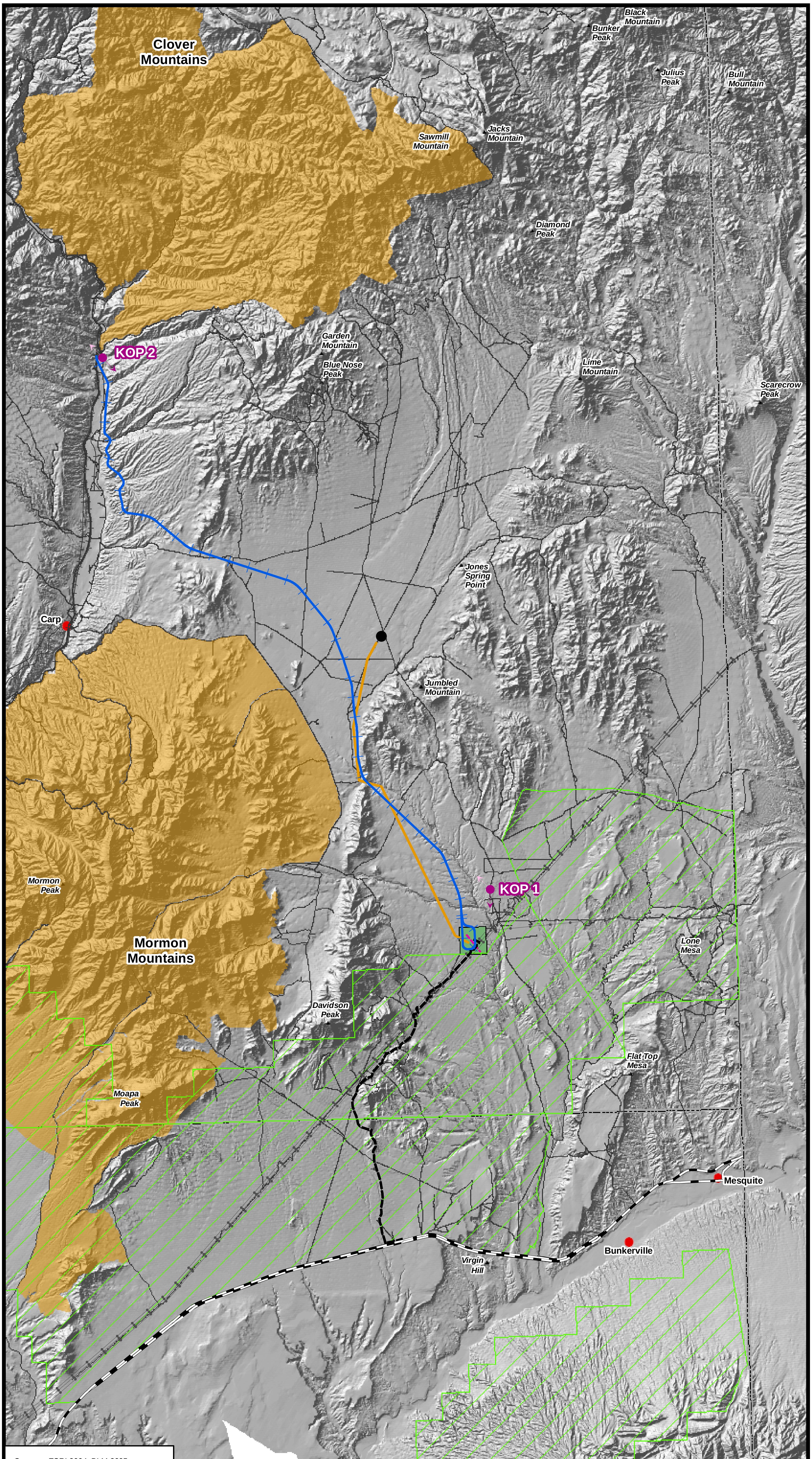
Class B: Above average areas in which features provide variety in form, line, color and texture and, although the combinations are not rare in the surrounding region, they provide sufficient visual diversity to be considered moderately distinctive.

Class C: Common areas where characteristic features have little variation in form, line, color, or texture in relation to the surrounding region.

Scenic quality in the Toquop Energy Project area was evaluated (see Section 3.6); evaluation forms to support this analysis are included at the back of this appendix.

2.0 VISUAL SIMULATIONS

Two visual simulations were developed to suggest the type of visual impact that the construction of the facilities would have on existing conditions. These simulations were based on the current understanding of the project design; it is possible that the final design specifications could change as design efforts continue or as changes are identified through the environmental impact statement or other permitting processes. Map B-1 shows the locations of the viewpoints for each simulation and the simulations are provided.



Key Observation Points

Toquop Energy Project EIS
Lincoln County, Nevada

LEGEND

Key Observation Points

Simulation Location (view direction clockwise from dark magenta)

Special Designation

ACECs
Wilderness

General Features

Proposed Rail Line
Proposed Coal-fired Plant Site (640 acres)
Permitted Well Field
Permitted Water Pipeline
Permitted Natural Gas Pipeline and Transmission Line Interconnection
Permitted Access Road

Reference Features

Existing Road
Interstate
Existing Railroad
Existing Transmission Line
Town

DRAFT February 2007

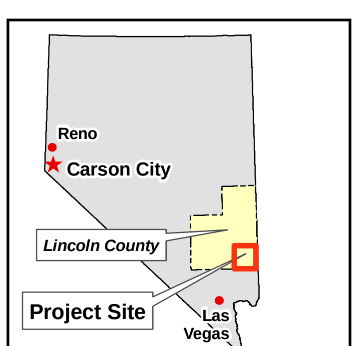
Reno
Carson City
Lincoln County
Project Site
Las Vegas

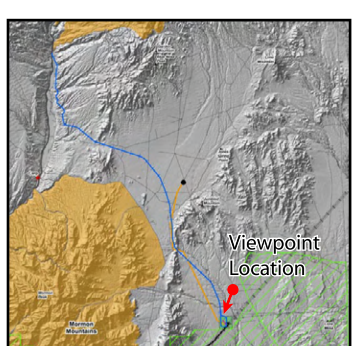
0 2 4
Miles

Map B-1

Existing Conditions

Visual Simulation



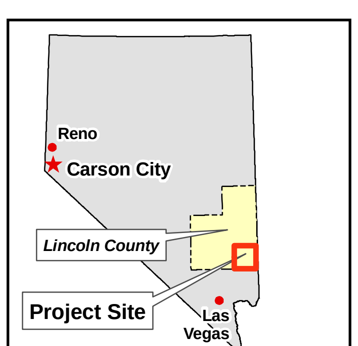


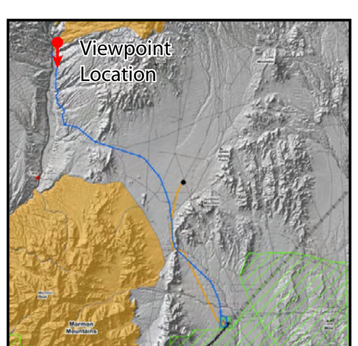
Visual Simulation
Kop 1

Toquop Energy Project EIS
Lincoln County, Nevada

Existing Conditions

Visual Simulation





Visual Simulation
Kop 2

Toquop Energy Project EIS
Lincoln County, Nevada

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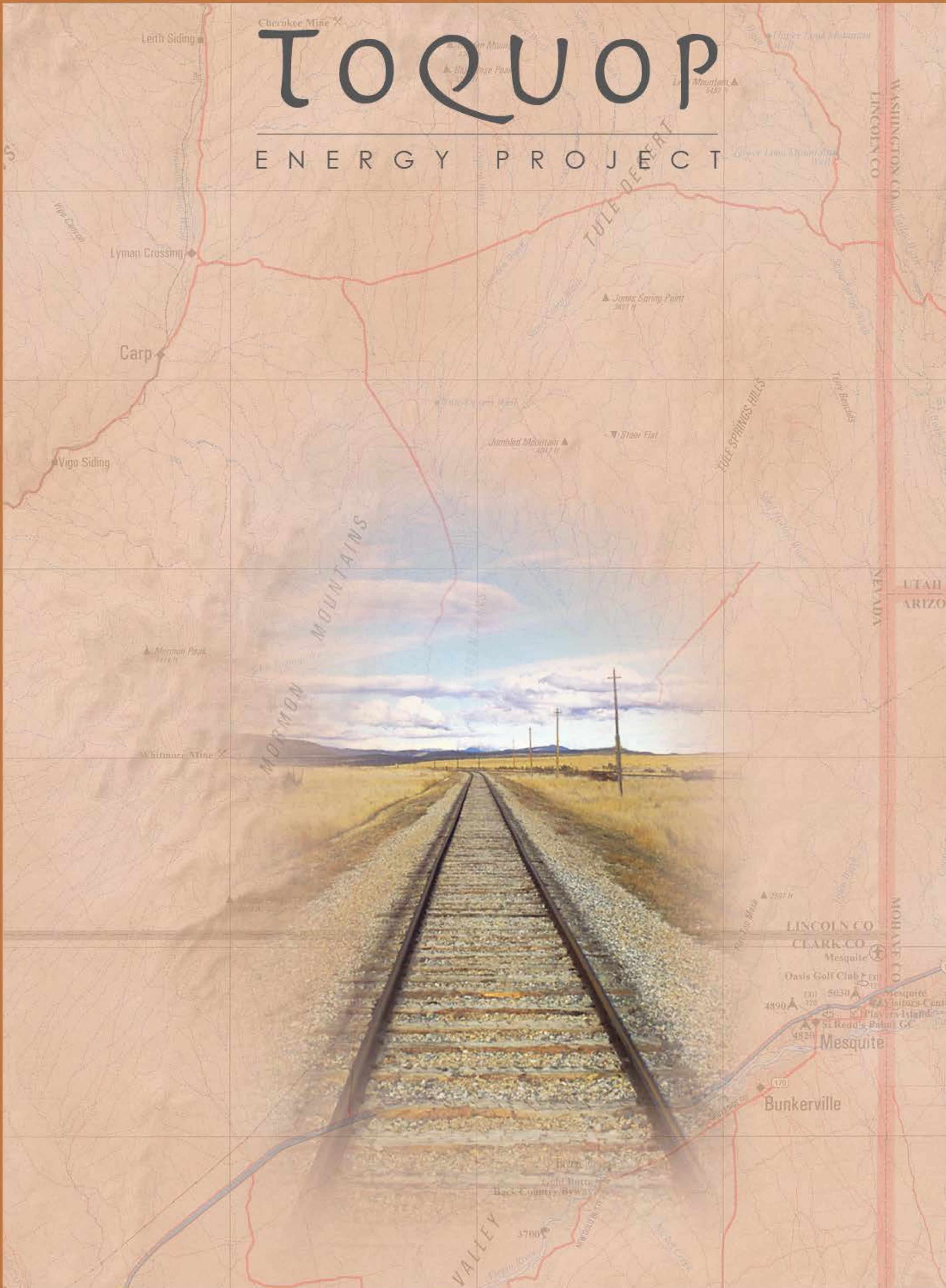


APPENDIX C - STATE OF NEVADA NOXIOUS WEED LIST

APPENDIX C
STATE OF NEVADA NOXIOUS WEED LIST

Category "A": Weeds not found or limited in distribution throughout the state; actively excluded from the state and actively eradicated wherever found; actively eradicated from nursery stock dealer premises; control required by the state in all infestations.

Category "B": Weeds established in scattered populations in some counties of the state; actively excluded where possible, actively eradicated from nursery stock dealer premises; control required by the state in areas where populations are not well established or previously unknown to occur.

Category "C": Weeds currently established and generally widespread in many counties of the state; actively eradicated from nursery stock dealer premises; abatement at the discretion of the state quarantine officer.

Common Name	Scientific Name
Category A Weeds:	
African rue	*Peganum harmala*
Austrian fieldcress	*Rorippa austriaca*
Austrian peaweed	*Sphaerophysa salsula / Swainsona salsula*
Camelthorn	*Alhagi camelorum*
Common crupina	*Crupina vulgaris*
Dalmation toadflax	*Linaria dalmatica*
Dyer's woad	*Isatis tinctoria*
Eurasian water-milfoil	*Myriophyllum spicatum*
Giant reed	*Arundo donax*
Giant salvinia	*Salvinia molesta*
Goats rue	*Galega officinalis*
Houndstongue	*Cynoglossum officinale*
Hydrilla	*Hydrilla verticillata*
Iberian star thistle	*Centaurea iberica*
Klamath weed	*Hypericum perforatum*
Leafy spurge	*Euphorbia esula*
Malta star thistle	*Centaurea melitensis*
Mayweed chamomile	*Anthemis cotula*
Mediterranean sage	*Salvia aethiopis*
Purple loosestrife	*Lythrum salicaria, L.virgatum* and their cultivars
Purple star thistle	*Centaurea calcitrapa*
Rush skeletonweed	*Chondrilla juncea*

Sow thistle	*Sonchus arvensis*
Spotted knapweed	Centaurea masculosa
Squarrose star thistle	Centaurea virgata Lam. var. squarrose
Sulfur cinquefoil	*Potentilla recta*
Syrian bean caper	*Zygophyllum fabago*
Yellow star thistle	*Centaurea solstiltialis*
Yellow toadflax	*Linaria vulgaris*
Category B Weeds:	
Carolina horsenettle	*Solanum carolinense*
Diffuse knapweed	*Centaurea diffusa*
Medusahead	*Taeniatherum caput-medusae*
Musk thistle	*Carduus nutans*
Russian knapweed	*Acroptilon repens*
Sahara mustard	*Brassica tournefortii*
Scotch thistle	*Onopordum acanthium*
White horsenettle	*Solanum elaeagnifolium*
Category C Weeds:	
Black henbane	*Hyoscyamus niger*
Canada thistle	*Cirsium arvense*
Green fountain grass	*Pennisetum setaceum*
Hoary cress	*Cardaria draba*
Johnson grass	*Sorghum halepense*
Perennial pepperweed	*Lepidium latifolium*
Poison hemlock	*Conium maculatum*
Puncture vine	*Tribulus terrestris*
Salt cedar (tamarisk)	*Tamarix spp*
Water hemlock	*Cicuta maculata*

SOURCE: Nevada Department of Agriculture, Plant Industry Division 2007

Risk Assessment for Noxious/Invasive Weeds

Project Name: Toquop Energy Project

Date Risk Assessment was completed: March 2007

Methods

URS conducted field surveys for rare plants/noxious and invasive weeds during May and June of 2006 in the proposed project area for the Toquop Energy Project to collect data necessary for completing a National Environmental Policy Act Environmental Impact Statement.

Project Summary

The proposed Toquop Energy Project is a 750-MW coal-fired generation unit and plant-cooling system located on BLM-administered land approximately 12 miles northwest of Mesquite, Nevada, and 50 miles south-southeast of Caliente, Nevada, in southern Lincoln County.

Under the No-Action and Proposed Action Alternatives, a well field and water pipeline would be developed in the Tule Desert hydrographic basin to supply groundwater for use in an evaporative cooling tower system. Facilities would include about 15 deep wells, a manifold system to connect the output from these wells to a single, 24-inch diameter buried pipeline, the extension of this buried pipeline and buried electrical distribution lines to the plant site, and a storage tank (approximately 500,000 gallon capacity). The length of the 24-inch-diameter pipeline would be 12.5 miles, partially along an existing road, with a permanent right-of-way width of 30 feet. New access roads would be constructed to the wells and storage tank as necessary for use during construction and maintenance activities.

To facilitate truck access between Interstate 15 (I-15) and the plant site about 14.4 miles of an existing dirt and gravel road would be upgraded by paving to a width of 24 feet, and some sections would be straightened.

An approximately 31-mile-long rail line would be constructed to connect with an existing Union Pacific Railroad line at Leith Siding, for the purpose of delivering coal to the power plant site. The permanent right-of-way for this rail line would be 100 feet wide.

Table 1
Acres Affected by the Proposed Action

FACILITY	ACRES OF TEMPORARY DISTURBANCE	ACRES OF PERMANENT DISTURBANCE
Power Plant	640	475
Access Road	216*	42
Water Pipeline	90	45
Rail Line	698	356
Well Field (Wells, Roads, Pumps)	17	12
TOTAL ACRES	**1,661**	**930**

NOTE: * Spatial data were not available to calculate the acres of vegetation within the construction right-of-way for the access road. However, the 2003 EIS (BLM 2003) indicated that a total of 216 acres would be within the temporary, construction right-of-way for the road.

Factor 1

Factor 1 assesses the likelihood of noxious/invasive weeds spreading to the project area. A definition of the categories for Factor 1 can be found at the end of this risk assessment. For the Toquop Energy Project, Factor 1 was determined to be **Moderate (7)**.

Table 2
Noxious/Invasive Weeds found in and near the proposed project facility locations.

Species	Common Name	Noxious/ Invasive
Tamarix spp.	Salt Cedar	Noxious
Lepidium latifolium	Tall Whitetop	Noxious
Brassica tournefortii	Sahara Mustard	Noxious
Acroptilon repens	Russian knapweed	Noxious
Bromus rubens	Red Brome	Invasive
Bromus tectorum	Cheatgrass	Invasive
Schismus spp.	Splitgrass	Invasive
Malcolmia africans	African Mustard	Invasive
Sisymbrium irio	London Rocket	Invasive
Salsola tragus	Russian Thistle	Invasive
Erodium spp.	Filaree	Invasive

The Moderate (7) rating was determined based on findings from field surveys conducted during May and June 2006 at and near the proposed facility locations. Three noxious weed species were found during surveys of the proposed project area including salt cedar (*Tamarix* spp.), tall whitetop (*Lepidium latifolium*), and Sahara mustard (*Brassica tournefortii*) (Table 2). A fourth noxious weed, Russian knapweed (*Acroptilon repens*) is known from the area but was not observed during field surveys. In Nevada, a noxious weed is a legal term for a plant that is designated by the State of Nevada as noxious and is, or is likely to be, detrimental or destructive and difficult to control or eradicate (NAC 555.010).

Salt cedar or tamarisk (*Tamarix ramosissima*, *chinensis*, *pentandra*) occurs occasionally along the proposed railroad route in the main forks and major tributaries of Toquop and Meadow Valley washes. The plants are widely scattered in the region of the proposed railroad route, except for Meadow Valley Wash, where dense stands occur at Lyman Crossing, with scattered plants in the frequently-flooded sections downstream of Rainbow Canyon, including Leith Crossing. Recent active stream flows have resulted in the germination of thousands of sprouts of tamarisk in the wet stream sections in the vicinity of Leith. It appears that the potential for mature stands of tamarisk to develop are limited in this section by scouring flood flows.

Tall whitetop (*Lepidium latifolium*) is another likely weed of the Meadow Valley Wash crossing and is present in much of the of the Meadow Valley Wash drainage. Like tamarisk, scouring flood flows limit establishment of this shallowly-rooted weed.

Sahara mustard (*Brassica tournefortii*) was observed throughout the proposed railroad route. The species is a problem in areas of sandy disturbances, in sand fields, and especially on sand dunes, where it competes directly with rare plant species such as Beaver Dam breadroot (*Pediomelum castoreum*), and straw milk-vetch (*Astragalus lentiginosus* var. *stamineus*). Currently, there are few areas along the route that have potential for dense infestation. In the near future it is likely to remain only common along drainages and at areas of heavy surface disturbance in this region. The species will likely become more frequent along the Tule Desert section of the railroad route when blown sands form on the railroad berm.

Additionally, Russian knapweed (*Acroptilon repens*) is found outside the proposed project area in surrounding areas and could potentially spread into the project area.

Several additional invasive weed species were observed during field surveys, including red brome (*Bromus rubens*), cheatgrass (*Bromus tectorum*), Splitgrass (*Schismus* spp.), African mustard (*Malcolmia africans*), London rocket (*Sisymbrium irio*), Russian thistle (*Salsola tragus*), and filaree (*Erodium* spp.) (refer to Table 2). Invasive species refer to those non-native species that out-compete native vegetation, reducing the quantity and diversity of native plants.

Red brome (*Bromus rubens* ssp. *madritensis*) is the primary weed of concern for this project and the species has caused widespread ecological damage throughout the region in association with long-term chronic disturbances and recent wildfires, especially in the Mormon and Meadow Valley mountains. In the region of the proposed railroad route, the increased fire intensities and shortened fire-return intervals associated with red brome are a threat to non fire-adapted native vegetation.

Cheat grass (*Bromus tectorum*) was detected throughout the route, usually as scattered plants on weedy terraces of washes or sometimes growing up through shrubs. This grass has caused extensive ecological damages in areas of the Great Basin subject to wildfire/brome type conversion. The presence of cheat grass in this region does not seem to warrant additional concern above that which should be dedicated to the control of red brome. Cheat grass is a similar ecological grass, and it is likely out competed by red brome, which is already abundant in the region.

Splitgrass (*Schismus*) is of low concern in this area, and if anything, it is indicative of more benign conditions than in areas of red brome infestation. Splitgrass is common throughout low elevations of southern Nevada and appears to be extending sporadically northward within warm ecotones. In the vicinity of the proposed railroad route, no habitats were observed that are likely to be prone to ecological damage from dense stands of this grass.

African mustard (*Malcolmia africans*) seems to vector in on linear disturbances, especially on the more low-angle, clayey soils. It is abundant now on some sections of the Kern River gas pipeline route in habitats that are similar to the area of the plant site and the proposed railroad route south of Toquop Gap. African mustard was mainly observed along roadsides and in the vicinity of Toquop Wash, with some scattered near the proposed Tule Desert wellfield and near the proposed plant site.

London rocket (*Sisymbrium irio*) is a common weed of the Mojave Desert in Nevada and skeletons from 2005 were observed throughout the proposed railroad route. Despite being ubiquitous, in the Mojave Desert it is usually restricted to growing up through shrubs and seems to be unable to acquire enough water and nutrients to form dense stands. Occasionally the species is very weedy, but usually only after significant chronic disturbances. The species is likely to be more common in the vicinity of construction areas and may spread weakly into the desert.

Russian thistle (*Salsola tragus*) is present throughout the proposed railroad route and in areas that are frequently disturbed. Along the proposed railroad route the species seems to be most dense and persistent in areas where frequent grazing and irrigation or frequently wetted soils occur. These areas occur mainly along Meadow Valley Wash, Toquop Gap, and the vicinity of the proposed Tule Desert wellfield. In areas where disturbances have time to stabilize, particularly in creosote bush desertscrub, Russian thistle seems to become less abundant over time. Certain areas along the Kern River gas pipeline to the east of Toquop Wash (vicinity of Terry Benches) have had dense infestations of Russian thistle following construction. No areas along the proposed railroad route appeared to have the potential for dense Russian thistle infestation. Sections of Meadow Valley Wash near Lyman Crossing have areas of dense Russian thistle. Elevated nutrient levels from repeated fires could greatly increase the number of Russian thistle present in the region, since it is so widespread (though usually uncommon).

Non-native filarees (*Erodium spp.*) are a potential future problem in the Mojave Desert. Filaree has been a locally dominant widespread weed in California since the 1800s, but is mostly uncommon in southern Nevada where rocky carbonate soils favor the native form (*E. texanum*). Red-stemmed filaree (*Erodium cicutarium*) was observed along the proposed railroad route in recently burned areas, especially south of Toquop Gap.

Due to the large linear extent of the proposed project and the presence of the noxious and invasive weeds mentioned above, a Moderate (7) rating was determined given the likelihood that weeds would be spread into and from the proposed project area as a result of the project.

Factor 2

Factor 2 assesses the consequences of noxious/invasive weed establishment and spread in the proposed project area. A definition of the categories for Factor 2 can be found at the end of this risk assessment. For the Toquop Energy Project, Factor 2 was determined to be **Moderate (7)**.

The Moderate (7) rating was chosen based on the current distribution of weeds in the vicinity of the proposed project area and the impacts of the establishment and spread of noxious and invasive weeds.

An increase in the spread of invasive grasses is likely to have the greatest potential impact to the proposed project area. These grasses compete with native vegetation for resources and lead to changes in the fire regime. The presence of these grasses increases the intensity and size of fires in the desert as well as decreases fire return-intervals. Fire within the proposed project area is likely to create conditions that favor invasive grasses and are deleterious to the non fire-adapted vegetation of the area. Conditions that select for the non-native grasses and against the native vegetation are likely to lead to the conversion of areas from desertscrub into non-native grasslands.

Other noxious and invasive weeds in the project area would compete with native vegetation for resources, change soil characteristics, and generally decrease wildlife habitat value for native species.

Risk Rating

The Risk Rating is obtained by multiplying Factor 1 by Factor 2. For the proposed Toquop Energy Project, the Risk Rating is **Moderate (49).**

Based on this risk rating, preventative management measures are needed for this project to reduce the risk of introduction and spread of noxious and invasive weeds into the area. Preventative measures are as follows:

1. Prior to project approval a site-specific weed survey will occur and a weed risk assessment will be completed. Monitoring will be conducted for a period no shorter than the life of the permit or until bond release and monitoring reports will be provided to the BLM. If the spread of noxious weeds is noted, appropriated weed control procedures will be determined in consultation with BLM personnel and will be in compliance with the appropriate BLM handbook sections and applicable laws and regulations. All weed control efforts on BLM-administered lands will be in compliance with BLM Handbook H-9011, H-9011-1 Chemical Pest Control, H-9014 Use of Biological Control Agents of Pests on Public Lands, and H-9015 Integrated Pest Management. Should chemical methods be approved, the lessee must submit a pesticide Use Proposal to the Authorized Officer 60 days prior to the planned application date. A pesticide Application Report must be submitted to the Authorized Officer by the end of the fiscal year follow chemical application.

2. Prior to the entry of vehicles and equipment to a project area, areas of concern will be identified and flagged in the field by a weed scientist or qualified

biologist. The flagging will alert personnel or participants to avoid areas of concern. These sites will be recorded using global positioning systems or other Ely Field Office approved equipment and provided to the Field Office Weed Coordinator or designated contact person.

3. Prior to entering public lands, the contractor, operator, or permit holder will provide information and training regarding noxious weed management and identification to all personnel who will be affiliated with the implementation and maintenance phases of the project. The importance of preventing the spread of weeds to uninfested areas and importance of controlling existing populations of weeds will be explained.

4. To eliminate the transport of vehicle-borne weed seeds, roots, or rhizomes all vehicles and heavy equipment used for the completion, maintenance, inspection, or monitoring of ground disturbing activities; for emergency fire suppression; or for authorized off-road driving will be free of soil and debris capable of transporting weed propagules. All such vehicles and equipment will be cleaned with power or high-pressure equipment prior to entering or leaving the work site or project area. Vehicles used for emergency fire suppression will be cleaned as a part of check-in and demobilization procedures. Cleaning efforts will concentrate on tracks, feet and tires, and on the undercarriage. Special emphasis will be applied to axels, frames, cross members, motor mounts, on and underneath steps, running boards, and front bumper/brush guard assemblies. Vehicle cabs will be swept out and refuse will be disposed of in waste receptacles. Cleaning sites will be recorded using global positioning systems or other mutually acceptable equipment and provided to the Field Office Weed Coordinator or designated contact person.

5. To eliminate the introduction of noxious weed seeds, roots, or rhizomes all interim and final seed mixes, hay, straw, hay/straw, or other organic products used for reclamation or stabilization activities will be certified free of plant species listed on the Nevada noxious weed list or specifically identified by the BLM Ely Field Office.

6. To eliminate the introduction of noxious weed seeds, roots, or rhizomes all source sites such as borrow pits, fill sources, or gravel pits used to supply inorganic materials used for construction, maintenance, or reclamation will be inspected and found to be free of plant species listed on the Nevada noxious weed list or

specifically identified by the BLM Ely Field Office. Inspections will be conducted by a weed scientist or qualified biologist.

7. Removal and disturbance of vegetation would be kept to a minimum through construction site management (e.g. using previously disturbed areas and existing easements, limiting equipment/materials storage and staging area sites, etc.)

8. Reclamation would normally be accomplished with native seeds only. These would be representative of the indigenous species present in the adjacent habitat. Rationale for potential seeding with selected nonnative species would be documented. Possible exceptions would include use of non-native species for a temporary cover crop to out-compete weeds. Where large acreages are burned by fires and seeding is required for erosion control, all native species could be cost prohibitive and/or unavailable. In all cases, seed mixes would be approved by the BLM authorized Officer prior to planting.

9. Mixing of herbicides and rinsing of herbicide containers and spray equipment would be conducted only in areas that are safe distance from environmentally sensitive areas and points of entry to bodies of water (storm drains, irrigation ditches, streams, lakes, or wells).

10. Methods used to accomplish weed and insect control objectives would consider seasonal distribution of large wildlife species.

11. No noxious weeds will be allowed on the site at the time of reclamation release. Any noxious weeds that become established will be controlled.

12. Areas that are reseeded would be monitored for 5 years to ensure native plants, which have been disturbed during construction, return to the reseeded areas.

Based on this Risk Rating, project modifications **are/are not** (circle one) needed for this project.

Weed Risk Assessment completed by: Jeff Johnson, URS Corporation.

Reviewed by/date reviewed: ______________________________ ________

BLM Noxious Weed Coordinator Date

Factor 1 Categories

None (0)	Noxious weed species are not located within or adjacent to the project area. Project activity is not likely to result in the establishment of noxious weed species in the project area.
Low (1-3)	Noxious weed species are present in the areas adjacent to but not within the project area. Project activities can be implemented and prevent the spread of noxious weeds into the project area.
Moderate (4-7)	Noxious weed species located immediately adjacent to or within the project area. Project activities are likely to result in some areas becoming infested with noxious weed species even when preventative management actions are followed. Control measures are essential to prevent the spread of noxious weeds within the project area.
High (7-10)	Heavy infestations of noxious weeds are located within or immediately adjacent to the project area. Project activities, even with preventative management actions, are likely to result in the establishment and spread of noxious weeds on disturbed sites throughout much of the project area.

Factor 2 Categories

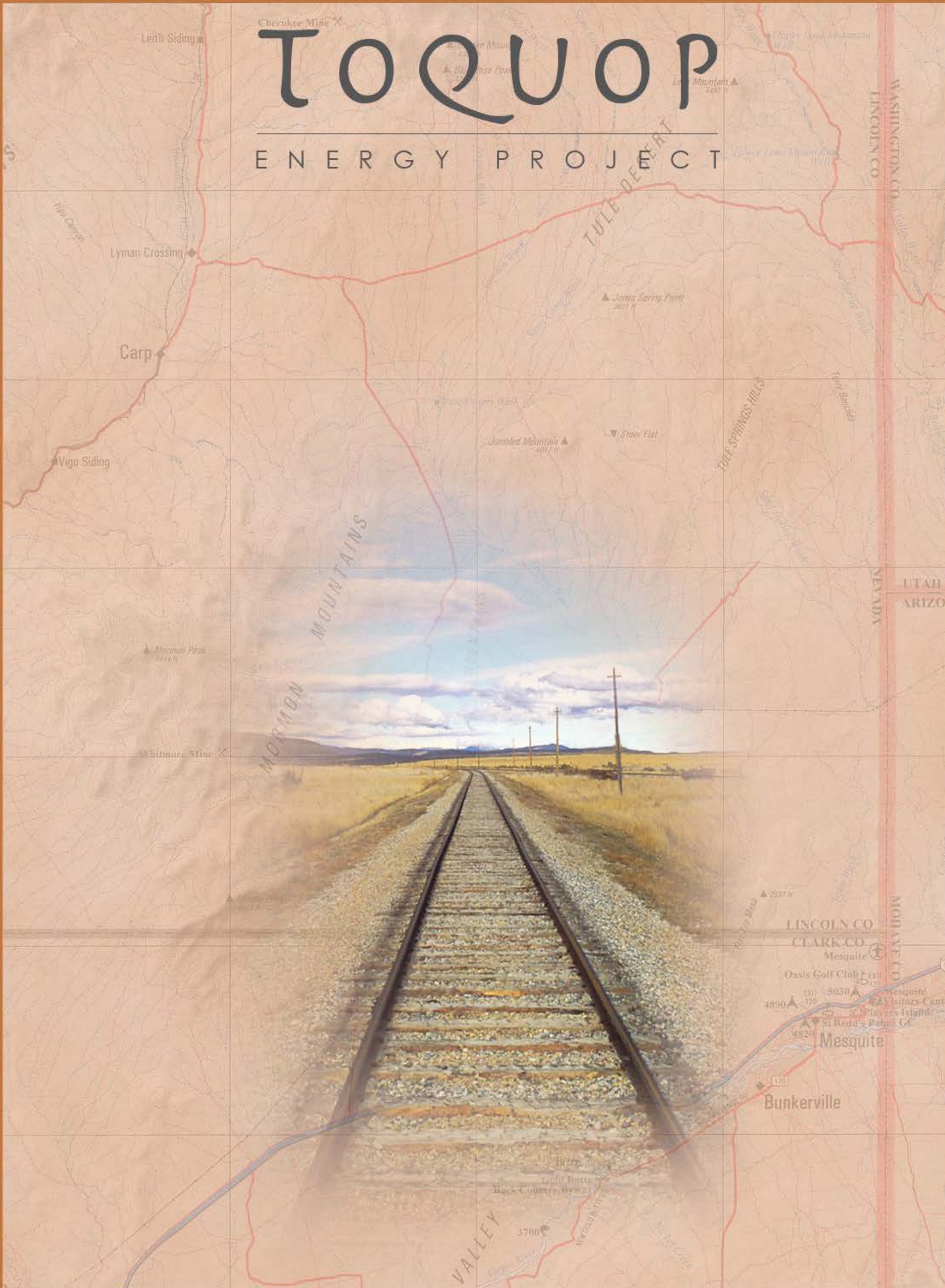
Low to Nonexistent (1-3)	None. No cumulative effects expected.
Moderate (4-7)	Possible adverse effects on site and possible expansion of infestation within the project area. Cumulative effects on native plant communities are likely but limited.
High (7-10)	Obvious adverse effects within the project area and probable expansion of noxious wee infestations to areas outside the project area. Adverse cumulative effects on native plant communities are probable.

Risk Rating Categories

None (0)	Proceed as planned.
Low (1-10)	Proceed as planned. Initiate control treatment on noxious weed populations that get established in the area.
Moderate (11-49)	Develop preventative management measures for the proposed project to reduce the risk of introduction of spread of noxious weeds into the area. Preventative management measures should include modifying the project to include seeding the area to occupy disturbed sites with desirable species. Monitor the area for at least 3 consecutive years and provide for control of newly established populations of noxious weeds and follow-up treatment for previously treated infestations.
High (50-100)	Project must be modified to reduce risk level through preventative management measures, including seeding with desirable species to occupy disturbed site and controlling existing infestations of noxious weeds prior to project activity. Project must provide at least 5 consecutive years of monitoring. Projects must also provide for control of newly established populations of noxious weeds and follow-up treatment for previously treated infestations.

TOQUOP

ENERGY PROJECT



APPENDIX D - AIR QUALITY

APPENDIX D
AIR QUALITY

1.0 INTRODUCTION

This technical support document provides detailed information regarding the air quality impacts of the No-Action Alternative and the Proposed Action Alternative of the Toquop Energy Project.

2.0 METHODS

This section presents a discussion of the potential impacts associated with the No-Action Alternative and the Proposed Action Alternative and their potential effects on air quality in the project area. In most instances, impacts are categorized and described in general terms without reference to facility type or any site-specific resources.

Estimated emissions of criteria and hazardous air pollutants (HAPs) from the proposed power plant under the Proposed Action Alternative were extracted from the air quality permit application prepared by ENSR Corporation (ENSR) for Toquop Energy Company, LLC (Toquop Energy), which was submitted to the Nevada Division of Environmental Protection (NDEP), pursuant to the Federal Prevention of Significant Deterioration (PSD) program. In addition, ENSR performed dispersion modeling to evaluate air-quality impacts of the plant emissions on local and regional air quality.

For purposes of the air-quality impact analysis, the following qualitative terms were used to describe the potential impact levels in terms of their relationship to established standards for air quality:

- **Major**. Ambient air quality would be permanently degraded as a direct result of the Proposed Action Alternative, to the extent that redesignation of the project area by the U.S. Environmental Protection Agency (EPA), with respect to one or more of the National Ambient Air Quality Standards (NAAQS) pollutants, from “attainment” or “unclassified” to “non-attainment” would be possible; an air-quality degradation increment, applicable to attainment and unclassified areas under the Federal PSD program regulations, would be consistently exceeded; regional haze would be consistently worsened by 5 percent visibility extinction or more; or cumulative regional emissions would increase, causing one or more of the results above.
- **Moderate**. Discernible degradation of regional air quality that does not consistently exceed applicable NAAQS, PSD increments, or Federal/state visibility protection standards.
- **Minor**. Insignificant degradation of regional or local ambient air quality at levels less than 20 percent of applicable standards; temporary or transient emissions occurring within a defined time period.
- **Negligible**. Indiscernible or unmeasurable degradation of regional or local ambient air quality or visibility.
- **None**. No air pollutant emissions occur.

3.0 NO-ACTION ALTERNATIVE

3.1 Impacts

3.1.1 Construction

Direct effects on air quality would occur from construction activities at the proposed power plant site, along the access road, along the water pipeline, and in the well field. During construction, temporary and localized increases in ambient concentrations of nitrogen oxides (NO_x), carbon monoxide (CO), sulfur dioxide (SO_2), particulate matter with an aerodynamic diameter of less than 10 microns (PM_{10}), particulate matter with an aerodynamic diameter of less than 2.5 microns ($PM_{2.5}$), and volatile organic compounds (VOCs) would result from exhaust emissions of vehicles, heavy construction equipment, diesel generators, and other machinery and tools. In addition, fugitive-dust emissions would result from vehicular travel on unpaved ground and from excavation and earthmoving activity. Areas surrounding the proposed power plant site, access road, and water pipeline would experience temporary disturbance associated with equipment access, materials, stockpile locations, and workspace requirements. In addition, earthmoving activities would increase the potential exposure of soils to accelerated erosion by wind and water.

A conservative emissions estimate was developed using the emission factor for generalized construction activities from the California Air Resources Board (CARB). Controlled emissions based on this factor are 0.11 ton per active acre per month of PM_{10} based on eight hours per day of construction activity (Countess Environmental 2006). This factor was increased to nine hours per day of construction activity, and a maximum of 35 percent of the proposed plant area (approximately 35 acres) was assumed to be disturbed in a given day. Additionally, it was estimated that access road construction would take place in 1.5-mile (2.4-kilometer [km]) sections before being paved, only one water well would be completed at a time, and excavation and soil disturbance for the water pipeline would occur in 2-mile (3.2-km) sections. Implementation of the No-Action Alternative would result in the direct disturbance of approximately 449 acres (Bureau of Land Management [BLM] 2003a).

Gaseous exhaust emissions were estimated using emission factors obtained from CARB Emission Inventory for Off-Road Large Compression-Ignited Engines. The operation of vehicles, heavy equipment, and other fuel-burning devices also results in emissions of particulate matter and gaseous pollutants, including NO_x, SO_2, and CO. Table D-1 summarizes the total mobile emissions of CO, NO_x, SO_2, PM_{10} that would be generated during the construction phase.

Table D-1
Emissions During the Construction Phase for the No-Action Alternative

	Carbon Monoxide (CO)	Nitrogen Oxides (NO_x)	Sulfur Dioxide (SO_2)	Particulate Matter (PM_{10})
	tons	tons	tons	tons
Power plant	16.7	73.0	10.6	303.5
Access road	3.5	19.0	3.2	61.3
Water pipeline	0.9	4.3	0.7	33.1
Wells	3.6	19.3	3.3	1.3
Total	24.7	115.7	17.8	399.3

SOURCE: Bureau of Land Management 2003a

The potential impacts resulting from construction activities under the No-Action Alternative would occur over a limited geographic area and for a limited time, as fugitive dust tends to settle within a few kilometers and as the locations of active work areas would be transient, with work activities typically moving to a new location every few days. Finally, the fugitive-dust emissions would be temporary, ceasing once the four-year construction schedule is completed. A Class II area impact analysis was completed that demonstrated Federal and state ambient air-quality standards would not be exceeded at any time during the construction phase. All of the predicted construction impacts are less than the allowable ambient air-quality standards. The estimate of reasonable foreseeable, but conservative, impacts for construction of the proposed power plant, access road, water pipeline, and well site under the No-Action Alternative are provided in Tables D-2 through D-5.

Table D-2
Estimated Emissions during Construction of the Power Plant under the No-Action Alternative

Pollutant	Maximum 1-Hour Predicted Impacts (μg/m³)	Averaging Period	Scaling Factor	Maximum Predicted Impacts (μg/m³)[1]	NAAQS (μg/m³)
Nitrogen dioxide (NO_2)	274.9	Annual	0.1	27.5	100
Carbon dioxide (CO_2)	51.8	8-hour	0.7	36.2	10,000
		1-hour	1.0	51.8	40,000
Sulfur dioxide (SO_2)	41.3	Annual	0.1	4.1	80
		24-hour	0.4	16.5	365
		3-hour	0.9	37.2	1,300
Particulate matter (PM_{10}) [2]	320.3	Annual	0.1	41.0	Revoked [3]
		24-hour	0.4	138.3	150

SOURCE: Bureau of Land Management 2003a
NOTES: [1] The impacts do not include background concentrations for the pollutants other than PM_{10}.
[2] Maximum predicted PM_{10} impacts include background of 9 μg/m³ (annual average) and 10.2 μg/m³ (24-hour average).
[3] Due to lack of evidence linking health problems to long-term exposure to PM_{10}, the U.S. Environmental Protection Agency has revoked the annual PM_{10} standard effective December 17, 2006.
μg/m³ = micrograms per cubic meter
NAAQS = National Ambient Air Quality Standards

Table D-3
Estimated Emissions during Construction of the Access Road under the No-Action Alternative

Pollutant	Maximum 1-Hour Predicted Impacts (μg/m³)	Averaging Period	Scaling Factor	Maximum Predicted Impacts (μg/m³) [1]	NAAQS (μg/m³)
Nitrogen dioxide (NO_2)	144.3	Annual	0.1	14.4	100
Carbon monoxide (CO_2)	102.4	8-hour	0.7	71.7	10,000
		1-hour	1.0	102.4	40,000
Sulfur dioxide (SO_2)	94.1	Annual	0.1	9.4	80
		24-hour	0.4	37.6	365
		3-hour	0.9	84.7	1,300
Particulate matter (PM_{10}) [2]	122.3	Annual	0.1	21.2	Revoked [3]
		24-hour	0.4	59.1	150

SOURCE: Bureau of Land Management 2003a
NOTES: [1] The impacts do not include background concentrations for the pollutants other than PM_{10}.
[2] Maximum predicted PM_{10} impacts include background of 9 μg/m³ (annual average) and 10.2 μg/m³ (24-hour average).
[3] Due to lack of evidence linking health problems to long-term exposure to PM_{10}, the U.S. Environmental Protection Agency has revoked the annual PM_{10} standard effective December 17, 2006.
μg/m³ = micrograms per cubic meter
NAAQS = National Ambient Air Quality Standards

Table D-4
Estimated Emissions during Construction of the Water Pipeline under the No-Action Alternative

Pollutant	Maximum 1-Hour Predicted Impacts (µg/m^3)	Averaging Period	Scaling Factor	Maximum Predicted Impacts (µg/m^3) [1]	NAAQS (µg/m^3)
Nitrogen dioxide (NO_2)	67.5	Annual	0.1	6.8	100
Carbon dioxide (CO_2)	55.9	8-hour	0.7	39.1	10,000
		1-hour	1.0	55.9	40,000
Sulfur dioxide (SO_2)	46.3	Annual	0.1	4.6	80
		24-hour	0.4	18.5	365
		3-hour	0.9	41.7	1,300
Particulate matter (PM_{10}) [2]	255.1	Annual	0.1	34.5	Revoked [3]
		24-hour	0.4	112.2	150

SOURCE: Bureau of Land Management 2003a

NOTES: [1] The impacts do not include background concentrations for the pollutants other than PM_{10}.

[2] Maximum predicted PM_{10} impacts include background of 9-µg/m^3 (annual average) and 10.2 µg/m^3 (24-hour average).

[3] Due to lack of evidence linking health problems to long-term exposure to PM_{10}, the U.S. Environmental Protection Agency has revoked the annual PM_{10} standard effective December 17, 2006.

µg/m^3 = micrograms per cubic meter

NAAQS = National Ambient Air Quality Standards

Table D-5
Estimated Emissions during Construction of the Well Site under the No-Action Alternative

Pollutant	Maximum 1-Hour Predicted Impacts (µg/m^3)	Averaging Period	Scaling Factor	Maximum Predicted Impacts (µg/m3) [1]	NAAQS (µg/m^3)
Nitrogen dioxide (NO_2)	207.8	Annual	0.1	20.8	100
Carbon dioxide (CO_2)	231.7	8-hour	0.7	162.2	10,000
		1-hour	1.0	231.7	40,000
Sulfur dioxide (SO_2)	214.1	Annual	0.1	21.4	80
		24-hour	0.4	85.6	365
		3-hour	0.9	192.7	1,300
Particulate matter (PM_{10}) [2]	146.6	Annual	0.1	23.7	Revoked [3]
		24-hour	0.4	68.8	150

SOURCE: Bureau of Land Management 2003a

NOTES: [1] The impacts do not include background concentrations for the pollutants other than PM_{10}.

[2] Maximum predicted PM_{10} impacts include background of 9-µg/m^3 (annual average) and 10.2 µg/m^3 (24-hour average).

[3] Due to lack of evidence linking health problems to long-term exposure to PM_{10}, the U.S. Environmental Protection Agency has revoked the annual PM_{10} standard effective December 17, 2006.

µg/m^3 = micrograms per cubic meter

NAAQS = National Ambient Air Quality Standards

3.1.1.1 Plant Operations

Operation of the 1,100-megawatt (MW) power plant would result in direct and indirect impacts on air quality within the project area. Air-pollutant emissions would result from the operation of the following natural-gas-fired equipment associated with the proposed power plant: four combustion turbines, eight duct burners, four fuel preheaters, and two auxiliary boilers. There also would be emissions from the two cooling towers, two diesel-fired emergency generators, and one diesel-fired emergency fire pump. The natural-gas- and diesel-fired equipment would cause air emissions of NO_x, CO, SO_2, PM_{10}, and VOCs. Minor quantities of HAPs, such as formaldehyde and benzene, also would be emitted from the combustion equipment. The cooling towers would cause emissions of PM_{10}. Table D-6 presents the potential criteria air pollutant emissions for the No-Action Alternative.

Table D-6
Summary of Maximum Annual Criteria Pollutant Emissions Summary
Under the No-Action Alternative

Source	**NO_X**	**CO**	**SO_2**	**VOC**	**PM_{10}**
	(ton/year)				
Single-combustion turbine generator with duct burners	84.05	236.52	50.11	18.47	105.12
Fuel preheater (per unit)	1.10	2.01	0.13	1.05	0.44
Auxiliary boiler (per unit)	2.8	5.84	0.48	0.326	0.40
Cooling tower (per cell)	–	–	–	–	0.73
Emergency fire-water pump engine	0.98	0.04	0.01	0.03	0.01
Totals [2]	355.91	967.48	202.23	79.04	434.97

SOURCE: Bureau of Land Management 2003a

NOTES: [1] Includes emissions from four single-combustion turbine generators and insignificant activities.

Air quality impacts resulting from plant operations under the No-Action Alternative would be the least of all alternatives considered for SO_2, PM_{10}, CO, and lead (Pb). However, nitrogen dioxide (NO_2) emissions would be higher than for the proposed coal-fired plant.

NO_x = nitrogen oxides
CO = carbon monoxide
SO_2 = sulfur dioxide
VOC = volatile organic compounds
PM_{10} = particulate matter equal to or less than 10 microns in diameter

This facility would use a selective catalytic reduction (SCR) system to control NO_x emissions from the combustion turbines and duct burners. The SCR system would be designed to control the combustion turbine generator/duct burner NO_x to 2.5 parts per million by volume, on a dry basis, or ppmvd, corrected to 15 percent oxygen (ppmvd at 15 percent ozone [O_3]). NO_x values would be corrected to 15 percent oxygen to standardize the NO_x value for variations in exhaust oxygen levels[1]. The catalyst would be replaced when ammonia (NH_3) slip reaches 10 ppmvd. Modern engineering and computer controls would be used to minimize the emissions of other pollutants from the combustion turbine generators and other combustion sources. The cooling towers would utilize highly efficient drift eliminators to minimize PM_{10} emissions. (These drift eliminators minimize the "drift loss" of aerosols by removing droplets entrained in the cooling tower exhaust stream.)

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[1] Note that the nitrogen oxide ($NO_{x)}$) value of 2.5 ppmvd at 15 percent oxygen ($O_{2)}$) was obtained from the Bureau of Land Management Final Environmental Impact Statement. However, the Environmental Protection Agency Reasonably Available Control Technology/Best Available Control Technical/Lower Achievable Emission Rate Clearinghouse lists numerous permits for natural-gas-fired combined-cycle combustion turbines greater than 25 megawatts with primary NO_x emission limits of 2.0 ppmvd at 15 percent O_2. Therefore, if the No-Action Alternative is constructed, the current Best Available Control Technical level of 2.0 parts per million by volume will likely be imposed during repermitting.

Manufacturer estimates, EPA AP-42 documents, and engineering experience from other plants were used to estimate criteria air pollutants from the facility. Maximum emissions of HAPs were estimated based on source test data compiled in the CARB California Air Toxic Emission Factor (CATEF) database.

3.1.1.2 Class II Impacts

Dispersion modeling was performed to predict the maximum NO_x, CO, PM_{10}, and SO_2 concentrations as a result of air emissions under the No-Action Alternative. No EPA-approved models exist for prediction of O_3 impacts from a single facility. Table D-7 presents the predicted impacts from the No-Action Alternative and compares them to the Class II increment and NAAQS. The Class II increment is the maximum allowable ambient air-quality deterioration allowed under the PSD program for a Class II area, while the NAAQS are the pollutant concentrations below which no adverse human health or environmental impacts are presumed to occur. None of the maximum predicted impacts exceeded the PSD increments or the NAAQS.

Table D-7
Estimated Air Quality Impacts during Plant Operations and Comparison to PSD Increment and NAAQS

Pollutant	Averaging Period	Maximum Predicted Impacts ($\mu g/m^3$) [1]	Ambient Impact Standards	
			PSD Increment ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)
Nitrogen dioxide (NO_2)	Annual	12.6	25	100
Carbon dioxide (CO_2)	8-hour	51.7	NA	10,000
	1-hour	406.6	NA	40,000
Sulfur dioxide (SO_2)	Annual	0.9	20	80
	24-hour	4.5	91	365
	3-hour	21.8	512	1,300
Particulate matter (PM_{10}) [2]	Annual	2.1	17	Revoked [3]
	24-hour	9.4	30	150

SOURCE: Bureau of Land Management 2003a

NOTES: [1] Other than PM_{10}, these impacts do not include background concentrations.

[2] Maximum predicted PM_{10} impacts include background of 9-µg/m^3 (annual average) and 10.2 µg/m^3 (24-hour average).

[3] Due to lack of evidence linking health problems to long-term exposure to PM_{10}, the U.S. Environmental Protection Agency has revoked the annual PM_{10} standard effective December 17, 2006.

µg/m^3 = micrograms per cubic meter

NAAQS = National Ambient Air Quality Standards

PSD = prevention of significant deterioration

Ambient impacts of HAPs were estimated using Industrial Source Complex Short Term 3 (ISCST3) and Complex Terrain Screening (CTSCREEN) modeling results. Table D-8 presents reasonable foreseeable, but conservative, results of 8-hour, 24-hour, and annual average HAP concentrations (BLM 2003a). None of the estimated HAP concentrations exceed the available standards, based on the appropriate exposure time. Therefore, even if residents were located close to the site, it would be very unlikely that the estimated HAP concentrations would result in an unacceptable risk. This rationale holds true for employees working at the facility. At this time, no residents or businesses are located near the power plant site.

Table D-8
Hazardous Air Pollutant Impact Analysis

Hazardous Air Pollutant (HAP)	8-Hour Average Concentration (µg/m^3)	24-hour Average Concentration (µg/m^3)	Annual Average Concentration (µg/m^3)	Nevada AACS (8-hour)[1] (µg/m^3)	8-hour Average Concentration Greater than Nevada AACS?	ATSDR MLR (acute, 1 to 14 days)[2,4] (µg/m^3)	24-hour Average Concentration Greater than ATSDR MRL	Region 9 Ambient Air PRG (chronic)[3] (µg/m^3)	24-hour Average Concentration Greater than EPA Region 9 PRG?
Formaldehyde	4.9E-01	2.8E-01	7.0E-02	7.1E+01	No	3.3E+01	No	1.5E-01	No
1.3-Butadiene	2.7E-02	1.5E-02	3.9E.03	5.2E+04	No	NA[5]	—	3.7E-03	No
Acetaldehyde	5.2E-01	3.0E-01	7.5E-02	NA[5]	—	NA[5]	—	8.7E-01	No
Acrolein	4.4E-02	2.5E-02	6.3-03	6.9E+00	No	4.1E-02	No	2.1E-02	No
Ethylbenzene	6.3E-02	3.6E-02	9.0E-03	1.0E+04	No	8.1E+02	No	1.1E+03	No
Hexane	5.2E-01	2.9E-01	7.4E-02	4.3E+03	No	NA[5]	—	2.1E+02	No
Naphthalene	1.4E-02	8.0E-03	2.0E-03	1.2E+03	No	NA[5]	—	3.1E+00	No
Propylene oxide	1.1E-01	6.1E-02	1.5E-02	NA[5]	—	NA[5]	—	5.2E-01	No
Toluene	2.9E-01	1.6E-01	4.1E-02	8.9E+03	No	8.1E+02	No	4.0E+02	No
Xylene (m,p)[6]	1.2E-01	6.9E-02	1.7E-02	NA[5]	—	NA[5]	—	NA[5]	—
Xylene (o)[6]	1.1E-01	6.2E-02	1.5E-02	NA[5]	—	NA[5]	—	NA[5]	—
Xylene (total)	2.2E-01	1.2E-01	3.1E-02	1.0E+04	No	8.1E+02	No	7.3E+02	No

SOURCES: [1] Agency for Toxic Substances and Disease Registry Toxicological Profile Information Sheets
[2] Agency for Toxic Substances and Disease Registry Minimal Risk Levels for Hazardous Substances

NOTES: U.S. Environmental Protection Agency Region 9 Ambient Air Preliminary Remediations Goals.
Agency for Toxic Substances and Disease Registry Minimal Risk Levels for ethylbenzene is based on sub-chronic (2 weeks to 1 year) exposure term.
[3] NA = value is not available for this HAP.
The ortho (o-) meta (m-), and para (p-) isomers specify where the two methyl groups are attached to the carbon atoms of the benzene ring.
µg/m^3 = micrograms per cubic meter
ATSDR = Agency for Toxic Substances and Disease Registry
[4] EPA = U.S. Environmental Protection Agency
[5] MRL = Minimal Risk Levels
[6] PRG = preliminary remediation goal

3.1.1.3 Class I Impacts

The California Puff Model (CALPUFF) screening model was used to predict impacts at Grand Canyon National Park using National Weather Service meteorological data from Las Vegas. Table D-9 lists the maximum predicted impact at the Grand Canyon National Park and the PSD Class I significance levels. All predicted impacts were well below the PSD Class I significance levels; therefore, the No-Action Alternative is presumed to have an insignificant impact on the air quality in the area. The CALPUFF model predicted that the impact on regional haze within the Grand Canyon National Park would be a 3.5 percent change in atmospheric light extinction. A facility predicted to cause a change of 5 percent or less is considered to have an insignificant impact on visibility.

The CALPUFF model was also used to predict acidic deposition in the Grand Canyon National Park for the No-Action Alternative. The modeling results indicate that the added nitrogen compounds and sulfur deposition would not exceed 1.3×10^{-3} kilograms per hectare per year (kg/ha/yr), individually. These values are significantly lower than the deposition analysis thresholds (DAT) for nitrogen compounds and sulfur, which are both set at 5.0×10^{-3} kg/ha/yr.

Table D-9
Maximum Predicted Air Quality Impacts at Grand Canyon National Park

Pollutant	Averaging Period	Maximum Predicted Impacts ($\mu g/m^3$)	Class I Significance Level ($\mu g/m^3$)
Nitrogen dioxide (NO_2)	Annual	0.0098	0.1
Sulfur dioxide (SO_2)	Annual	0.009	0.1
	24-hour	0.078	0.2
	3-hour	0.03	1.0
Particulate matter (PM_{10})	Annual	0.02	0.2
	24-hour	0.17	0.3

SOURCE: Bureau of Land Management 2003a
NOTE: This table does not include any background concentrations.
$\mu g/m^3$ = micrograms per cubic meter

3.1.2 Mitigation

The following fugitive-dust mitigation measures were paraphrased from Appendix B of the 2003 Environmental Impact Statement (EIS) (BLM 2003a) and will be carried forward through all of the alternatives:

1. Contractors will be required to comply with all applicable Federal, state, and local laws and regulations concerning prevention and control of noise and air pollution. Contractors are expected to use reasonably available methods and devices to control, prevent, and reduce atmospheric emissions or discharges of atmospheric contaminants and noise.
2. Contractors will obtain applicable air-quality permits before starting construction or operating equipment that will result in regulated atmospheric emissions. The approvals require Best Available Control Technology (BACT) for regulated emissions vented through stacks and vents and sources of fugitive dust emissions. Methods such as wetting exposed soil or roads with water or chemical dust suppressants where dust is generated by passing vehicles will be employed.

3. Contractors will be required to reduce dust from construction operations and prevent it from causing a nuisance to people. To accomplish this, the following measures will be implemented:

    - For the duration of construction activities, actively disturbed areas will be stabilized through the use of wet suppression, as required, to meet ambient air quality standards. Surfactants may be used to aid in wet suppression, thereby reducing the volume of water required to effectively treat the site. Disturbed areas of the site, including storage piles not being actively used for a period of one week or longer, will be stabilized, as appropriate, to minimize dust emissions. Active stabilization may not be required if soil moisture or natural crusting is sufficient to limit ambient impacts. Water (where applied outside the fenced area) would be applied evenly to avoid pooling.
    - Bulk material stored on site that is a possible fugitive-dust source will be actively wetted, as needed, to minimize ambient impacts. It is anticipated that the majority of the material will be used on site upon arrival. Should bulk materials require onsite storage for an extended period of time, the application of active wet suppression or the installation of a porous wind fence will be used, as necessary, to minimize fugitive-dust generation.
    - Many of the unpaved surfaces, such as onsite access roads, will be covered with gravel and watered, as necessary, to minimize dust generation.
    - Onsite fugitive-dust emissions will be limited by reducing vehicle speeds and a combination of active and passive dust suppression measures. Additional mitigation practices will include the following:
        – Onsite access roads, parking lots, and lay-down areas will be maintained with a gravel cover to the maximum extent practical.
        – Traffic off maintained onsite access roads will be restricted and a posted speed limit of 15 miles per hour (mph) will be enforced to minimize emissions from unpaved road segments.
        – Unpaved road segments will be watered, as necessary.
        – Gaseous emissions from mobile sources will be minimized by proper maintenance and tune-up of equipment.

4.0 PROPOSED ACTION ALTERNATIVE

This section addresses the predicted or anticipated impacts on local and regional air quality attributable to the Proposed Action Alternative, including the following sources:

- Air pollution emissions from construction activities including fugitive dust from earthmoving activities (plant and rail line construction) and tailpipe emissions from construction vehicles and equipment.
- Particulate emissions from materials handling (including coal, ash, gypsum, lime, powdered activated carbon, and coal combustion products [CCP]) and vehicle traffic on roads during operations.
- Emissions of criteria air pollutants from the power plant operations, which include the combustion of coal, the operation of air-pollution-control equipment, and the combustion of fuel oil in the auxiliary boilers, fire-water pump engine, emergency generator, onsite locomotive engines, and fuel and oil storage tanks.

4.1 Sources of Air Pollutant Emissions from Construction Activity

URS Corporation (URS) estimated criteria pollutant emissions associated with construction activity, including fugitive dust due to earthmoving activity, vehicular traffic on roads, and particulate and gaseous pollutant emissions from gasoline- and diesel-fueled vehicles and equipment. Further technical details on how criteria and HAP emissions were estimated for the various elements of the project and how ambient air quality pollutant concentrations and deposition rates were developed are provided below. Tables showing the calculated emission rates, predicted ambient concentrations, visibility impacts, and predicted deposition rates are also provided.

4.1.1 Fugitive Dust from Earthmoving Activity

Earthmoving activity associated with construction projects typically cause emissions of particulate matter in the form of fugitive dust. For this EIS, the estimation of a PM_{10} emission rate considers the actual level of activity at the site and the effect of controls. For general construction activity in desert soils (plant site and rail line), a generally accepted estimate of controlled PM_{10} emissions is 0.11 tons/acre-month of total particulate matter (Countess Environmental 2006). These emission and control factors were used to estimate the PM_{10} emissions resulting from construction activity.

4.1.1.1 Vehicle and Equipment Exhaust Emissions

During construction, gasoline- and diesel-fueled vehicles and equipment generate gaseous and particulate exhaust emissions. Table D-10 includes a roster of typical equipment to be used during construction of the proposed project. This table also presents the emission factors for VOC, CO, NO_x, PM_{10}, and SO_2 used to calculate air pollution emission rates for this equipment. Emission factors for vehicles were obtained from EPA document AP-42, "Volume II, Emission Factors for Mobile Sources" (EPA 1995).

Table D-10
Construction Vehicle and Equipment Tailpipe Emission Factors (g/hp-hr)[1,2]

Equipment	SCC	Power (hp)	HC EF	CO EF	NO_x EF	PM_{10} EF[3]	SO_2 EF[4]
2-ton trucks	2270002051	250	0.33	1.20	5.36	0.30	0.005
5-15 ton trucks	2270002051	400	0.22	2.10	5.78	0.22	0.005
Sideboom (other)	2270002081	500	0.22	2.10	5.78	0.22	0.005
Dozer (rubber tire)	2270002063	850	0.31	1.23	5.92	0.21	0.005
Large shovel	2270002063	850	0.31	1.23	5.92	0.21	0.005
Grader	2270002048	600	0.22	2.10	5.78	0.30	0.005
Tractor / backhoe / loader	2270002066	100	1.22	6.39	6.23	1.04	0.006
Welder / air compressor / generator	2270006025	300	0.31	0.79	5.64	0.23	0.005
Crane	2270006015	400	0.21	1.37	6.09	0.16	0.005
Bore / drill rig	2270002033	400	0.21	1.37	6.09	0.16	0.005

SOURCE: U.S. Environmental Protection Agency 2004a
NOTES:
1 Tier1 values were used for all equipment.
2 Emission Factors were calculated using U.S. Environmental Protection Agency report "Exhaust and Crankcase Emission Factors for Non-Road Engine Modeling-Compression-Ignition."
3 The portion of particulate matter attributable to sulfur in the diesel fuel (S PM) is calculated assuming 0.0015 percent of sulfur content for the local diesel fuel (the Tier1 sulfur content).
4 SO_2 emission factor assumed diesel sulfur content of 0.0015 percent.
EF = emission factor
g/hp-hr = grams per horsepower hour
hp = horesepower

SCC = source classification code
HC = hydrocarbon
CO = carbon monoxide
NO_x = nitrogen oxides
PM_{10} = particulate matter equal to or less than 10 microns in diameter
SO_2 = sulfur dioxide

Emission factors for off-highway diesel-fueled vehicles and equipment were calculated following the method outlined in the EPA report "Exhaust and Crankcase Emission Factors for Non-Road Engine Modeling-Compression-Ignition" (EPA 2004a). For all such vehicles and equipment, Tier 1 emission factors were used. Tier 1 refers to the first Federal standards for non-road diesel engines regulations adopted in 1994 and phased in from 1996 to 2000. The use of the Tier 1 standards allows for conservative estimation of diesel exhaust emissions. Emission factors for pickup trucks and crew cabs were obtained from the EPA model MOBILE5, based on national averaged fleet conditions, at a speed of 15 mph and an ambient temperature of 60 degrees Fahrenheit (^oF). Annual emissions for all diesel-fueled vehicles and equipment were calculated based on average engine horsepower (hp) for each type of vehicle and equipment, and an operating schedule of 10 hours per day, 6 days per week and 52 weeks per year. Annual emissions for gasoline-fueled pickup trucks and crew cabs were calculated based on a traveling distance of 10 miles per day during power plant construction and 25 miles per day during rail line construction, all with an operating schedule of 6 days per week and 52 weeks per year.

4.2 <u>Sources of Air Pollutant Emissions from Material Handling Operations</u>

4.2.1 Locomotive Rail Line Travel Emissions

Railway locomotive engines will operate while delivering coal and other materials to the site. Exhaust emissions will be released during the operation of the diesel-fired locomotive engines. Locomotive rail line travel emissions were calculated using EPA document Technical Highlights – Emission Factors for Locomotives (EPA 1997). Similar assumptions were used by ENSR to calculate onsite locomotive emissions in Section 5.8 of Appendix 5, "Air Pollution Emissions Details and Summary," of the PSD Application (ENSR 2006a).

4.2.1.1 Coal Unloading, Handling, and Transfer Operations

The following text is excerpted from Section 7.1.5.1 , Description of Proposed Project, of the PSD Application (ENSR 2006a).

> The [Toquop Power Project] TPP has been designed to burn sub-bituminous coals from the Powder River Basin in Wyoming. [Sub-bituminous coal is a coal whose properties range from those of lignite to those of bituminous coal and used primarily as fuel for steam-electric power generation.] Coal will be delivered to the project site by rail from the existing UP [United Pacific] rail line that passes west of the power plant site. A new rail track or "line" will be constructed to connect the existing line to the power plant. On average, approximately one unit train will deliver coal to the site each day.
>
> Coal will be removed from each rail car by a bottom dumper system that will deposit the coal into a hopper for transfer by conveyor to the coal storage area. Conveyors will transfer the coal into and out of the coal storage area. A coal crusher unit will crush the coal, and the crushed coal will be conveyed to the coal silos adjacent to the main boiler.
>
> The fugitive dust emissions from the rail bottom dumper, the coal transfer points, and the crusher will be controlled by individual baghouses or filters that will draw air through the transfer points or processes, and filter particulates from the air stream, prior to being emitted into the atmosphere. The filtered (collected) materials will be transferred back to the coal operations for

eventual combustion in the boiler. A total of approximately 3 million tons of coal per year may be delivered to the site by train.

Coal Unloading System

The coal unloading system will be designed to accommodate the daily unloading of a maximum of one unit train with approximately 120 tons of coal in each car. If the boiler is operating at full load, an average of approximately one unit train per day will be required. The new incoming rail line and loop track will be designed and constructed to accommodate a maximum of one unit train per day. An automated train positioner and an enclosed bottom car dumper will be used to unload the coal. The coal unloading system will be provided with receiving hoppers and grillage, two belt feeders, chute work and cut-off gates, dust control systems, duplex sump pumps, emergency egress tunnel with ventilation, and all necessary control devices. The coal subsequently will be transferred from the rail unloading area to a transfer house.

Coal Stackout and Reclaim System

Coal from the transfer house will be transferred to the active areas of the coal storage piles via a gull-wing stacker. The traveling gull-wing stacker will be provided with dual stackout conveyors and telescoping chutes. All transfer points will be provided with dust spray controls. Mobile equipment will transfer coal from the active storage area to the long-term storage area.

The active areas of the storage pile will be of sufficient size to provide for about 7 days of active reclaimable coal. A reclaim tunnel will be located adjacent to the active storage area. Reclaim and blending will be accomplished using front-end loaders, which will transport the coal from the coal storage area to the reclaim coal grate. Reclaim conveyors will [move] coal to the transfer house and will be provided with belt scales and magnetic separators to direct coal to the crusher house feed conveyors.

Approximately 30 days of long-term coal storage will be provided in the storage pile. Mobile equipment will be used to transfer the coal from the long-term storage area to the active reclaim area.

Coal Crushing

Coal from the reclaim system will be transferred to the coal crusher house. The crusher house will be a totally enclosed structure and will include a surge bin, variable speed belt feeders, granulator crushers and motors, and all necessary chutes and gates. The crushers will reduce the coal to a nominal size of 1 to 2 inches.

Silo Fill System

The plant feed conveyor will transport coal to the surge bin located in the plant transfer tower. The belt feeders will be capable of feeding coal to one of two tripper conveyors. Each tripper conveyor will be provided with a traveling tripper to continuously fill the boiler silos.

4.2.1.2 Ash Handling and Disposal

The following text is excerpted from Section 7.1.5.2, Description of Proposed Project, of the PSD Application (ENSR 2006a):

> Coal combustion will produce ash, which will be removed from the baghouse (fly ash) and from the bottom of the boiler (bottom ash). Fly ash will be collected from the flue gas by the baghouses and pneumatically transported into the fly ash silo. The fly ash will be transferred from the silos to trucks or rail cars for shipment offsite for beneficial reuse (as feedstock for concrete preparation or other uses), or loaded into trucks for disposal at the approved coal combustion products (CCP) landfill. Fly ash will be mixed with approximately 10 percent water by weight before being loaded into trucks for transport to the approved CCP disposal area.
>
> Bottom ash will be removed from the boiler after quenching and pneumatically transported into the bottom ash silo storage silo for subsequent loading to trucks or rail cars for shipment offsite for beneficial reuse or for disposal at the approved CCP landfill. While transfers from the fly ash and bottom ash silos will be controlled by bin vent filters, all exposed ash will be wetted prior to any handling operations in the open. [Wetting of the ash will reduce particulate emissions during handling operations.]

4.2.1.3 Gypsum Handling and Disposal

The following text is excerpted from Section 7.1.5.3, Description of Proposed Project, of the PSD Application (ENSR 2006a):

> Calcium sulfate (gypsum) will be generated annually by the power plant. The product from the flue gas desulfurization (FGD) process is synthetic gypsum. It will be produced in a form that has been dewatered to a moisture content in the range of 10 to 20 percent. This gypsum material will be loaded into trucks or rail cars for shipment offsite, for either beneficial reuse in sheet rock manufacturing or loaded into trucks for disposal at the approved CCP landfill.

4.2.1.4 Quicklime Handling and Storage

The following text is excerpted from Section 7.1.5.4, Description of Proposed Project, of the PSD Application (ENSR 2006a):

> Quicklime required for the FGD system will be transported to the project site by rail or by truck, depending on which is the most cost-effective means of transportation. Quicklime will be used in the FGD system to remove sulfur dioxide (SO_2) from the flue gases. Quicklime will be delivered and unloaded through a pneumatic conveying system. The pneumatic conveyor system will transfer the Quicklime to the Quicklime storage silos. Each Quicklime silo will be equipped with a baghouse to control particulate matter with an aerodynamic diameter of 10 microns or less (PM_{10}) emissions.
>
> The Quicklime from the storage silos is transferred to the Quicklime preparation building. This transfer of Quicklime is an enclosed process. The Quicklime is mixed with water and made into a slurry that will be injected into the wet FGD system for SO_2 control. The Quicklime slurry is then stored in tanks near the wet FGD system. From these tanks, the Quicklime slurry is sent to the wet FGD system.

4.2.1.5 Powdered Activated Carbon Handling and Storage

The following text is excerpted from Section 7.1.5.5, Description of Proposed Project, of the PSD Application (ENSR 2006a):

The [project] plans to comply with the applicable New Source Performance Standards mercury control regulations that were promulgated by the U.S. Environmental Protection Agency (EPA) on May 18, 2005. While there has been considerable work done on a number of promising mercury control technologies at the pilot scale and small demonstration scale, no truly commercial control technology exists today. The technology that is closest to commercialization involves the injection of powdered activated carbon (PAC) upstream of a particulate collection device. This technology has been tested at commercial scale for relatively short periods of time on a number of commercial power plants with encouraging but varying results. Results are highly dependent upon the type of coal being burned and the configuration of the power plant, particularly the combination and sequence of pollution devices employed.

The preamble to the Clean Air Mercury Rule provides a discussion of the control of mercury by SCR and FGD equipment. From that discussion and the analysis of the data from EPA's Mercury Information Collection Request, Toquop Energy, LLC may comply with the final mercury new source performance emission standards without the addition of a specific mercury control device. Toquop Energy, LLC is considering the installation of a PAC system to enhance mercury controls; however, its ultimate installation would depend on the performance of the other control equipment (SCR and scrubber) and on the cost of mercury allowances under a (not-yet proposed) cap and trade system.

At this point in time, the most viable technology is the injection of PAC, which is the basis of the description provided below and in subsequent sections. However, prior to the expected start of construction, it is possible that another option (such as FGD additives, oxidation catalysts, and other technologies) could become the preferred technique. The following discussion applies to an activated carbon injection system, which is currently considered part of the proposed [project].

If needed, PAC would be delivered to the site by trucks and pneumatically unloaded into a storage silo. The boiler will be provided with a single storage silo capable of holding a 14-day supply of PAC. PM_{10} emissions from the transfer operations and activated carbon storage silo would be controlled by a baghouse. The PAC would be injected into the boiler flue gas stream downstream of the SCR system. With use of carbon injection at the TPP, the carbon would be collected in the main boiler particulate control equipment.

4.2.1.6 CCP Disposal Area

The following text is excerpted from Section 5.10, Air Pollution Emissions Details and Summary, of the PSD Application (ENSR 2006a):

As currently proposed, CCP, consisting of fly ash, bottom ash, FGD by-product (gypsum), and spent activated carbon (if used), will either be sold to potential end users or disposed at an onsite landfill, which will be specifically developed for [the project]. The projected emissions from the landfill activities are included in the modeling effort.

4.2.1.7 Vehicle Traffic On Roads

The following text is excerpted from Section 5.9, Air Pollution Emissions Details and Summary, of the PSD Application (ENSR 2006a):

Raw materials and CCP may arrive and depart to the site by either railcar or truck. Dust emissions were estimated from the paved roadways that may be used by activated carbon supply trucks, NH_3 supply trucks, Quicklime and Quicklime supply trucks, chemical delivery trucks, fuel oil supply trucks, and trucks transporting CCP off-site. Emissions from the paved roads were calculated based on an emission factor developed from Equation 2 in AP-42, Chapter 13.2.1, *Paved Roads*. Note tailpipe emissions from these commercial vehicles were not addressed in the PSD Application.

4.3 Sources of Air Pollutant Emissions from Power Plant Operations

The proposed project would include one pulverized coal (PC) supercritical boiler and a steam turbine generator capable of generating 750 MW (gross) of electric power. Major systems would include power generating and transmission, materials handling, heat rejection (cooling), and air-emissions control. The proposed Toquop Energy Project would also include two auxiliary boilers, a fire-water pump engine, an emergency generator, and fuel and oil storage tanks.

4.3.1 Coal Combustion Emissions

Local and regional ambient air quality impacts associated with the proposed project would result from the combustion of sub-bituminous coals mined from the Powder River Basin in Wyoming. Criteria pollutant emission rates for the proposed power plant were obtained from the PSD permit application prepared by ENSR.

The following text is excerpted from Section 7.1.2.1, Description of Proposed Project, of the PSD Application. (ENSR 2006a*)*:

> The project will operate one supercritical, PC-fired boiler. PC combustion is the most commonly used method of combustion in coal-fired power plants. It is a well-proven, reliable, and cost-effective technology for power generation in utility-scale applications. While the majority of the coal-fired power generation facilities in the United States (U.S.) use a sub-critical steam cycle, Toquop Energy, LLC has selected a supercritical steam cycle. The advantages of the supercritical steam cycle include higher efficiency, lower emissions, and reduced fuel consumption. Use of a once through, supercritical steam cycle and other design features will enable this plant to be one of the most efficient dry cooled steam electric plants ever built in the U.S. with a net efficiency greater than 40 percent based on the lower heating value of the fuel. State-of-the-art emission controls will be used to minimize emissions of potential air pollutants. Water consumption will be minimized by using a Heller system, dry natural draft cooling tower.
>
> The boiler will include four coal silos for short-term coal storage. Upon leaving the coal silos, the coal will be pulverized and fed into the low-oxides of nitrogen (NO_x) coal burners for combustion. The coal burners and the boiler will be designed to avoid hot spots that could lead to excessive generation of NO_x. The heat from the combustion of the coal will serve to generate steam at supercritical pressure and high temperature for increased cycle efficiency and lower relative emissions.
>
> Steam generated in the boiler will drive its individual steam turbine generator. The steam expands through the steam turbine, such that the thermal energy contained in the steam is converted to the mechanical energy required to rotate the steam turbine-generator shaft. The generator, which is directly coupled to the steam turbine, uses this mechanical energy to produce electricity. After releasing all economically-available energy, the steam exhausts from the steam turbine-generator and flows into the condenser, where waste heat in the steam is removed to condense the steam and form water. The condensed water is then pumped back to the boiler to complete the cycle.

4.3.1.1 Fuel Oil Combustion and Storage Emissions

The following text is excerpted from Section 7.1.3, Description of Proposed Project, of the PSD Application. (ENSR 2006a):

> Two auxiliary steam boilers will meet the steam demand during start up of the main steam generators (auxiliary steam consumers: de-aerator, steam air heater, turbine seals, etc). The auxiliary steam generators are of fire-tube/smoke-tube type (package boilers, shell type). Each auxiliary steam generator has a heat input capacity of 86.4 million British thermal units/hour. Emission will be controlled by only burning ultra low sulfur (0.0015 percent sulfur) distillate oil, low-NO_X burners, good combustion, and limiting operation to 550 hours/year. Support facilities required to operate the auxiliary boilers include water supply and storage, fuel delivery and storage, and an electrical distribution system. Fuel will be delivered by truck or rail to a 1,060,000-gallon diesel fuel tank.

The following text is excerpted from Section 7.1.4, Description of Proposed Project, of the PSD Application. (ENSR 2006a*)*:

> There will be one emergency diesel generator with an output capacity of 1,482 horsepower and one firewater pump engine with an output capacity of 284 horsepower. These units will operate during emergency situations and for readiness maintenance checks. Emission will be controlled by only burning ultra low sulfur (0.0015 percent sulfur) distillate oil, through good combustion practices, and limiting normal operation to a maximum of 100 hours/year for each engine.

The following text is excerpted from Section 7.1.7, Description of Proposed Project, of the PSD Application. (ENSR 2006a):

> One 1,060,000-gallon fuel oil storage tank; one 4,000-gallon fuel oil storage tank; one 1,000-gallon gasoline storage tank; two 14,000-gallon lube oil storage tanks; two 3,000-gallon lube oil storage tanks; a 1,000-gallon used oil storage tank; and one 300-gallon fuel oil storage tank will be located onsite. These tanks primarily will contain No. 2 fuel oil (commercial grade) to supply the emergency generator, fire-water pump engine and for startup of the pulverized coal-fired boilers, gasoline for plant equipment and lube oil for the main boilers and generators.

4.3.1.2 Commuting Employee Vehicles on Access Roads

Criteria air pollutant emissions resulting from employees driving vehicles to commute to the plant were conservatively estimated. URS conservatively assumed that all 110 employees will work five days per week, and that each person would drive a gasoline-fueled vehicle separately to work each day. Tailpipe emission factors for vehicles were obtained from EPA document AP-42, Volume II, “Emission Factors for Mobile Sources” (EPA 1995). Emission factors for pickup trucks and crew cabs were obtained from EPA model MOBILE5 based on national averaged fleet conditions at a speed of 15 mph and an ambient temperature of 60 ^{o}F. Annual emissions were calculated based on a round-trip travel distance of 50 miles per day from the plant to Mesquite, Nevada, with an operating schedule of 5 days per week (Monday through Friday) and 52 weeks per year.

4.4 Estimation of Air Pollutant Emissions

The following sections describe the methodology used to calculate emissions of regulated air pollutants from the proposed project, organized as follows:

- Criteria air pollutant emissions from project construction activity, including fugitive dust from earthmoving and tailpipe emissions from construction vehicles and equipment
- Criteria air pollutant emissions from material-handling operations, including coal, ash, gypsum, quicklime, powdered activated carbon CCP, and emissions due to vehicle traffic on roads during operations

- Criteria and hazardous air pollutant emissions from operation of the proposed power plant, including coal combustion emissions from the main stack; fuel oil combustion in auxiliary boilers, fire-water pump engine, and emergency generator; and tailpipe emissions from vehicles traveling to and from the plant site

4.4.1 Air Emissions from Project Construction Activity

4.4.1.1 Fugitive Dust Due to Earthmoving Activity

URS estimated criteria pollutant emissions associated with construction activity, including fugitive dust due to earthmoving activity, vehicular traffic on roads, and particulate and gaseous pollutant emissions from gasoline- and diesel-fueled vehicles and equipment.

For purposes of this impact analysis, it was assumed that disturbed ground would undergo watering during active earthmoving. According to the Western Regional Air Partnership (WRAP) Fugitive Dust Handbook (Countess Environmental 2006), the 0.11 ton/acre-month PM_{10} emission factor assumes a control effectiveness of 50 percent due to routine watering. (Please note that the previously permitted actions such as the access road, water pipeline, and well field are not specifically addressed in this analysis, as the impacts would be the same as described for the No-Action Alternative.)

URS conservatively assumed that up to 120 acres of ground would undergo active earthmoving activity at any one time on the power plant site during the initial 18 months. Maximum controlled PM_{10} emissions from plant site construction are estimated to be 13.2 tons/month. For the remaining 24 months it was assumed that a maximum of 40 acres per month would be undergo active earthmoving. Based on this varied earthmoving schedule, it is estimated that a maximum of 343.2 tons of PM_{10} will be emitted during plant site construction.

The rail line would be approximately 31 miles long, with a total project area of 697.6 acres. Maximum controlled PM_{10} emissions from construction of the rail line are estimated to be 76.7 tons/month. Based on an 18-month construction schedule, it is estimated that a maximum of 1,381 tons of PM_{10} would be emitted during construction of the proposed rail line.

Table D-11 summarizes the estimated PM_{10} emissions due to earthmoving activity from each phase of the Proposed Action Alternative. For the Proposed Action Alternative, the total maximum controlled PM_{10} emissions from construction of the plant site and rail line are estimated to be 89.9 tons/month. Since these emissions would be generated by earthmoving activity and occur at ground level, it is unlikely that the PM_{10} would be transported more than 1 or 2 km, except on unusually windy days (see Mitigation section for dust control measures during periods of high wind). In addition, the fugitive dust sources will be spatially distributed over a large area and spread out over the three-year duration of the construction period. Furthermore, the locations of active work areas would be transient, with work activities typically moving to a new location every few days. Finally, the PM_{10} emissions from earthmoving activity would be temporary, ceasing as each phase of the project is completed. Based on the foregoing, the ambient air quality impacts (fugitive dust) of project construction activity are considered to be minor.

Table D-11
Particulate Matter (PM_{10}) Emissions Associated with Construction of Plant Site and Rail line under the Proposed Alternative

Length (mile)	Work Area (acre)	Projected Construction Time (months)	PM_{10} EF (tons/acre-month) [1]	Controlled PM_{10} Emission (tons/month) [2]	Total Controlled PM_{10} Emission (tons) [3]
Proposed Toquop Power Plant Site					
NA	120.0 [4]	50.0	0.11	13.2	343.2
Proposed Rail line					
31.0	697.6	24.00	0.11	76.7	1,381
Totals [5]	817.6	-	0.11	89.9	1,724

SOURCE: Countess Environmental 2006
NOTES:

1 From Countess Environmental 2006 *WRAP Fugitive Dust Handbook.*
2 PM_{10} EM = ER (tons/acre-month) x Daily Activity (acres) = Controlled PM_{10} Emissions (tons/month)
3 PM_{10} EM = ER (tons/acre-month) x Daily Activity (acres) x Work Months (months) = Total Controlled PM_{10} Emissions
4 The estimated work area disturbed during plant construction was assumed to be 120 acres (plant site footprint) out of the specified 647.6 acres. A maximum of 120 acres per month would be disturbed during the first 18 months with 40-acres per month during the remaining 24 months.
5 Previously action items such as access roads, water pipeline, and well field are not included in this evaluation.

PM_{10} = particulate matter equal to or less than 10 microns in diameter
EF = emission factor
NA = not applicable

4.4.1.2 Criteria Pollutant Emissions from Construction Vehicles and Equipment

Table D-12 summarizes the equipment and vehicle roster and estimated criteria pollutant emission rates for construction of the proposed power plant. Table D-13 summarizes the equipment and vehicle roster and estimated criteria pollutant emission rates for construction of the proposed rail line. Table D-14 summarizes the combined estimated tailpipe criteria pollutant emission rates for all vehicles and equipment used on all phases of construction for the proposed project. The maximum annual emissions were calculated to be 33.6 tons of VOC, 194.8 tons of CO, 657.2 tons of NO_x, 28.6 tons of PM_{10} and 0.6 tons of SO_2. Total emissions for the duration of the construction activity were estimated to be 84.1 tons of VOC, 486.2 tons of CO, 1,657.2 tons of NO_x, 71.6 tons of PM_{10} and 1.5 tons of SO_2.

The criteria pollutant tailpipe emissions would be spatially distributed over a large area and spread out over the three-year duration of the construction period. Furthermore, the locations of active work areas will be transient, with work activities typically moving to a new location every few days. Finally, the tailpipe emissions from construction activity would be temporary, ceasing as each phase of the project is completed. Therefore, the criteria pollutant emissions from construction vehicles and equipment are considered to be negligible.

4.4.1.3 Locomotive Rail Travel Emissions

It was assumed that each train has three engines, each rated at 4,000 brake hp, and that a maximum of 0.87 unit train deliveries would occur per day. It was also assumed for analysis purposes that the locomotive would average 40 mph while traveling on the 31-mile-long rail line for a total round trip of 19,688 miles per year of or 492.2 hours per year. NO_x, CO, VOC, and particulate matter (PM) emissions were estimated using emission factors obtained from EPA-420-F-97-051, dated December 1997. SO_2 emissions were calculated assuming a diesel fuel heating value of 137, 000 British thermal units (Btu) per gallon, a diesel sulfur content of 0.0015 percent, and an estimated distillate oil density of 7.2 pounds per gallon. Note that the EPA low sulfur diesel rule for locomotives goes into effect on June 1st, 2007. Criteria pollutant emissions for the locomotive engines are summarized in Table D-12.

Table D-12
Summary of Criteria Pollutant Emissions for Locomotive Rail Line Travel

Pollutant	EF		Emissions		
	g/bhp-hr [(1)]	lb/bhp-hr	lb/hr	lb/yr	tpy
NO_x	0.51	0.001	13.49	6,639.78	3.32
CO	1.32	0.003	34.92	17,187.62	8.59
VOC	10.49	0.023	277.51	136,590.42	68.30
SO_2 [(2)]	-	-	0.14	68.91	0.03
PM	0.33	0.001	8.73	4,296.91	2.15

SOURCE; U.S. Environmental Protection Agency 1997
NOTES:

[1] Emission factors (g/bhp-hr) were obtained from Table 9 –Fleet Average Emission Factors for Locomotives, EPA-420-F-97-051, December 1997.

[2] SO_2 emissions (lb/hr) were calculated using the following equation: SO_2 (lb/hr) = Total hp rating * 7,500 (hp to British thermal unit/hour conversion factor) / Diesel Fuel Heating Value (British thermal unit/gallon) * Density of diesel fuel (pounds/gallon) * diesel fuel sulfur content (5) / 100 * 64 lb SO_2 / 32 lb S

EF = emission factor
g/bhp-hr = gram per brake horsepower hour
lb/bhp-hr = pound per brake horsepower hour
lb/hr = pounds per hour
lb/yr = pounds per year
tpy = tons per year
NO_x = nitrogen oxides
CO = carbon monoxide
VOC = volatile organic compounds
SO_2 = sulfur dioxide
PM = particulate matter

4.4.1.4 Emissions from Material Handling Operations

4.4.1.4.1 Coal Handling

PM_{10} emission rates for the coal handling were obtained from ENSR (ENSR 2006a). The following subsections summarize the PM_{10} emissions from these coal-handling operations:

The following text is excerpted from Section 5.2.1 through 5.2.6 of Appendix 5, Air Pollution Emissions Details and Summary, of the PSD Application (ENSR 2006a):

Railcar Unloading

Coal unloading operations occur inside a railcar dumper building via a bottom dumper. The coal is unloaded continuously from the railcars through a bottom dump system into underground hoppers, which then feed an unloading conveyor. Emissions from coal unloading operations are calculated using the equation in AP-42, Chapter 13.2.4, *Aggregate Handling and Storage Piles*. Hourly emissions are based upon a maximum hourly coal unloading rate of 5,000 tons/hour, and annual emissions are based on a maximum annual coal unloading rate of 2,944,000 tpy. Emissions from the entire system are controlled by fogging water sprays. The fogging water sprays are estimated to provide a PM_{10} control efficiency of 85 percent. Emissions of PM_{10} were calculated as 0.11 lb/hr and 0.03 tpy.

PM$_{10}$ Emissions from Coal Unloading Operations
E_{PM10} (pounds/hour) = (1.45E-04 pounds/ton) * (5,000 tons/hour) * (1-85/100)
E_{PM10} (pounds/hour) = 0.11
E_{PM10} (tpy) = (1.45E-04 pounds/ton) * (2,944,000 ton/year) * (1-85/100) / (2,000 pounds/ton)
E_{PM10} (tpy) = 0.03

Coal Transfer Operations – Transfer House

Coal is transferred from the unloading conveyor belt to the coal yard conveyor belt inside the transfer house. Emissions from the transfer house building are controlled by a baghouse with a design outlet grain loading of 0.005 [grain per dry standard cubic foot] gr/dscf. The baghouse will be designed for 8,833 [dry standard cubic foot per minute] dscfm, and maximum hours of operation will be 24 hours per day and 8,760 hours per year. Emissions of PM$_{10}$ from the coal transfer operations were calculated to be 0.38 lb/hr and 1.66 tpy.

PM$_{10}$ Emissions from Coal Transfer Operations – Transfer House
E_{PM10} (pounds/hour) = (0.005 gr/dscf) * (8,833 dscfm) / (7,000 gr/pound) * (60 minutes/hour)
E_{PM10} (pounds/hour) = 0.38
E_{PM10} (tpy) = (0.38 pounds/hour) * (8,760 hours/year) / (2,000 pounds/ton)
E_{PM10} (tpy) = 1.66

Coal Stackout Operations

Emissions from coal stackout operations are calculated using the equation in AP-42, Chapter 13.2.4, *Aggregate Handling and Storage Piles*. Hourly emissions are based upon a maximum hourly coal unloading rate of 5,000 tons/hour, and annual emissions are based on a maximum annual coal unloading rate of 2,944,000 tons/year. An emission factor of 1.45E-04 pounds/ton was used to estimate PM$_{10}$ emissions from the coal pile stackout and the coal yard conveyor; [Note that 1.45E-04 is equivalent to 0.000145]. A mean wind speed of 12.0 miles per hour (mph), obtained from the Overton, Nevada met station, and a mean coal moisture content of 19.42 percent based on the minimum coal moisture content from the worst-case coal were used. [Worst case coal assumes highest ash and sulfur content in order to calculate conservative emissions estimates.] Wet suppression (water sprays) will be used to control PM$_{10}$ emissions from the coal yard stackout operations. There are hoods on the telescoping chute to provide weather protection and dust control. The water sprays and hoods are estimated to provide a PM$_{10}$ control efficiency of 75 percent. Individual emissions of PM$_{10}$ were calculated as 0.18 lb/hr and 0.05 tpy for both the Gull Wing Stacker and the coal yard conveying. Therefore the total PM$_{10}$ emissions due to stackout operations are 0.36 lb/hr and 0.1 tpy.

PM$_{10}$ Emissions from Coal Stackout Operations – Gull Wing Stacker to Coal Pile
E_{PM10} (pounds/hour) = (1.45E-04 pounds/ton) * (5,000 tons/hour) * (1-75/100)
E_{PM10} (pounds/hour) = 0.18
E_{PM10} (tpy) = (1.45E-04 pounds/ton) * (2,944,000 tpy) * (1-75/100) / (2,000 pounds/ton)
E_{PM10} (tpy) = 0.05

PM$_{10}$ Emissions from Coal Stackout Operations – Coal Yard Conveying
E_{PM10} (pounds/hour) = (1.45E-04 pounds/ton) * (5,000 tons/hour) * (1-75/100)
E_{PM10} (pounds/hour) = 0.18
E_{PM10} (tpy) = (1.45E-04 pounds/ton) * (2,944,000 tpy) * (1-75/100) / (2,000 pounds/ton)
E_{PM10} (tpy) = 0.05

Table D-13
Plant Site Construction Vehicle/Equipment Emissions

Vehicle/Equipment	Quantity	Fuel	Average Engine Power (hp)	Unit of Emission Factors	Emission Factors [1, 2]					Maximum Annual Emissions (tons/year) [3, 4]					Total Emissions (tons) [3, 4, 5]				
					VOC	CO	NO_x	PM_{10}	SO_2	VOC	CO	NO_x	PM_{10}	SO_2	VOC	CO	NO_x	PM_{10}	SO_2
Trucks (2-ton)	5	Diesel	250	g/hp-hr	0.33	1.20	5.36	0.30	0.005	1.42	5.16	23.05	1.27	0.02	4.25	15.49	69.15	3.82	0.06
Trucks (5-15 tons)	10	Diesel	400	g/hp-hr	0.22	2.10	5.78	0.22	0.005	2.98	28.88	79.56	3.01	0.07	8.93	86.63	238.67	9.02	0.20
Sideboom	6	Diesel	500	g/hp-hr	0.22	2.10	5.78	0.22	0.005	2.23	21.66	59.67	2.25	0.05	6.70	64.97	179.00	6.76	0.15
Dozer	6	Diesel	850	g/hp-hr	0.31	1.23	5.92	0.21	0.005	5.36	21.54	103.75	3.64	0.09	16.09	64.63	311.25	10.91	0.26
Large Shovel	0	Diesel	850	g/hp-hr	0.31	1.23	5.92	0.21	0.005	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grader	4	Diesel	600	g/hp-hr	0.22	2.10	5.78	0.30	0.005	1.79	17.33	47.73	2.45	0.04	5.36	51.98	143.20	7.34	0.12
Tractor / Backhoe / Loader	6	Diesel	100	g/hp-hr	1.22	6.39	6.23	1.04	0.006	2.51	13.18	12.86	2.14	0.01	7.52	39.54	38.58	6.43	0.04
Welder / Air Compressor / Generator	15	Diesel	300	g/hp-hr	0.31	0.79	5.64	0.23	0.005	4.86	12.15	87.35	3.49	0.08	14.58	36.46	262.05	10.48	0.23
Crane	4	Diesel	400	g/hp-hr	0.21	1.37	6.09	0.16	0.005	1.13	7.55	33.50	0.89	0.03	3.40	22.65	100.49	2.68	0.08
Bore/Drill Rig	0	Diesel	400	g/hp-hr	0.21	1.37	6.09	0.16	0.005	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pickup Trucks and Crew Cabs	12	Gasoline	200	g/mile	4.72	46.06	2.41	0.093	0.113	0.19	1.90	0.10	0.00	0.00	0.58	5.70	0.30	0.01	0.01
Total Emissions										**22.48**	**129.35**	**447.57**	**19.15**	**0.39**	**67.43**	**388.05**	**1342.71**	**57.46**	**1.16**

SOURCE: U.S. Environmental Protection Agency 2004a

NOTES:

1 Emission factors for off-highway diesel fueled vehicle/equipment were calculated following the method outlined in the EPA report "Exhaust and Crankcase Emission Factors for Non-Road Engine Modeling-Compression-Ignition," EPA420-P-04-009, April 2004. For all vehicles and equipment, Tier 1 emission factors were used.

2 Emission factors for pickup trucks and crew cab were obtained from MOBILE5 run based on national averaged fleet conditions, at a speed of 15 miles per hour and an ambient temperature of 60 degrees Fahrenheit (^oF).

3 Annual emissions for all diesel-fueled vehicle/equipment were calculated based on average engine horsepower for each type of vehicle/equipment, and an operating schedule of 10 hours/day, 6 days/week and 52 weeks/year.

4 Annul emissions for pickup trucks and crew cab were calculated based on a traveling distance of 10 miles/day during Power Plant construction with an operating schedule of 6 days/week and 52 weeks/year.

5 Total emissions from Power Plant construction are based on 36-months of construction.

VOC = volatile organic compounds
CO = carbon monoxide
NO_x = nitrogen oxides
PM_{10} = particulate matter with aerodynamic diameter less than or equal to 10 micrometers
SO_2 = sulfur dioxide

Table D-14
Rail line Construction Vehicle/Equipment Emissions

Vehicle/Equipment	Quantity	Fuel	Average Engine Power (hp)	Unit of Emission Factors	Emission Factors [1, 2]					Maximum Annual Emissions (tons/year) [3, 4]					Total Emissions (tons) [3, 4, 5]				
					VOC	CO	NO_x	PM_{10}	SO_2	VOC	CO	NO_x	PM_{10}	SO_2	VOC	CO	NO_x	PM_{10}	SO_2
Trucks (2-ton)	2	Diesel	250	g/hp-hr	0.33	1.20	5.36	0.30	0.005	0.57	2.07	9.22	0.51	0.01	0.86	3.11	13.83	0.77	0.02
Trucks (5-15 tons)	5	Diesel	400	g/hp-hr	0.22	2.10	5.78	0.22	0.005	1.49	14.44	39.78	1.50	0.03	2.24	21.66	59.67	2.26	0.05
Sideboom	2	Diesel	500	g/hp-hr	0.22	2.10	5.78	0.22	0.005	0.74	7.22	19.89	0.75	0.02	1.11	10.83	29.84	1.13	0.03
Dozer	2	Diesel	850	g/hp-hr	0.31	1.23	5.92	0.21	0.005	1.79	7.18	34.58	1.21	0.03	2.69	10.77	51.88	1.82	0.05
Large Shovel	1	Diesel	850	g/hp-hr	0.31	1.23	5.92	0.21	0.005	0.89	3.59	17.29	0.61	0.01	1.34	5.39	25.94	0.91	0.02
Grader	2	Diesel	600	g/hp-hr	0.22	2.10	5.78	0.30	0.005	0.89	8.66	23.87	1.22	0.02	1.34	13.00	35.80	1.84	0.03
Tractor / Backhoe / Loader	5	Diesel	100	g/hp-hr	1.22	6.39	6.23	1.04	0.006	2.09	10.98	10.72	1.79	0.01	3.14	16.48	16.08	2.68	0.02
Welder / Air Compressor / Generator	5	Diesel	300	g/hp-hr	0.31	0.79	5.64	0.23	0.005	1.62	4.05	29.12	1.16	0.03	2.43	6.08	43.68	1.75	0.04
Crane	1	Diesel	400	g/hp-hr	0.21	1.37	6.09	0.16	0.005	0.28	1.89	8.37	0.22	0.01	0.42	2.83	12.56	0.34	0.01
Bore/Drill Rig	2	Diesel	400	g/hp-hr	0.21	1.37	6.09	0.16	0.005	0.57	3.77	16.75	0.45	0.01	0.86	5.66	25.13	0.67	0.02
Pickup Trucks and Crew Cabs	4	Gasoline	200	g/mile	4.72	46.06	2.41	0.093	0.113	0.16	1.58	0.08	0.00	0.00	0.24	2.37	0.12	0.01	0.01
Total Emissions										**11.10**	**65.44**	**209.67**	**9.43**	**0.18**	**16.67**	**98.18**	**314.53**	**14.18**	**0.30**

SOURCE: U.S. Environmental Protection Agency 2004a

NOTES:

[1] Emission factors for off-highway diesel fueled vehicle/equipment were calculated following the method outlined in the U.S. Environmental Protection Agency report "Exhaust and Crankcase Emission Factors for Non-Road Engine Modeling-Compression-Ignition," EPA420-P-04-009, April 2004. For all vehicles and equipment, Tier 1 emission factors were used.

[2] Emission factors for pickup trucks and crew cab were obtained from MOBILE5 run based on national averaged fleet conditions, at a speed of 15 miles per hour and an ambient temperature of 60 degrees Fahrenheit (°F).

[3] Annual emissions for all diesel-fueled vehicle/equipment were calculated based on average engine horsepower for each type of vehicle/equipment, and an operating schedule of 10 hours/day, 6 days/week and 52 weeks/year.

[4] Annul emissions for pickup trucks and crew cab were calculated based on a traveling distance of 25 miles/day during Railroad Construction with an operating schedule of 6 days/week and 52 weeks/year.

[5] Total emissions from Rail line construction are based on 18-months of construction.

hp = horsepower
VOC = volatile organic compounds
CO = carbon monoxide
NO_x = nitrogen oxides
PM_{10} = particulate matter with aerodynamic diameter less than or equal to 10 micrometers
SO_2 = sulfur dioxide

Table D-15
Summary of Emissions from Construction Equipment and Vehicles

	Quantity					Emission Factors [1, 2]					Maximum Annual Emissions (tons/year) [3, 4]					Total Emissions (tons) [3, 4, 5]				
Vehicle/Equipment	**Power Plant**	**Rail line**	**Fuel**	**Average Engine Power (hp)**	**Unit of Emission Factors**	**VOC**	**CO**	**NO_x**	**PM_{10}**	**SO_2**	**VOC**	**CO**	**NO_x**	**PM_{10}**	**SO_2**	**VOC**	**CO**	**NO_x**	**PM_{10}**	**SO_2**
Trucks (2-ton)	5	2	Diesel	250	g/hp-hr	0.33	1.20	5.36	0.30	0.005	1.98	7.23	32.27	1.78	0.03	5.11	18.60	82.98	4.59	0.08
Trucks (5-15 tons)	10	5	Diesel	400	g/hp-hr	0.22	2.10	5.78	0.22	0.005	4.47	43.32	119.34	4.51	0.10	11.17	108.29	298.34	11.28	0.25
Sideboom	6	2	Diesel	500	g/hp-hr	0.22	2.10	5.78	0.22	0.005	2.98	28.88	79.56	3.01	0.07	7.81	75.80	208.84	7.89	0.18
Dozer	6	2	Diesel	850	g/hp-hr	0.31	1.23	5.92	0.21	0.005	7.15	28.73	138.33	4.85	0.12	18.78	75.40	363.13	12.73	0.31
Large Shovel	0	1	Diesel	850	g/hp-hr	0.31	1.23	5.92	0.21	0.005	0.89	3.59	17.29	0.61	0.01	1.34	5.39	25.94	0.91	0.02
Grader	4	2	Diesel	600	g/hp-hr	0.22	2.10	5.78	0.30	0.005	2.68	25.99	71.60	3.67	0.06	6.70	64.98	179.00	9.18	0.15
Tractor/backhoe/loader	6	5	Diesel	100	g/hp-hr	1.22	6.39	6.23	1.04	0.006	4.60	24.16	23.58	3.93	0.02	10.66	56.02	54.66	9.11	0.06
Welder/air compressor/generator	15	5	Diesel	300	g/hp-hr	0.31	0.79	5.64	0.23	0.005	6.48	16.20	116.47	4.66	0.10	17.01	42.54	305.73	12.23	0.27
Crane	4	1	Diesel	400	g/hp-hr	0.21	1.37	6.09	0.16	0.005	1.42	9.44	41.87	1.12	0.03	3.82	25.48	113.05	3.02	0.09
Bore/Drill Rig	0	2	Diesel	400	g/hp-hr	0.21	1.37	6.09	0.16	0.005	0.57	3.77	16.75	0.45	0.01	0.86	5.66	25.13	0.67	0.02
Pickup trucks and crew cab	12	4	Gasoline	200	g/mile	4.72	46.06	2.41	0.093	0.113	0.52	5.07	0.27	0.01	0.01	0.82	8.07	0.42	0.02	0.02
Total Emissions											33.58	194.79	657.24	28.58	0.57	84.10	486.23	1,657.24	71.64	1.46

SOURCE: U.S. Environmental Protection Agency 2004a
NOTES:
[1] Emission factors for off-highway diesel fueled vehicle/equipment were calculated following the method outlined in the EPA report "Exhaust and Crankcase Emission Factors for Non-Road Engine Modeling-Compression-Ignition," EPA420-P-04-009, April 2004. For all vehicles and equipment, Tier 1 emission factors were used.
[2] Emission factors for pickup trucks and crew cab were obtained from MOBILE5 run based on national averaged fleet conditions, at a speed of 15 miles per hour and an ambient temperature of 60 degrees Fahrenheit (^oF).
[3] Annual emissions for all diesel-fueled vehicle/equipment were calculated based on average engine horsepower for each type of vehicle/equipment, and an operating schedule of 10 hours/day, 6 days/week and 52 weeks/year.
[4] Annul emissions for pickup trucks and crew cab were calculated based on a traveling distance of 10 miles/day during Power Plant construction, 25 miles/day during Access Road Construction, and 50 miles/day during transmission line and water conveyance system construction, all with an operating schedule of 6 days/week and 52 weeks/year.
[5] Total duration of Power Plant is 36 months while the Rail line construction is 18-months.
VOC = volatile organic compounds
CO = carbon monoxide
NO_x = nitrogen oxides
PM_{10} = particulate matter with aerodynamic diameter less than or equal to 10 micrometers
SO_2 = sulfur dioxide

Coal Storage Pile

Emissions have been calculated separately for wind erosion and for maintenance activities on the coal storage pile. Emissions from wind erosion from both the active and inactive coal storage piles are calculated based on a guidance document produced by the Mojave Desert Air Quality Management District (2000), which is based on a derivation of AP-42, Chapter 13.2.5, *Industrial Wind Erosion*. An emission factor of 7.08E-01 tons/acre-year for PM_{10} was developed using conservative assumptions and estimated coal pile acreages; [Note that 7.08E-01 is equivalent to 0.708]. These assumptions, which can be found in detail on the emissions calculation sheet for coal pile wind erosion in Attachment 5-A, include silt loading (6 percent), days with precipitation (30 days), and frequency of windy hours (12.0 percent) on the active coal pile, a control efficiency of 75 percent for PM_{10} has been assumed to take account for wet suppression of the coal pile; [Attachment 5-A refers to the PSD Application and can be found within the Administrative Record]. For the inactive coal pile, since there will be minimal disturbances, caking of the surface layer will occur. [Caking of the surface layer refers to stabilization of the coal pile due to inactivity and natural precipitation events which would allow for "crusting" of the surface.] Therefore, wet suppression along with compaction and the use of coal pile binder on the inactive coal storage pile was assumed to allow for 87.5 percent control for PM_{10}.

<u>PM_{10} Emissions from Coal Storage Pile Wind Erosion</u>
E_{PM10} (tpy) = (7.08E-01 tons/acre-year) * (21.52 acres exposed surface area) * (1-75/100) [Active Pile]
E_{PM10} (tpy) = (7.08E-01 tons/acre-year) * (9.34 acres exposed surface area) * (1-87.5/100) [Inactive Pile]
E_{PM10} (tpy) = 3.81 [Active Pile]
E_{PM10} (tpy) = 0.83 [Inactive Pile]
E_{PM10} (pounds/hour) = (3.81 tpy) / (8,760 hours/year) * (2,000 pounds/ton) [Active Pile]
E_{PM10} (pounds/hour) = (0.83 tpy) / (8,760 hours/year) * (2,000 pounds/ton) [Inactive Pile]
E_{PM10} (pounds/hour) = 0.87 [Active Pile]
E_{PM10} (pounds/hour) = 0.19 [Inactive Pile]

Emissions from maintenance activities on the active coal storage pile are calculated using the equation in AP-42, Chapter 11.9, *Western Surface Coal Mining* (see Attachment 5A); [Attachment 5-A refers to the PSD Application and can be found within the Administrative Record]. Hourly emissions are based upon the equation for bulldozing of coal as provided in Table 11.9-1, a coal moisture content of 19.42 percent (worst-case coal), and a silt content of 8.6 percent (Table 11.9-3 for coal silt). Annual emissions assume bulldozing activities will occur for a maximum of 12 hours/day, and 3,744 hours/year. For emission calculation purposes, some form of wet suppression (water sprays) will be used during coal pile maintenance activities when necessary. Therefore, a PM_{10} control efficiency of 75 percent was used for water sprays.

<u>PM_{10} Emissions from Coal Storage Pile Maintenance (Bulldozing)</u>
E_{PM10} (pounds/hour) = [(18.6) * ($8.6^{1.5}$)] / ($19.42^{1.4}$) * (0.75 PM10 scaling factor) * (1-75/100)
E_{PM10} (pounds/hour) = 1.38
E_{PM10} (tpy) = (1.38 pounds/hour) * (3,744 hours/year) / (2,000 pounds/ton)
E_{PM10} (tpy) = 2.59

Coal Reclaim Crushing and Transfer Operations

Coal will be reclaimed from either the active or inactive coal piles via front-end loader. The front-end loader will push the coal over a grate, where the coal will fall onto a conveyor belt, which will pass through the transfer house. In the transfer house, the coal will be transferred to the crusher feed conveyors, which will move the coal to the crusher house. Inside the crusher house, the crusher feed conveyors discharge the coal into a surge bin. The coal is fed from the surge bin to the coal crushers, which reduce the coal size. The coal is discharged from the crushers onto the plant feed conveyor belts inside the coal crusher building. Emissions from the coal crusher building are controlled by a baghouse with a design outlet grain loading of 0.005 gr/dscf. The baghouse will be designed for 8,833 dscfm. Coal crushing and transfer systems are anticipated to operate up to 24 hours/day.

<u>PM_{10} Emissions from Coal Crushing and Transfer Operations</u>
E_{PM10} (pounds/hour) = (0.005 gr/dscf) * (8,833 dscfm) / (7,000 gr/pound) * (60 minutes/hour)
E_{PM10} (pounds/hour) = 0.38
E_{PM10} (tpy) = (0.38 pounds/hour) * (8,760 hours/year) / (2,000 pounds/ton)
E_{PM10} (tpy) = 1.66

Coal Transfers to Tripper Deck Coal Silos

Coal transfers to the coal silos in the tripper deck occur inside the tripper deck building. Emissions from the coal tripper deck building are controlled by a baghouse with a design outlet grain loading of 0.005 gr/scf. These units feed directly to the boilers and hence could operate 8,760 hours per year. The baghouse will be designed for 11,667 dscfm.

<u>PM_{10} Emissions from Coal Transfers to Tripper Deck Operations</u>
E_{PM10} (pounds/hour) = (0.005 gr/dscf) * (11,667 dscfm) / (7,000 gr/pound) * (60 minutes/hour)
E_{PM10} (pounds/hour) = 0.50
E_{PM10} (tpy) = (0.50 pounds/hour) * (8,760 hours/year) / (2,000 pounds/ton)
E_{PM10} (tpy) = 2.19

4.4.1.5 Storage Silos

PM_{10} emission rates for the storage silos were obtained from ENSR (ENSR 2006a). Tables D-14 and D-15, along with the following subsections, summarize the PM_{10} emissions from these six storage silos:

The following text is excerpted from Section 5.3 of Appendix 5 (Air Pollution Emissions Details and Summary) of the PSD Application. (ENSR 2006a):

Fly Ash Storage Silo

Emissions from the fly ash storage silo can occur during two activities, when pneumatically transferring ash from the main boiler baghouses, and during unloading from the fly ash storage silo to trucks or railcars for ash disposal or beneficial reuse. Emissions from the fly ash storage silo are controlled by bin vent filters, with a design outlet grain loading of 0.01 gr/dscf. The fly ash storage silo bin vent filters will be designed for 3,500 dscfm. Emissions are calculated as follows:

PM$_{10}$ Emissions from Fly Ash Storage Silo Bin Vent Filter – Transfers from Main Boiler Baghouse to Fly Ash Silo
E_{PM10} (pounds/hour) = (0.01 gr/dscf) * (3,500 dscfm) / (7,000 gr/pound) * (60 minutes/hour)
E_{PM10} (pounds/hour) = 0.30
E_{PM10} (tpy) = (0.30 pounds/hour) * (8,760 hours/year) / (2,000 pounds/ton)
E_{PM10} (tpy) = 1.31

PM$_{10}$ Emissions from Fly Ash Storage Silo Bin Vent Filter – Transfers from Fly Ash Silo to Trucks/Railcars
E_{PM10} (pounds/hour) = (0.01 gr/dscf) * (3,500 dscfm) / (7,000 gr/pound) * (60 minutes/hour)
E_{PM10} (pounds/hour) = 0.30
E_{PM10} (tpy) = (0.30 pounds/hour) * (8,760 hours/year) / (2,000 pounds/ton)
E_{PM10} (tpy) = 1.31

Bottom Ash Storage Silo

Emissions from the bottom ash storage silo can occur during two activities, when pneumatically transferring ash from the main boiler hopper, and during unloading from the bottom ash storage silo to trucks or railcars for ash disposal or beneficial reuse. Emissions from the bottom ash storage silo are controlled by bin vent filters, with a design outlet grain loading of 0.01 gr/dscf. The bottom ash storage silo bin vent filters will be designed for 3,500 dscfm. Emissions are calculated as follows:

PM$_{10}$ Emissions from Bottom Ash Storage Silo Bin Vent Filter – Transfers from Main Boiler Hopper to Bottom Ash Silo
E_{PM10} (pounds/hour) = (0.01 gr/dscf) * (3,500 dscfm) / (7,000 gr/pound) * (60 minutes/hour)
E_{PM10} (pounds/hour) = 0.30
E_{PM10} (tpy) = (0.30 pounds/hour) * (8,760 hours/year) / (2,000 pounds/ton)
E_{PM10} (tpy) = 1.31

PM$_{10}$ Emissions from Bottom Ash Storage Silo Bin Vent Filter – Transfers from Bottom Ash Silo to Trucks/Railcars
E_{PM10} (pounds/hour) = (0.01 gr/dscf) * (3,500 dscfm) / (7,000 gr/pound) * (60 minutes/hour)
E_{PM10} (pounds/hour) = 0.30
E_{PM10} (tpy) = (0.30 pounds/hour) * (8,760 hours/year) / (2,000 pounds/ton)
E_{PM10} (tpy) = 1.31

FGD By-Product/Gypsum Storage Silo

Emissions from the FGD by-product/gypsum storage silo can occur during two activities, when pneumatically transferring gypsum from the FGD scrubber de-watering system, and during unloading from the FGD by-product/gypsum storage silo to trucks or railcars for ash disposal or beneficial reuse. Emissions from the FGD by-product/gypsum storage silo are controlled by bin vent filters, with a design outlet grain loading of 0.01 gr/dscf. The FGD by-product/gypsum storage silo bin vent filters will be designed for 3,500 dscfm. Emissions are calculated as follows:

PM$_{10}$ Emissions from Gypsum Storage Silo Bin Vent Filter – Transfers from FDG System to Gypsum Ash Silo
E_{PM10} (pounds/hour) = (0.01 gr/dscf) * (3,500 dscfm) / (7,000 gr/pound) * (60 minutes/hour)
E_{PM10} (pounds/hour) = 0.30

E_{PM10} (tpy) = (0.30 pounds/hour) * (8,760 hours/year) / (2,000 pounds/ton)
E_{PM10} (tpy) = 1.31

PM_{10} Emissions from Gypsum Storage Silo Bin Vent Filter – Transfers from Gypsum Silo to Trucks/Railcars
E_{PM10} (pounds/hour) = (0.01 gr/dscf) * (3,500 dscfm) / (7,000 gr/pound) * (60 minutes/hour)
E_{PM10} (pounds/hour) = 0.30
E_{PM10} (tpy) = (0.30 pounds/hour) * (8,760 hours/year) / (2,000 pounds/ton)
E_{PM10} (tpy) = 1.31

Quicklime Storage Silos

Emissions from the Quicklime storage silos can occur during two activities, when pneumatically transferring Quicklime from supply trucks and during discharge from the Quicklime storage silo to the FGD slurry preparation building. Emissions from the Quicklime storage silo are controlled by bin vent filters, with a design outlet grain loading of 0.01 gr/dscf. The Quicklime storage silo bin vent filters will be designed for 4,000 dscfm. Emissions are calculated as follows:

PM_{10} Emissions from Quicklime Storage Silo Bin Vent Filter – Transfers from Quicklime Supply Trucks to Quicklime Silo
E_{PM10} (pounds/hour) = (0.01 gr/dscf) * (4,000 dscfm) / (7,000 gr/pound) * (60 minutes/hour)
E_{PM10} (pounds/hour) = 0.34
E_{PM10} (tpy) = (0.34 pounds/hour) * (8,760 hours/year) / (2,000 pounds/ton)
E_{PM10} (tpy) = 1.50

PM_{10} Emissions from Quicklime Storage Silo Bin Vent Filter – Transfers from Quicklime Silo to FGD Slurry Preparation Building
E_{PM10} (pounds/hour) = (0.01 gr/dscf) * (4,000 dscfm) / (7,000 gr/pound) * (60 minutes/hour)
E_{PM10} (pounds/hour) = 0.34
E_{PM10} (tpy) = (0.34 pounds/hour) * (8,760 hours/year) / (2,000 pounds/ton)
E_{PM10} (tpy) = 1.50

Powdered Activated Carbon (PAC) Storage Silo

PAC injection is being considered as a potential mercury (Hg) control option. One storage silo is being considered for storage and handling of PAC to be injected into the main boiler exhaust stream. PM_{10} emissions potentially occur when the PAC is off-loaded pneumatically from trucks into the storage silo. Since the transfers to the main boiler will be controlled and accounted for by the main boiler baghouse, only emissions from truck unloading activities are discussed here. Emissions from the unloading of PAC from supply trucks to the storage silo are controlled by bin vent filters, with a design outlet grain loading of 0.01 gr/dscf. Each bin vent filter will be designed for 4,000 dscfm. Emissions are calculated as follows:

PM$_{10}$ Emissions from PAC Storage Silo
E_{PM10} (pounds/hour) = (0.01 gr/dscf) * (4,000 dscfm) / (7,000 gr/pound) * (60 minutes/hour)
E_{PM10} (pounds/hour) = 0.34
E_{PM10} (tpy) = (0.34 pounds/hour) * (8,760 hours/year) / (2,000 pounds/ton)
E_{PM10} (tpy) = 1.50

4.4.1.6 Coal Combustion Products (CCP) Disposal Area

The following text is excerpted from Section 5.4 of Appendix 5, Air Pollution Emissions Details and Summary, of the PSD Application (ENSR 2006a):

> As currently proposed, CCP, consisting of fly ash, bottom ash, FGD by-product (gypsum), and spent activated carbon (if used), will either be sold to potential end users or disposed at an onsite landfill, which will be specifically developed for [the project]. The projected emissions from the landfill activities are included in the modeling effort. As calculations in Attachment 5-A show, with the high moisture content (50 percent) and the local meteorological conditions, the maximum hourly emissions from the truck unloading operations are 0.0004 pounds/hour and 0.002 tons/year; [Attachment 5-A refers to the PSD Application and can be found within the Administrative Record]. The emissions from bulldozing at the landfill are based on 12 hours per day and 3,120 hours per year of bulldozer operation and a lower moisture content (27 percent) than the delivered CCP, giving a PM$_{10}$ emission rate of 1.33 lbs/hour and 2.07 tpy.
>
> The emissions from wind erosion of the active CCP landfill cell were calculated based on a guidance document produced by the Mojave Desert Air Quality Management District (2000), which is based on a derivation of AP-42, Chapter 13.2.5, *Industrial Wind Erosion*. An emission factor of 9.44 tons/acre-year for PM$_{10}$ was developed using conservative assumptions and an estimated active CCP cell acreage. These assumptions, which can be found in detail on the emissions calculation sheet for CCP pile wind erosion in Attachment 5-A, include silt loading (80 percent), days with precipitation (30 days), and frequency of windy hours (12.0 percent). On the active CCP pile, a control efficiency of 75 percent for PM$_{10}$ has been assumed to take account for wet suppression of the CCP pile; [Attachment 5-A refers to the PSD Application and can be found within the Administrative Record]. Since the CCP materials are saturated and easily form a crust surface, there are negligible emissions from wind erosion from inactive areas of the CCP landfill. Roadways leading up to the central area of the landfill will be paved, and also will be controlled with water sprays. The roadway emissions are accounted for in the onsite paved roadway emissions as discussed in Section 5.9.

4.4.1.7 Vehicle Traffic On Roads

The following text is excerpted from Section 5.9 of Appendix 5, Air Pollution Emissions Details and Summary, of the PSD Application (ENSR 2006a):

> Raw materials and CCP may arrive and depart to the site by either railcar or truck. Dust emissions were estimated from the paved roadways that may be used by activated carbon supply trucks, NH_3 supply trucks, Quicklime and Quicklime supply trucks, chemical delivery trucks, fuel oil supply trucks, and trucks transporting CCP off-site. Emissions from the paved roads were calculated based on an emission factor developed from Equation 2 in AP-42, Chapter 13.2.1, *Paved Roads*. Maximum daily and annual truck deliveries for each material are summarized in [Table D-16]. Detailed calculations are provided in Attachment 5A; [Attachment 5-A refers to the PSD Application and can be found within the Administrative Record]. This table provides

conservative estimates of emissions, since the CCP may be transported off site by rail; however, this application includes an allowance for CCP transport over paved roadways. This “allowance” incorporates a conservative assumption that all CCP would be transported via paved roadway.

Table D-16
Annual and Daily Haul Trips

Material	Maximum Annual (truckloads/year)[1]	Maximum Daily (truckloads/day)	Basis
Activated carbon	180	2.0	Delivery for 3-day weekend
Ammonia (NH_3)	237	0.65	Delivery for 3-day weekend
Fuel Oil[2]	50	5.0	Delivery required to fill fuel oil tank half-full
Quicklime	9996	27.4	Delivery for 3-day weekend
Coal combustible product (CCP)	4838	13.3	115 percent of average daily delivery
Miscellaneous chemicals	350	15.0	
Totals	15,651	62	

SOURCE: ENSR Corporation 2006b
NOTES:
1 Based on annual material usage/waste production assuming worst-case coal for that material/waste.
2 Annual fuel oil usage is based two auxiliary boilers for 550 hours per year, and the fire-water pump engine and emergency generator for 100 hours per year, and fuel deliveries for maximum CCP hauling operations. Also included is the maximum amount of fuel oil to be used during boiler startups in a year.

A one-way trip distance of 1.0 mile [1.6 kilometers] was used for emission calculation purposes. With a maximum of 62 round trips per day, this leads to a maximum of approximately 124 vehicle miles traveled (VMT) per day and 31,302 miles per year [50,375 kilometers per year]. A control efficiency of 75 percent for PM10 has been accounted for periodic watering of the paved haul roads when necessary. Based on climatological data, the number of annual days of precipitation was set to 30. A detailed breakdown of emission calculations is found in the supporting documentation included at the end of this appendix. The emission calculations identify different truck weights for delivery of each material, and different emission factors (lbs/VMT) for each group of trucks. The overall summary of emission rates is shown below.

PM_{10} Emissions from Paved Haul Roads
E_{PM10} (pounds/hour) = (pounds/VMT) * (VMT/day) / (24 hours/day)
E_{PM10} (pounds/hour) = 1.16
E_{PM10} (tpy) = (pounds/VMT) * (VMT/year) / (2,000 pounds/ton)
E_{PM10} (tpy) = 3.79

Vehicle Tailpipe Emissions – Based on the total VMT described above and assuming the emission factors for 400 horsepower diesel trucks (5-15 ton vehicles), and an average vehicle speed of 15 miles per hour (mph) the total hours of operation per year is 2,087. Total tail pipe emissions are estimated as follows:

2,087 hours * 5-15 ton truck emission factor (determined is Table D-9) = emissions in grams per year

Therefore, the annual tailpipe emissions (in tons per year) for haul trucks would be:

NO_x = 5.31
CO = 1.93
SO_2 = 0.0046
VOC = 0.20
PM_{10} = 0.20

4.4.1.8 Emissions from Power Plant Operations

This subsection identifies the air pollutant emissions associated with operation of the proposed power plant, including vehicular emissions associated with employee commuting vehicles.

Criteria Pollutants Emission Estimates from PSD Permit Application

The proposed project will include one PC, supercritical boiler and a steam-turbine generator capable of generating 750 MW (gross) of electric power. Major systems include power generating and transmission, material handling, heat rejection (cooling), and air emissions control. Air-pollution emissions would result from the operation of the following: one coal-fired boiler, two fuel oil-fired auxiliary boilers, one emergency generator, one fire-water pump engine, onsite locomotives, fuel oil storage tanks, and other various material handling emissions.

Criteria air pollutant emission rates were obtained from the PSD application (ENSR 2006a). Table D-17 and Table D-18 present a summary of maximum potential-to-emit (PTE) criteria air pollutant emission rates from the proposed power plant. These emission rates are based on the conservative assumption that both generating units of the plant will operate for 8,760 hours each year, at full-load operation. Based on these potential-to-emit values, the proposed power plant will be a major source, as defined under federal New Source Review (NSR) regulations, codified at 40 CFR §51., for PM_{10}, NO_x, SO_2, CO, O_3 (NO_x and VOC emissions) and lead. Accordingly, the PSD permit application must identify BACT requirements, and address the ambient air quality impacts for each of these criteria pollutants. $PM_{2.5}$ emissions were estimated to be 83.7 percent of PM_{10} emissions. Emissions of NH_3 and $PM_{2.5}$ were not quantified in the PSD application.

Carbon Dioxide Emissions

Combustion of biomass and all fossil fuels (coal, coke, petroleum and natural gas) result in emissions of CO_2. CO_2 is widely considered to be a “greenhouse gas” (GHG). Greenhouse gases, which also include water vapor, methane, nitrous oxides, chlorofluorocarbons and other chemicals, play a natural role in maintaining the temperature of the earth’s atmosphere, by allowing some sunlight to pass through and heat the surface of the earth and then absorbing a portion of the infrared heat reflected or transmitted to the ground. Natural sources of GHG include volcanic eruptions, plant respiration and decomposition of organic matter.

Carbon dioxide forms when one atom of carbon unites with two atoms of oxygen, either during combustion or in the atmosphere after being emitted from the stack. Because the atomic weight of carbon is 12 and oxygen is 16, the atomic weight of carbon dioxide is 44. Based on that ratio and a 99 percent fraction of fuel oxidized during combustion 72.6 pounds of carbon dioxide for every percent-ton of carbon as shown by the following equation.

$$(44 \text{ ton } CO_2 / 12 \text{ ton C}) * 0.99 * 2000 (\text{lb } CO_2 / \text{ton } CO_2) * 1/100\% = 72.6 \text{ lb } (CO_2 / \text{ton } \%C)$$

Table D-17
Maximum Hourly Criteria Pollutant Emissions Summary

Unit ID	Source	NO_X	CO	SO_2	VOC	PM_{10}	Pb
		(pounds/hour)					
S2.001	Main boiler	363.0	604.8	308.4	18.3	181.5	1.21
S2.002	Auxiliary boiler #1	8.64	3.15	0.14	0.21	2.08	7.8E-04
S2.003	Auxiliary boiler #2	8.64	3.15	0.14	0.21	2.08	7.8E-04
S2.004	Emergency generator engine	15.68	8.49	0.36	(1)	0.49	1.1E-04
S2.005	Fire-water pump engine	1.88	1.63	0.004	(1)	0.09	2.2E-05
S2.006	Coal transfer building	--	--	--	--	0.38	--
S2.007	Coal crushing building	--	--	--	--	0.38	--
S2.008	Coal transfers to tripper deck silos	--	--	--	--	0.50	--
S2.009	Bottom ash storage silo vents	--	--	--	--	0.60	--
S2.010	Fly ash storage silo vents	--	--	--	--	0.60	--
S2.011	FGD byproduct/gypsum storage silo vents	--	--	--	--	0.60	--
S2.012	Quicklime storage silo vents	--	--	--	--	0.68	--
S2.013	Activated carbon storage silo	--	--	--	--	0.34	--
S2.014	Fuel storage tank (1,060,000 gallons)	--	--	--	0.06	--	--
PF.001	Railcar unloading	--	--	--	--	0.11	--
PF.002	Coal yard conveying	--	--	--	--	0.18	--
PF.003	Coal yard stackout operations	--	--	--	--	0.18	--
PF.004	Coal storage pile – wind erosion	--	--	--	--	1.06	--
PF.005	Coal storage bulldozing	--	--	--	--	1.38	--
PF.006	Paved haul roads	--	--	--	--	1.16	--
PF.007	Onsite locomotive engine	4.30	1.03	0.14	0.40	0.13	Neg.
PF.008	CCP landfill bulldozing	--	--	--	--	1.33	--
PF.009	CCP landfill truck drop	--	--	--	--	0.0004	--
PF.009	CCP landfill – active cell wind erosion	--	--	--	--	10.77	--

SOURCE: ENSR Corporation 2006a, 2007a

NOTES: Emissions standards for these engines are based upon U.S. Environmental Protection Agency Tier standards, which are based on a combination of NO_X + non-methane hydrocarbon; therefore, VOC emissions have been included in NO_X total emissions to produce a conservatively NO_X emission rate.

NOx = nitrogen oxides
CO = carbon monoxide
SO2 = sulfur dioxide
VOC = volatile organic compounds
PM_{10} = particulate matter equal or less than 10 micrometers
Pb = lead
FGD = flue gas desulphurization
Neg. = negligible
CCP = coal combustion products

Table D-18
Maximum Annual Criteria Pollutant Emissions Summary

Unit ID	Source	NO_X	CO	SO_2	VOC	PM_{10}	Pb
		(ton/year)					
S2.001	Main boiler	1,590.0	2649.0	1,351.0	80.0	795.0	5.30
S2.002	Auxiliary boiler #1	2.38	0.87	0.04	0.06	0.57	0.00021
S2.003	Auxiliary boiler #2	2.38	0.87	0.04	0.06	0.57	0.00021
S2.004	Emergency generator engine	0.78	0.42	0.018	(1)	0.02	0.0000057
S2.005	Fire-water pump engine	0.09	0.08	0.0002	(1)	0.005	0.0000011
S2.006	Coal transfer building	--	--	--	--	1.66	--
S2.007	Coal crushing building	--	--	--	--	1.66	--
S2.008	Coal transfers to tripper deck silos	--	--	--	--	2.19	--
S2.009	Bottom ash storage silo vents	--	--	--	--	2.62	--
S2.010	Fly ash storage silo vents	--	--	--	--	2.62	--
S2.011	FGD byproduct/gypsum storage silo vents	--	--	--	--	2.62	--
S2.012	Quicklime storage silo vents	--	--	--	--	3.0	--
S2.013	Activated carbon storage silo	--	--	--	--	1.50	--
S2.014	Fuel storage tank (1,060,000 gallons)	--	--	--	0.27	--	--
PF.001	Railcar unloading	--	--	--	--	0.03	--
PF.002	Coal yard conveying	--	--	--	--	0.05	--
PF.003	Coal yard stackout operations	--	--	--	--	0.05	--
PF.004	Coal storage pile – wind erosion	--	--	--	--	4.63	--
PF.005	Coal storage bulldozing	--	--	--	--	2.59	--
PF.006	Paved haul roads	--	--	--	--	3.79	--
PF.007	Onsite locomotive engine	18.85	4.53	0.61	1.75	0.59	Neg.
PF.008	CCP landfill bulldozing	--	--	--	--	2.07	--
PF.009	CCP landfill truck drop	--	--	--	--	0.002	--
PF.009	CCP landfill – active cell wind erosion	--	--	--	--	47.18	--
	Totals	1,614	2,656	1,352	82	875	5.3

SOURCE: ENSR Corporation 2006a, 2007a

NOTES: Emissions standards for these engines are based upon U.S. Environmental Protection Agency Tier standards, which are based on a combination of NO_X + non-methane hydrocarbon; therefore, VOC emissions have been included in NO_X total emissions to produce a conservatively NO_X emission rate.

CO = Carbon Monoxide
CCP = coal combustion products
FGD = flue gas desulphurization
Neg. = negligible
NO_x = nitrogen oxides
Pb = lead
PM_{10} = particulate matter equal or less than 10 micrometers
SO_2 = sulfur dioxide
VOC = volatile organic compounds

Carbon Dioxide emissions due to coal combustion were estimated using Table 1.1-20 *Default CO_2 Emission Factors for U.S. Coals* of EPA, AP-42, Volume I, Fifth Edition, Chapter 1: External Combustion Sources - Bituminous And Sub-bituminous Coal Combustion 9/98 (EPA 1998). The proposed project would combust sub-bituminous coal, which is assumed to have an average carbon content of 66.3 percent (EPA 1998). Therefore, the CO_2 emission factor for sub-bituminous coal is 4,813.4 pounds of CO_2 per ton of coal. The Proposed-Action Alternative (750 MW plant) is assumed to combust a maximum of 2,944,000 tons of coal per year. Multiplying the total coal combustion (in tpy) times a 95 percent correction factor and times the CO_2 emission factor (4,813.4 l CO_2 /ton coal) results in an estimated annual carbon dioxide emission total of 7.08 million tpy.

NH_3 Emissions

When SCR is used to control NO_x emissions, a small portion of the injected reagent (NH_3) does not get reacted and remains in the flue gas. Although NH_3 is not listed as a Federal HAP, it is regulated as an Extremely Hazardous Substance under Sections 302, 304 and 313 of the Federal Emergency Planning and Community Right-to-Know Act and must be reported annually under the Toxic Release Inventory (TRI) requirements. In addition, NH_3 is regulated by the Process Safety Management (PSM) requirements under Occupational Safety and Health Administration and the Risk Management Program requirements under Section 112(r) of the Federal Clean Air Act. Most of the excess reagent used is consumed through various chemical reactions within the SCR equipment. However, a small portion remains in the flue gas and is emitted to the atmosphere as "NH_3 slip." A number of factors can affect NH_3 slip, including reaction temperature, residence time, degree of mixing, and molar ratio of NH_3. The EPA document *Emission Inventory Improvement Program - Estimating Ammonia Emissions from Anthropogenic Nonagricultural Sources* (EPA 2004a) provides recommended emission factors for calculating NH_3 emissions based on tons of coal combusted. For coal-fired boilers constructed since 1997, the document prescribes a maximum NH_3 slip emission factor of 0.08 pounds NH_3 per ton of coal, which is based on a 5 ppmv NH_3 slip.

Multiplying the average annual coal combustion of 2,944,000 tpy (with a 95 percent correction factor) by the NH_3 emission factor (0.08 lb NH_3 / ton coal) results in a maximum annual NH_3 emissions rate of 117.8 tons for the Proposed Alternative.

4.4.1.9 Hazardous Air Pollutants

A summary of predicted HAPs emitted by the Toquop Energy Project during operation of the coal-fired boiler, auxiliary boilers, emergency generator engine and fire-water pump engine is presented in Table D-19. Mercury emissions would be controlled to meet the final Mercury New Source Performance Standard (NSPS) for new, sub-bituminous coal-fired boilers utilizing wet scrubbers, which is 0.042 lbs/GW-hr gross output.

The data show that the total emissions are above the major source threshold for HAPs, but since the source category has been removed from the Clean Air Act Section 112(c) list, the case-by-case review under Maximum Achievable Control Technology is not required.

Table D-19
Hazardous Air Pollutant Summary

Emissions Unit	Total HAPs (tpy)	Maximum Individual HAP (tpy)
Main boiler	87.10	50.59 (Hydrogen Chloride)
Auxiliary boilers	5.3E-02	4.2E-02 (Formaldehyde)
Emergency generator	1.2E-03	4.9E-04 (Benzene)
Diesel fire pump	7.6E-04	3.1E-04 (Propylene)
Totals	87.1	50.6 (Hydrogen Chloride)

SOURCE: ENSR Corporation 2006a
NOTES: HAP = hazardous air pollutant
tpy = tons per year

4.4.1.10 Vehicle Emissions Associated with Power Plant Operations

Table D-20 summarizes the predicted maximum annual tailpipe emissions resulting from power plant employees commuting to work. The overly conservative estimation technique is discussed in Section 4.

4.5 <u>Predicted Ambient Air Quality Impacts</u>

Pursuant to the PSD permitting process, ENSR performed a series of American Meteorological Society/U.S. Environmental Protection Agency Regulatory Model (AERMOD) modeling exercises to evaluate the ambient air quality impacts in Class II areas (near-field receptors within and outside Lincoln County, Nevada) including predicted near-field pollutant concentrations and distant Class II special consideration area pollutant concentrations, and CALPUFF to evaluate air quality impacts in five Class I areas within 186 miles (300 km).

4.5.1 Class II Area Impacts

This section presents the results of the PSD Class II modeling analysis prepared by ENSR for the Proposed Action Alternative. The analysis modeled project emissions from the main stack emissions from the 750-MW pulverized coal-fired boiler, as well as emissions from the following sources: two auxiliary boilers, one emergency generator, one fire water pumps, material handling sources, and emissions from road traffic.

The AERMOD model was used to predict the project impacts in PSD Class II areas, using an on-site meteorological data monitoring program, which has been set up at the southeast corner of the proposed site. Modeling domains and receptor networks appropriate for the Class II analysis were employed.

In the context of the Prevention of Significant Deterioration (PSD) permitting requirements, a PSD increment evaluation and NAAQS Evaluation were conducted to assess potential cumulative impacts on air quality. The PSD increment evaluation is used to estimate the degradation of air quality caused by construction of manmade sources of air pollution after certain baseline dates. The NAAQS evaluation, which includes background pollutant concentrations, is used to estimate the total impacts of all natural and anthropogenic sources of air pollution on air quality as compared to the pollutant concentrations at which human health or the environment could be impacted.

Table D-20 is a list of the permitted major sources included by ENSR in the PSD cumulative impact analysis.

Table D-20
Background Sources Included in the Cumulative Modeling Analysis

Facility Name	Facility Type	Location
Royal Cement Company	Cement plant	Logandale, Nevada
Nevada Power Company Reid Gardner Station	Coal-fired electric generating station	Moapa, Nevada
Western Mining and Materials	Crushing and screening plant	Black Rock, Arizona
Simplot Silica Products	Silica sand production	Overton, Nevada
Casablanca/Oasis Casino	Hotel and casino	Mesquite, Nevada
Rinker Materials Moapa Facility	Cement plant	Moapa, Nevada
Precision Aggregates	Sand and gravel yard	Mesquite, Nevada
Lasco Bathware	Plumbing products manufacturer	Moapa, Nevada
Legacy Rock	Sand and gravel yard	Logandale, Nevada
BLM Moapa Decorative Rock Pit	Sand and gravel yard	Logandale, Nevada
Sunroc Corp Bunkerville Ready Mix	Cement plant	Bunkerville, Nevada
Ready Mix, Inc.	Cement plant	Las Vegas, Nevada
Geneva Pipe of Nevada	Concrete pipe manufacturer	Moapa, Nevada
General Rock Products	Sand and gravel yard	Las Vegas, Nevada

SOURCE: ENSR Corporation 2007a
NOTE: BLM = Bureau of Land Management

Table D-21
Summary of Vehicle Emissions from Permanent Work Force

	Quantity [1]	Fuel	Average Engine Power (hp)	Unit of Emission Factors	Emission Factors (EF) [2]					Maximum Annual Emissions (tpy) [3]				
					VOC	CO	NO_x	PM_{10}	SO_2	VOC	CO	NO_x	PM_{10}	SO_2
Vehicle	110	Gasoline	200	g/mile	4.72	46.06	2.41	0.093	0.113	7.4	72.6	3.8	1.5	0.2

SOURCE: URS Corporation emissions calculations 2006

NOTES:

1 Each of the total estimated 110 full-time employees is assumed to work 5 days per week (260 days per year). Each employee is assumed to drive his or her own gasoline powered vehicle to and from work each day.

2 Emission factors for pickup trucks and crew cab were obtained from MOBILE5 run based on national averaged fleet conditions, at a speed of 15 miles per hour and an ambient temperature of 60 degrees Fahrenheit (^{o}F).

3 Annual emissions for pickup trucks and crew cabs were calculated based on a traveling distance of 50 miles/day for 260 days/year, as follows: TPY= 200 * (EF * 50 miles/day * 260 days/year) / (454 grams/pound * 2000 pounds/ton)

hp = horesepower
VOC = volatile organic compounds
CO = carbon monoxide
NO_x = nitrogen oxides
PM_{10} = particulate matter with aerodynamic diameter less than or equal to 10 micrometers
SO_2 = sulfur dioxide

The results of the modeling analysis are summarized as follows (ENSR 2006a):

- The proposed project impacts would be above PSD Class II significance levels for a limited area around the facility (about 1.8 km for the 3-hourSO_2, 0.6 km for annual NO_2, and 1.0 km for short term (24-hour) and annual PM_{10}). The project would have insignificant impacts for CO (1 and 8 hour), SO_2 (24 hour and annual) and Pb.
- The PSD application estimated $PM_{2.5}$ emissions as comprising 83.7 percent of PM_{10}. Since the maximum 24-hour and annual modeled ambient PM_{10} concentrations are less than the corresponding NAAQS for $PM_{2.5}$, compliance with the NAAQS for $PM_{2.5}$ is assured.
- Currently there are no other major sources of criteria pollutants near the proposed plant site so the proposed plant should be representative of the area.
- The peak air quality impacts from the facility are located very close to the fenceline (within about 1 km in most cases). These impacts are likely due to the emergency generator, auxiliary boilers and/or on-site locomotives that do not run continuously.
- The PSD increment consumption due to the facility emissions is well within PSD Class II increments. The modeling analysis for the proposed project shows compliance with PSD Class II increments and the NAAQS.
- The NO_2 annual impact is 19% of the PSD increment and is located approximately 0.6 km from the main stack. The SO_2 3-hour impact is 6% of the PSD increment and is located approximately 5.7 km from the main stack. The PM_{10} 24-hour and annual impacts are 48% and 22% of the PSD increments, respectively, and are located about 1 km of the main stack.
- The NO_2 annual impact is 5% of the NAAQS and located about 0.6 km from the main stack. The SO_2 3-hour impact is 2% of the NAAQS and is located 5.7 km from the main stack. The PM_{10} 24-hour impact is 10% of the NAAQS and is located about 1 km of the main stack. Note that the EPA revoked the annual PM_{10} standard effective December 17, 2006.
- The results of the additional impacts analysis indicate no predicted impacts above screening levels for soils and vegetation.

In conclusion, the potential effects on air quality due to emissions from the proposed project facility, in conjunction with nearby area source emissions, are expected to result in predicted concentrations in Class II areas that are in compliance with PSD and NAAQS limits. Therefore, the air quality impacts are minor as defined in Section 4.7.1 above.

Table D-22 summarizes the predicted ambient air quality impacts of the power plant, based on the AERMOD modeling results. The maximum predicted ambient concentrations for SO_2 (24-hour and annual) and CO (1-hour and 8-hour) are below the Significant Impact Level (SIL) for those pollutants. In accordance with the EPA document *Guideline on Air Quality Models* (EPA 1999), no further analysis of these pollutants (i.e. Class I impacts and increment consumption), for the specified averaging times, is required under the PSD regulations. The maximum predicted ambient concentrations for NO_x (annual), SO_2 (3-hour) and PM_{10} (24-hour and annual) are above the corresponding SIL. There are no promulgated SILs for lead. None of the predicted maximum ambient pollutant concentrations exceeded the corresponding PSD Class II degradation increment or the NAAQS.

Table D-23 summarizes the predicted ambient air quality impacts of the power plant on the Lake Mead National Recreation Area (NRA), based on the CALPUFF modeling results. The maximum predicted ambient concentrations for SO_2 (3-hour, 24-hour and annual), PM_{10} (24-hour and annual) and NO_2 (annual) are below the Class II Significance Impact Level (SIL) for those pollutants. Therefore, no additional modeling for PSD increment consumption is required for Lake Mead NRA.

Table D-22
Maximum Predicted Air Quality Impacts from the Proposed Project

Pollutant	Averaging Period	Maximum Modeled Conc. (μg/m^3)	Distance km (mi)	Bearing (degrees)	SIL (μg/m^3)	% of SIL	PSD Class II Increment (μg/m^3)	% of Increase	NAAQS (μg/m^3)	% of Ambient Standard
NO_2	Annual	**4.758**	0.6 km (0.4 mi)	193	1	476%	25	19%	100	5%
SO_2	3 hour	**30.505**	5.7 km (3.5 mi)	279	25	122%	512	6%	1,300	2%
	24 hour	3.193	5.7 km (3.5 mi)	279	5	64%	91	4%	365	1%
	Annual	0.413	9.6 km (6.0 mi)	19	1	41%	20	2%	80	1%
PM_{10}	24 hour	**14.450**	1.0 km (0.6 mi)	80	5	289%	30	48%	150	10%
	Annual	**3.722**	0.6 km (0.4 mi)	193	1	372%	17	22%	Revoked	NA
CO	1 hour	107.480	5.7 km (3.5 mi)	279	2,000	5%	N/A	N/A	40,000	0.3%
	8 hour	28.951	0.6 km (0.4 mi)	200	500	6%	N/A	N/A	10,000	0.3%
Pb	Quarterly	0.011	5.7 km (3.5 mi)	279	N/A	N/A	N/A	N/A	1.5	1%

SOURCE: ENSR Corporation 2007a
NOTES: μg/m^3 = micrograms per cubic meter
km = kilometer
mi = mile(s)
SIL = Significant Impact Level
PSD = Prevention of Significant Deterioration
NAAQS = National Ambient Air Quality Standards
NO_2 = nitrogen dioxide
SO_2 = sulfur dioxide
PM_{10} = particulate matter equal to or less than 10 microns in diameter
CO = carbon monoxide
Pb = lead
N/A = not applicable

Table D-23
Lake Mead National Recreation Area (Class II) PSD Increment
CALPUFF Modeling Results (2003-2005)

Pollutant	Class I Area	Average Period	Maximum Modeled Concentrations (μg/m^3)			Class II SIL	PSD Class II Increment
			2003	2004	2005	(μg/m^3)	(μg/m^3)
SO_2	Lake Mead NRA [1]	3-hr [2]	2.681	2.569	3.092	25.0	512
		24-hr	0.699	0.891	0.844	5.0	91
		Annual [3]	0.045	0.059	0.052	1.0	20
PM_{10}	Lake Mead NRA [1]	24-hr	0.374	0.459	0.469	5.0	30
		Annual	0.033	0.042	0.037	1.0	17
NO_2	Lake Mead NRA [1]	Annual	0.039	0.057	0.045	1.0	25

SOURCE: ENSR Corporation 2007d
NOTES: [1] Impacts assessed on the 2-kilometer meteorological and computational grid.
[2] 3-hour SO_2 concentrations reflect a 483.8 pounds/hour SO_2 limit.
[3] Annual SO_2 concentrations reflect 1,351 tons per year SO_2 limit.
μg/m^3 = micrograms per cubic meter
PSD = Prevention of Significant Deterioration
SIL = Significant Impact Level
NRA = National Recreation Area
SO_2 = sulfur dioxide
PM_{10} = particulate matter equal to or less than 10 microns in diameter
NO_2 = nitrogen dioxide

4.5.1.1 Class I Area Impacts

Dispersion modeling of the air quality impacts of the proposed project, using CALPUFF, has been completed for PSD Class I areas. The results are summarized below.

- The project impacts are below PSD significance levels and therefore would have an insignificant impact on SO_2, NO_2 and PM_{10} increments.
- The project's impact is a small fraction of the total PSD increment. The cumulative analysis shows that the proposed project would not cause or contribute to a PSD Class I increment violation, and that no Class I increment violations are predicted in the areas modeled.
- The project's impacts at all modeled Class I areas were below the deposition analysis thresholds (DAT) for sulfur and nitrogen deposition. The annual predicted impact of sulfur and nitrogen depositions are conservative because a 100 percent annual capacity factor is assumed in the emission portion of the model. Lake Mead NRA results are provided for informational purposes only as Sensitive Class II areas are not held to the 0.005 kilogram per hectare per year Class I DAT change in extinction significant threshold.
- The project's impacts on regional haze would be below the significance threshold of 5 percent change to background extinction with the use of the FLAG screening procedures and Method 2. The Method 6 results with P-G coefficients indicate that the 98 percentile of regional haze impacts are well below the 5 percent change in extinction. Therefore, the project does not have a significant regional haze impact. Lake Mead NRA results are provided for informational purposes only as Sensitive Class II areas are not held to the 5 percent change in extinction significant threshold.

Table D-24 presents the maximum predicted ambient concentrations of NO_2, SO_2 and PM_{10} within 5 Class I areas (located within 300 km of the project site) during the calendar years 2003, 2004 and 2005. The modeling results indicate that the proposed project has insignificant impacts on SO_2, PM_{10} and NO_2 Additionally, no Class I increment violations are predicted in the areas modeled.

4.5.1.2 Visibility and Regional Haze

Regional haze modeling was conducted using CALPUFF for Bryce Canyon, Capitol Reef, Grand Canyon, and Zion National Parks, and for the Sycamore Canyon Wilderness. Table D-25 presents the regional haze modeling results, using FLAG guidance, for calendar years 2003, 2004 and 2005. The modeling results using Method 6 (MVISBK=6) have no days above a 5 percent change in extinction at any Class I area during any year. Table D-26 presents the regional haze modeling results, showing that at the 98^{th} percentile the regional haze impacts are well below the threshold 5 percent change in extinction. This result is further evidence that the proposed project will not have an adverse impact on regional haze. Sensitive Class II areas are not held to the same 5 percent change in extinction significant threshold. Therefore the results for Lake Mead NRA are provided for informational purposes.

Table D-24
Class I Area PSD Increment CALPUFF Modeling Results (2003-2005)

Pollutant	Class I Area	Average Period	Maximum Modeled Concentrations (µg/m³) 2003	2004	2005	Class I SIL (µg/m³)	PSD Class I Increment (µg/m³)
SO_2	Capitol Reef National Park[1]	3-hour [3]	0.160	0.128	0.124	1.0	25
		24-hour	0.055	0.022	0.037	0.2	5
		Annual [4]	0.002	0.001	0.001	0.1	2
SO_2	Sycamore Canyon Wilderness[1]	3-hour [3]	0.104	0.075	0.096	1.0	25
		24-hour	0.019	0.014	0.016	0.2	5
		Annual [4]	0.001	0.0005	0.001	0.1	2
SO_2	Bryce Canyon National Park[2]	3-hour [3]	0.161	0.137	0.996	1.0	25
		24-hour	0.035	0.024	0.184	0.2	5
		Annual [4]	0.002	0.002	0.002	0.1	2
SO_2	Grand Canyon National Park [2]	3-hour [3]	0.637	0.858	0.856	1.0	25
		24-hour	0.111	0.161	0.150	0.2	5
		Annual [4]	0.004	0.005	0.004	0.1	2
SO_2	Zion National Park[2]	3-hour [3]	0.574	0.454	0.552	1.0	25
		24-hour	0.093	0.064	0.123	0.2	5
		Annual [4]	0.005	0.004	0.004	0.1	2
PM_{10}	Capitol Reef National Park[1]	24-hour	0.047	0.012	0.031	0.3	8
		Annual	0.002	0.001	0.001	0.2	4
PM_{10}	Sycamore Canyon Wilderness[1]	24-hour	0.013	0.012	0.014	0.3	8
		Annual	0.001	0.0004	0.001	0.2	4
PM_{10}	Bryce Canyon National Park[2]	24-hour	0.025	0.015	0.017	0.3	8
		Annual	0.001	0.001	0.001	0.2	4
PM_{10}	Grand Canyon National Park[2]	24-hour	0.069	0.124	0.079	0.3	8
		Annual	0.003	0.004	0.003	0.2	4
PM_{10}	Zion National Park[2]	24-hour	0.086	0.041	0.075	0.3	8
		Annual	0.004	0.003	0.003	0.2	4
NO_2	Capitol Reef National Park[1]	Annual	0.0003	0.0002	0.0003	0.1	2.5
NO_2	Sycamore Canyon Wilderness[1]	Annual	0.0001	0.00003	0.0001	0.1	2.5
NO_2	Bryce Canyon National Park[2]	Annual	0.0004	0.003	0.001	0.1	2.5
NO_2	Grand Canyon National Park[2]	Annual	0.002	0.002	0.002	0.1	2.5
NO_2	Zion National Park[2]	Annual	0.002	0.001	0.001	0.1	2.5

SOURCE: ENSR Corporation 2007d
NOTES: Results reflect the completed 2-km runs and specific periods for the 500-meter grid that would affect the overall peak impacts.
1 Impacts assessed on the 2-km meteorological and computational grid.
2 Impacts assessed on the 500-m meteorological and computational grid.
3 3-hour SO_2 concentrations reflect a 483.8 pounds/hour SO_2 limit.
4 Annual SO_2 concentrations reflect 1,351 tons per year SO_2 limit.
µg/m3 = micrograms per cubic meter
SIL = Significant Impact Level
PSD = Prevention of Significant Deterioration
SO_2 = sulfur dioxide
PM_{10} = particulate matter equal to or less than 10 microns in diameter
NO_2 = nitrogen dioxide

Table D-25
Regional Haze CALPUFF Modeling Results – FLAG (2003-2005)

Class I Area	2003			2004			2005		
	Days > than N% ΔB_{ext}		MAX% ΔB_{ext}	Days > than N% ΔB_{ext}		MAX% ΔB_{ext}	Days > than N% B_{ext}		MAX% ΔB_{ext}
	5%	10%		5%	10%		5%	10%	
MVISBK=2, FLAG Background, 2-km grid									
Capitol Reef NP	0	0	3.04	0	0	1.42	0	0	2.17
Sycamore Canyon W	0	0	1.69	0	0	1.01	0	0	1.22
Lake Mead NRA [1]	27	0	9.83	46	10	14.70	28	5	16.37
MVISBK=2, FLAG Background, 0.5-km grid									
Bryce Canyon NP	0	0	4.03	0	0	0.91	0	0	1.85
Grand Canyon NP	0	0	2.75	0	0	4.33	0	0	3.32
Zion NP	0	0	4.70	0	0	1.95	0	0	4.61

SOURCE: ENSR Corporation 2007d
NOTES: Results reflect the completed 2-km runs and specific periods for the 500-m grid that would affect the overall peak impacts.
[1] Sensitive Class II areas are not held to the 5 percent change in extinction significant threshold. Results are provided for informational purposes.
NP = National Park, W =Wilderness Area, NRA = National Recreational Area

Table D-26
Regional Haze CALPUFF Modeling Results – Method 6 (2003-2005)

Class I Area	2003				2004				2005			
	Days > than N% ΔB_{ext}		MAX% ΔB_{ext}	8th Highest % ΔB_{ext}	Days > than N% ΔB_{ext}		MAX% ΔB_{ext}	8th Highest % ΔB_{ext}	Days > than N% ΔB_{ext}		MAX% ΔB_{ext}	8th Highest % ΔB_{ext}
	5%	10%			5%	10%			5%	10%		
MVISBK=6, 20% Best Natural Background, 2-km grid												
Capitol Reef NP	0	0	3.84	1.01	0	0	1.20	0.63	0	0	3.09	0.84
Sycamore Canyon W	0	0	1.19	0.53	0	0	1.11	0.49	0	0	1.00	0.44
Lake Mead NRA [1]	64	10	14.85	10.68	74	22	18.88	13.55	67	13	19.77	11.34
MVISBK=6, 20% Best Natural Background, 500-m grid												
Bryce Canyon NP	0	0	2.85	0.74	0	0	0.88	0.55	0	0	1.71	0.52
Grand Canyon NP	0	0	3.00	1.82	0	0	3.99	2.49	0	0	2.93	1.96
Zion NP	1	0	5.06	1.97	0	0	2.04	1.50	1	0	5.24	1.37
MVISBK=6, Annual Average Natural Background, 2-km grid												
Capitol Reef NP	0	0	2.97	0.78	0	0	0.93	0.49	0	0	2.39	0.65
Sycamore Canyon W	0	0	0.92	0.41	0	0	0.86	0.38	0	0	0.77	0.34
Lake Mead NRA [1]	42	3	11.50	8.27	52	8	14.62	10.49	43	5	15.31	8.78
MVISBK=6, Annual Average Natural Background, 500-m grid												
Bryce Canyon NP	0	0	2.20	0.58	0	0	0.68	0.43	0	0	1.33	0.40
Grand Canyon NP	0	0	2.32	0.1.41	0	0	3.09	1.93	0	0	1.52	1.5
Zion NP	0	0	3.91	1.52	0	0	1.58	1.16	0	0	4.05	1.06

SOURCE: ENSR Corporation 2007d
NOTES: Results reflect the completed 2-km runs and specific periods for the 500-m grid that would affect the overall peak impacts.
[1] Sensitive Class II areas are not held to the 5 percent change in extinction significant threshold. Results are provided for informational purposes.
km = kilometer, m = meter
NP = National Park, W =Wilderness Area, NRA = National Recreation Area

4.5.1.3 Deposition of Sulfates and Nitrates

Based on the CALPUFF model output files, ENSR prepared a table of predicted deposition rates for sulfates and nitrates, resulting from SO_2 and NO_x emitted by the proposed power plant. Table D-27 summarizes the maximum predicted deposition rates, and predicted locations relative to the main stack, for these chemical species. The modeling results indicate that the Proposed Action Alternative would have impacts below the DAT for sulfur and nitrogen deposition at all Class I areas, except for sulfur deposition at Zion, where the impact is only slightly above the DAT. The annual predicted impacts of sulfur and nitrogen deposition are conservative in the sense that a 100 percent annual capacity factor is assumed in the emission portion of the model input.

Table D-27
Deposition CALPUFF Modeling Results (2003-2005)

Pollutant	Class I Area	Averaging Period	Maximum Modeled Deposition Rate 2003 (kg/ha/yr)	2004 (kg/ha/yr)	2005 (kg/ha/yr)	NPS Class I Deposition Analysis Thresholds (kg/ha/yr)
Sulfur [3]	Capitol Reef NP[1]	Annual	0.0011	0.0012	0.0015	0.005
	Sycamore Canyon W[1]	Annual	0.0005	0.0006	0.0006	0.005
	Bryce Canyon NP[2]	Annual	0.0015	0.0018	0.0016	0.005
	Grand Canyon NP[2]	Annual	0.0012	0.0016	0.0018	0.005
	Zion NP[2]	Annual	0.0044	0.0045	0.0045	0.005
	Lake Mead NRA[1]	Annual	0.0081	0.0116	0.0117	-
Nitrogen	Capitol Reef NP[1]	Annual	0.0007	0.0008	0.0010	0.005
	Sycamore Canyon W[1]	Annual	0.0003	0.0005	0.0004	0.005
	Bryce Canyon NP[2]	Annual	0.0009	0.00011	0.0020	0.005
	Grand Canyon NP[2]	Annual	0.0007	0.00011	0.0010	0.005
	Zion NP[2]	Annual	0.0025	0.0025	0.0024	0.005
	Lake Mead NRA[1]	Annual	0.0057	0.0082	0.0077	-

SOURCE: ENSR Corporation 2007d

NOTES: Results reflect the completed 2-km runs and specific periods for the 500-meter grid that would affect the overall peak impacts. Lake Mead National Recreation Area results are provided for informational purposes.

[1] Impacts assessed on the 2-km meteorological and computational grid.

[2] Impacts assessed on the 500-m meteorological and computational grid.

[3] Annual sulfur deposition rates reflect 1,215 tons per year SO_2 limit.

kg/ha/yr = kilograms per hectare year

NPS = National Park System, NP = National Park, W =Wilderness Area, NRA = National Recreation Area

4.6 <u>Mitigation</u>

4.6.1 For Construction Emissions

Please refer to Section 4.7.2.2 of this document, as the mitigation measures for the Proposed Alternative would be the same as the No-Action Alternative.

4.6.1.1 For Plant Operations

The following text is excerpted from Section 7.1.8 of Appendix 7 (Description of Proposed Project) of the PSD Application. (ENSR 2006a):

Primary Power Plant Air Emissions Control

The air emissions control system for the [proposed project] will be designed to meet BACT requirements, as implemented under the air permitting regulations, to limit emissions. Emissions control will be provided for the main boiler and the coal and material handling systems. The determination of BACT is discussed in Appendix 10. [Appendix 10 refers to the PSD Application and can be found within the Administrative Record.]

The exhaust from the boiler will be treated by controls designed to minimize emission of pollutants to the atmosphere. The exhaust gases will pass through a SCR unit that will use NH_3 and a catalyst to convert NO_X into molecular nitrogen and water vapor. If needed, PAC then would be injected into the gas stream to capture trace amounts of mercury. PAC injection would be followed by a fabric filter, or baghouse, which would capture the reacted PAC and particulate emissions from the flue gas. The system then will route the exhaust gases through a wet scrubber where the flue gas will be passed through a sprayer system with an aqueous solution of saturated calcium oxide (hydrated lime). The chemical reaction between SO_2 in the gas and the calcium in the scrubber slurry will remove sulfur compounds from the flue gases. These systems are described below.

After treatment, boiler flue gases will be routed to a main stack for exhausting to the atmosphere. The following components will be installed to treat flue gases.

- Low-NO_X burners and an SCR system will be used for removal of NO_X from the gases. NO_X is formed during combustion and also is formed from nitrogen compounds in the fuel. The permit application proposed a controlled NO_X emission rate for the main boiler of 0.06 lb/MMBtu. The boiler will be designed to minimize NO_X formation; the exhaust will be treated to further reduce emissions. In the SCR system, a specifically designed catalyst will be installed, and NH_3 will be mixed with the exhaust gas in a ratio that will be adjusted for the NO_X in the flue gas. As the NH_3 and NO_X pass the catalyst, the NO_X will be reacted and reduced to form molecular nitrogen and water vapor. There is some minor amount of unreacted NH_3 "slip" in the exhaust; however, this emission will be minimized through operational controls.
- An activated carbon injection system is included in this application as an option for controlling mercury emissions, especially elemental mercury, in the flue gases. Mercury adsorbs to particles of activated carbon, which are then trapped in the fabric filter and routed to a landfill for disposal. If there are no customers for the fly ash, the existing fabric filter system may be used to capture the spent activated carbon. Alternately, a separate particulate removal device may be used to remove the fly ash prior to the injection of activated carbon. Mercury removal in this system will depend on the total amount of carbon used, flue gas temperature, mercury speciation, flue gas composition, and type and amount of activated carbon used. PAC storage and handling equipment and operations are included in this air permit application, but will not be installed unless required to meet mercury emission limits.
- A fabric filter system will collect particulate matter emissions (fly ash) from the flue gases. Fabric filters are capable of over 99 percent control efficiency. The permit application proposed a controlled PM_{10} emission rate for the main boiler of 0.02 lb/MMBtu, which includes condensables. The system will consist of multiple baghouse compartments, each containing an array of fabric bags that will be used to capture the fly ash as the flue gas passes through the filter bags. Periodically, each compartment will be cleaned by pulsing the bags to dislodge particulates into a fly ash hopper beneath the compartment. Once a

compartment is cleaned, cleaning will proceed to cycle through each remaining compartment. Collected fly ash will be routed from the fly ash hopper to a fly ash silo for storage, and ultimately for shipment offsite. Fly ash will be sold to customers in the concrete industry, or it may be mixed with other CCPs for landfill disposal.

- A FGD wet scrubber system will be installed to control emissions of SO_2 and smaller amounts of acid gases. Wet scrubbers are capable of 80 to 98 percent control efficiency. The wet scrubber at the proposed facility will operate at an approximate control efficiency of 98%. The permit application proposed a controlled SO_2 emission rate for the main boiler of 0.06 lb/MMBtu. SO_2 is formed during combustion from naturally occurring sulfur contained in coal. In the scrubber system, calcium oxide (Quicklime) will be dissolved in water to form scrubber slurry, which will be sprayed into a scrubber chamber. The flue gases will be transported through the chamber and mixed with the scrubber slurry spray. The design of the scrubber chamber will promote the mixing of the small slurry droplets with the flue gases, thereby promoting absorption of the SO_2 from the gas into the slurry spray droplets. The chemical reaction will form calcium sulfate (the basic component of gypsum, which is used in commercial wallboard or sheetrock). The scrubber slurry solution will be recycled in the system unit is reaches saturation. The scrubber slurry will be concentrated, filtered, and the gypsum that is generated will be dewatered for transportation offsite to gypsum customers or for disposal in the CCP landfill.

Support Systems Air Emissions Control

As previously discussed, Quicklime will be delivered to the site by truck or rail car and stored in silos for use in the wet scrubber system. NH_3 will be delivered by rail car or truck and stored in large pressurized storage tanks for feed into the SCR system. If used, activated carbon for the PAC system would be delivered to the site by truck, transferred to a silo for storage, and fed to the exhaust stream for control of mercury emissions in the flue gases.

In addition to the main unit at the power plant, air pollution controls will be applied to other potential sources of emissions. The controlled units will include the materials handling operations for coal, ash, Quicklime, and activated carbon. Emission reduction measures for the auxiliary boiler are discussed in Section 7.1.3, Auxiliary Boilers; [Attachment 5-A refers to the PSD Application and can be found within the Administrative Record].

Fugitive particulate emissions from coal handling will be controlled by selective water or fogging sprays and by baghouses that will be connected to the enclosed handling system. The baghouses will draw air through the coal handling operations and partially enclosed conveyors and capture the particles from that air stream by drawing it through the bag filters. Baghouses will be attached to the transfer house, coal crusher, and tripper conveyor system. Baghouses will be monitored for pressure drop to ensure that the individual bags are not breached or plugged. Material collected from the bag cleaning operations will be fed back into the coal stream and ultimately will be fed to the boiler.

Wet suppression techniques will be applied at several points in the handling of the coal. This technique will involve fogging sprays during coal unloading, and spraying the surface of the coal storage piles with water and surfactants to inhibit the formation of wind-blown dust (fugitive dust) from those piles. Shrouds will be used for all transfer conveyors to eliminate particulate emissions from these operations.

4.7 Summary of Impacts

During construction, both the No-Action and Proposed Alternatives would result in temporary and localized increases in ambient air concentrations of nitrogen oxides (NO_x), carbon monoxide (CO), sulfur dioxide (SO_2), particulate matter with aerodynamic diameter less than 10 microns (PM_{10}), particulate matter with aerodynamic diameter less than 2.5 microns ($PM_{2.5}$) and volatile organic compounds (VOCs) from exhaust emissions of worker vehicles, heavy construction equipment, diesel generators and other machinery and tools. In addition, fugitive dust emissions would result from vehicular travel on unpaved ground surfaces and from excavation and earthmoving activity. The No-Action Alternative is associated with fewer of these types of impacts because it would not require construction of the rail line included under the Proposed Alternative. These impacts would be mitigated through measures such as wet suppression, use of gravel on unpaved surfaces, and travel and speed restrictions.

The operation of the plant under either alternative would cause criteria pollutant emissions. The Proposed Alternative would result in higher emissions of NO_x, SO_2, PM_{10}, CO, and Pb during plant operations. Under both alternatives, none of the maximum predicted impacts from plant emissions would exceed the PSD Class II Increments (the maximum allowable ambient air quality deterioration allowed under the PSD program) or the NAAQS (the pollutant concentrations below which no adverse human health or environmental impacts would occur).

Table D-28 compares the maximum emissions due to construction activities from the No-Action and Proposed Action Alternatives. The emissions of CO, NO_x, and PM_{10} would be greater for the Proposed Action Alternative due to construction of the rail line. The majority of the PM_{10} emissions (~99 percent) would be due to earthmoving. Since these emissions would occur at ground level, it is unlikely that the emissions would be transported more than a few kilometers, except on unusually windy days. In addition, all of these emissions would be temporary, spatially distributed over a large area, and spread out over construction schedules ranging from 6 to 36 months. The mitigation measures would be expected to reduce these impacts.

Table D-29 compares the maximum emissions due to plant operations from the No-Action and Proposed Action Alternatives. Consequently, the total annual emissions of VOC, CO, NO_x, SO_2, and PM_{10} for the No-Action Alternative would be less than estimated for Proposed Action. The Proposed Action would have lower efficiency and higher emissions per unit of power produced.

Table D-28
Comparison of Maximum Pollutant Emissions for the Duration of Construction Activities

Criteria Pollutant	No-Action Alternative (1,100 MW Plant) (tons)	Proposed Action Alternative (750 MW Plant) (tons)
CO	24.7	486.2
NO_x	115.7	1,657.2
SO_2	17.8	1.5
PM_{10}	399.3	1,795.9

SOURCE: URS Corporation calculations (based on Bureau of Land Management 2003a), ENSR Corporation 2006a
NOTE: Construction activities and duration of project elements vary.
MW = megawatt
CO = carbon monoxide
NO_x = nitrogen oxides
SO_2 = sulfur dioxide
PM_{10} = particulate matter equal to or less than 10 microns in diameter

Table D-29
Comparison of Maximum Pollutant Emissions from Plant and Mine Operations

Criteria Pollutant	No-Action Alternative (1,100 MW Plant) (tons)	Proposed Action Alternative (750 MW Plant) (tons)
VOC	79	82
CO	967	2,656
NO_x	356	1,614
SO_2	202	1,352
PM_{10}	435	875
HAPs	19.4	87.1

SOURCE Bureau of Land Management 2003a, ENSR Corporation 2006a
NOTES: MW = megawatt
VOC = volatile organic compounds
CO = carbon monoxide
NO_x = nitrogen oxides
SO2 = sulfur dioxide
PM_{10} = particulate matter equal to or less than 10 microns in diameter
HAP = hazardous air pollutant

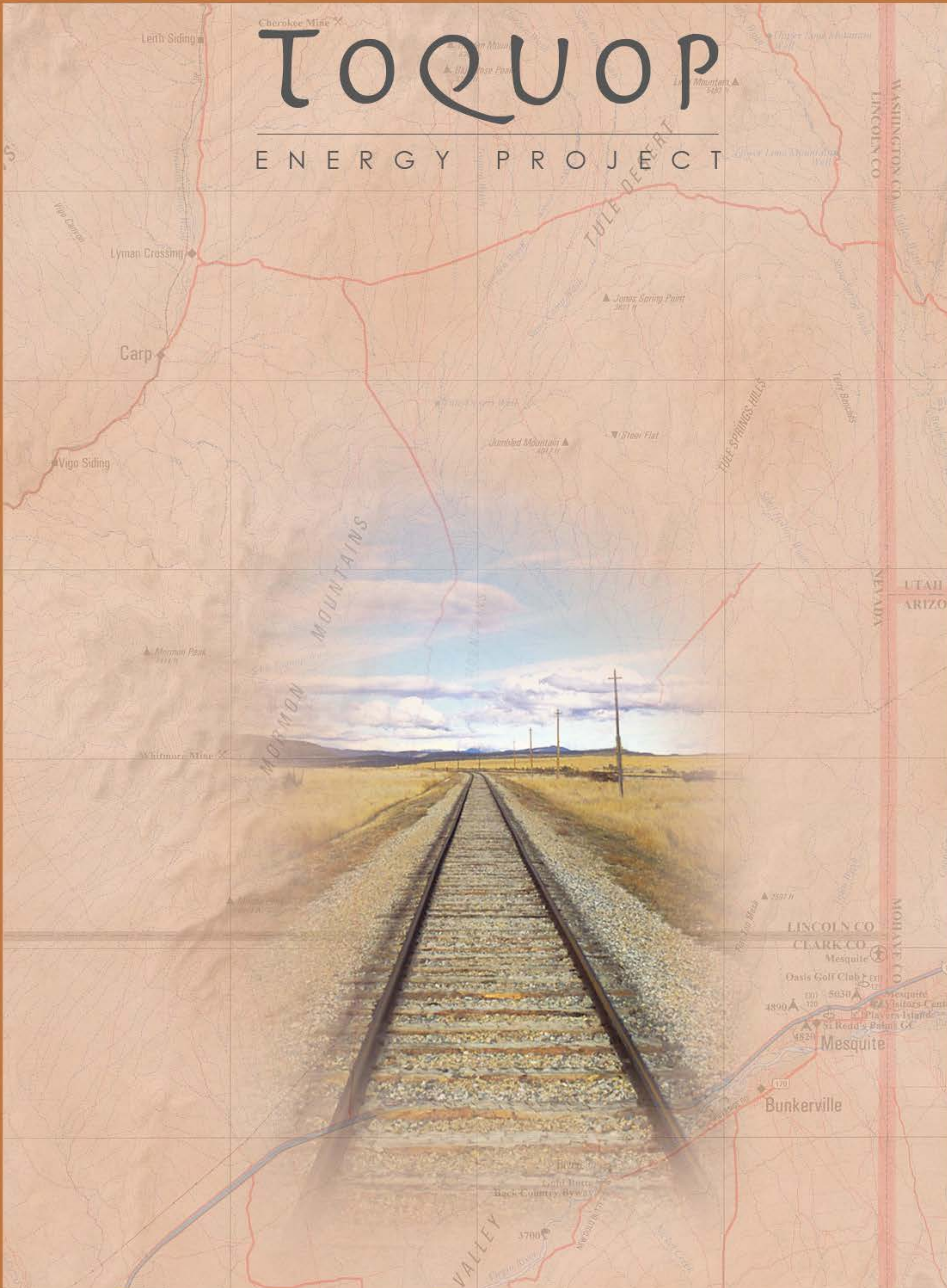
The operation of the plant under either alternative would cause criteria pollutant emissions. The Proposed Alternative would result in higher emissions of SO_2, PM_{10}, CO, and Pb during plant operations. However, NO_x emissions would be higher under the No-Action Alternative. Under both alternatives, none of the maximum predicted impacts from plant emissions would exceed the PSD Class II Increments (the maximum allowable ambient air quality deterioration allowed under the PSD program) or the NAAQS (the pollutant concentrations below which no adverse human health or environmental impacts would occur).

Under the Proposed Alternative, carbon dioxide emissions are predicted to total about 7 million tons per year and NH_3 emissions would reach a maximum rate of just under 118 tons annually. In addition, locomotive rail travel would emit criteria pollutants. Controls for mercury emissions are part of the Proposed Alternative project. Fugitive particulate emissions from coal handling would be controlled by wet suppression and by baghouses that would be connected to the enclosed handling system.

Potential impacts on regional haze or visibility were evaluated. Modeling efforts concluded that the No-Action Alternative would result in a 3.5 percent change in atmospheric light extinction, which is below the threshold of 5 percent at which a significant adverse impact would be recognized. Under the Proposed Alternative, impacts on regional haze also would be below the 5 percent threshold. Additional modeling for SO_2 will be performed at Zion and Grand Canyon National Parks.

TOQUOP

ENERGY PROJECT



APPENDIX E - BEST MANAGEMENT PRACTICES FOR RECLAMATION

APPENDIX E

BEST MANAGEMENT PRACTICES FOR RECLAMATION

The *Proposed Toquop Land Disposal Amendment to the Caliente Management Framework Plan and Final Environmental Impact Statement for the Toquop Energy Project* (Bureau of Land Management [BLM] 2003a) identified a series of standard operating procedures (referred to here as best management practices) that would guide reclamation efforts following construction of the Toquop Energy Project. These practices would be followed for any of the alternatives under consideration in this Draft Environmental Impact Statement.

- Reclamation would normally be accomplished with native species only. These would be representative of the indigenous species present in the adjacent habitat. Rationale for potential planting with selected non-natives would be documented. Possible exceptions could include use of non-natives for a temporary cover crop to out-compete weeds.

- Seeding would occur during November 15 through March 15 to ensure a greater chance of success.

- Reclamation release criteria are as follows:

    - One-hundred percent of the perennial plant cover of selected comparison areas, normally like adjacent habitat. If the adjacent habitat is severely disturbed, a range site description may be used as a cover standard. Cover is normally crown cover as estimated by the point intercept method. Selected cover can be determined using a method as described in *Sampling Vegetation Attributes, Interagency Technical Reference* (BLM 1996). The reclamation plan for the project area would identify the site-specific release criteria and associated statistical methods in the reclamation plan or permit.
    - No noxious weeds would be allowed on the sites for reclamation release. Control of noxious weeds would follow an integrated pest management plan approved by the authorizing officer. A list of Nevada noxious weeds would be provided by the authorized officer.

- All available growth medium would be salvaged and stockpiled prior to disturbance. All disturbed areas would be recontoured to blend as nearly as possible with the natural topography prior to revegetation. All compacted portions of the disturbance would be ripped to a depth of 12 inches unless solid rock is encountered. Adequate fine-grain seedbed must be established to provide good seed to soil contact. Large blocks and clumps of soil with deep pockets should be avoided. This normally requires some type of tillage procedure after ripping.

- All portions of access roads not needed for other uses as determined by the BLM authorized officer would be reclaimed.

- Mulching (certified weed-free as required by Bureau of Land Management) of the seedbed following seeding may be required under certain conditions, such as severe erosion.

- The success of the vegetative growth on a reclaimed site may be evaluated for release no sooner than during the third growing season after earthwork and planting have been completed. Where it has been determined that revegetation success criteria have not been met, the agencies and the operator would meet to decide on the best course of actions necessary to meet the reclamation goal.

- Where applicable, the following agencies would be consulted to determine the recommended plant species composition, seeding rates, and planting dates:

  - U.S. Fish and Wildlife Service
  - U.S. Natural Resources Conservation Service
  - U.S. Bureau of Land Management

- Grasses, forbs, shrubs, and trees appropriate for site conditions and surrounding vegetation would be included on the plant list. Species chosen for a site would be matched for site drainage, climate, shading, resistance to erosion, soil type, slope, aspect, and vegetation management goals. Upland revegetation would match the plant list to the site's soil type, topographic position, elevation, and surrounding natural communities.

- Construction areas, including storage yards, would be free of waste material and trash accumulations at all times.

- All unused materials and trash would be removed from construction and storage sites during the final phase of work. All removed material would be placed in approved sanitary landfills or storage sites and work areas would be left to conform to the natural landscape.

- Upon completion of construction, any land disturbed would be graded to provide proper drainage and blend with the natural contour of the land. Following grading, it would be revegetated using plants native to the area, suitable for the site conditions, and beneficial to wildlife.

- Following completion of construction, all yards, offices, and construction buildings, including concrete footings and slabs, would be removed from the site.

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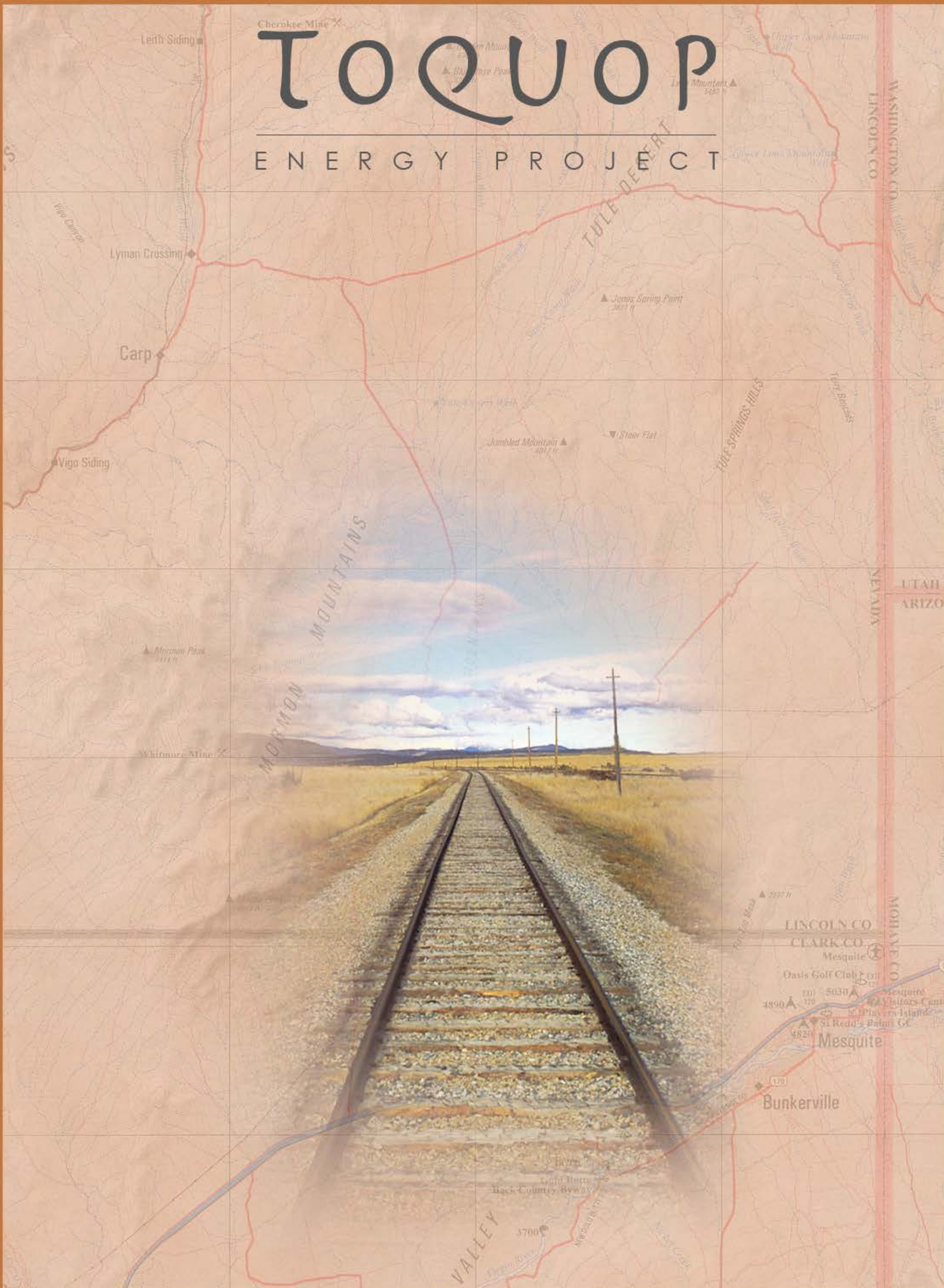
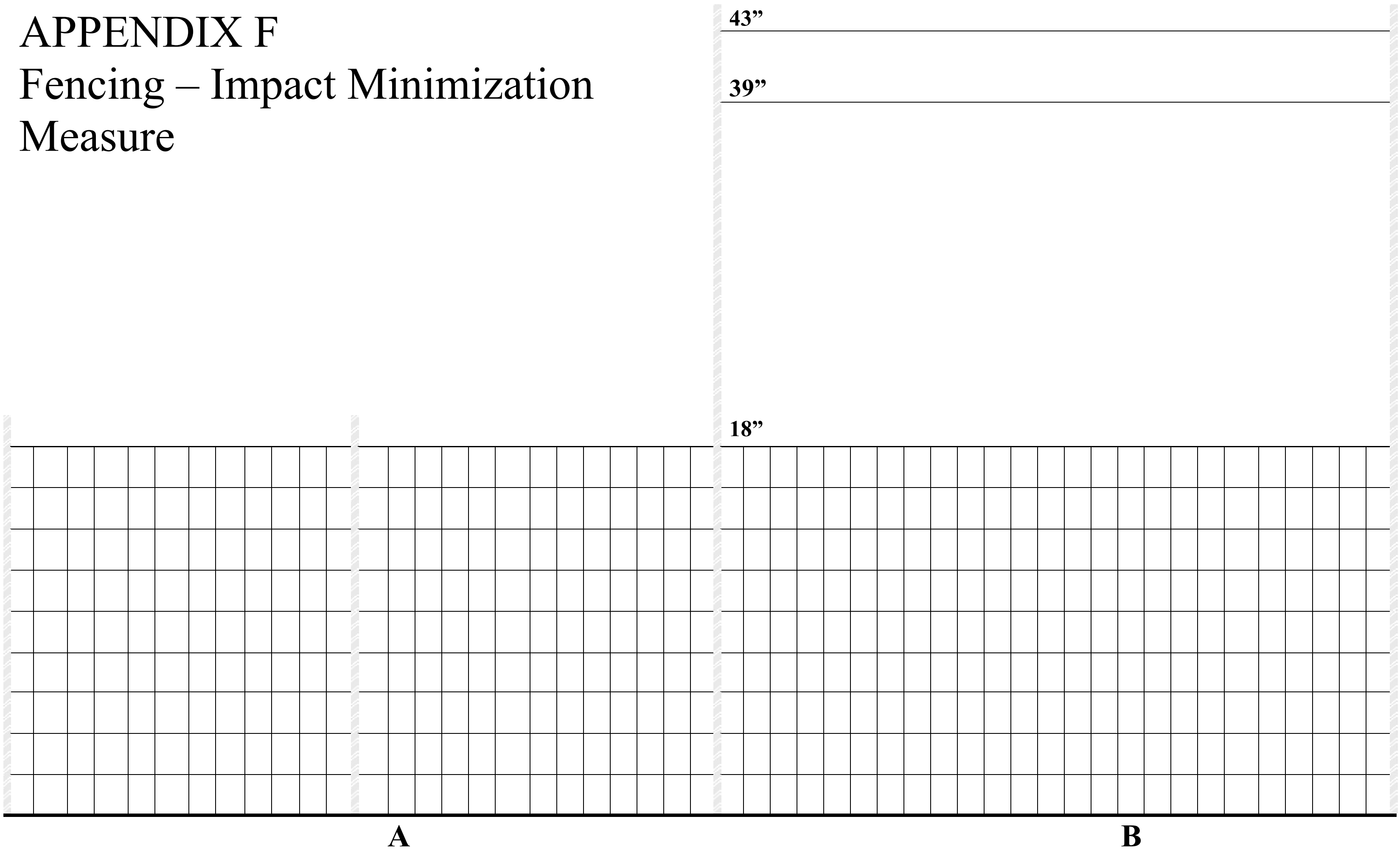


APPENDIX F - RAIL LINE FENCE

APPENDIX F
Fencing – Impact Minimization Measure



A – Preferred short fence for desert tortoise along rail line and access road from Interstate 15, and around power plant site

- 1-inch by 2-inch metal mesh, at least 18 inches high

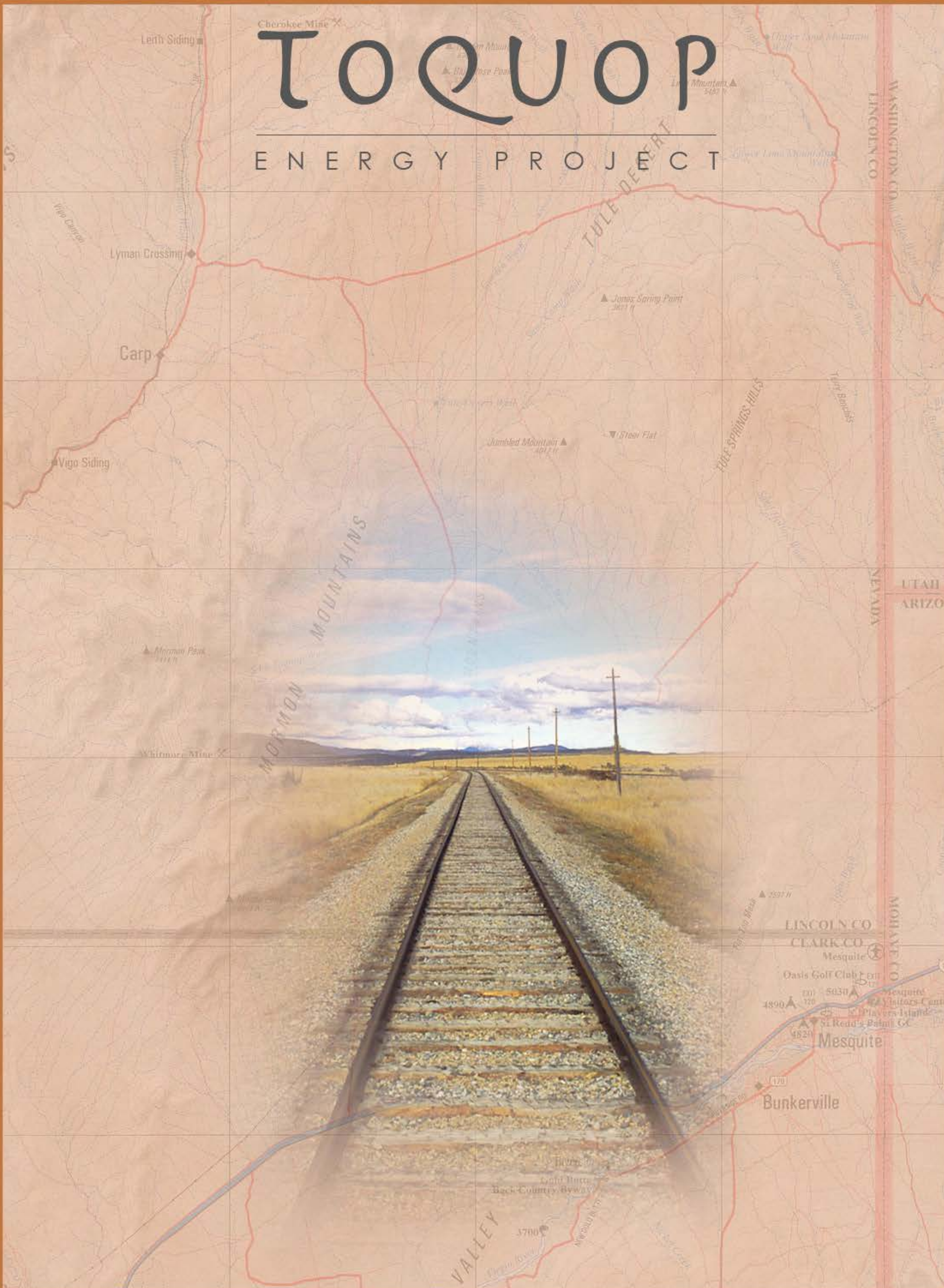
B – Tall fence for livestock along rail line that allows safe access for bighorn sheep

- All wire strands are smooth, no barbs
- Space between top of tortoise mesh and first smooth wire (39 inches) is no less than 21 inches
- Space between top two strands (39 inches and 43 inches) is no more than 4 inches.
- Fence posts, stays, or H-braces are spaced no more than 10 feet apart.

SOURCES: Helvie 1971; Sizer 1967; Bureau of Land Management 1985
NOTE: Heights described are from ground level

TOQUOP

ENERGY PROJECT



CHAPTER 1.0 - INTRODUCTION

1.0 INTRODUCTION

1.1 PROJECT OVERVIEW AND LOCATION

In April 2003, the Bureau of Land Management (BLM) issued a Record of Decision on the Final Environmental Impact Statement (EIS), hereinafter referred to as the 2003 EIS, for the Toquop Energy Project proposed by Toquop Energy, Inc. This project was outlined and analyzed in the 2003 *Proposed Toquop Land Disposal Amendment to the Caliente Management Plan and Final Environmental Impact Statement for the Toquop Energy Project*. The project was to include construction and operation of a 1,100-megawatt (MW) natural-gas-fired electric-power-generation plant and associated facilities in Lincoln County, Nevada. The stated goal for the project was to generate electrical power at competitive prices, as a solution to the near- and long-term power shortages projected for the western United States. The Record of Decision accompanying the Final EIS approved the following rights-of-way (ROWs):

- 100 acres for the power plant site and access road to the power plant from the main access road, plus additional temporary ROW during construction
- 87 acres for improvements to the existing access road from I-15 to the power plant site boundary, plus additional temporary ROW during construction
- 45 acres for a 24-inch buried pipeline and buried electric line between the power plant and the well field, plus additional temporary ROW during construction and 6 acres for storage sites

Since 2003, the price of natural gas has increased substantially and natural-gas prices are projected to remain unstable due to increasing demand coupled with higher exploration and development costs. This, together with the fact that newer technology has improved the efficiency and environmental performance of modern coal-fired plants, has caused the proponent to reconsider the original proposal in favor of a new strategy that would offer greater economic stability by using coal instead of natural gas. In line with the project's original aim to provide power at competitive prices, Toquop Energy Company, LLC. (Toquop Energy) now proposes to construct a 750-MW coal-fired power plant in the same location.

The new coal-fired power plant project has a number of components that differ from the original gas-fired power plant project, and BLM has determined that preparation of a new EIS is warranted. The new project differs from the original project in the following key respects:

- Plant capacity would decrease from 1,100 MW to 750 MW.
- The plant facilities would use more surface area to accommodate the storage and handling of coal and the disposal of ash.
- A rail line to transport coal to the site would need to be constructed.

Map 1-1 shows the locations of the proposed facilities. The power plant would be located on 640 acres of public land currently managed by BLM, located in Township 11 South, Range 69 East, Section 36. This site is approximately 12 miles northwest of Mesquite, Nevada, and 50 miles south-southeast of Caliente, Nevada, in southern Lincoln County. The rail line would leave the existing Union Pacific Railroad line at Leith Siding, and would cross about 31 miles of land managed by the BLM to the power plant.

1.2 PURPOSE AND NEED

The purpose of the action is to provide public land for the development of energy production by allowing for the construction of power plants on public lands managed by the BLM. The multiple-use mission of the BLM includes managing activities such as mineral development, energy production, recreation, and grazing, while conserving natural, historical, cultural, and other resources on the public lands. BLM's objective is to meet public needs for use authorizations such as rights-of-way, permits, leases, and easements while avoiding or minimizing adverse impacts to other resource values. The proposal to construct, operate and maintain a coal-fired power plant on public lands would be in accordance with this objective.

The need for the action is established by BLM's responsibility under the Federal Land Policy and Management Act of 1976 to respond to applications for ROW Grants and a request for land disposal. The BLM will: (1) respond to the request for a ROW for the rail line that would be required to transport coal to the power plant site, and (2) respond to the request to amend the ROW for the power plant site required for the construction and operation of a coal-fired power plant. The rail line would require a corridor 31 miles long across BLM-managed land, with ROW access to a width of 200 feet temporarily during construction and 100 feet wide for long-term use of the rail line. A 100-acre ROW was originally granted for the gas-fired plant; however, an amendment to the ROW is needed to accommodate the proposed 475-acre coal-fired plant. As part of the Proposed Action Alternative, BLM would dispose (by sale) of the 640-acre parcel that the power plant would occupy.

An access road, a water-supply system, and a transmission-line interconnection were granted permits as part of the previous gas-fired power plant project and would not be changed under the Proposed Action Alternative.

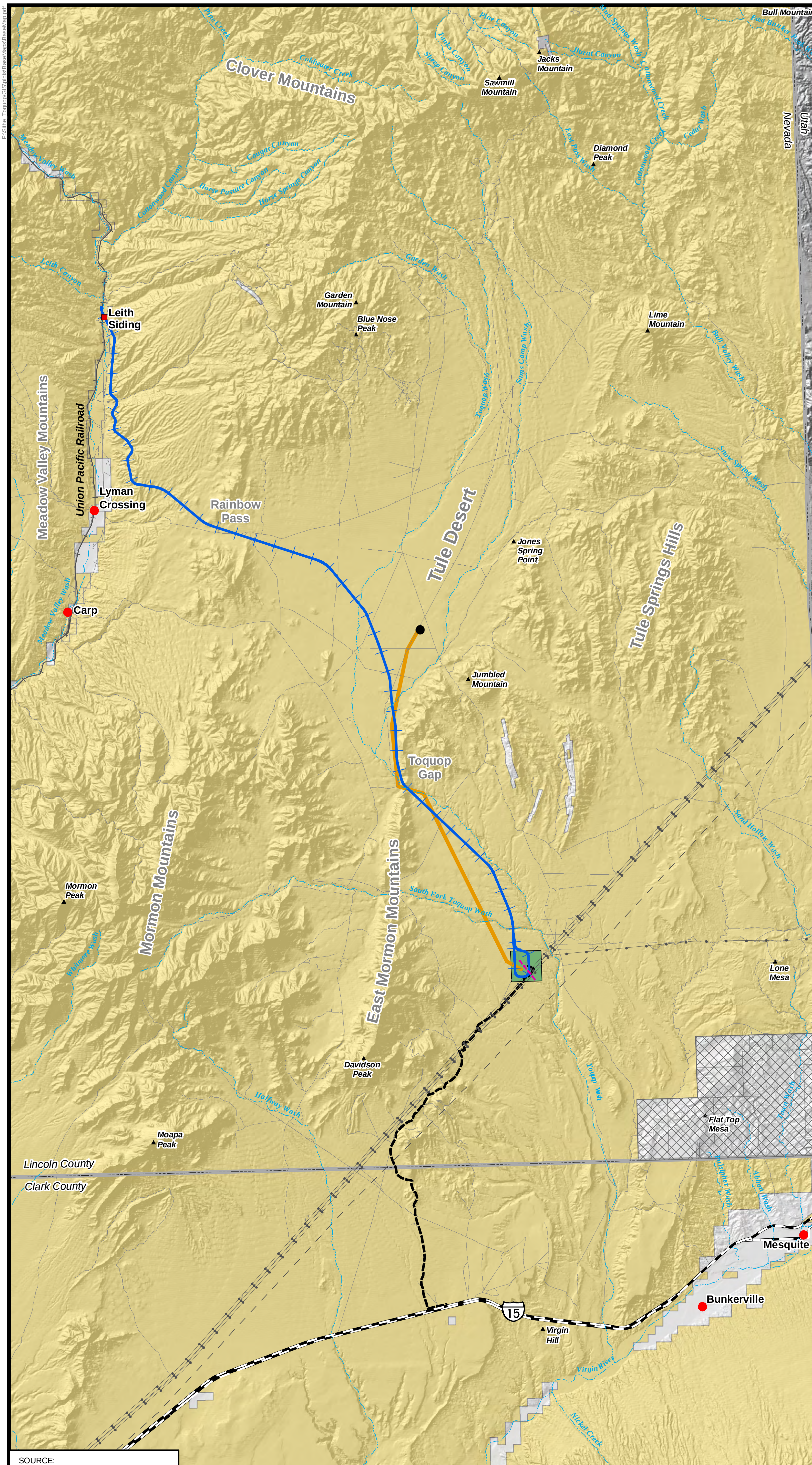
1.3 TIERING TO THE 2003 EIS

While some of the facilities associated with the coal-fired generation project are identical to those considered in the 2003 EIS, BLM has chosen to require a new EIS rather than a supplement to the 2003 EIS. Accordingly, this EIS will be tiered to the 2003 EIS to incorporate by reference the relevant aspects of the earlier analysis. The 2003 EIS evaluated three alternatives in addition to the proposed action (the natural gas-fired power plant) and the no action alternative. These alternatives included two alternate site locations, water-cooled vs. air-cooled technologies in the power plants, alternative access roads, alternative water requirements, and alternative transmission and gas line connections. In addition, alternative fuels and other potential locations for the power plant and access roads were considered during the scoping process, but eliminated from detailed analysis because they failed to meet the project needs, were economically infeasible, and /or were environmentally unacceptable.

Some of the ROWs granted in the BLM's 2003 Record of Decision would not be changed under the current proposed project. Specifically, the proponent has not requested any action by BLM related to the existing ROW grants for the water pipeline, access road, and disposal of the 640-acre site. The current EIS is focused on the issues and impacts that were not addressed in the previous EIS, or builds upon the 2003 analysis to adequately consider the impacts that could result from the grant of additional ROW or a ROW amendment.

Surface Management and Project Components

Toquop Energy Project EIS
Lincoln County, Nevada



LEGEND

Surface Management

- Bureau of Land Management
- Private

General Features

- Proposed Rail Line
- Proposed Plant Site (640 acres)
- Permitted Well Field
- Permitted Water Pipeline
- Permitted Natural Gas Pipeline and Transmission Line Interconnection
- Permitted Access Road
- Toquop Township

Reference Features

- Existing Road
- Interstate
- Existing Railroad
- Existing Transmission Line
- Existing Natural Gas Pipeline
- River, Stream, or Wash
- Mountain Peak
- Town
- Point of Interest

Reno
Carson City
Lincoln County
Project Site
Las Vegas

0 2 4
Miles

Map 1-1

Table 1-1 summarizes the project features that are already permitted and those requiring further approvals.

Table 1-1
Acreages of Proposed and Permitted Project Features

	Acres	Permitted	Proposed
Power plant site	640		x
Gas-fired power plant footprint	100	x	
Coal-fired power plant footprint	475		x
Water pipeline permanent ROW (30 feet wide)*	45	x	
Water pipeline construction ROW (60 feet wide)*	90	x	
Access road permanent ROW (50 feet wide)*	138	x	
Rail line permanent ROW (100 feet wide)*	356		x
Rail line construction ROW (200 feet wide)*	698		x

SOURCE: Bureau of Land Management 2003a
NOTES: Acreages are approximate and ROW widths may vary due to terrain
*Acre count excludes 640-acre plant site
ROW = right-of-way

1.4 BACKGROUND

The population of the western United States grew by nearly 20 percent between 1990 and 2000. Nevada outpaced every state in the nation during that period, with a 66 percent increase in population. Las Vegas grew by 83 percent, becoming the fastest growing metropolitan area in the United States (Perry and Mackun 2001). A consequence of this growth is the rapidly rising demand for electricity in the region. A new state-of-the-art coal-fired plant would limit pollution and respond to that need.

The Western Electricity Coordinating Council (WECC) 2005 Ten-Year Coordinated Plan Summary forecasts that projected demand in the Arizona, New Mexico, and southern Nevada subregion would require 6,340 MW of additional power generation sometime between 2005 and 2012, a period during which the Proposed Action Alternative would be ready to enter into service. According to Toquop Energy, the project would be capable of contributing approximately 11 percent of the projected demand for new generation. WECC data indicate that Las Vegas, Arizona, New Mexico, and southern Nevada currently rely on energy imported from out-of-state in order to meet the demands of growing populations. The Proposed Action Alternative would significantly strengthen the reliability of the electric grid in the Las Vegas area by reducing the need for imported energy over the existing transmission system. Toquop Energy's overall goal is to generate electrical power at competitive prices to meet projected power needs in the region. At this time, natural-gas-fired generation makes up about 37 percent of total generating capacity in the WECC service area, almost double the percent contributed by coal-fired generation (WECC 2005). Many of the region's existing coal-fired generators are 40 or more years old, and may be facing retirement over the next decade. Fuel diversity is needed in the region due to the high cost and volatility of natural gas and the potential for interruptions in the supply of natural gas. United States supplies of coal are currently readily available, and coal can be stored much easier than natural gas. The WECC Ten-Year Coordinated Plan Summary raised concerns about possible natural-gas shortages that might persist for a number of years, as well as concerns about pipeline system capacity. Interruptions in the gas supply could reduce the reliability of the areawide electricity supply (WECC 2005).

The project proponents have determined that the use of coal would increase the predictability and affordability of power, as natural-gas prices have risen substantially between 1999 and 2006 and are expected to remain unstable in the foreseeable future. One advantage of converting to coal-fired generation is that the United States has ample coal reserves. Furthermore, coal can be stored on site, protecting against potential disruptions in the fuel supply. Technological innovations make coal a feasible and cost-effective alternative. Hybrid cooling and state-of-the-art pollution-control devices reduce water usage and bring emissions closer to that of gas-fired power generation (BLM 2003a). The plant capacity would be reduced from the originally proposed 1,100 MW, as described in the original project, to 750 MW in this project to partially reduce emissions that would occur with coal- versus gas-fired power generation.

1.5 OVERVIEW OF THE NEPA PROCESS

The EIS evaluates the potential environmental effects of the Proposed Action Alternative and identifies appropriate mitigation measures. The BLM is guiding this effort as lead Federal agency under the authority of the National Environmental Policy Act of 1969 (NEPA) process, assisted by the Nevada Department of Wildlife and the U.S. Surface Transportation Board, which are participating as cooperating agencies. The EIS is being prepared in accordance with the Federal Land Policy and Management Act of 1976, NEPA, Council of Environmental Quality regulations implementing NEPA (Title 40, Code of Federal Regulations, Sections 1500–1508 [40 CFR 1500–1508]), U.S. Surface Transportation Board, Executive Order 13212, May 18, 2001[1], and other relevant regulations.

BLM is required to perform the following tasks as part of the NEPA process:

- Identify issues
- Collect relevant data and information
- Assess project-related impacts, identify alternatives to the action proposed, and define mitigation measures
- Complete a Draft EIS
- Offer the Draft EIS for public review
- Prepare a Final EIS
- Issue a Record of Decision

The first step in this process for the Proposed Action Alternative was to invite the participation of agencies and the general public to help identify project-related issues. Although scoping took place for the original 2003 project, it was necessary to initiate a new effort to define the extent of analyses appropriate to this revised project. A summary of public outreach efforts, including public meetings, is presented in Chapter 5. A summary of all scoping activities and the comments received about the project are documented in the Scoping Summary Report, available on the project Web site (http://www.blm.gov/eis/nv/toquop/) or from the BLM Ely Field Office. Section 1.5 below summarizes the issues raised by the scoping process and indicates where each issue is addressed in the EIS.

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[1] "The increased production and transmission of energy in a safe and environmentally sound manner is essential to the well-being of the American people … agencies shall take appropriate actions, to the extent consistent with applicable law, to expedite projects that will increase the production, transmission, or conservation of energy." (Federal Register, Vol. 66, No. 99, 28357).

Much of the information used to develop the baseline resource inventory for the analysis was compiled from existing data on file at the BLM Ely Field Office, and information was also collected from other sources, including government agencies and academic institutions. The 2003 EIS for the original project provided information still relevant to the current project. The 2003 EIS also incorporated information from published and unpublished reports, maps, and digital data for use in a geographic information system format.

Chapter 3 describes the existing conditions in the project area, as related to the following resource categories:

- Lands
- Livestock grazing and rangeland
- Recreation and access
- Wilderness and special management areas
- Visual resources
- Climate and air quality
- Noise
- Geology, soils, and minerals
- Groundwater resources
- Surface water resources
- Biological resources (including vegetation, wildlife, special status species)
- Wild horses and burros
- Archaeology and historic preservation
- Public health and safety, hazardous materials, and waste
- Paleontological resources
- Social and economic conditions
- Environmental justice

During the scoping and data collection processes for this EIS, BLM consulted with the U.S. Fish and Wildlife Service to achieve compliance and consistency with Section 7 of the Endangered Species Act. Additionally, consultation with the Nevada State Historic Preservation Office, in order to assure compliance with Section 106 of the National Historic Preservation Act), would be necessary to assure that these processes are completed in conjunction with the EIS.

Chapter 4 summarizes all potential project-related impacts that have been identified and analyzed in this Draft EIS. The impact analysis also identifies and considers measures that could be undertaken to mitigate impacts.

The release to the public of this Draft EIS coincides with the initiation of a 60-day public review period. Public meetings would be held during this period to solicit comments from agencies and the public regarding the findings of the Draft EIS. After completing a thorough review of comments received during this period, BLM would prepare responses to each comment and incorporate consideration of all comments into the Final EIS.

1.6 ISSUES ADDRESSED IN THE EIS

In March 2006 public scoping meetings were held in four different communities to introduce the public to the project and allow them to identify issues they believe should be addressed in the EIS. A total of 113 people attended the meetings, and many of them presented comments. Additional comments were received through letters, electronic mail messages, and the project Web site. The scoping process and the issues identified through that process are discussed in detail in Chapter 5 and in the June 2006 Scoping Summary Report, available on the project Web site. Table 1-2 lists the key issues and questions that were raised through scoping and indicates the sections where the issues are addressed in this EIS.

Table 1-2
Summary of Issues from Scoping Report

Issue or Question	Response, or Section(s) of the Environmental Impact Statement (EIS) Where Issue Is Addressed
Project Description	
Identify the source of the coal that would be used and any associated issues.	Section 2.3
Evaluate alternative fuels for the plant, including renewable sources.	Section 2.4
What new transmission lines would be required?	Section 2.3
Has this type of technology been constructed elsewhere before?	Yes
Project Purpose and Need	
Who would be the customers for this power?	Sections 1.2 and 1.3
Consider the need for this plant given there are other new generation projects under way.	Section 1.3
Is there enough transmission capacity to handle the power from this project?	Yes. The proposed interconnection is addressed in Section 2.3.2.1.
Project Alternatives	
Can this plant be an integrated gasification combined-cycle plant with carbon-capture storage technology?	Section 2.4
The No-Action Alternative should be considered.	Chapters 2 and 4
Why was this site selected rather than a site closer to the rail line and further from populations?	Section 2.3
Can Toquop Energy purchase power from renewable sources or integrate some renewable generation on site?	Although this is not a part of the project as proposed, Toquop Energy has indicated that they would be open to considering these options.
Consider alternatives to mercury-emission-control technologies; alternative sites and transportation methods for transport of plant materials or byproducts; and alternative coal-haul routes.	Chapters 2 and 4
Air Quality	
As plant components age, would pollution increase?	Yes, but an air permit would be required, which would set emission limits.
How would this plant contribute to visual impairment in Class I and other areas?	Appendix D
Consider the contribution of mercury and other emissions to health problems such as asthma and cancer.	Discussion of health-protective air-quality standards are in Section 4.7.
How much will emissions contribute to global warming?	Appendix D

Issue or Question	Response, or Section(s) of the Environmental Impact Statement (EIS) Where Issue Is Addressed
Where is downwind? Where would the effects of plant emissions be?	Section 3.7.2.1
What air-pollution-control technologies would be used at plant and how effective are they?	Appendix D
Air-quality modeling should occur, including baseline, projected, and during operation, following U.S. Environmental Protection Agency guidelines.	Modeling has occurred, and a Prevention of Significant Deterioration application has been submitted. Also see Section 4.18.3.6.
Would coal washing be used to control various emissions?	No
During the life of the project, how much total mercury will be emitted into the air and water systems?	Appendix D
Water Resources	
Consider the impacts of groundwater withdrawal on springs, in-stream flows, and riparian habitats.	Section 4.10
Address impacts of groundwater pumping and withdrawal in the Colorado River flow system areas.	Section 4.10
Consider the frequency, extent, and duration of flooding that would occur as a result of surface runoff and the effects on discharge to groundwater.	Section 4.11
Consider the amount and effects of discharged wastewater during construction and operation.	Section 4.11
Biological Resources	
Consider construction impacts regarding habitat disturbance, noise, encroachment of invasive species, and stormwater runoff.	Section 4.12
Evaluate the impacts from air emissions, particularly mercury and heavy metals, in vegetation, water, and wildlife.	Section 4.12
Would tall facilities (cooling towers, stacks) impact birds, and how would bird strikes be minimized?	Section 4.12.2.1
Evaluate impacts from construction and presence of the rail line related to habitat fragmentation and disruption of the wildlife movement corridor.	Section 4.12
The proposed rail line is in desert tortoise area. What would be the impacts on the species?	Section 4.12
How would birds and other wildlife be prevented from using the evaporation ponds?	Section 4.12 (Note that evaporation ponds are only a component of the No-Action Alternative.)
Evaluate the effects on riparian species due to degradation of air quality.	Section 4.12
What would be done to minimize the spread of noxious weeds?	Section 4.12
Would the construction and the presence of power lines increase the population of ravens, which are predators of the desert tortoise?	No additional power lines would be developed under any of the alternatives considered in this EIS.
Evaluate water depletion and effects on animal species and water-dependent species.	Sections 4.10 and 4.12
Archaeology and Historic Preservation	
Would the proposed rail line corridor impact cultural resources?	Section 4.14
Consider traditional and historic land-use patterns.	Section 3.14
Identify traditional cultural places.	Section 3.14
Visual Resources	
Analyze effects of project components on dark-sky night attributes.	Section 4.6

Issue or Question	Response, or Section(s) of the Environmental Impact Statement (EIS) Where Issue Is Addressed
Analyze presence of haze in special designations including Wilderness areas and national monuments, among others.	Section 4.6
Noise	
Evaluate noise pollution from the railroad.	Section 4.8
Consider average projected peak-noise levels from plant and steam blowing at fence line.	Section 4.8
Land Use and Transportation	
Would maintenance and access roads be closed to the public or provide all-terrain vehicle and other vehicle access?	Existing roads into the power plant would be closed to public; steel barriers would provide controlled access.
What new proposed roadways or routes would be established?	Section 2.2
What are grazing allotments and public-land health assessments in areas where the project site is located?	Section 3.3
How would this project increase rail traffic on the proposed rail line and other railroads to which it is linked?	Section 2.3
Consider the number of daily train and truck trips and the impacts of those trips.	Section 4.4
Consider project impacts on specially designated areas.	Section 4.5
Underpasses and/or overpasses may be needed to prevent disruptions to access during train trips.	Existing access roads would be maintained.
Recreation	
Consider project impacts on local and regional recreation from new project facilities, potentially increased access, and regional haze.	Section 4.4
Consider recently increased demand for recreation due to Lincoln County legislation and recent and foreseeable development.	Sections 4.4 and 4.18
Hazardous Materials and Safety	
Identify safety and emergency-response plans regarding transportation and storage of hazardous materials and project waste.	Section 4.15
Evaluate whether the coal traffic-and-transport system would result in increased fire hazard.	Section 4.15
Storage and disposal of project waste is a safety concern.	Section 4.15
Would toxic materials be hauled on the railroad?	Coal would be hauled on the rail line.
Evaluate whether the spread of noxious weeds would increase fire hazard.	Section 4.12
Socioeconomics	
Consider impacts on Mesquite from increased traffic and people.	Sections 4.4 and 4.17
Consider whether Mesquite would experience the most adverse impacts in order to provide regional benefit.	Sections 4.16, 4.17 and 4.18 (and other Chapter 4 sections, as appropriate)
What are economic benefits to Mesquite?	Section 4.16
How would Mesquite handle housing, medical, and other infrastructure needs during worker influx?	Section 4.16
Will this project disproportionately affect minority or low-income populations?	Section 4.17
Would local agencies be assisted in providing services to accommodate influx of population associated with this project?	Section 4.17
Government-to-Government and Agency Consultation	
Consult with the American Indian tribes claiming affinity with the area.	Chapter 5

Issue or Question	Response, or Section(s) of the Environmental Impact Statement (EIS) Where Issue Is Addressed
Cumulative Effects	
Consider impacts of other proposed coal-fired plants in the western United States on natural resources.	Section 4.18
Consider cumulative impacts on global warming from various sources.	Section 4.18 and Appendix D
Consider cumulative air-pollution impacts from various sources, existing and foreseeable, including those resulting from future growth and development.	Section 4.18
Consider cumulative impacts on water resources, including other industrial and development projects.	Section 4.18
Would this project limit development of future major stationary sources?	Section 4.18
Consider cumulative visual impacts on special designations (national parks and monuments).	Section 4.18

1.7 RELATIONSHIP TO APPLICABLE LAWS, POLICIES, PLANS, AND PROGRAMS

BLM is responsible for managing public lands in accordance with all applicable laws, including Federal Land Policy and Management Act of 1976 and NEPA. The agency is therefore reviewing the development plans for the Toquop Energy Project to assure that adequate protection is provided against unnecessary degradation of public land resources and that the project complies with all applicable state and Federal laws.

Approved land use plans in adjacent BLM administrative units were reviewed for changes since the issuance of the 2003 EIS, and include the Las Vegas Resource Management Plan, the Arizona Strip Field Office Resource Management Plan, the Virgin River Management Framework Plan, and the Nellis Air Force Base Range Resource Plan. Plans from other jurisdictions—including Lincoln County, Clark County, State of Nevada, and local jurisdictions such as the City of Mesquite—were reviewed as part of data-collection efforts.

Table 1-3 below lists the laws, regulations, and Executive Orders that may apply to the Toquop Energy Project Proposed Action Alternative.

Table 1-3
Laws, Regulations, Executive Orders, Permits, and Approvals That May Apply to the Proposed Action Alternative of the Toquop Energy Project

National Environmental Policy Act of 1969 (NEPA) 42 U.S.C. 4321 et seq.
Council on Environmental Quality general regulations implementing NEPA (40 Code of Federal Regulations [CFR] Parts 1500-1508)
Department of the Interior's implementing procedures and proposed revisions (August 28, 2000, Federal Register)
National Historic Preservation Act of 1966 (NHPA) and regulations implementing NHPA 16 United States Code (U.S.C.) 470 et seq.
Antiquities Act of 1906 16 U.S.C. 431 et seq.
Archaeological Resources Protection Act of 1979, as amended 16 U.S.C. 470aa et seq.
Native American Graves Protection and Repatriation Act of 1990
Clean Air Act of 1990 42 U.S.C. 7401 et seq.
Clean Water Act of 1987 33 U.S.C. 1251 et seq.

Disposition: Sales 43 CFR 2700
Endangered Species Act of 197316 U.S.C. 1531 et seq.
Nevada Division of Forestry Critically Endangered Flora Law (Nevada Revised Statutes [NRS] 5.27-5.33)
Noise Control Act of 1972, as amended 42 U.S.C. 4901 et seq.
Occupational Safety and Health Act 29 U.S.C. 651 et seq. (1970)
Mineral Leasing Act of 1920
Pollution Prevention Act of 1990 42 U.S.C. 13101 et seq.
Safe Drinking Water Act 42 U.S.C. s/s 300f et seq. (1974)
Migratory Bird Treaty Act of 1918 (Migratory Bird Guidance) 16 U.S.C. 703–711 Executive Order January 1, 2001
Executive Order 11512, NEPA, Protection and Enhancement of Environmental Quality
Executive Order 11593, National Historic Preservation
Executive Order 11988, Floodplain Management
Executive Order 11990, Protection of Wetlands
Executive Order 12088, Federal Compliance with Pollution Control Standards
Executive Order 12898, Environmental Justice
Executive Order 13007, Indian Sacred Sites
American Indian Religious Freedom Act of 1978 (42 U.S.C. 1996)
Memorandum on Government-to-Government Relations with Native American Tribal Governments of 1994
Indian Self-Determination and Educational Assistance Act of 1975, Title I
Indian Self-Determination and Educational Assistance Act of 1994, Title IV
Departmental Responsibilities for Indian Trust Resources, 512 DM 2.1
Sacred Sites, 512 DM 3
Executive Order 13175, Consultation and Coordination with Indian Tribal Governments
Executive Order 13112, Invasive Species
Secretarial Order 3206 (June 5, 1997), Responsibilities, and the Endangered Species Act
Federal Land Policy and Management Act of 1976 (FLPMA) 43 U.S.C. 1701 et seq.
Bureau of Land Management (BLM) right-of-way (ROW) regulations 43 CFR 2800
Federal Permits and Approvals
BLM NEPA Record of Decision for Proposed Action
BLM ROW for electric power generating plant, electric transmission lines and substations, well field and water pipeline, electric distribution line, access roads, railroad spur, and other ancillary approvals
Fish and Wildlife Service, Endangered Species Act Section 7 Consultation and Biological Opinion
Environmental Protection Agency (EPA) (delegated to Title V Authority, Nevada Division of Environmental protection), Acid Rain (Title IV Clean Air Act [CAA]) Permit
EPA, Region IX, Title V (CAA) Operating Permit
EPA, Section 402 National Pollutant Discharge Elimination System Notification for Stormwater Management during Construction
EPA, Section 402 National Pollutant Discharge Elimination System Notification for Stormwater Management during Operation
Army Corps of Engineers, Section 404 Excavation or Discharge of Fill Material into Waters of the U.S., Including Wetlands
State of Nevada Permits and Approvals
Nevada State Historic Preservation Office, Section 106 review and concurrence, per NHPA for BLM lands, per protocol between BLM and Nevada State Historic Preservation Office

Nevada Department of Wildlife Project Review, Wildlife and Habitat Consultation for Disturbance on BLM-Administered Land
Nevada Division of Environmental Protection, Bureau of Water Pollution Control, Temporary Discharge Permit
Nevada Public Utilities Commission Utility EPA Permit
Nevada Division of Environmental Protection, Section 401 Water Quality Certification
Nevada Department of Water Resources, State Engineer, Water Right Permit
Nevada Department of Environmental Quality, Prevention of Significant Deterioration Program Major Source Permit
Nevada Department of Environmental Quality, Dust Control Permit
Nevada Division of Environmental Protection, Bureau of Water Pollution Control, Ground Water Discharge Permit
Nevada Department of Wildlife, Industrial Artificial Pond Permit
Nevada Department of Transportation, Encroachment Permit
Lincoln and Clark County Permits and Approvals
County Master Plan Amendment, Zone Change, and Special Use Permit
Grading permits

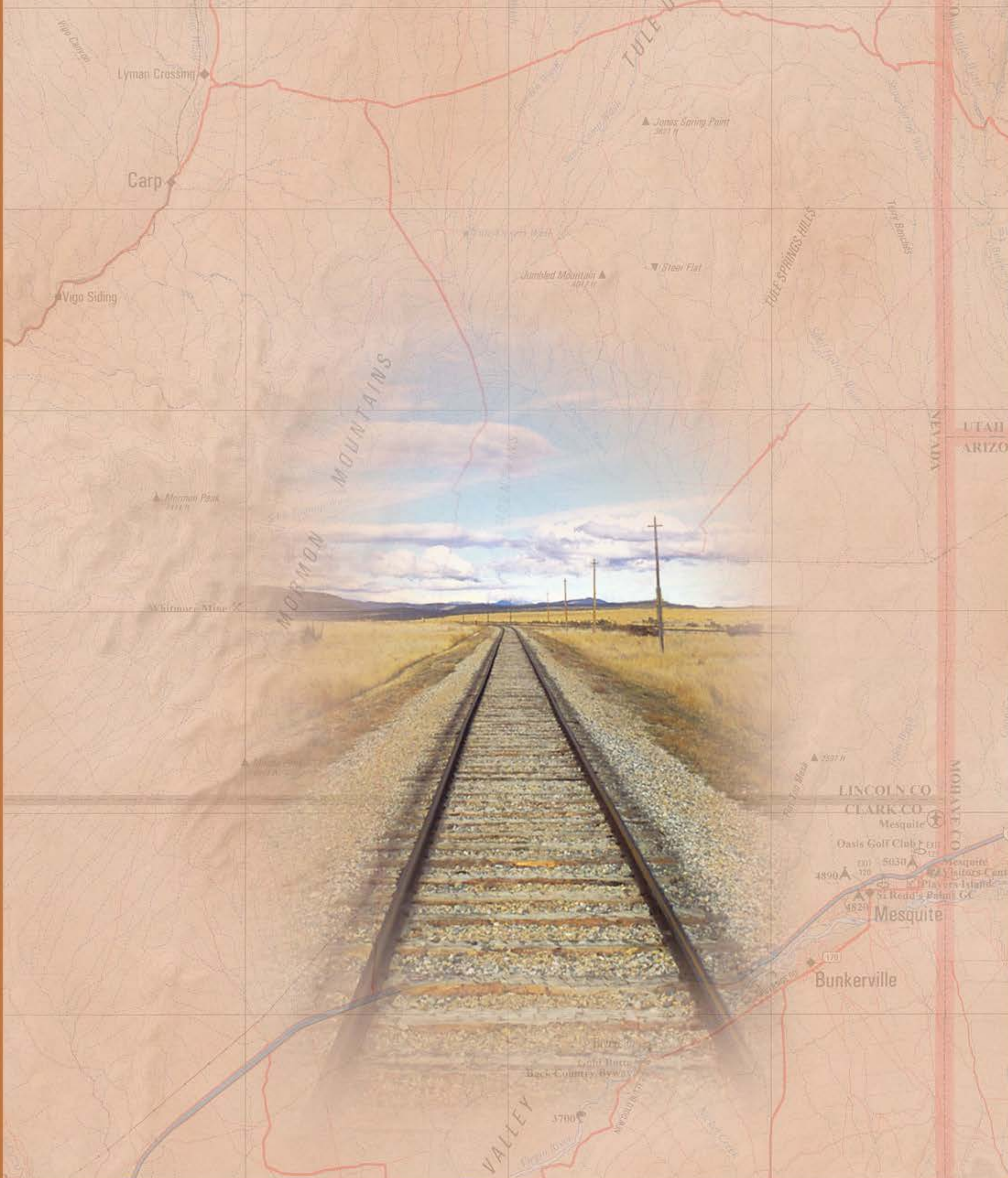
1.8 PROJECTS CONSIDERED FOR CUMULATIVE ANALYSIS

Council on Environmental Quality guidelines for the preparation of EISs require that cumulative impacts be addressed in addition to direct and indirect impacts. Cumulative impacts are those incremental impacts that would result from the effects of the Proposed Action Alternative when added to the effects of other past, present, and reasonably foreseeable projects. BLM recognizes the need for a thorough analysis of potential cumulative effects, not only from power plant siting activities, but from other development activities as well. This section identifies large projects whose cumulative impacts may extend across a broad range of the resource categories being assessed in this document. Each project has been evaluated to determine if it is sufficiently defined (reasonably foreseeable) to be (1) relevant to potential impacts, (2) within the project area of influence, and (3) of a magnitude that potentially could result in a cumulative impact. Descriptions and cumulative effects, if any, of the projects listed below are presented in Section 4.18*,* Cumulative Impacts, of Chapter 4, Environmental Consequences, together with any other projects not listed here whose effects would be very resource-specific. The projects considered in the cumulative impacts analysis are the following:

- Southwest Intertie Project
- Reid Gardner Station
- Chuck Lenzie Generating Station
- Kern River Gas Transmission Company Expansion Pipeline
- Holly Energy Partners
- White Pine Energy
- Ely Energy Center Project
- Ash Grove Cement Plant
- Mesquite Airport
- Exit 109 Interchange
- Proposed Meadow Valley Wash Area of Critical Environmental Concern
- Yucca Mountain Rail
- Kane Springs Valley Water Development Project
- Tule Desert – Clover Water Development
- Silverhawk Intermountain Project
- Apex Power Plant
- Virgin and Muddy Rivers Development Project
- Southern Nevada Water Authority, Vidler Water Company Inc., Lincoln County Water District, and Coyote Springs Water Development projects
- Riverside Planned Unit Development
- Coyote Springs Development

TOQUOP

ENERGY PROJECT



CHAPTER 2.0 - ALTERNATIVES INCLUDING THE PROPOSED ACTION ALTERNATIVE

2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION ALTERNATIVE

2.1 INTRODUCTION

This chapter describes the two alternatives analyzed in this Environmental Impact Statement (EIS). Section 2.4 describes alternatives that were considered but eliminated from detailed analysis and briefly explains why they were eliminated. The alternatives that are analyzed in Chapter 4 are described below.

2.2 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, a 1,100-megawatt (MW) natural-gas-fired power plant would be constructed and operated on a site in Lincoln County, Nevada, as permitted in the 2003 EIS (Bureau of Land Management [BLM] 2003a). Ancillary facilities would include a 14.4-mile-long access road and a water-supply system including a well field and 12.5-mile-long water pipeline (refer to Map 1-1).

2.2.1 BLM Actions

Under the No-Action Alternative, no additional decision or action would be required by BLM beyond those set forth in the September 2003 Record of Decision for the Toquop Energy Project rights-of-way (ROWs) (BLM 2003b). Table 2-1 summarizes the ROWs that have been granted.

Table 2-1
Rights-of-Way Granted in the 2003 Record of Decision (No-Action Alternative)

Right-of-Way Serial Number	Description	Permanent Rights-of-Way	Temporary Use Permit
N-77484	1,100-MW natural-gas-fired power plant	80 acres	
N-77484-01 N-77484-02 N-77484-03	Access road from the main access road to power plant Overhead transmission line connecting power plant to Navajo-McCullogh transmission line 20-inch-diameter gas pipeline connecting power plant to Kern River pipeline	20 acres (400 feet wide, 2,178 feet long)	
N-77485	Access road from Interstate 15 to power plant site	87 acres (50 feet wide, 76,032 feet long)	40 feet wide (20 feet to each side of permanent right-of-way) and two 10-acre storage sites
N-77486 N-77486-01	Underground electric power line from power plant to well field Buried 24-inch-diameter water pipeline from well field to power plant	45 acres (30 feet wide, 66,000 feet long)	30 feet wide (15 feet to each side of permanent right-of-way) and two 3-acre storage sites

SOURCE: Bureau of Land Management 2003b
NOTES: MW = megawatt

2.2.2 Project Components

The components of the No-Action Alternative include facilities and actions as described in the sections below.

2.2.2.1 Power Plant and Associated Facilities

The 640-acre site for the proposed power plant is located in southeast Lincoln County, Nevada; Township 11 South, Range 69 East, Section 36. Under the No-Action Alternative, the 640-acre site, on which the natural-gas-fired power plant would be constructed, would be disposed of through sale. The BLM subsequently would turn over the ownership of the 640-acre power plant site to Toquop Energy Company, LLC (Toquop Energy). Although the land sale was not carried through to completion, BLM did issue the ROWs for the gas-fired plant site and associated access road, power lines, water pipeline, and gas pipeline (refer to Map 1-1).

The plant would use a combined-cycle technology to generate electricity, which would be transmitted to the existing Navajo-McCullough electric transmission line that passes through the southeastern corner of the site. The power plant, switchyard, equalization and evaporation ponds, and associated facilities would cover about 100 acres on the site and would be enclosed within an 8-foot-high chain-link fence, incorporating tortoise fencing to exclude the desert tortoise from the plant site. BLM would issue ROWs for the construction and operation of the power plant and all related facilities. The No-Action Alternative power plant employs combined-cycle technology, which would use four combustion-turbine generators in series with four heat-recovery steam generators and four steam-turbine engines. Exhaust gas would pass through a series of emissions-control systems and would be vented through an elevated exhaust stack that would be 180 feet high. A 5-acre uncovered equalization pond would be constructed onsite to keep the water chemistry balanced for use in the cooling system and a 20-acre evaporation pond also would be constructed to handle the wastewater disposal (BLM 2003a).

The power generation operations would be fueled by natural gas arriving to the site via the 36-inch-diameter Kern River Gas Transmission Company pipeline, which currently passes through the southeastern corner of the site. A tap, meter station, and connective pipeline would be constructed and connected to the existing gas line to provide natural gas to the site.

A new well field and new water pipeline would be developed in the Tule Desert hydrologic basin to supply groundwater for use in an evaporative wet-cooling tower system. Facilities would include 15 wells, each approximately 1,000 to 1,500 feet deep; a manifold system to connect the output from these wells to a single buried pipeline 24 inches in diameter; an extension of this buried pipeline and buried electrical distribution lines to the plant site; and a storage tank with a capacity of approximately 500,000 gallons. Although the exact location of each well is not yet known, they would be spatially dispersed in the southern third of the Tule Desert (refer to Map 1-1) and would be located as close as possible to one of the several existing dirt roads in the area. It is estimated that, under the No-Action Alternative, the natural-gas-fired power plant could require up to 7,000 acre-feet per year (af/yr) of water. More than 90 percent of this water (approximately 6,300 acre-feet) would be used by an evaporative cooling tower system. The 24-inch-diameter water pipeline would be 12.5 miles long, would be located partially along an existing road, and would require a permanent ROW width of 30 feet. The pipeline would be buried under 36 inches of cover, well below potential streambed scour, erosion, and exposure, and away from potential lateral bank migration. New access roads would be constructed to the wells and storage tank as necessary for use during construction and maintenance activities (BLM 2003a).

About 14.4 miles of an existing dirt-and-gravel road would be upgraded by paving to a width of 24 feet. Some sections would be straightened to facilitate truck access between Interstate 15 (I-15) and the plant site (refer to Map 1-1). The permanent ROW for the access road would encompass 138 acres (50 acres in Clark County and 88 acres in Lincoln County) (BLM 2003a).

2.2.2.2 Construction Activities

Under the No-Action Alternative, construction activities would occur over a period of approximately 26 months. The average construction crew would total about 500 people. Construction activities related to the power plant facilities would be completed within the 640-acre plant site in four phases and would include (1) site clearing and preparation, (2) foundation construction, (3) building and equipment installation, and (4) site cleanup and project startup (BLM 2003a).

The access road that would serve the power plant is currently used to maintain a microwave station, fiber-optic lines, natural gas pipelines, and electric transmission lines located on the southern end of the East Mormon Mountains. Construction activities would increase the traffic along this road. Various types of diesel-powered construction equipment, such as bulldozers and dump trucks, would be used for approximately 120 days each as summarized in Table 2-2.

Table 2-2
Land in Clark and Lincoln Counties Affected by the Access Road

	Clark County (acres)	Lincoln County (acres)	Total (acres)
Construction ROW for access road	89	157	246
Existing access road	10	20	30
Net new construction ROW disturbance	79[a]	137[b]	216
Staging areas	0	20[a]	20
Long-term ROW for access road	50	88	138
Net new permanent disturbance within long-term ROW[c]	23	42	65

SOURCE: Bureau of Land Management 2003a
NOTES: ROW = right-of-way
[a] All within the Mormon Mesa Area of Critical Environmental Concern (ACEC)
[b] 123 acres within the Mormon Mesa ACEC
[c] Except for these acres, all other lands disturbed as a result of project activities in the construction ROW, permanent ROW, and staging areas would be reclaimed.

Temporary ROWs for construction access and staging areas would be required along the access roads and water pipelines and within the well field. The construction ROW for the 14.4-mile-long access road to the power plant site would vary in width because of terrain and would occupy 246 acres. The current access road in this location occupies about 30 acres, and the net increase in disturbance due to construction activities therefore would be about 216 acres. Staging areas for road construction would require an additional 20 acres in Lincoln County. The staging areas and temporary road construction ROWs would be reclaimed after construction, in accordance with restoration plan requirements of the appropriate BLM field office.

ROW area requirements for each of the proposed wells would be a maximum of 1 acre per well. Approximately 0.33-acre would be used for a new 300-foot-long well access road and pipeline, with a construction ROW that would be 60 feet wide. The other 0.66-acre would be for construction activities at each well site. A 500,000-gallon water-storage tank would be required to maintain flow and pressure to the plant. The maximum disturbed area for the water-storage tank also would be 1 acre. The water pipelines would require a temporary construction ROW of 60 feet in width to allow for soil disturbance during pipeline trenching, laying, and backfilling operations and the laying of electrical lines to the well field. Staging areas would include 3 acres near the northern end of the pipeline, 3 acres midway along the pipeline east of Toquop Gap, and 3 acres at the plant site. All areas temporarily disturbed by construction in the ROWs and staging areas would be reclaimed (BLM 2003a).

2.2.2.3 Operation and Maintenance

Under the No-Action Alternative, permanent water rights to supply up to 7,000 af/yr of water would be required. These water rights were included in a joint application by Vidler Water Company Inc. and Lincoln County that was submitted to the Nevada State Engineer. In Ruling 5181, the State Engineer granted the right to use 2,100 af/yr to Vidler Water Company Inc. and Lincoln County. A request for the required additional 4,900 acre-feet water rights was included in a second application, by the same proponents, which is being held for action pending results of additional hydrologic studies requested by the State Engineer. Most of the water for the power plant would be used in the evaporative cooling system (90 percent, or 3,800 gallons per minute under annual average design operating conditions). The remaining water would be filtered, as necessary, to provide service water, potable water, and water for the demineralized water-treatment system. That system would supply the high-purity water needs of the heat-recovery steam generators.

Permanent employees at the plant site would total 25. These employees would travel to the site along the improved access road from I-15.

Occasional maintenance and monitoring of production wells would occur, requiring travel over the access roads to reach the wells. Maintenance of the water pipeline would require periodic inspection of the entire route, and include routine exercising of all valves in the system. It is anticipated that this activity could be supported using low-impact all-terrain vehicles.

2.2.2.4 Decommissioning

The gas-fired power plant would have a life expectancy of 42 years, including construction. At the end of its useful life, the plant would be decommissioned, and all structures and equipment at the site would be dismantled and removed. The onsite evaporation and equalization ponds would be excavated of sediment. The excavated material would be tested and disposed of at an approved offsite disposal facility in accordance with Federal, state, and local regulations. All pond liners would be removed and the land surface would be reclaimed. The water pipeline and electric distribution line would be closed and left in place. All wells would be decommissioned and abandoned in accordance with state regulations. Potential uses of water rights by Lincoln County or Vidler Water Company Inc., after the 42-year project life, would be residential and commercial development. Hazardous materials, byproducts, and chemicals would be disposed at the time of decommissioning according to Federal, state, and local regulations.

2.3 PROPOSED ACTION ALTERNATIVE

Toquop Energy proposes to construct, operate, and maintain a 750-MW coal-fired power plant and associated facilities. Toquop Energy also would construct and maintain a new rail line to transport the coal to the power plant, although it is unclear at this time who would operate the rail line. This section summarizes the Proposed Action Alternative, highlighting how that alternative differs from the No-Action Alternative. Additional information on the Proposed Action Alternative is provided in Appendix A.

2.3.1 BLM Actions

Because ROWs have already been granted for the original project (i.e., Proposed Action Alternative in the 2003 EIS) and, therefore, the Proposed Action Alternative in this EIS, BLM approval has been requested for an additional ROW for the rail line and to amend the power plant site ROW. A 100-acre ROW was originally granted for the gas-fired plant; however, an amendment to the ROW is needed to accommodate the proposed 475-acre coal-fired plant. The permitted and requested ROW are summarized in Table 2-3. As part of the Proposed Action Alternative, BLM would dispose (by sale) of the 640-acre parcel that the power plant would occupy.

2.3.2 Project Components

The components of the Proposed Action Alternative would include the facilities and actions as described in the sections below.

2.3.2.1 Description of Facilities

Project facilities would include a single 750-MW generation unit and plant-cooling system, a 31-mile-long rail line to transport coal to the plant, coal-storage facilities, a water-supply system (including a well field and a 12.5-mile-long water pipeline), waste-management operation facilities, and a power-transmission interconnection to an existing power-transmission line that passes through the southeast portion of the project area (Map 2-1). The water-supply system, power-interconnection facilities, and improvements to the access road from I-15 to the site would be the same as those described in the No-Action Alternative. All materials used in roadway improvements and other associated project construction, such as gravel, sand, and ballast would be transported to the site from existing sources. No new excavations or pits would result from the project.

Within the same 640-acre site as described in the No-Action Alternative, the power plant block would occupy 261 acres, ash disposal would occupy 150 acres, and topsoil-storage areas would occupy 64 acres, with the remaining 165 acres left undisturbed.

Administration Building and Control Center

The administration building and control center for each generating unit would be a multi-use facility consisting of administrative offices, training and conference facilities, technical libraries, operations offices, and locker rooms for operations personnel.

Turbine Hall

The turbine hall would contain the primary steam-turbine driver and the electric-power generator. This elevated building would also contain all of the necessary equipment (e.g., gantry cranes) to properly maintain rotating equipment and piping systems on this deck.

Supercritical Boiler

A supercritical boiler is a modern, high-efficiency steam generator that provides the driving energy for the turbine generator. The boiler would allow the facility to have an operating efficiency ranging between 37 and 41 percent. The major equipment in the boiler system would include coal-storage bunkers, pulverizers, primary-air fans, an economizer, and a selective catalytic reduction unit.

Turbine Generator and Associated Systems

The steam turbine would be the mechanical driver for the generator. The turbine and condenser would receive the steam from the boiler and convert the energy to rotational energy, driving the generator and then converting that energy to electricity. The turbine generator would be equipped with lubrication, cooling, and protection systems to assure the reliability of the equipment and safety of the employees.

Air-Emission-Control Equipment and Facilities

State-of-the-art emission controls would be used to minimize potential air pollutants. Air-pollution controls for the pulverized coal-fired boilers would consist of the following:

- Low-nitrogen-oxide (NO_x) burners and selective catalytic reduction to control NO_x emissions
- Low-sulfur coal and wet-flue gas desulfurization (FGD) to control sulfur dioxide (SO_2) emissions
- Wet FGD and a wet stack to control acid-gas emissions, including sulfuric-acid (H_2SO_4) mist
- Wet FGD to control mercury emissions
- Activated carbon and hydrated quicklime injection, installed before the fabric-filter baghouse, if needed for additional reductions, with secondary reductions in SO_2 emissions and H_2SO_4 mist
- A fabric filter to control particulate emissions
- High-efficiency combustion to control carbon monoxide and volatile organic compound emissions

Figure 2-1 is a flow diagram illustrating the air-emission controls and Table 2-4 is the key to Figure 2-1.

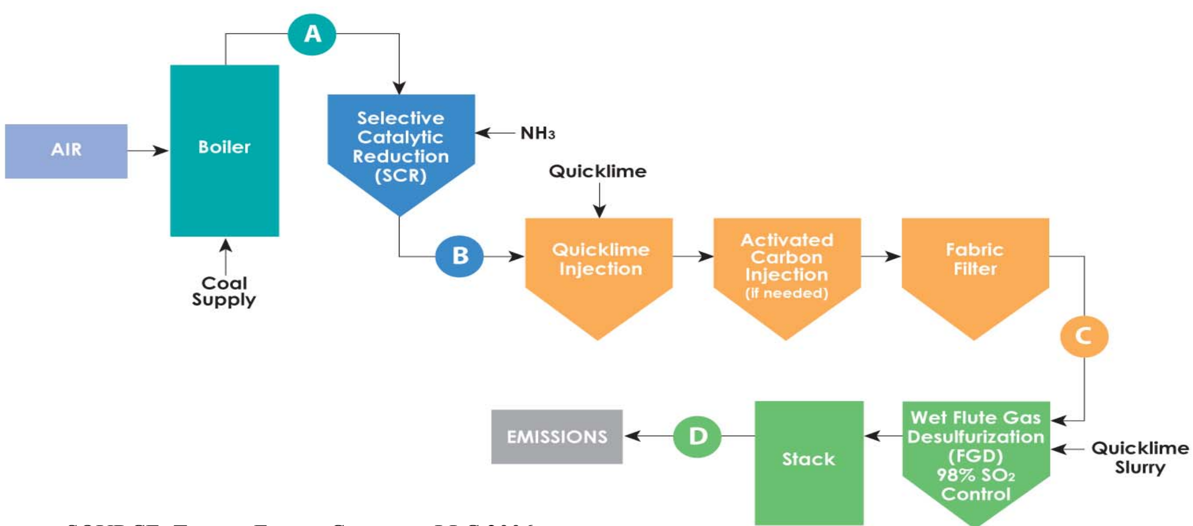
Table 2-3
Rights-of-Way Granted and Proposed for the Proposed Action Alternative

Right-of-Way Serial Number	Description	Permanent Rights-of-Way	Temporary Use Permit
NA (requires amendment to N-77484)	750 MW coal-fired power plant Access road from the main access road to power plant	475 acres	
	Overhead transmission line connecting power plant to Navajo-McCullogh transmission line 20-inch-diameter gas pipeline connecting power plant to Kern River pipeline		
NA (right-of-way has been requested)	Rail line from Union Pacific Railroad at Leith Siding to power plant	356 acres (100 feet wide, about 31 miles long)	200 feet wide (100 feet to each side of the permanent right-of-way)

Right-of-Way Serial Number	Description	Permanent Rights-of-Way	Temporary Use Permit
N-77485	Access road from Interstate 15 to power plant site	87 acres (50 feet wide, 76,032 feet long)	40 feet wide (20 feet to each side of permanent right-of-way) and two 10-acre storage sites
N-77486	Underground electric power line from power plant to well field	45 acres (30 feet wide, 66,000 feet long)	30 feet wide (15 feet to each side of permanent right-of-way) and two 3-acre storage sites
N-77486-01	Buried 24-inch-diameter water pipeline from well field to power plant		

SOURCE: Bureau of Land Management 2003b
NOTES: MW = megawatt, NA = Not applicable

Figure 2-1
Air Emission Controls



SOURCE: Toquop Energy Company, LLC 2006a

Table 2-4
Key to the Air Emission Controls Flowchart

Emissions	A (lb/hr*)	B (lb/hr*)	C (lb/hr*)	D (lb/hr*)
Sulfur dioxide (SO_2)	18,150	17,969	17,969	363
Nitrogen oxides (NO_x)	3,630	363	363	363
Sulfuric acid (H_2SO_4)	58.5	240	24	24
Particulate matter	6,050	6,050	60.5	60.5

SOURCE: Toquop Energy Company, LLC 2006
NOTE: *lb/hr = pounds per hour

Maintenance Shops

Each unit would have a maintenance shop equipped with all of the machinery and equipment required to maintain each unit as well as the other common facilities. These buildings also would contain storage for parts and consumables, as well as offices for the maintenance supervisory staff.

Diesel Generators and Building

The facility would be equipped with standby generators to supply electric power to serve critical loads during periods when station power is unavailable. The fuel source for these engines would be from the fuel-oil-storage tank. A diesel-fuel day-tank with appropriate containment would be located in this building.

Diesel Fire-Water Pumps and Building

The fire-water systems would be charged with pumps driven by diesel engines. The fuel source for these engines would be from the fuel-oil-storage tank. A diesel-fuel day-tank with appropriate containment would be located in this building. Fire water would be drawn from the raw-water-storage tank.

Rail Line

The project includes a 31-mile-long single-track rail line that would extend from the existing Union Pacific Railroad (UPRR) rail line at Leith Siding to the power plant site. In addition, a side-track rail would be constructed at Leith Siding in order to accommodate intersection traffic between trains traveling the existing UPRR line and the proposed rail line to the power plant.

Desert Tortoise Fencing

Permanent tortoise fencing would be constructed, as appropriate, along the proposed rail line's permanent ROW and access road and around the power plant site in those areas where desert tortoise are known to exist. The fence would protect the desert tortoise. By erecting fencing along the rail line, tortoises would be prevented from becoming trapped between track rails.

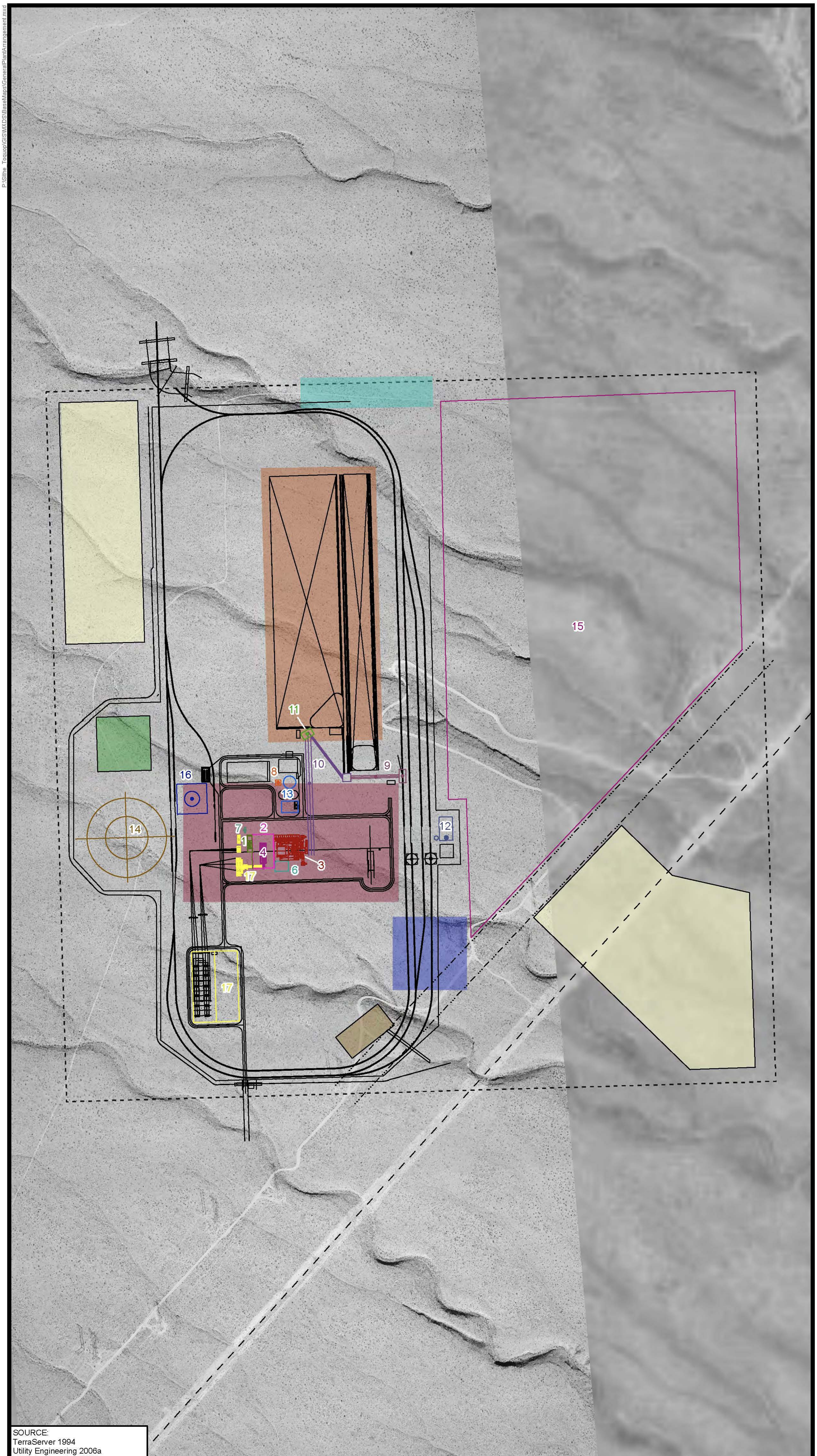
In accordance with current specifications, tortoise fencing would consist of 1-inch-horizontal by 2-inch-vertical mesh. The mesh would extend at least 18 inches above the ground and, where feasible, 6 to 12 inches below the ground. In situations where it is not feasible to bury the fence, the lower 6 to 12 inches of the fence would be bent at a 90-degree angle towards potentially approaching tortoises and covered with cobble or other suitable material to ensure that tortoises or other animals cannot dig underneath and create gaps that allow passage. Along the railroad, tortoise undercrossings would be provided at intervals of not greater than 1 mile. It is anticipated that not more than one or two under-crossings specifically placed for tortoises would be needed to meet this objective, since most of the railroad is located in terrain that would require frequent culverts for drainage purposes that also could be designed to function as tortoise crossings.

Coal-Rail Unloading Station

Powder River Basin coal from Wyoming would be delivered to the plant site by rail on trains containing up to 100 cars. Cars would be unloaded over a rapidly unloading trestle, and coal would be dropped onto a double-ended conveyor in the concrete-lowering well. Coal then would be conveyed to a turning well, where it would be weighed and tested, and then sent to either a passive pile (stacked by the mobile plant) or the active pile (stacked by the linear-rail-mounted stacker/reclaimer).

General Plant Arrangement

Toquop Energy Project EIS
Lincoln County, Nevada



SOURCE:
TerraServer 1994
Utility Engineering 2006a
Utility Engineering 2006b

LEGEND

General Features
- Property Boundary

Plant Features
- 1 – Administration Building and Control Center
- 2 – Turbine Hall
- 3 – Super-Critical Boiler
- 4 – Turbine Generator System
- 6 – Maintenance Shops
- 7 – Diesel Generators and Building
- 8 – Diesel Fire-Water Pumps and Building
- 9 – Coal Rail Unloading Station
- 10 – Coal Conveyor Transfer House
- 11 – Coal Crusher Building
- 12 – Lime Preparation
- 13 – Water Supply and Treatment Systems
- 14 – Dry Cooling Towers
- 15 – Solid Waste Disposal
- 16 – Oil Storage
- 17 – Electrical Switchyard and Main Transformers
- Existing Transmission Line Right-of-Way
- Existing Natural Gas Pipeline
- Other Plant Features

Plant General Areas
- Water Surge Pond
- Coal Handling Facilities
- Onsite Rail Line Loop
- Perimeter Drainage
- Power Plant Block
- Storm Water Basin
- Top Soil Storage

0 250 500 1,000
Feet

Map 2-1

Coal-Conveyor Transfer House

The system would include all equipment necessary to reclaim coal from the lowering-well stack-out area and then crush, weigh, and convey coal to the boiler coal silos, as required. To accomplish the routing, and to minimize the potential dust and hazards associated with transferring to various conveyors, these transfer points would be enclosed and environmentally controlled.

To reduce dust, the coal-transfer systems at the plant site would have filtered-air collection systems and water fogging for the receipt and transport of coal. Three side-enclosed conveyors with fully enclosed transfer points would reduce noise and wind losses that create dust. Onsite passive coal storage would be compacted and covered by earth or treated with a surfactant to prevent emissions and spontaneous combustion. Dust suppression, enclosures, and baghouses would be used, as appropriate, to control emissions from material transfer points and the coal bunkers. All transfer stations would operate under a slight negative pressure with vents routed through a fabric filter in order to achieve a 99 percent particulate-matter-control efficiency. The coal-storage pile would be treated to reduce dust emissions.

Coal-Crusher Building

The coal crusher would be used to reduce coal to less than 6 inches in diameter, which is the size distribution recommended by the pulverizer manufacturer. The crusher would be fed directly by a belt conveyor using a controlled feed rate of coal of up to 2,000 tons per hour. A coal sorter would allow the bypass of any coal less than 1 inch in diameter.

Lime Preparation

Quicklime, used in the FGD process, would be delivered to the facility and stored in unit-specific silos. The lime would be fed into grinding mills that would prepare the lime as a fine powder, which would be mixed into slurry and then be delivered to the FGD vessel.

Water-Supply and Treatment Systems

Water delivered to the site from the Tule Desert well field would be stored in the raw water tank. Water would be drawn from this tank to be treated by reverse-osmosis units and demineralization systems in the water-treatment building and used in the boiler-feed-water and the cooling-water systems. Chemical injection systems also would be contained in this building to maintain the proper water chemistry for these systems. The wastewater streams in the facility would be recirculated and treated in this area as well to minimize the amount of water discharged to the environment and to reduce the amount of water drawn from the local aquifer. The chemicals required for the water-treatment systems would be stored in this building, which would contain appropriate containment systems.

Dry-Cooling Towers

The heat-rejection system used to cool the water in the steam-condensing system would be a closed-loop, water-cooled system using hyperbolic natural-draft-cooling towers. These towers would be equipped with multiple water-to-air heat exchangers designed to minimize the facility's water consumption by 80 percent when compared to a similar plan using traditional wet cooling.

Solid-Waste Disposal

The primary combustion byproducts from the facility would be fly ash and bottom ash derived from the combustion process, and synthetic gypsum derived from the FGD process. Combustion byproducts would be collected from the bottom of the boiler ("bottom ash"), from the flue-gas passages before and at the baghouse ("fly ash"), and from the separation system of the wet FGD ("synthetic gypsum"). These byproducts would each be stored in 10-day silos and made available for resale. When the byproducts cannot be sold to market and exceed plant storage capability, they would be transferred to a pug mill where they would be mixed with wastewater in order to attain an 18- to 21-percent moisture content to limit dust-control issues, and then transferred by conveyor to a byproducts hopper for subsequent disposal at the onsite landfill.

The bottom-ash removal system would convey bottom ash from the boiler as pyrites, which must be ground and then transferred pneumatically to a storage silo. The bottom-ash-storage silo would be equipped with a vent filter and truck-loading nozzle to control emissions of particulate matter with an aerodynamic diameter less than 10 microns (PM_{10}). The fly-ash removal system internally would convey fly ash pneumatically into hoppers and then through air seals to silos equipped with a vent filter and truck-loading nozzle to control PM_{10} emissions. Bottom ash and fly ash are commonly sold into market as aggregate for use in road-bed and sub-bed material, road de-icing products, blasting grit, flowable fill for construction, brick manufacturing, roofing shingles, and concrete filler. The synthetic gypsum is created by spraying hydrated calcium oxide into the flue-gas stream, capturing sulfates and sulfites that would otherwise create H_2SO_4, but that instead create calcium sulfate dihydrate within the wet-FGD absorber. Forced oxidation creates nearly pure synthetic gypsum that must be removed from the reagent tank and dewatered, rinsed, and dewatered again before being transferred to a gypsum-storage silo that is equipped with a vent filter and truck loading nozzle to control PM_{10} emissions. Rinse water is returned to the wet FGD or sent to water treatment for recycling or use as a wetting agent for landfill. Synthetic gypsum products are used in the market as wallboard material and construction adhesives and in the cement and agricultural markets, thereby reducing the amount of natural gypsum that would otherwise be mined for these same purposes.

If it is not cost effective to resell these byproducts for use off site, the materials would be disposed of properly in the onsite landfill. The landfill would be constructed in accordance with all applicable Federal, state and U.S. Environmental Protection Agency laws and regulations

Oil Storage

Oil would be stored in a 50,000-gallon storage tank surrounded by an earthen-berm secondary containment system. Other lubricating oils and solvents would be stored in appropriately designated areas in the maintenance workshop and storage buildings. Oil would be transferred by truck or rail to the diesel-storage tank.

Electrical Switchyard and Main Transformers

The electrical switchyard would be the primary connection point to the transmission grid. The switchyard is designed to provide the proper connections for putting energy into the grid as it is generated or to take power from the grid as required in the facility. The transformers would convert the generated energy to a level that is usable on the transmission grid.

Water-Surge Pond

At times, when the plant is shutting down, some of the water in the boiler is lost. This lost water is collected in the water-surge pond, sent through the water-treatment plant, and then reused. The majority of the time there would be no water in the pond.

2.3.2.2 Construction Activities

Site preparation activities would be carried out in accordance with a grading design, developed by the construction contractor, that responds to the site topography and mitigation requirements. Specific plans or measures proposed for fugitive-dust control, erosion and sedimentation control, site reclamation, stormwater-runoff control, and the protection of natural and cultural resources would be implemented as identified through this National Environmental Policy Act process.

Laydown areas, storage areas, and temporary construction facilities would be located on the 640-acre power plant site. Site laydown areas would be stylized or modified based on specific contours of the site, terrain, entry and exit points, and preventative maintenance and material-storage requirements. A nominal 200-foot-wide temporary ROW would be required for construction activities along the rail corridor. Areas requiring excavation and fill materials may be wider. Appendix A provides additional information on construction activities.

The construction ROWs and staging areas associated with the well field, water pipeline, and the access road would be the same as those evaluated in the 2003 EIS (refer to Section 2.2 of this chapter).

During construction of the rail line, a 200-foot-wide corridor would be used from Leith Siding at the existing UPRR to the Toquop Energy Project plant site. Access to the construction ROW would be from either end of the rail line, and by using existing roads identified on Map 2-2. There would be three areas that would require the installation of bridges or large culverts. Bridges would be needed to cross the Meadow Valley Wash and the Toquop Gap. Additional cut and fill and culverts would be used to span the washes going up from the Meadow Valley Wash Bridge. All construction personnel, equipment, and materials would be restricted to the 200-foot construction ROW and would enter the construction area at either end of the rail line. At this time it is anticipated that the rail construction period would be 24 months.

2.3.2.3 Operation and Maintenance

Power Plant

The project life for the Proposed Action Alternative would be 54 years, comprising 4 years of power plant construction and 50 years of plant operation. Water rights would be exercised at the beginning of plant construction. Operation of the power plant would require up to 3.1 million tons of coal per year. The plant would use natural gas supplied via the Kern River Gas Transmission Company line for the initial startup, and for startups during regular maintenance. Fuel oil would provide a backup source of startup fuel. Except at startup, the power plant would produce its own operating power and would not require nor use external sources of power supply. The coal would be delivered from the Powder River Basin to the plant site via an existing UPRR line and the new rail line. Coal would be blended, crushed, and pulverized to a powder for optimized burning in the boilers. The power plant would use a supercritical pulverized-coal boiler. Use of a "once-through" supercritical steam cycle and other design features would enable this plant to operate with a higher net efficiency than other coal-fired power plants.

Using a Heller system dry-natural-draft-cooling tower would minimize water consumption. A direct-contact jet condenser would be used with the Heller cooling tower system. In this system, the process steam from the steam turbine is fed to the condenser, where it is condensed by direct cooling with the cooling water from the closed-cooling cycle. The blended cooling water and condensate are collected in the hot well and extracted by circulating water pumps. Approximately 3 percent of this flow—corresponding to the amount of steam condensed—is fed to the boiler-feed-water system by condensate pumps. The major part of the flow is returned to the cooling tower for re-cooling. Cooling is performed by the delta-shaped heat exchangers at the base of the hyperbolic cooling tower, where cooling airflow is induced by temperature differential within the tower.

The hybrid cooling tower was selected because of its ability to minimize water consumption. When the ambient temperature is below 80 degrees Fahrenheit, the cooling tower operates as a dry-natural-draft-cooling tower. When the temperature exceeds 80 degrees Fahrenheit, the facility has the option of applying water overspray on the heating surfaces inside the cooling tower to provide additional cooling. This type of cooling tower has no particulate emissions. Due to the very limited amount of water used in the cooling process, no visible plume would be emitted from the cooling tower.

Other materials that would be stored on site include limestone, quicklime, and ammonia. Quicklime would be purchased from local suppliers and delivered to the site by trucks that would off-load onto a pneumatic conveyer that delivers the quicklime to a storage silo. The silo would be equipped with a baghouse to control PM_{10} emissions. Quicklime would be withdrawn from the bottom of the silo by a rotary vane feeder and transported to the limestone slurry tank, where it would be mixed with water. The quicklime slurry would be used in the wet FGD. Activated carbon (if needed) and quicklime would be delivered to the site by trucks and pneumatically conveyed to storage silos that also would be equipped with a baghouse to control PM_{10} emissions. Quicklime would be injected into the duct prior to the fabric filter to control acid-gas emissions. Activated carbon would be injected, if necessary, into the duct prior to the fabric filter to control mercury emissions. A nontoxic surfactant would be applied as needed to control dust emissions from passive coal storage piles.

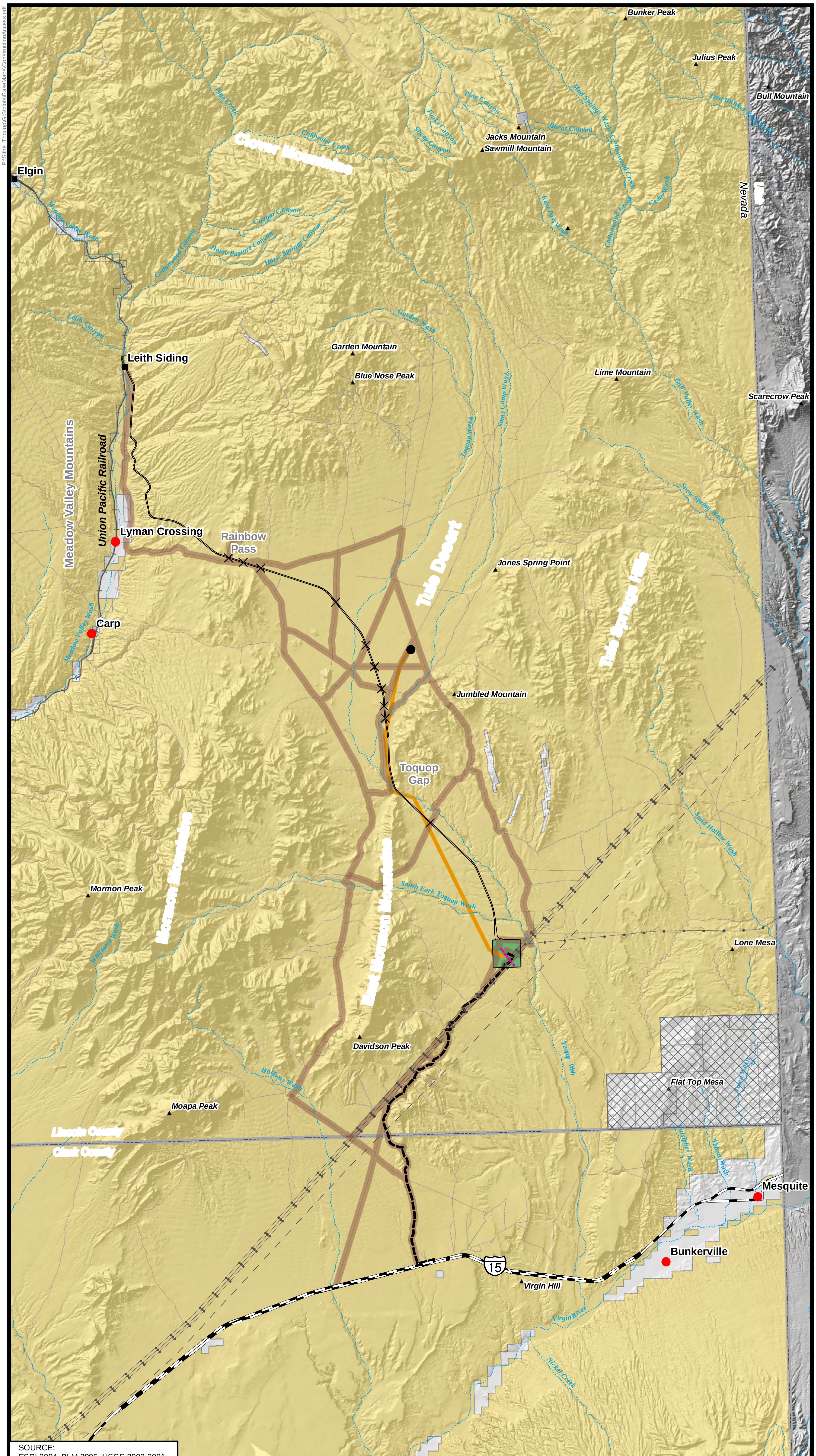
Anhydrous ammonia would be purchased from local suppliers and delivered to the site by truck for storage in a pressurized tank. There are no air-pollutant emissions from pressurized storage tanks. The anhydrous ammonia system consists of all equipment required to unload, compress, store, transfer, vaporize, dilute, and convey the ammonia/air mixture into the ammonia injection grid upstream of the selective catalytic-reduction system.

Byproducts from power generation would include fly ash, which would be collected by the main fabric filter. The pulverized-coal-fired boiler also would generate bottom ash. Fly ash and bottom ash would be stored in separate ash silos. A fabric filter would control emissions from the ash silos. Gypsum with water content in the 10 to 20 percent range would be generated by the wet FGD. It is anticipated that a market for recycling coal combustion byproducts would be available in growing metropolitan areas in southern Nevada, since fly ash and gypsum are used in concrete and other building materials. If it is not cost effective to resell these byproducts for use off site, the materials would be disposed of properly in a landfill on site. The landfill would be constructed in accordance with all applicable Federal, state, and U.S. Environmental Protection Agency laws and regulations.

The power plant would employ approximately 110 permanent employees, who would travel to the site along the improved access road. Traffic along the access road also would include deliveries of quicklime, ammonia, and other materials in accordance with all Federal, state and local regulations governing the management of hazardous materials.

Construction Access

Toquop Energy Project EIS
Lincoln County, Nevada



LEGEND

- Rail Line Construction Right-of-Way (200 feet)
- Construction Access Road

Surface Management

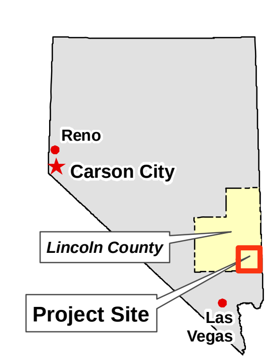
- Bureau of Land Management
- Private

General Features

- Proposed Rail Line
- Proposed Plant Site (640 acres)
- Permitted Well Field
- Permitted Water Pipeline
- Permitted Natural Gas Pipeline and Transmission Line Interconnection
- Permitted Access Road
- Toquop Township
- Future Rail Line Crossing

Reference Features

- Existing Road
- Interstate
- Existing Railroad
- Existing Transmission Line
- Existing Natural Gas Pipeline
- River, Stream, or Wash
- Mountain Peak
- Town
- Point of Interest



0 2 4
Miles

Map 2-2

Rail Line

The proposed coal-fired power plant would use low-sulfur coal from northeast Wyoming's Powder River Basin; long-term coal-supply contracts would be completed with mines that are already permitted to provide adequate supply. The Powder River Basin is estimated to contain 64 billion tons of mineable coal that could last as much as 150 years at current usage rates (Wyoming Mining Association 2006). In 2005, 390 million tons of coal were mined from the Powder River Basin (BLM 2007a). To transport coal to the plant site, the existing UPRR network would be used from Wyoming to Leith Siding in Nevada. At this location, an approximately 31-mile-long rail line would be constructed to connect the UPRR line to the plant site (refer to Map 1-1). The permanent ROW for this rail line would be 100 feet wide.

Traffic along the new rail line is expected to be two trains with 80 to 100 cars per day, one loaded with coal coming from the UPRR, and the other empty and heading back toward the UPRR line. Within this ROW, there would be a maintenance road for periodic inspections of the rail and any fencing that may be within the ROW. Installing barriers at existing road crossings would restrict access to the rail ROW. The periodic inspections would be done by either car or off-highway vehicles (OHV), depending on the limiting factors of the terrain along the rail. Access to the ROW for the inspections would be by existing roads.

Well Field and Water Pipeline

The annual water requirements for power generation under the Proposed Action Alternative would total 2,500 acre-feet. Under the 2003 EIS, the State Engineer approved 2,100 acre-feet of water for the power plant. This water supply would still be granted under the Proposed Action Alternative; an additional 400 acre-feet would be required to reach the 2,500-af/yr water requirements for the proposed coal-fired power plant. The approval for the additional 400 acre-feet is pending. Maintenance of the well field and water pipeline would be the same as evaluated in the 2003 EIS, as mentioned previously under the No-Action Alternative in Section 2.2.2.1 of this chapter.

Lincoln County Water District has proposed the Lincoln County Land Act (LCLA) Groundwater Development Project. If this project is completed, it would develop additional groundwater resources in the Tule Desert and the Clover Valley and water pipelines that would deliver water to the LCLA development area and the Toquop Energy Project. This project's proposed water pipeline, if constructed, would eliminate the need for a separate water pipeline for the Toquop Energy Project and would allow for water from either the Clover Valley or Tule Desert hydrographic basins to serve the needs of the power plant.

As part of the LCLA Groundwater Development Project, the volume of water to be transported through the proposed facilities would be approximately 23,824 af/yr, including the 2,500 af/yr for the Toquop Energy Project. The additional water would be used to support development in the LCLA development area. The LCLA Groundwater Development Project is currently undergoing an EIS. The additive impact of this project is included in the evaluation of cumulative impacts in Chapter 4.

The proposed facilities that will be evaluated in the LCLA EIS include approximately eight groundwater production wells (16 inches in diameter) located in the Tule Desert and Clover Valley hydrographic basins, a 23-mile-long water transmission pipeline (24 inches in diameter), and lateral pipelines (12 inches in diameter) to connect the water transmission pipeline to the production wells. The proposed width of the ROW for the water transmission pipeline would be 30 feet with a temporary width of 60 feet during construction. The proposed width of the ROW for the lateral pipelines would be 20 feet with a temporary width of 60 feet during construction. The production well site ROWs would be 100 feet by 100 feet with a temporary construction area of 100 feet by 200 feet. Access roads approximately 12 feet in width would be needed from existing roads in the Tule Desert area to each well site. The proposed production wells in the Tule Desert would be located in the well field area previously authorized for the Toquop Energy Project. The proposed water transmission pipeline, if constructed, would eliminate the need for a separate water pipeline for the Toquop Energy Project. From the power plant site, the transmission pipeline would proceed to the LCLA development area. Electric lines, communication lines, and a natural gas pipeline would be located within portions of the proposed transmission pipeline ROW.

Access Road

Improvements to the access road would be the same as those evaluated in the 2003 EIS, including upgrading the paved surface, widening the ROW, and grading/straightening the existing roadway.

2.3.2.4 Decommissioning

The power plant is expected to have a 50-year design life without requiring major capital improvements. At the end of its life, the plant would be decommissioned, and all structures and equipment at the site would be dismantled and removed. The operator of the rail line (Toquop Energy or other parties) would coordinate with BLM regarding future use or decommissioning of the rail line. The landfill would be closed in accordance with all state regulations. All wells would be converted to other uses or decommissioned and abandoned in accordance with state regulations. Following removal or abandonment of facilities, any disturbed areas would be rehabilitated as nearly as possible to their original condition. Potential uses of water rights by Lincoln County or Vidler Water Company Inc. after the 54-year project life are not known at this time.

2.4 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS

A summary of the alternatives that were considered but eliminated from detailed analysis is provided below and is organized by (1) alternative locations for the power plant site, (2) alternative power generation technologies, and (3) alternative rail line alignments.

2.4.1 Alternative Location for the Power Plant

In the 2003 EIS, an alternative location was evaluated. The "northern" power plant site is located approximately 12 miles northwest of the Toquop Energy parcel, closer to Meadow Valley Wash, and further from the existing transmission and gas lines than the proposed parcel that is the subject of this EIS. The northern parcel site would require an additional 12 miles of gas pipeline, transmission lines, and access road, creating additional impacts to resource areas. These impacts are described in the 2003 EIS, Chapter 4. This alternative was not selected in the 2003 EIS because it did not provide any environmental advantage over the site selected in the 2003 Record of Decision.

2.4.2 Alternative Power Generation Technologies

The 2003 EIS evaluated several alternative power generation technologies, including use of hydroelectric resources, biomass, fuel oil, and wind and solar resources (BLM 2003a). A coal-fired plant was eliminated from detailed consideration in the 2003 EIS because of the high cost of a rail line, impact of air emissions, and higher demand for water use. However, by incorporating dry-cooling and high-efficiency technology into the proposed coal-fired power plant design, potential emissions and water use would be reduced. Increasing natural gas prices also have made coal-fired power plants a more cost-effective method of power production. Due to the reasons mentioned above, a coal-fired power plant could be operated more cost-effectively than was assumed in the 2003 EIS. The other alternative generation technologies have been eliminated from detailed consideration in this EIS.

2.4.3 Alternative Coal Generation Technologies

2.4.3.1 Integrated Gasification Combined Cycle

Integrated gasification combined cycle (IGCC) is a developing coal technology that offers the potential for improved environmental performance and comparable (i.e., slightly lower) efficiency to pulverized coal-fired power plants. Proponents of IGCC point to low air-pollutant emissions, less solid waste by-products, and reduced water consumption when compared to specific examples of direct coal-combustion technologies. Although carbon dioxide (CO_2) capture is not a currently proven technology or required, the ability of IGCC to provide for easier CO_2 capture than direct coal-combustion technologies may prove to be an advantage in the future. In addition, the potential for coproduction of hydrogen adds potential to the production of clean transportation fuel. Comparisons between IGCC and direct coal-combustion technologies are affected by fuel composition, assumed air-pollution-control methods and performance, site elevation, cooling technology, and other factors. For example, IGCC heat rates increase as the ash content of the coal increases. High ash concentrations in some coals also create operating and maintenance issues to the extent that IGCC is not feasible due to the high ash content of the coal.

Currently there are only four operating coal-based power-generation IGCCs in the world. Two of these are demonstration plants in the United States. The two demonstration plants are single-train systems consisting of one gasification process, one gas cleanup process, one combustion turbine, and one steam turbine. The demonstration plants, which are all partially supported by government and research funding, have net capacities of 250 MW (Tampa Electric Polk Power Plant in Florida) and 262 MW (Wabash River Plant in Indiana). Recently, the Polk Power Plant has been operating on a 55 percent petroleum coke/45 percent coal feed, and the Wabash River Plant has operated on 100 percent petroleum coke since the U.S. Department of Energy demonstration program ended in 2000 (Holt 2004). Petroleum coke is less expensive than coal and offers better IGCC performance and reliability due to low ash and high heating value. In late 2004, the Wabash River Plant was reported as not operating due to business reasons (Holt 2004).

IGCC is not an inherently low-emitting or pollution-free process. Emission levels of existing IGCC plants as well as "qualifying advanced coal projects," as defined by the Energy Policy Act of 2005, are not, in total, lower than proposed emission rates for the Toquop Energy Project as shown in Table 2-5.

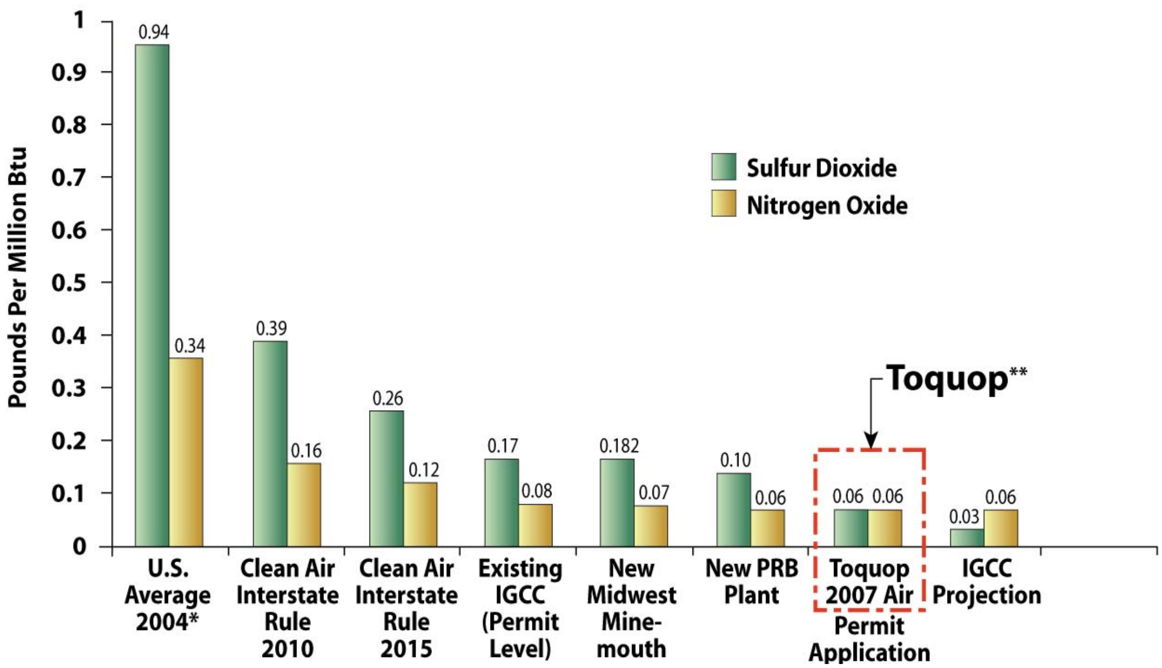
Table 2-5
Emission Levels

	Existing IGCC (percent)	Advanced Coal Projects (percent)	Toquop Energy Project (percent)
Removal percentage of SO_2	98.0	99.0	98.0
NO_x emissions (lb/MMBtu*)	0.07	0.07	0.06
PM_{10} emissions (lb/MMBtu*)	0.015	0.015	0.01
Mercury removal percentage	90.0	90.0	90.0

SOURCE: Holtz 2004, ENSR Corporation 2006a
NOTES:
IGCC = integrated gasification combined cycle
SO_2 = sulfur dioxide
NO_x = nitrogen oxides
PM10 = particulate matter with an aerodynamic diameter less than 10 microns
lb/MMBtu = pounds per million British thermal units

Figure 2-2 compares SO_2 and NO_X emissions of different types of coal-fired power plants, including IGCC, in relation to the Toquop Energy Project.

Figure 2-2
Sulfur Dioxide and Nitrogen Oxide Emissions from Coal-Fired Generating Plants



SOURCE: Toquop Energy Company, LLC 2006
NOTES: Inserted for discussion purposes only to show relationship of the estimated emissions of the Toquop Energy Project
* Estimate
** Estimate

Capital costs for an IGCC plant would be affected by the location of the Toquop Energy Project and would exceed the Toquop Energy Project costs by $350 to $600 million. While some of the cost difference might be reduced by incentives in Title XVII of the Energy Policy Act of 2005, the credits are limited to a maximum of $135.5 million to a single project and the amount of the credit can be reduced or eliminated depending on the actual allocation of the credits to a given project.

The cost of electricity for an IGCC plant would be $3.5 per megawatt-hour to $6 per megawatt-hour higher than the Proposed Action Alternative ($17 to $30 million annually).

IGCC plants have lower reliability than supercritical pulverized-coal plants, especially in the early years of operation, and they are more prone to incidents of forced outage as the plant ages over time. Therefore, there may be additional costs associated with lost electricity production and a need for a firm natural gas supply. These potential additional costs have not been quantified.

The technological risk of building an IGCC plant might make the plant less desirable to utility investors and power purchasers. The increased risk also would increase financing costs, as lenders would want more equity and higher maintenance and debt coverage reserves. These factors would increase the total capital cost.

IGCC was determined to not be a commercially viable option for the Toquop Energy Project. The IGCC project would not result in lower overall emissions. The project would have a much higher cost and there would be substantial technological risk that would make the plant unattractive to power purchasers and investors.

2.4.3.2 Circulating Fluidized Bed

The technology choice between circulating fluidized bed (CFB) combustion power plants, subcritical pulverized-coal power plants, and supercritical pulverized-coal plants depends on many factors including the size of the project, the types of fuel that would be burned, fuel properties, plant location, and local solid-waste and water issues. In addition, the technology choice is affected by the developer's or utility's experience with the technology and perception of technological risk and maintenance issues, as well as future fuel costs and electricity prices.

The maximum size of a CFB boiler is currently 300 MW net, while pulverized-coal units can be as large as 1,200 MW net. For large plants, the need for multiple CFB units adversely impacts the capital cost. Currently, all CFB plants in operation are subcritical units with significantly higher heat rates and lower efficiencies as compared to supercritical pulverized-coal units. In some areas of the country, the ability of CFB plants to provide fuel flexibility and the ability to burn poor-quality fuels such as petroleum coke, waste coal, and biomass is important.

There are several key differences between a CFB plant and a supercritical pulverized-coal plant.

Two or three CFB units would be required instead of one supercritical pulverized-coal unit to achieve the planned Toquop Energy Project power output. The smaller CFB units would perform less efficiently than one supercritical pulverized unit, i.e. the cost and air emissions per unit of power generated would be higher with CFB units. The construction and operation of CFB units also would have higher capital and operational costs than the proposed Toquop Energy Project.

On a pound-per-million-British thermal unit basis, most emissions from a CFB plant would be similar to the Proposed Action Alternative supercritical pulverized-coal power plant.

The heat rate for a CFB plant would be about 9,950 British thermal units per kilowatt-hour, while the heat rate for the Toquop Energy Project is 8,792 British Thermal Units per kilowatt-hour (net, higher heating value basis). For the same net electricity production and emission rates, a CFB plant would generate 11 percent more emissions than the Toquop Energy Project, and 15 to 20 percent higher CO_2 emissions.

On an annual tons-per-year basis, all emissions from a CFB plant would be higher than the Proposed Action Alternative supercritical pulverized-coal power plant due to the higher heat rate.

Based on annual emissions, a supercritical pulverized-coal power plant is the preferred technology. For reasons of economic feasibility and annual emission rates, this alternative was eliminated from further study.

2.4.4 Alternative Rail Line Routes

Several alternative routes for the rail line were considered but eliminated from detailed analysis. The primary reasons for their dismissal were grade and slope considerations or potential impacts on specially designated areas (Map 2-3).

Alternative Rail Line 1

Alternative Rail Line 1 begins at the Hoya Siding of the UPRR with less than a 1.5 percent maximum grade heading south. The route heads east through the Mormon Mountains pass (Jacks Pockets) to Mormon Mesa, then northeast through the East Mormon Mountains pass to the plant site. The total track length is 35 miles. This route was dismissed as a viable alternative because it crosses Mormon Mesa Area of Critical Environmental Concern (ACEC) and approximately 8 miles of the Mormon Mountains Wilderness.

Alternative Rail Line 2

Alternative Rail Line 2 begins at UPRR's Hoya Siding with less than a 1.3 percent maximum grade, circumvents the Mormon Mountains by traveling farther south and east than Alternative Rail Line 1, and crosses Mormon Mesa. This route approaches the plant site across Halfway Wash, south of Davidson Peak. Multiple wash crossings would require the installation of box culverts. This route would have a total track length of 39 miles. The maximum grade would be 1.3 percent; however, the grade could be reduced with additional minor earthwork. Alternative Rail Line 2 was eliminated from further consideration because it crosses the Mormon Mountains Wilderness and Mormon Mesa ACEC.

Alternative Rail Line 3

Alternative Rail Line 3 originates south of Glendale in Moapa Valley and heads north across the Muddy River from the UPRR to arrive at the same plateau as Alternative Rail Line 1. The route then traverses through the Mormon Mountains pass to the plant site along the same route as the Alternative Rail Line 1. This route would result in a total track length of 42 miles, with up to 3 miles on trestle or bridging.

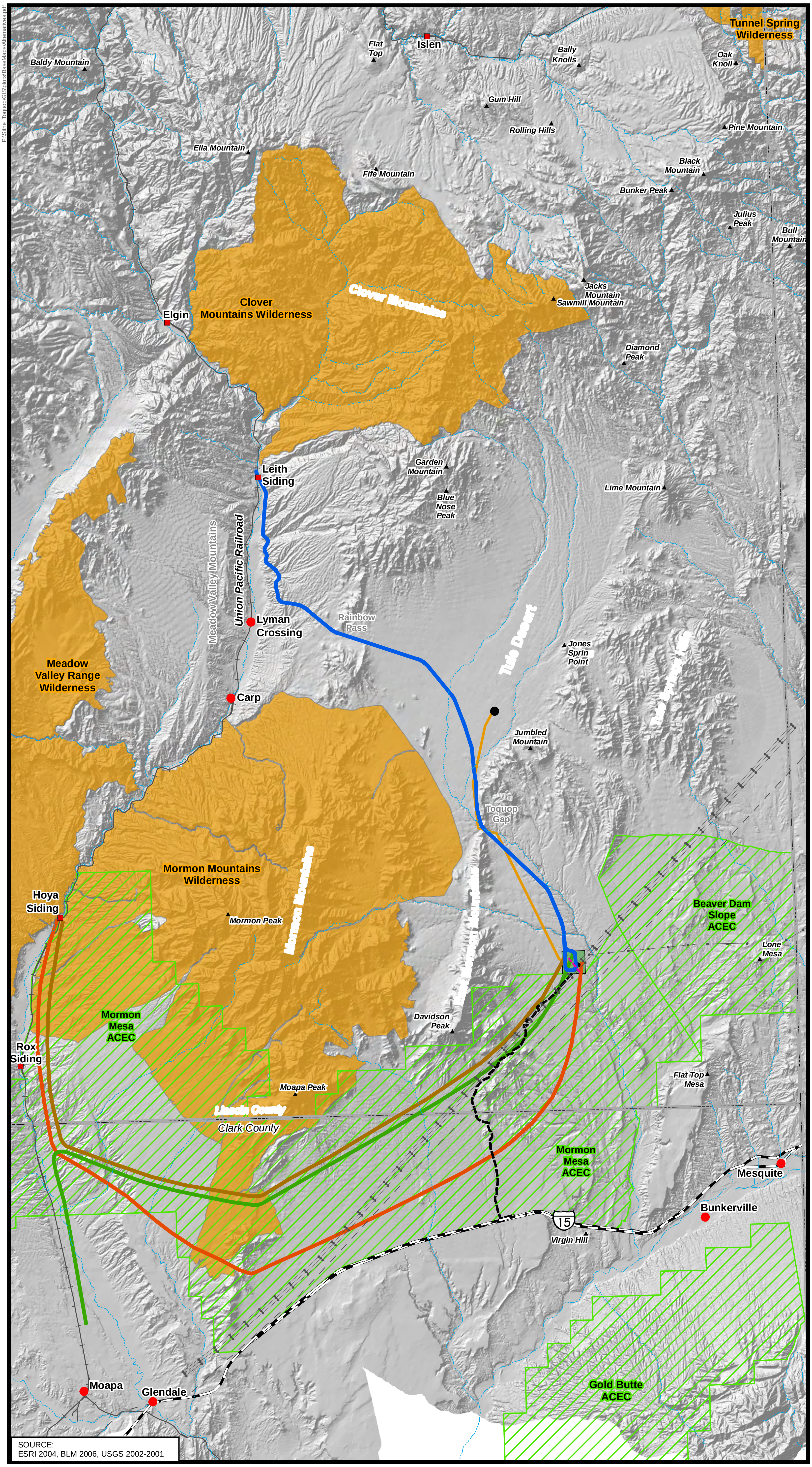
This route was dismissed as a viable alternative because it passes through the Mormon Mountains Wilderness and Mormon Mesa ACEC.

2.4.5 No Power Plant Development

In the 2003 EIS, the scenario in which no power plant would be built was analyzed. ROWs are now in place, as described in 2003 Record of Decision. Toquop Energy could, at this time, move forward with the construction of the gas-fired plant and ancillary facilities without additional ROW grants.

Alternative Rail Line Routes Considered

Toquop Energy Project EIS
Lincoln County, Nevada



LEGEND

Rail Line Alternatives

- Proposed Rail Line
- Alternative Rail Line 1
- Alternative Rail Line 2
- Alternative Rail Line 3

Special Designation

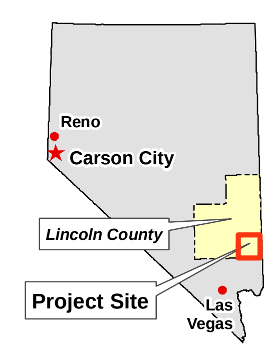
- Wilderness
- Area of Critical Environmental Concern

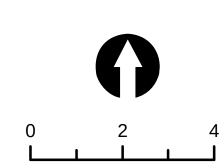
General Features

- Proposed Plant Site (640 acres)
- Permitted Well Field
- Permitted Water Pipeline
- Permitted Natural Gas Pipeline and Transmission Line Interconnection
- Permitted Access Road

Reference Features

- Existing Road
- Interstate
- Existing Railroad
- Existing Transmission Line
- Existing Natural Gas Pipeline
- River, Stream, or Wash
- Mountain Peak
- Town
- Point of Interest

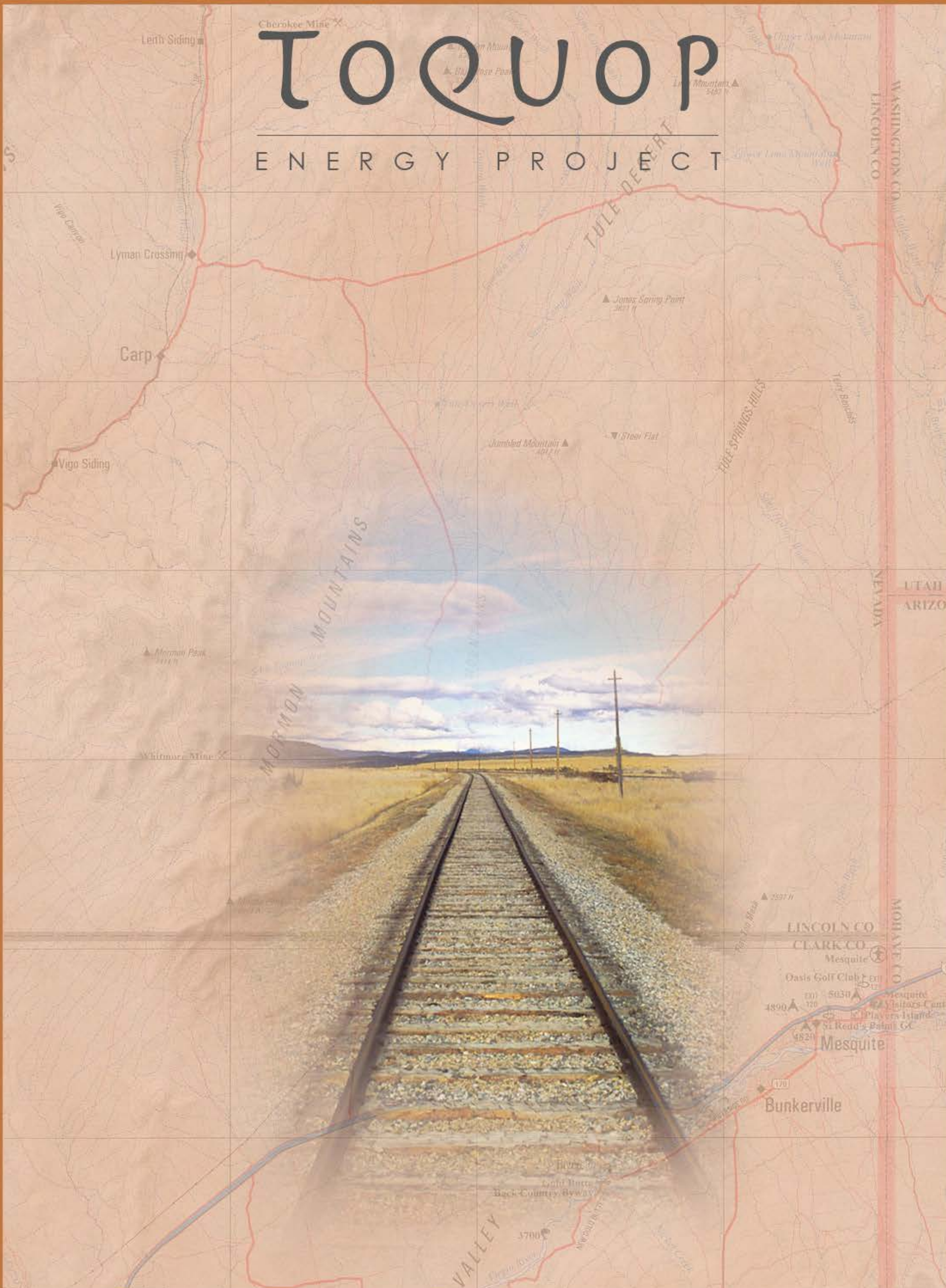




Map 2-3

TOQUOP

ENERGY PROJECT



CHAPTER 3.0 - AFFECTED ENVIRONMENT

3.0 AFFECTED ENVIRONMENT

3.1 INTRODUCTION

This chapter characterizes the existing conditions in the project area. In accordance with the National Environmental Policy Act of 1969 (NEPA) and related statutes, the purpose of the affected environment chapter is to describe the human and natural environment that could be affected by the Proposed Action Alternative. The information provided in this chapter is intended to be of appropriate detail to provide an understanding of the general area, respond to the issues that were raised during scoping, and support and clarify the impact analysis provided in Chapter 4. Data were collected for the following resources and resource uses:

- Lands
- Livestock grazing and rangelands
- Recreation and access
- Wilderness and special management areas
- Visual resources
- Climate and air quality
- Noise
- Geology, soils, and minerals
- Groundwater resources
- Surface water resources
- Biological resources (vegetation, wildlife, and special status species)
- Wild horses and burros
- Archaeology and historic preservation
- Paleontological resources
- Public safety, hazardous materials, and solid waste
- Socioeconomic conditions
- Environmental justice

There are several resources that are not discussed because it was determined that the resource is not present in the project area and therefore would not be impacted by the alternatives. These resources include Indian Trust assets, prime and unique farmlands, paleontological resources, and wild and scenic rivers.

Maps are included to illustrate existing conditions for some resources. The maps were developed using spatial data in a geographic information system (GIS) program; the data were generated from existing sources and field survey data.

3.2 LANDS

3.2.1 <u>Data Collection Methods</u>

This section discusses lands and realty actions. Existing land use data were collected through analysis of aerial photography, field verification, review of existing studies and plans, and coordination with the Bureau of Land Management (BLM) Ely Field Office (Map 3-1). Land uses within the project area were mapped using existing data, and the area within 0.5 mile of the Proposed Action Alternative facilities was field-verified. Throughout this section, the area within 0.5 mile of the Proposed Action Alternative is referred to as the study area. The regional area examined for land use includes land outside the study area, but generally within 15 miles of the project (unless otherwise noted), and provides a context for land uses in the general area of the project. Ownership data were collected from the BLM Ely Field Office. Future or planned land use information was collected through review of existing plans.

3.2.2 Existing Conditions

3.2.2.1 Regional Overview

Land located within and adjacent to the study area boundaries is public land administered by the BLM Ely and Las Vegas field offices in Nevada. The study area is approximately 12 miles northwest of the city of Mesquite, 50 miles southeast of the city of Caliente, 6 miles north of the Lincoln and Clark County boundary line, 57 miles west of the city of St. George in Utah, and 10 miles west of the Nevada/Utah/Arizona border (BLM 2003a). In the study area, there are dirt roads, three collocated transmission lines, a natural gas pipeline, and communication facilities (Map 3-1).

Privately owned land located near the project area includes three narrow strips of gypsum mining in holdings near Jumbled Mountain and a few private residences located near Carp, Nevada, stretching north along the Union Pacific Railroad (UPRR) to Leith Siding (Map 3-1). Recently, the BLM sold 13,500 acres, known as Toquop Township, to private owners per appropriate laws and regulations. The parcels are located 2 miles northwest of the city of Mesquite, with the closest point to the Proposed Action Alternative located in Township 11 South, Range 69 East, Section 36, about 6 miles southeast of the power plant site.

The area has experienced little development apart from range improvements.

Along the existing railroad track, there are areas identified as towns, such as Carp, Nevada (Map 3-1). Field observations have found that these areas, although once thriving communities, are now sparsely populated.

3.2.2.2 Power Plant Site

The proposed power plant site is located within Assessor Parcel Number 08-251-01 (BLM 2003a). The Navajo-McCullough electric transmission line, Red Butte-Harry Allen electric transmission line, and the Kern River Natural Gas Transmission Company pipeline cross the southeast corner of the site (BLM 2003a). Running northwest from the site is the right-of-way (ROW) for a permitted water pipeline that would connect to a permitted well field.

No future land uses have been identified for the site. A 12.5-mile-long water pipeline permitted to deliver water to the proposed plant could be extended in the future to serve other users.

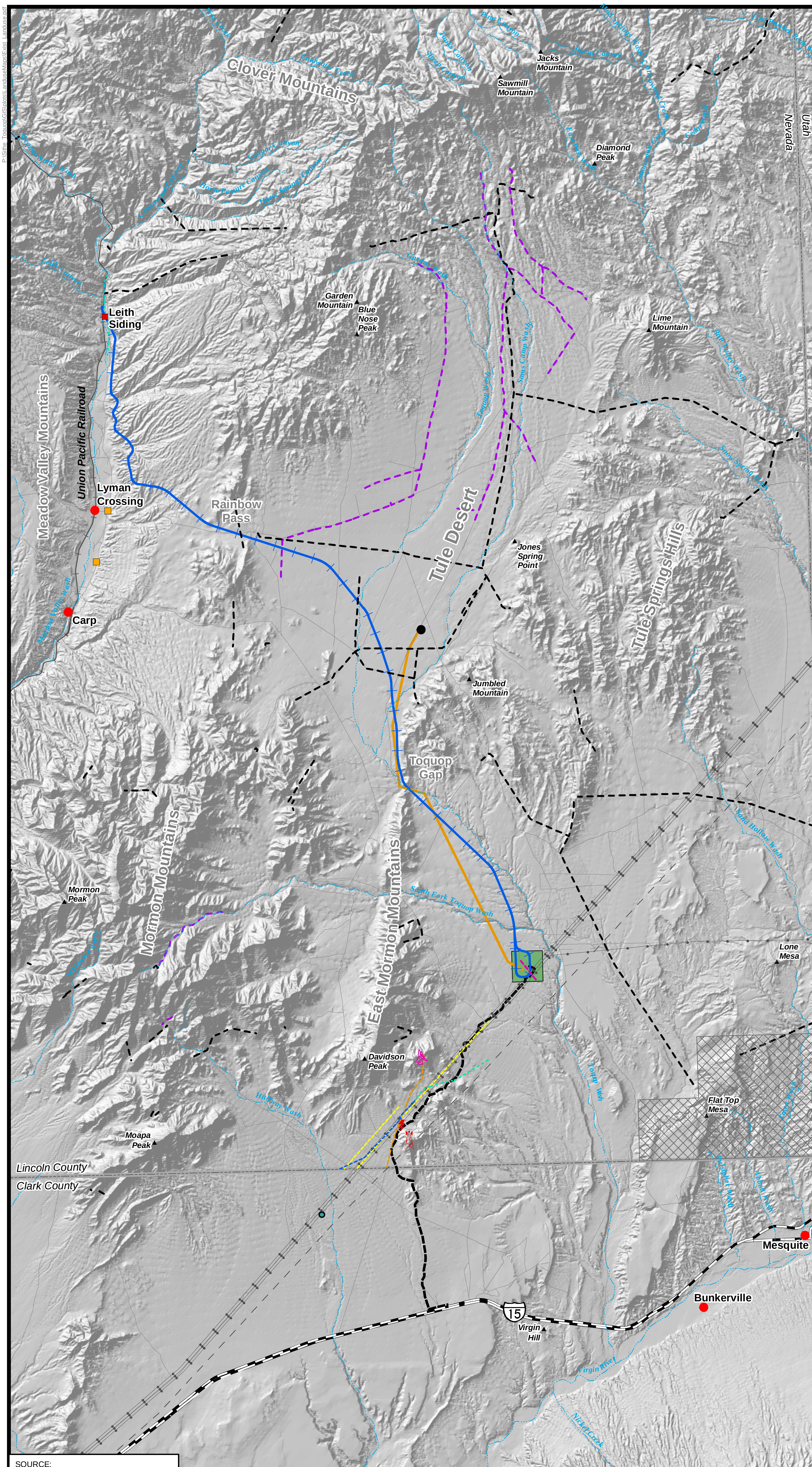
3.2.2.3 Proposed Rail Line

The portion of the existing UPRR that lies within the study area is one of the busiest sections in the country, with trains running once every 40 minutes. BLM databases indicate a town site along the proposed rail line at Leith Siding, but field verification revealed that the area is now uninhabited.

3.3 LIVESTOCK GRAZING AND RANGELANDS

3.3.1 Data Collection Methods

Existing data were collected through coordination with the BLM Ely Field Office and from the Ely Resource Management Plan (RMP)/Environmental Impact Statement (EIS) . Grazing allotments within the project area were mapped using existing data.



Existing Land Use

Toquop Energy Project EIS
Lincoln County, Nevada

LEGEND

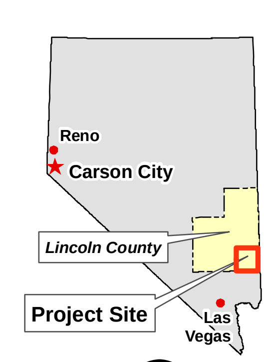
Range Improvement
- Fence
- Pipeline

Residence
- House

Utilities
- Communication Tower
- Natural Gas Pipeline
- Powerline Building
- Radio Tower
- Pipeline Application
- Pipeline Right-of-Way
- Powerline
- Telephone Line

General Features
- Proposed Railroad Line
- Proposed Plant Site (640 acres)
- Permitted Well Field
- Permitted Water Pipeline
- Permitted Natural Gas Pipeline and Transmission Line Interconnection
- Permitted Access Road
- Toquop Township

Reference Features
- Existing Road
- Interstate
- Existing Railroad
- Existing Transmission Line
- Existing Natural Gas Pipeline
- River, Stream, or Wash
- Mountain Peak
- Town
- Point of Interest



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Map 3-1

3.3.2 Existing Conditions

3.3.2.1 Regional Overview

Most of the land in the study area is considered rangeland. The BLM administers the grazing program on public land under provisions of the Taylor Grazing Act of 1934, the Federal Land Policy Management Act of 1976, and the Public Rangelands Improvement Act of 1978. These laws direct the BLM to authorize and manage livestock grazing on public land according to the principles of multiple use and sustained yield and to prevent the degradation of rangeland resources by providing for their orderly use, improvement, and development. The BLM's livestock grazing standards were designed to improve public land health and are to be implemented at the watershed, allotment, or pasture level.

3.3.2.2 Power Plant Site

Most of the study area is actively used for grazing (Map 3-2). Authorizations to graze livestock are measured in animal unit months (AUMs), which are defined by BLM as the amount of forage needed to sustain one cow and its calf, five sheep, or five goats for a month (BLM 2005a). The study area falls within six separate grazing allotments (Map 3-2): White Rock (2,880 authorized AUMs), Garden Springs (2,809 authorized AUMs), Summit Spring (715 authorized AUMs), Snow Springs (3,567 authorized AUMs), Henrie Complex (1,373 authorized AUMs), and Gourd Spring (3,458 authorized AUMs). A boundary fence has been constructed within the Gourd Spring allotment to restrict livestock from entering the Mormon Mesa Area of Critical Environmental Concern (ACEC), which is closed to grazing to protect critical Mojave desert tortoise habitat (BLM 2003a). The Beacon allotment (no authorized AUMs) is also within the study area boundaries; however, it is closed to grazing to protect critical desert tortoise habitat. As a result of the Caliente Management Framework Plan Amendment for Management of Desert Tortoise Habitat of 2000, portions of the Henrie Complex allotment (1,373 AUMs) were closed, or had acres, AUMs, or season of use adjusted (BLM 2005a).

3.3.2.3 Proposed Rail Line

The proposed rail line would pass through four grazing allotments: Gourd Spring, Garden Springs, White Rock, and Henrie Complex. Table 3-1 illustrates the number of miles of the proposed rail line that would pass through each allotment.

Table 3-1
Length of Proposed Rail Line by Allotment

Grazing Allotment	Length (miles)
Garden Springs	1.9
White Rock	4.5
Henrie Complex	10.3
Gourd Spring	14.2

SOURCE: Bureau of Land Management 2006; URS geographic information data 2006

3.4 RECREATION AND ACCESS

3.4.1 Data Collection Methods

Data for recreation and access were obtained through analysis of aerial photography; review of existing studies, GIS data, and plans; and coordination with the BLM Ely Field Office. Distances on the existing transportation network were derived from GIS calculations. The regional area examined for recreational use includes land outside the study area but generally within 30 miles of the Proposed Action Alternative (unless otherwise noted) and provides a context for consideration of recreational uses in the general area of the project.

3.4.2 Existing Conditions

3.4.2.1 Regional Overview

The area surrounding the Proposed Action Alternative is primarily undeveloped, sparsely occupied, BLM-administered land. Land use and access patterns in the project area are influenced primarily by traditional usage (livestock grazing) and major transportation corridors.

Recreation

Traditional recreational use includes the hunting of upland game (quail, chukar, pheasant, turkey, cottontail rabbit), waterfowl, and big game (deer, bighorn sheep, mountain lion). Several wildlife water developments in the East Mormon Mountains are adjacent to the project area. Other pursuits are fur trapping (mainly bobcat) and varmint hunting (mostly coyote and jackrabbit). Angling is limited to Lower Virgin River and the Overton Arm of Lake Mead. Seasonal wildflower sighting, bird watching, hiking, off-highway vehicle (OHV) driving, and primitive camping are recreational activities commonly occurring in and on land near the project area. Throughout the vicinity of the project area there are numerous user-defined primitive campsites, including two located approximately 4 miles north of Interstate 15 (I-15) next to the permitted access road.

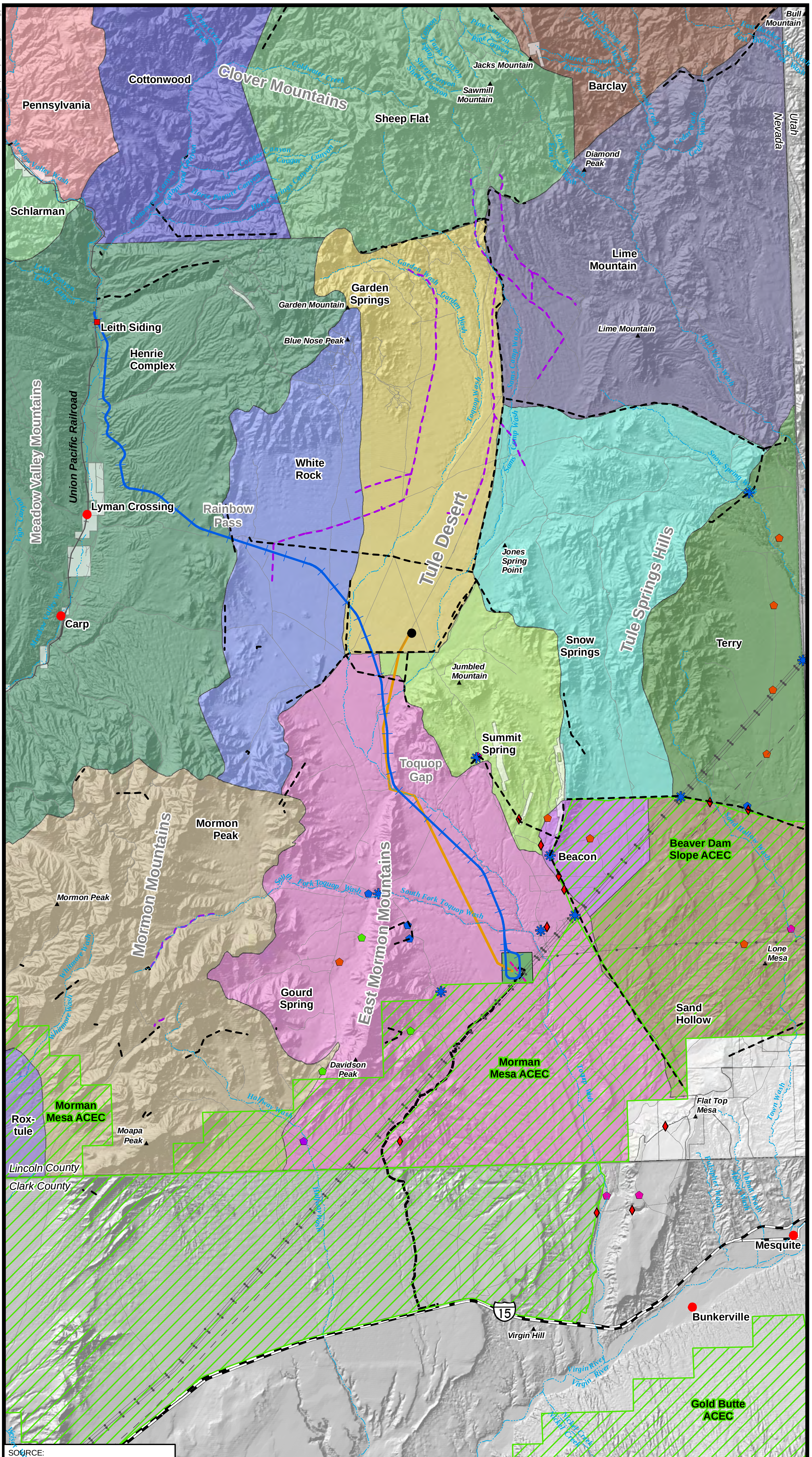
The proposed power plant site is approximately 15 miles north of the Logandale Trails system, a multiple-use motorized- and non-motorized-trails play area. The site is also 20 miles north of the area of Lake Mead's Overton Beach, which is the nearest recreation area to the project site. Lake Mead is part of the Lake Mead National Recreation Area, which encompasses Lake Mead, Lake Mojave, and both Federal and non-Federal land. Nevada state parks in the region include Kershaw-Ryan State Park and Beaver Dam State Park, both about 25 miles north of the Proposed Action Alternative. Additionally, Grant Bowler County Park is located near the Logandale Trails system. These state and county parks are located in very remote, canyon-laden areas and are popular areas for hiking and nature study.

The popularity of OHVs over the last 20 years has encouraged casual four-wheel-drive exploration of primitive and remote public lands. The Toquop Wash is used by OHV recreationists year-round and by many quail hunters in the fall. OHV use in the project area has been increasing. Several high-speed competitive OHV events have occurred in the area since the late 1970s, including small truck/car races conducted by the Silverdust Racing Association, the ACERBIS Nevada Rally for motorcycles, several Best in the Desert Racing Association truck/car/motorcycle/OHV events, and the Nevada 2000 OHV race.

In addition, backcountry areas are a popular venue for non-speed, non-competitive, street-legal, off-highway-capable, and self-guided motorcycle scenic touring. The Caliente/Tule Desert/Mormon Mountains area is used for several self-guided motorcycle scenic tours.

Access/Transportation

I-15 is the only major roadway in the project area and serves as the main north-south route connecting Las Vegas, Nevada, and Salt Lake City, Utah. I-15 is approximately 12 miles south of the proposed power plant site. In this area, the interstate is aligned southwest-northeast. The character of I-15 in the vicinity of the Proposed Action Alternative consists of a paved, divided freeway with paved shoulders, two lanes in each direction, and a posted speed limit of 75 miles per hour. Access to the project site would be from I-15 via the East Mesa Interchange (Exit 109) approximately 9 miles west of Mesquite, Nevada. Exit 109



Grazing Allotments

Toquop Energy Project EIS
Lincoln County, Nevada

LEGEND

Range Improvements

- Corral
- Exclosure
- Other
- Small Game Guzzler
- Trough
- Cattle Guard
- Gate
- Fence
- Pipeline

Areas Unavailable to Grazing

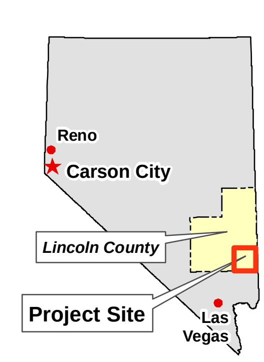
- Private Land
- Area of Critical Enviromental Concern (ACEC)

General Features

- Proposed Rail Line
- Proposed Plant Site (640 acres)
- Permitted Well Field
- Permitted Water Pipeline
- Permitted Natural Gas Pipeline and Transmission Line Interconnection
- Permitted Access Road

Reference Features

- Existing Road
- Interstate
- Existing Railroad
- Existing Transmission Line
- Existing Natural Gas Pipeline
- River, Stream, or Wash
- Mountain Peak
- Town
- Point of Interest



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Map 3-2

is a truck rest area, paved but without facilities, that can be accessed directly from eastbound and westbound I-15. Table 3-2 lists the existing and estimated average daily traffic volumes for I-15 near the East Mesa Interchange (Exit 109) and for the East Mesa Interchange off-ramp.

Table 3-2
Existing and Estimated Average Daily Traffic Volumes on 1-15 Near the Project Area

Roadway	Average Daily Vehicle Traffic*	Average Daily Truck Traffic**
I-15 near the East Mesa Interchange (2000)	15,800	1,580
Eastbound	7,900	790
Westbound	7,900	790
I-15 near the East Mesa Interchange (2003 estimate)	18,818	1,882
Eastbound	9,409	941
Westbound	9,409	941
East Mesa Interchange off-ramp (2000)	680	68
Eastbound	280	28
Westbound	400	40
East Mesa Interchange off-ramp (2003 estimate)	810	81
Eastbound	330	33
Westbound	480	48

SOURCE: Leegard 2001
NOTES: *Calculated at 6 percent annual growth rate, based on historical traffic records
**Estimated at 10 percent of average daily vehicle traffic

Four miles of the access road from I-15 to the proposed power plant site are in good condition. The 8-mile section between a turn-off that leads to communications towers and the northern side of Toquop Wash is a graded road with many sharp turns that require slow speeds.

3.4.2.2 Power Plant Site

The proposed power plant site does not include any paved active roads and is located approximately 1 mile from the Toquop Wash area, a popular four-wheel-drive and quail hunting area. There are no developed recreational facilities within the power plant site.

3.4.2.3 Proposed Rail Line

The area of BLM-administered land that the 31-mile-long proposed rail line would occupy includes several dirt roads, mostly used for ranching purposes (refer to Map 3-2). There are approximately 11 instances where the rail line would cross existing maintained dirt roads. In some cases the rail line would cross the same existing road more than once. Some of these unmaintained or unpaved roads have surface conditions that may require the use of four-wheel-drive vehicles, due to roughness, grade, drainage crossings, or other obstructions. These roads also experience light OHV use. Apart from the light OHV use and ranching-related activities that take place on these roads, there is very little other recreational use regularly occurring in the area that the rail line would occupy. There are no paved roads that would bisect the proposed rail line.

3.5 WILDERNESS AND SPECIAL MANAGEMENT AREAS

3.5.1 Data Collection Methods

Data for wilderness and special management areas were obtained through the analysis of aerial photography; review of existing studies, GIS data, and plans; and coordination with the BLM Ely Field Office and the U.S. Forest Service (Forest Service). The existing wilderness designations were derived from GIS calculations. The regional area examined for wilderness and special management areas includes land outside the study area, but generally within 30 miles of the Proposed Action Alternative (unless otherwise noted) (Map 3-3).

3.5.2 Existing Conditions

3.5.2.1 Regional Overview

Located north and west of the Proposed Action Alternative, the Mormon Mountains, Clover Mountains, and the Meadow Valley Range wildernesses were dedicated by Congress in 2004. Consequential to the Wilderness designations in 2004, there are no wilderness study areas in or immediately adjacent to the project area. The Mormon Mesa ACEC borders the proposed power plant site to the south and continues to the northern edge of I-15. This ACEC was established through BLM's land use planning process in 1998 (Clark County portion) and 1999 (Lincoln County portion) (refer to Map 3-3).

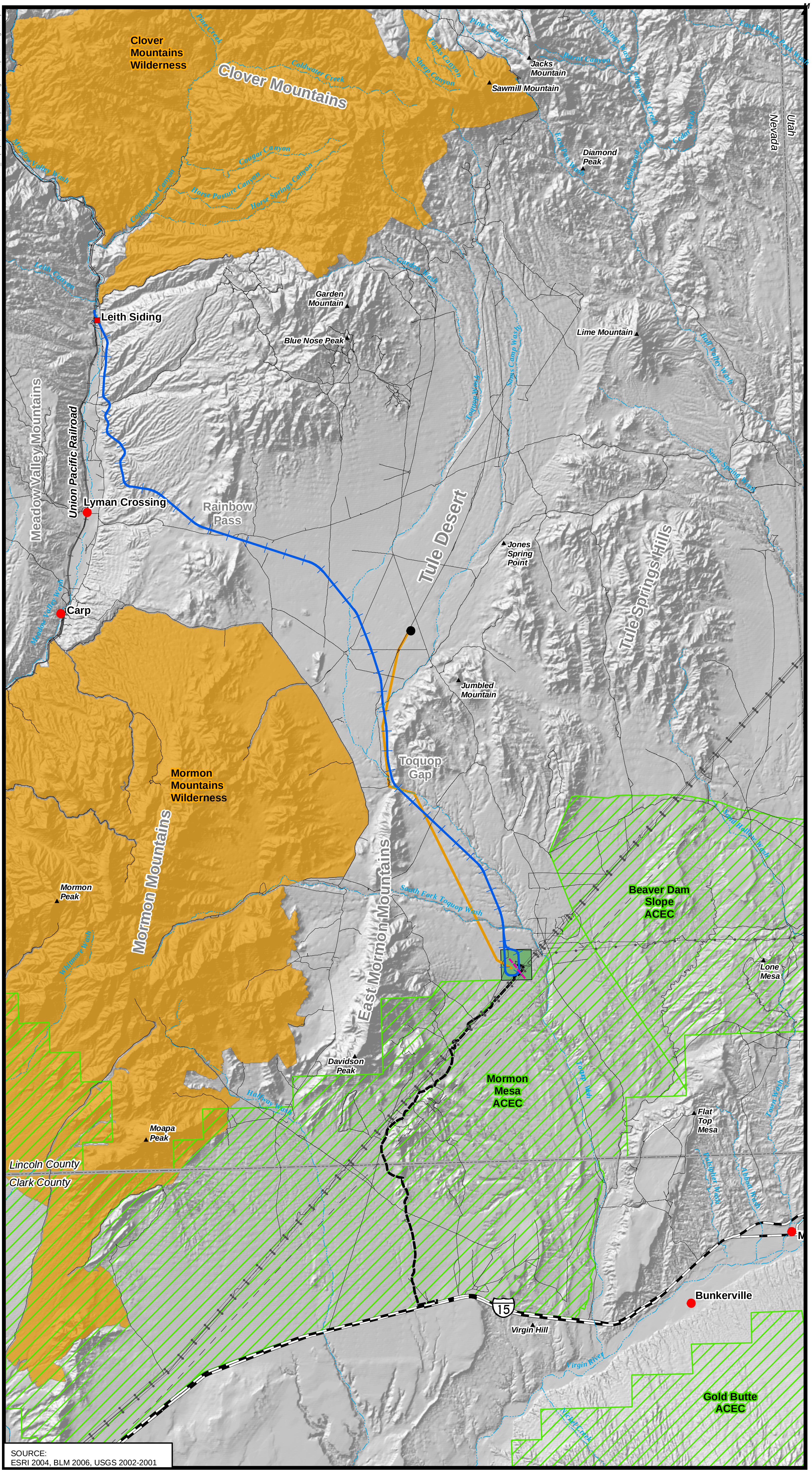
Wilderness

The Mormon Mountains Wilderness encompasses 162,866 acres and is approximately 4 miles west of the proposed power plant site. The proposed rail line comes within 1 mile of the wilderness near Toquop Gap. The wilderness provides outstanding opportunities for solitude. The rugged terrain, large size and undeveloped nature offers a natural, primitive, and solitary experience. The Mormon Mountains Wilderness includes rolling bajadas with cholla (*Cylindropuntia acanthocarpa*), yucca (*Yucca* sp.) and Joshua trees (*Yucca brevifolia*), uniquely carved canyons forested with single-leaf pinyon pine (*Pinus monophylla*) and juniper (*Juniperus osteosperma*) as well as Colorado pinyon (*Pinus edulis*) and Rocky Mountain juniper (*Juniperus scopulorum*), and jagged mountain peaks topped with isolated stands of old-growth ponderosa pine (*Pinus ponderosa*). The various climates and elevations associated with these features provide important habitat for a wide spectrum of flora and fauna. The lower elevations support habitat for the desert tortoise (*Gopherus agassizii*), Gila monster (*Heloderma suspectum*), white bear poppy (*Arctomecon merriamii*), Clark Mountain agave (*Agave utahensis* var. *nevadensis*), western banded gecko (*Coleonyx variegatus*), sidewinder (*Crotalus cerastes*), and long-nosed leopard lizard (*Gambelia wislizenii*). Animals that live higher in the mountains include desert bighorn sheep (*Ovis canadensis nelsoni*), mule deer (*Odocoileus hemionus*), bobcat (*Lynx rufus*), and mountain lion (*Puma concolor*). An impressive variety of raptors live in the area. Burrowing owl (*Athene cunicularia*), golden eagle (*Aquila chrysaetos*), ferruginous hawk (*Buteo regalis*), red-tailed hawk (*Buteo jamaicensis*), prairie falcon (*Falco mexicanus*), Cooper's hawk (*Accipiter cooperii*), northern harrier (*Circus cyaneus*), merlin (*Falco columbarius*), and American kestrel (*Falco sparverius*) are among those residing in or seasonally frequenting the Wilderness. Throughout the Mormon Mountains region are some of the most abundant and valuable prehistoric sites in Nevada (BLM 2003a).

The Clover Mountains Wilderness is located north of the proposed rail line's point of intersection with the UPRR in Leith Siding. This 85,748-acre wilderness provides opportunities for solitude in this land of rolling hills, rugged peaks, and jagged outcrops of rhyolite, twisting canyons, and perennial waters. The volcanic peaks rise more than 7,000 feet in elevation. High in the mountains live isolated stands of old-growth ponderosa pine and quaking aspen (*Populus tremuloides*). Ash (*Fraxinus* sp.), cottonwood (*Populus fremontii*), quaking aspen, and other riparian vegetation grow along Cottonwood Creek. The Tule Desert encompasses the lowest elevations in the southern portion of the wilderness, with vegetation of sagebrush (*Artemesia tridentata*), Joshua trees, and yucca. Mule deer, desert bighorn sheep, mountain lion, bobcat, badger (*Taxidea taxus*), prairie falcon, and golden eagle have been seen in the area. The Tule Desert provides important habitat for kit fox (*Vulpes macrotis*) and numerous species of reptiles. Sensitive species likely to be found in the wilderness include the pallid bat (*Antrozous pallidus*), California myotis (*Myotis californicus*), and banded Gila monster. (BLM 2003c)

Special Designation and Existing Access

Toquop Energy Project EIS
Lincoln County, Nevada



SOURCE:
ESRI 2004, BLM 2006, USGS 2002-2001

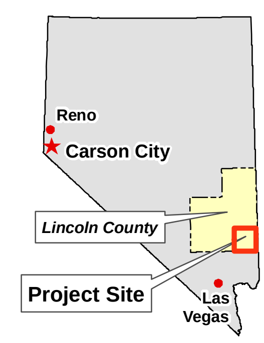
LEGEND

Special Designation
- Wilderness
- Area of Critical Environmental Concern

Existing Access
- Road

General Features
- Proposed Rail Line
- Proposed Plant Site (640 acres)
- Permitted Well Field
- Permitted Water Pipeline
- Permitted Natural Gas Pipeline and Transmission Line Interconnection
- Permitted Access Road

Reference Features
- Existing Road
- Interstate
- Existing Railroad
- Existing Transmission Line
- Existing Natural Gas Pipeline
- River, Stream, or Wash
- Mountain Peak
- Town
- Point of Interest



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Map 3-3

The third wilderness in the vicinity (approximately 30 miles) of the Proposed Action Alternative is the Meadow Valley Range Wilderness. This 123,488-acre area is due west of the Mormon Mountains Wilderness. Wildlife in the Meadow Valley Range Wilderness consists of fauna similar to that found in the Clover Mountains Wilderness. Vegetation consists of low-desert shrub with the exception of the northern section of the Meadow Valley Mountains, which is pinyon and juniper forest. It consists of three major landforms: the long ridgeline of the Meadow Valley Mountains, a large bajada beginning high on the main ridge sloping easterly toward Meadow Valley Wash, and finally Bunker Hills, 5 miles from the southern portion of the central bajada. (BLM 2003c)

Areas of Critical Environmental Concern

The Federal Land Policy and Management Act provides BLM with the authority to designate and protect resources within ACECs. An ACEC designation is the principal BLM designation for public land where special management is required to protect important natural, cultural, and scenic resources, or to identify natural hazards.

The BLM Ely Field Office identified two ACECs in its 1999 Proposed Caliente Management Framework Plan Amendment and Environmental Impact Statement for the Management of Desert Tortoise Habitat. These were the Mormon Mesa and Beaver Dam Slope ACECs. In September 2000, BLM's Nevada State Office issued the Approved Caliente Management Framework Plan Amendment and Record of Decision for the Management of Desert Tortoise Habitat. The two ACECs now complement adjoining and nearby ACECs designated for desert tortoise management by other BLM offices in Nevada, Utah, and Arizona (refer to Map 3-3). These ACECs are part of the landscape-scale management strategy intended to facilitate desert tortoise recovery. Current management direction applicable to the Proposed Action Alternative is to grant access to private parcels, Federal oil and gas leases, and mining claims based on NEPA analysis and Endangered Species Act (ESA) Section 7 consultation.

As noted in the 2003 EIS, the proposed power plant site borders the Mormon Mesa ACEC. Except for the northernmost 0.9 mile stretch, the 12.5-mile-long access road from I-15 is within this ACEC. Approximately 5 miles of the access road is in Clark County, and approximately 8 miles are within Lincoln County. BLM's Las Vegas Field Office has management jurisdiction for the Clark County portion of the Mormon Mesa ACEC, and the BLM Ely Field Office has management jurisdiction for the Lincoln County portion.

3.6 VISUAL RESOURCES

3.6.1 <u>Data Collection Methods</u>

This section is a description of the existing visual quality of the lands in the vicinity of the proposed coal-fired power plant and rail line. Scenic quality evaluation forms, which are part of the visual resource management (VRM) system, are used as a baseline to show the inherent aesthetics of the landscape, public value of viewing the landscape, and sensitivity to visual effects from the proposed action. The visual study analysis was conducted in compliance with BLM Visual Resource Inventory Manual 8410-1 (BLM 1986). Additional information on scenic-quality inventory criteria, scenic-quality evaluation forms and map can be found in Appendix B.

BLM is responsible for ensuring that the scenic values of public lands are considered before allowing uses that may have visual impacts. This is accomplished through its VRM system. VRM classes are established through the RMP process and objectives are established for each class. There are four VRM classes and management objectives, as follows:

- **Class I Objective**. The objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention.
- **Class II Objective**. The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominantly natural features of the characteristic landscape.
- **Class III Objective**. The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominantly natural features of the characteristic landscape.
- **Class IV Objective**. The objective of this class is to provide for management activities that require major modification 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.

3.6.2 Existing Conditions

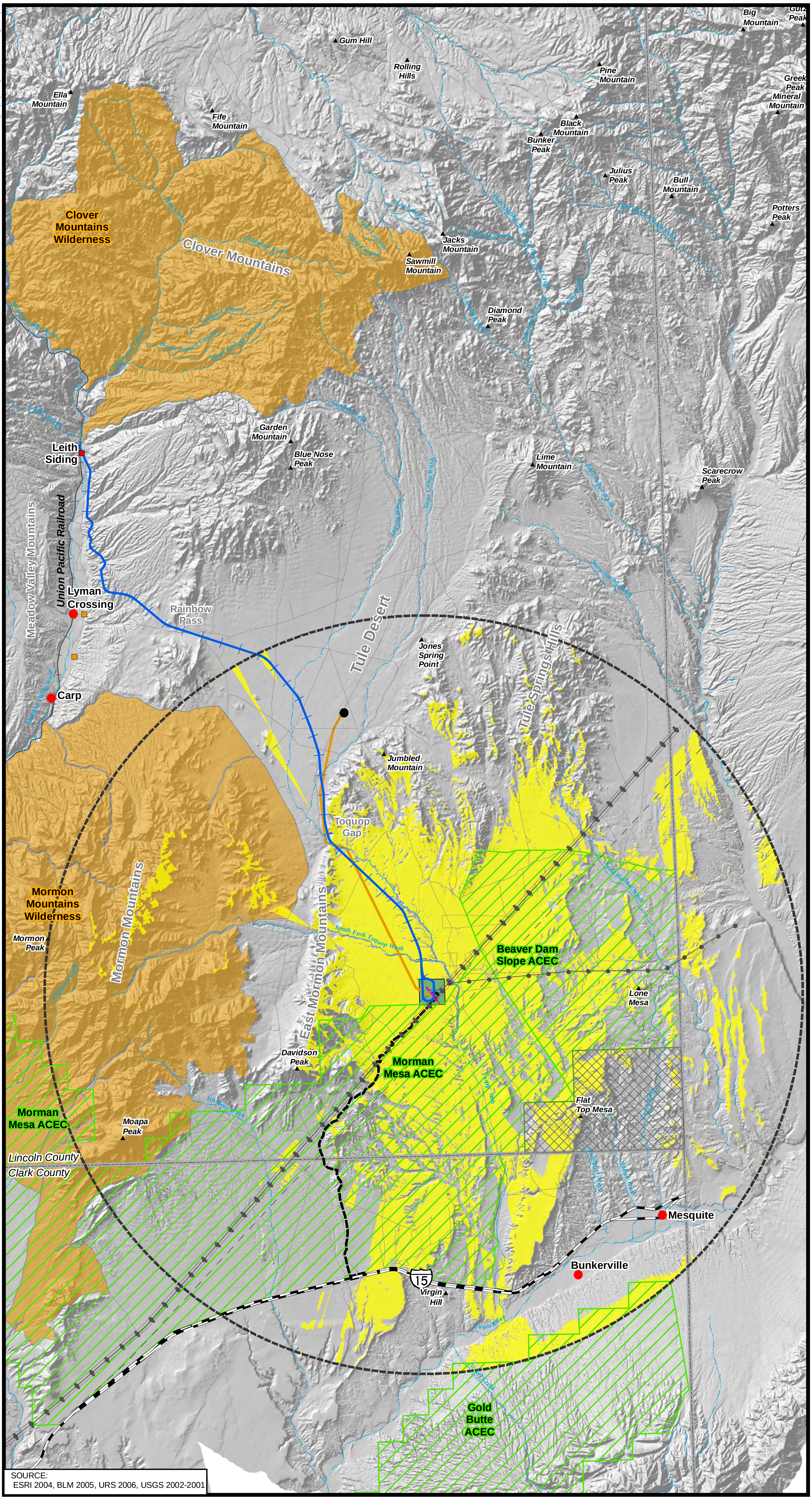
3.6.2.1 Regional Overview

The study area is located within the Basin and Range physiographic province in the southeast corner of Lincoln County, Nevada (Fenneman 1930). The topographic character of the southern portion of the Proposed Action Alternative area is flat to gently sloping hills dissected by Toquop Wash and the South Fork tributary. Seventy-five-foot-tall rock walls of the riparian canyon distinctively characterize the South Fork tributary. The East Mormon Mountains can be seen in the background to the west and the Tule Springs Hills to the north. Transmission lines cross this portion of the study area, which includes the proposed power plant site.

The middle portion of the Proposed Action Alternative, as it crosses the Tule Desert, is extremely flat. Surrounding mountains are clearly visible in all directions. The topographic character of the northern portion of the study area can be described as gently sloping hills bisected by a riparian tributary. Modifications to the area include two homes with associated outstructures to the east of Meadow Valley Wash and UPRR tracks to the west. Vegetation on surrounding hills is short and sparse.

The vegetative character of the project area is predominately Sonora-Mojave creosotebush-white bursage desertscrub dotted with Joshua trees. Riparian areas include blackband rabbit brush (*Chrysothamnus paniculatus*), desert willow, jimsonweed (*Datura wrightii)*, salt cedar (*Tamarix ramosissima*), and desert tobacco (*Nicotiana obtusifolia*). The overall area exhibits hues of tans, greens, brown-reds and grays.

The Mormon Mountains Wilderness, west and south of the Proposed Action Alternative, is visible from most locations in the project area (Map 3-4 and Map 3-5). These mountains have elevations of up to 7,300 feet; however, the East Mormon Mountains, with elevations up to 5,200 feet, would obstruct views of the power plant site from most of the Mormon Mountains. Clover Mountains Wilderness is visible from Meadow Valley Wash (refer to Map 3-5).



Views of Proposed Coal-fired Plant

Toquop Energy Project EIS
Lincoln County, Nevada

LEGEND

- Plant is Visible*
- Proposed Coal-fired Plant Visual Area of Effect
- Residence

Special Designation

- Areas of Critical Environmental Concern
- Wilderness

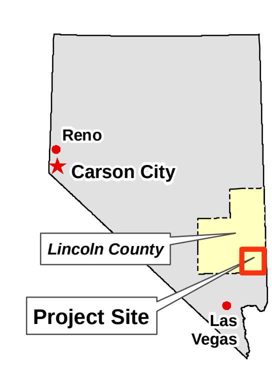
General Features

- Proposed Rail Line
- Proposed Plant Site (640 acres)
- Permitted Well Field
- Permitted Water Pipeline
- Permitted Natural Gas Pipeline and Transmission Line Interconnection
- Permitted Access Road
- Toquop Township

*Stack is 730 feet in height.

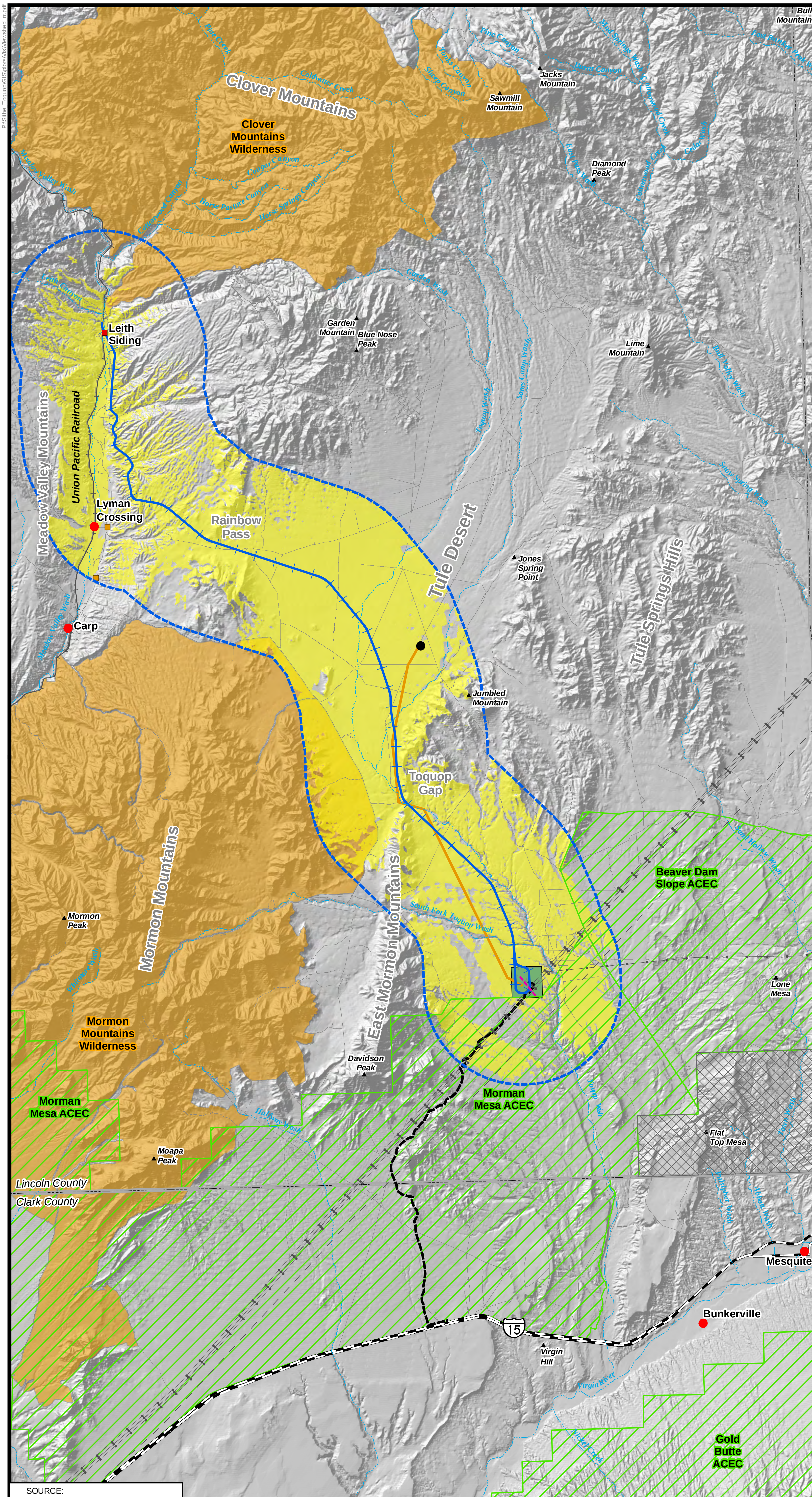
Reference Features

- Existing Road
- Interstate
- Existing Railroad
- Existing Transmission Line
- Existing Natural Gas Pipeline
- River, Stream, or Wash
- Mountain Peak
- Town
- Point of Interest



0 2 4
Miles

Map 3-4



Views of Proposed Rail Line

Toquop Energy Project EIS
Lincoln County, Nevada

LEGEND

- Rail Line is Visible*
- Proposed Railroad Line Visual Area of Effect
- Residence

Special Designation

- Areas of Critical Environmental Concern
- Wilderness

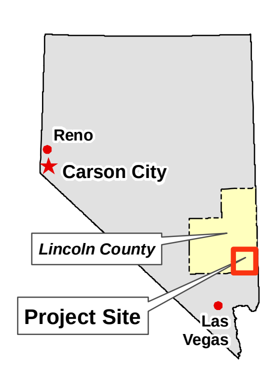
General Features

- Proposed Rail Line
- Proposed Plant Site (640 acres)
- Permitted Well Field
- Permitted Water Pipeline
- Permitted Natural Gas Pipeline and Transmission Line Interconnection
- Permitted Access Road
- Toquop Township

*Railroad is elevated 4 feet.

Reference Features

- Existing Road
- Interstate
- Existing Railroad
- Existing Transmission Line
- Existing Natural Gas Pipeline
- River, Stream, or Wash
- Mountain Peak
- Town
- Point of Interest



0 2 4
Miles

Map 3-5

3.6.2.2 Power Plant Site

Scenic quality rating units are used by BLM to describe specific natural landscape types found in the larger landscape ecotype. The designations are categorized into three levels—A, B, and C. Appendix B provides the scenic quality ratings observed within the Proposed Action Alternative's visual area of effect. Class A landscapes are associated primarily with mountainous areas.

Class B landscapes are primarily associated with rolling hills of desertscrub grasslands and riparian stringers. Class C landscapes primarily are associated with flat-to-gently sloping desertscrub grasslands. The area in the vicinity of the proposed power plant is identified as Class C. BLM currently manages the land that includes the proposed power plant site as VRM Class IV.

An analysis was conducted to assess where viewers would be located in order to see the 730-foot-tall power plant stack, the highest and most visible plant feature (refer to Map 3-5). A 15-mile viewing radius was evaluated, as distances beyond that would not be visually impacted. Travelers along I-15 could have broken views of the plant stack. Toquop Township, where future development might occur, is approximately 6 miles southeast of the proposed power plant site. Portions of the western parcels atop the Flat Top Mesa could have views of the project. However, the terrain would obstruct plant views from eastern parcels.

3.6.2.3 Proposed Rail Line

Scenic quality rating units that would be traversed by the proposed rail line are provided in Appendix B. The rail line would pass through scenic quality Class B and C areas managed by BLM as VRM Class IV.

An analysis was conducted to assess where potential viewers of the rail line might be located. A 3-mile distance from the line was analyzed; beyond that distance views would not be impacted. It is anticipated that the rail line would sustain one round-trip delivery of coal per day from Leith Siding to the power plant site; therefore, analysis was done for views of the rail line only and does not include rail cars. The majority of viewable locations are managed by BLM as VRM Class IV; however, lands in the Mormon Mountains Wilderness and Clover Mountains Wilderness, managed as VRM Class I, also would have views of the rail (refer to Map 3-5).

3.7 CLIMATE AND AIR QUALITY

3.7.1 Data Collection Methods

Climate data were obtained from the Western Regional Climate Center. Data for assessing the existing conditions of the air-quality study area were available from Federal, state, and local air-quality permitting authorities. Specifically, the Web site for the U.S. Environmental Protection Agency (EPA) Region IX provides information on stationary-air-quality emission sources in those states located in Region IX, which include Arizona, California, and Nevada, as well as attainment classifications, ambient-air concentrations, and Class I area designations (EPA 2006a). The Web sites for state (Arizona Department of Environmental Quality [ADEQ] 2006, Nevada Division of Environmental Planning [NDEP] 2006, and Utah Department of Environmental Quality [UDEQ] 2006) and local permitting authorities (Clark County Department of Air Quality and Environmental Management [CCDAQEM] 2006) provide information about applicable air-quality regulations.

Site-specific meteorological and air-quality data were obtained from a data-monitoring program station that was set up at the southeast corner of the Proposed Action Alternative site. The data were collected in accordance with a monitoring protocol that was submitted to NDEP, Bureau of Air Pollution Control. The site-specific data presented within this EIS are from the period of April 19, 2006, through February 28, 2007, and meet the EPA's and Nevada's monitoring guidance of 90 percent data-capture requirements. A final prevention of significant determination (PSD) submittal eventually would be submitted once a full year of data has been collected.

3.7.2 Existing Conditions

3.7.2.1 Climate

The Proposed Action Alternative site is located within Nevada's southeast desert region, which is characterized by relatively flat, sparsely vegetated desert terrain, punctuated by ridges and buttes (e.g., East Mormon Mountains, Jumbled Mountain, and Davidson Peak) and traversed by various washes (Toquop Wash and South Fork Toquop Wash). Surrounding areas include higher elevations with the Clover Mountains to the north, the Black Rock Mountains to the southeast, and the Mormon Range to the east. Table 3-3 summarizes meteorological conditions in and near the air-quality study area.

Table 3-3
Meteorological Conditions Within and Near the Air Quality Study Area

Monitor	Approximate Distance and Direction From Proposed Site	Winter Average	Spring Average	Summer Average	Fall Average	Annual Average/ Total
Mean Monthly Temperature Average (°F)[a]						
Bunkerville, Nevada	13 mi (21 km)/ SSE	46.5	64.0	84.7	64.9	65.0
Elgin 3 SE, Nevada	30 mi (48 km)/ NNW	43.7	58.1	80.0	62.7	61.1
Mesquite, Nevada	13 mi (21 km)/ SE	47.7	65.9	87.4	67.5	67.1
Lytle Ranch, Utah	19 mi (30 km)/ NE	43.7	60.0	78.9	54.5	59.3
Littlefield, Arizona	17 mi (28 km) / ESE	45.3	63.3	85.4	66.6	65.1
Toquop Onsite Data [c]	-	45.4	65.0	89.0	64.7	66.0
Mean Monthly Precipitation Average (inches)[a]						
Bunkerville, Nevada	13 mi (21 km)/ SSE	2.40	1.15	1.32	1.44	6.31
Carp, Nevada	20 mi (32 km)/ NW	1.95	1.10	0.80	0.88	4.73
Elgin 3 SE, Nevada	30 mi (48 km)/ NNW	4.93	4.11	2.82	2.20	14.06
Mesquite, Nevada	13 mi (21 km)/ SE	2.43	0.92	1.18	1.61	6.14
Lytle Ranch, Utah	19 mi (30 km)/ NE	4.36	2.64	1.54	2.16	10.70
Littlefield, Arizona	17 mi (28 km)/ ESE	2.13	1.98	1.54	1.50	7.15
Toquop Onsite Data [c]	-	0.41	0.00	2.35	1.30	4.06
Mean Monthly Snowfall Average (inches)[a]						
Carp, Nevada	20 mi (32 km)/ NW	0.2	0.0	0.0	0.0	0.2
Elgin 3 SE, Nevada	30 mi (48 km)/ NNW	2.4	0.1	0.0	0.2	2.7
Lytle Ranch, Utah	19 mi (30 km)/ NE	0.6	0.0	0.0	0.0	0.6
Toquop Onsite Data [c]	-	NM	NM	NM	NM	NM
Average Wind Speed (miles per hour)[b]						
Caliente Airport, Nevada	49 mi (79 km)/ NNW	2.6	4.3	4.4	2.8	3.5
Las Vegas-Nellis Airport, Nevada	60 mi (97 km)/ SW	8.0	10.2	10.0	8.0	9.0
Kingman Airport, Arizona	122 mi (196 km)/ S	7.8	10.2	10.6	8.1	9.2
Cedar City Airport, Utah	81 mi (130 km)/ NE	7.1	9.0	8.7	6.9	7.9
Toquop Onsite Data [c]	-	10.4	10.0	10.0	9.5	9.9

SOURCES: Western Regional Climate Center 2006a, 2006b

NOTES: °F = degrees Fahrenheit
mi = mile
km = kilometer
NM = not monitored
[a] For mean monthly temperature, mean monthly precipitation, and mean monthly snowfall, the period used for Bunkerville is 1919–2005, for Carp is 1949–1962, for Elgin 3 SE 2E is 1965–1985, for Mesquite is 1961–2005, for Lytle Ranch is 1988–2005, and for Littlefield is 1951–1995.
[b] For average wind speed values, averages are based on data collected between 1992 and 2002.
[c] Toquop onsite data include the period from April 19, 2006, through February 28, 2007.

The southeastern portion of Nevada has four defined seasons. In the summer, the average temperature (in Fahrenheit) ranges from the upper 70s to the mid 80s, with highs reaching the low 100s. In comparison, the average temperature in the winter is generally in the mid to high 40s (BLM 2003a).

Precipitation values tend to be highest in the winter months, ranging from 1.95 inches (Carp, Nevada) to 4.93 inches (Elgin, Nevada), and lowest in the fall months, ranging from 0.88 inches (Carp, Nevada) to 2.20 inches (Elgin, Nevada). As the data show, some of these monitors record snowfall within the winter months, but the maximum average amount of snowfall per year is still below 3 inches (BLM 2003a).

As Table 3-3 shows, wind speed tends to be highest in the spring and summer months, ranging from 4.3 miles per hour (mph) (Caliente, Nevada) to 10.6 mph (Kingman, Arizona), and lowest in the winter and fall months, ranging from 2.6 mph (Caliente, Nevada) to 8.1 mph (Kingman, Arizona). The closest monitor to the Proposed Action Alternative site is the monitor located in Caliente, Nevada. Average annual wind speeds in Caliente, Nevada, do not exceed 5 mph (Western Regional Climate Center 2006a and 2006b).

Three remote automated weather station (RAWS) monitors provide data that best represent the prevalent wind patterns within the study area (Western Regional Climate Center 2006c). These data were evaluated and the following results were ascertained:

- Wind patterns recorded at the Toquop Wash Nevada RAWS monitor, located approximately 3 miles (5 kilometers [km]) southeast of the proposed plant site, show that winds from the north occur approximately 48 percent of the year, and winds are from the southwest approximately 26 percent of the year. The remaining winds are evenly distributed from the other compass directions.
- Based on wind patterns recorded at the Badger Springs–Ivins RAWS monitor, approximately 22 miles (35 km) northeast of the proposed plant site, winds are predominantly from the south-southwest approximately 33 percent of the year and from the east approximately 23 percent of the year. The remaining winds are distributed from the other compass directions.
- The Kane Springs Nevada RAWS monitor, located approximately 37 miles (59 km) northwest of the proposed plant site, shows wind patterns that are predominantly from the north-northwest approximately 31 percent of the year and from the south approximately 30 percent of the year. The remaining winds are distributed from the other compass directions.

Figure 3-1 and Figure 3-2 present the onsite data wind rose at the 10-meter and 200-meter level, respectively. More details on additional parameters collected for use in the AERMOD model can be found in Appendix 8A – Class II Modeling Report of Air Quality Dispersion Modeling Report – Class II Area Impacts, Toquop Power Project (ENSR Corporation [ENSR]2006b). Site-specific data at the 10-meter level shows wind patterns that are predominantly from the south-southwest approximately 51 percent of the year with a wind speed greater than or equal to 10.3 meters per second and from the north-northwest approximately 30 percent of the year with a wind speed ranging between 5.1 and 7.7 meters per second. The remaining winds are distributed from the other compass directions. Site-specific data at the 200-meter level shows wind patterns that are predominantly from the south-southwest approximately 56 percent of the year and from the north-northwest approximately 19 percent of the year with wind speeds greater than or equal to 10.3 m/s occurring in multiple directions. The remaining winds are distributed from the other compass directions.

3.7.2.2 Air Quality

The existing condition of air quality within the air-quality study area is characterized using the following quantifiable indicators:

- Monitored ambient concentrations of criteria air pollutants for which National Ambient Air Quality Standards (NAAQS) are established in the Clean Air Act (CAA) and regulated by the EPA consisting of nitrogen dioxide (NO_2), carbon monoxide (CO), sulfur dioxide (SO_2), ozone (O_3), particulate matter less than or equal to 10 microns in diameter (PM_{10}), particulate matter less than or equal to 2.5 microns in diameter ($PM_{2.5}$), and lead (Pb).
- Observed levels of visibility, as a measure of air quality, which is monitored in most Class I areas (i.e., areas meeting criteria for relatively pristine air quality are designated as Class I areas under the Federal CAA).

For the purposes of evaluating air quality resource impacts associated with the Proposed Action Alternative, the air-quality study area encompasses a 31-mile (50-km) radius from all actions associated with the Proposed Action Alternative (Map 3-6). The 31-mile (50-km) radius is the area within which meteorological and air-quality data are deemed more representative of the Proposed Action Alternative site, and in which information on background sources was obtained. A 31-mile (50-km) radius was chosen to be consistent with minimum air-quality analyses required for major source air-quality permitting. Specifically, when conducting an air-quality-impact analysis for a major emission source, the analysis considers the geographical area located within at least a 31-mile (50-km) radius. The region of influence is the total area in which measurable impacts of the Proposed Action Alternative are evaluated and may extend well beyond 31 miles (50 km) from the project site.

The air-quality study area is located primarily in southern Nevada, with some portions extending into Arizona and Utah. For most of the air-quality study area, relatively complete information resources are available to support these indicators in the form of visibility data. However, only one ambient air quality monitoring station is located within 31 miles (50 km) of the Proposed Action Alternative site, which provides data for NO_2, PM_{10} and O_3. Ample data are available for the metropolitan Las Vegas area, but it is considered non-representative of the air-quality study area because of the substantial difference in the types of activities that contribute to air-quality impacts.

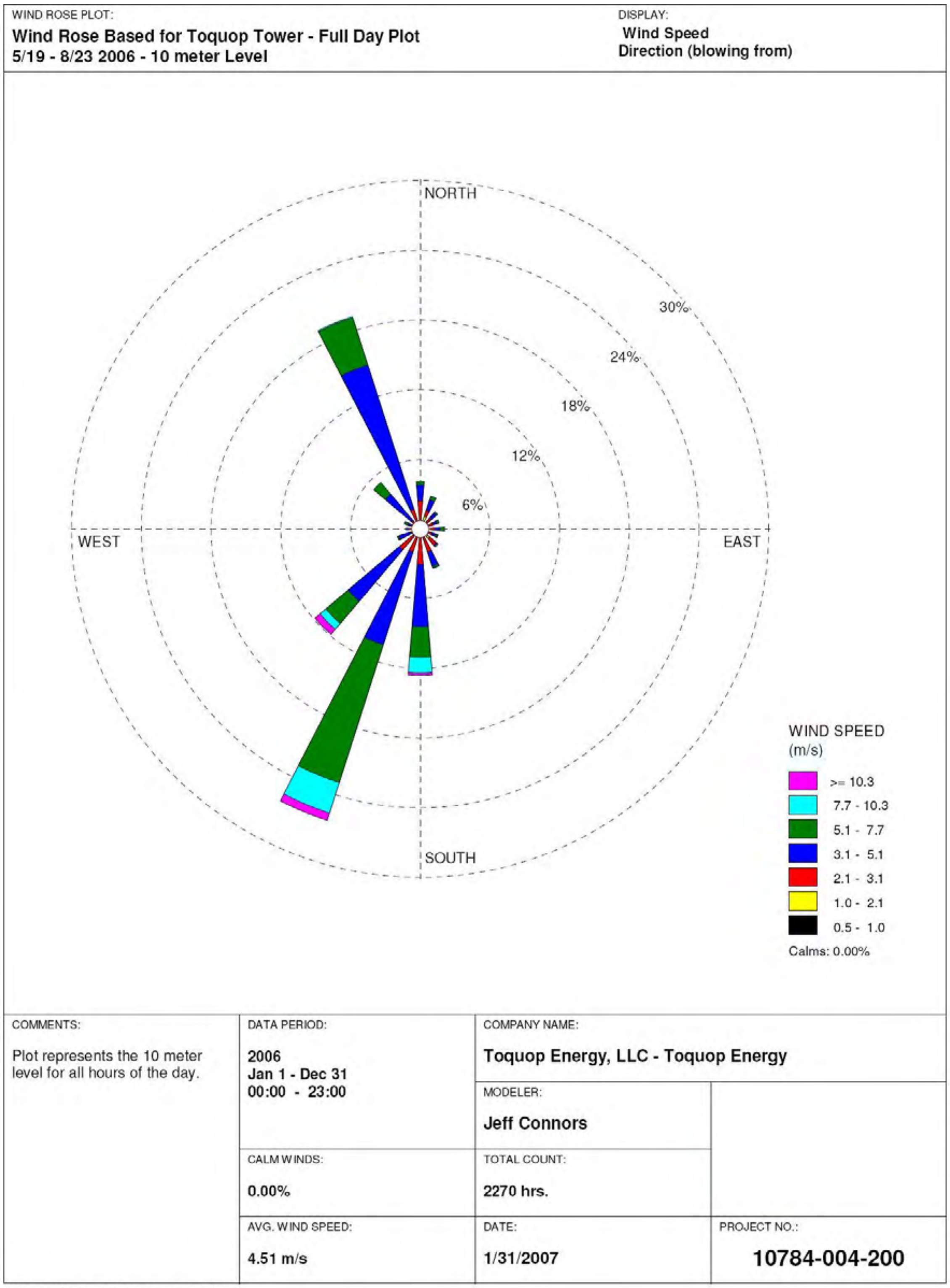
Regulations and Guidelines

The following subsections identify Federal, state, and local laws and regulations that are pertinent to the Proposed Action Alternative, evaluation of the study area, or analysis of the project impacts.

Federal Laws and Regulations. Since 1970, the Federal CAA and subsequent amendments have provided the authority and framework for EPA regulation of air-emission sources. The EPA regulations promulgated pursuant to the authority provided in the CAA establish requirements for the monitoring, control, and documentation of activities that would affect ambient concentrations of certain pollutants that may endanger public health or welfare. In particular, these regulations have the overall objective of achieving and maintaining adherence to appropriate standards for ambient air quality.

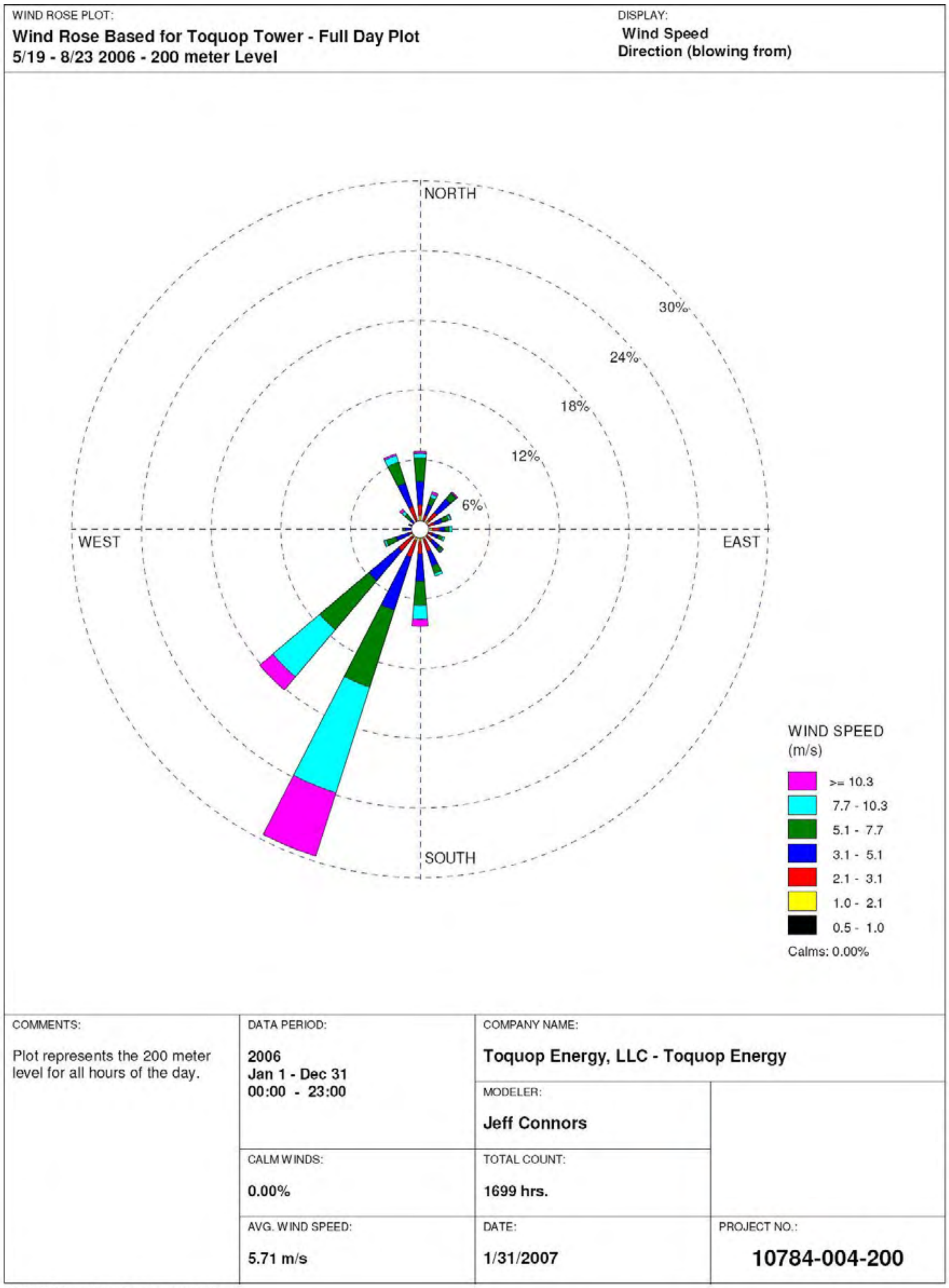
National Ambient Air Quality Standards. As mentioned above, the CAA established NAAQS, which historically have applied to six criteria pollutants—SO_2, CO, NO_2, PM_{10}, O_3, and Pb. These standards are defined in terms of threshold concentration (e.g., micrograms per cubic meter [$\mu g/m^3$]) measured as an average for specified periods of time (averaging times). Short-term standards (i.e., 1-hour, 8-hour, or

Figure 3-1
Onsite Data Wind Rose at 10-Meter Level

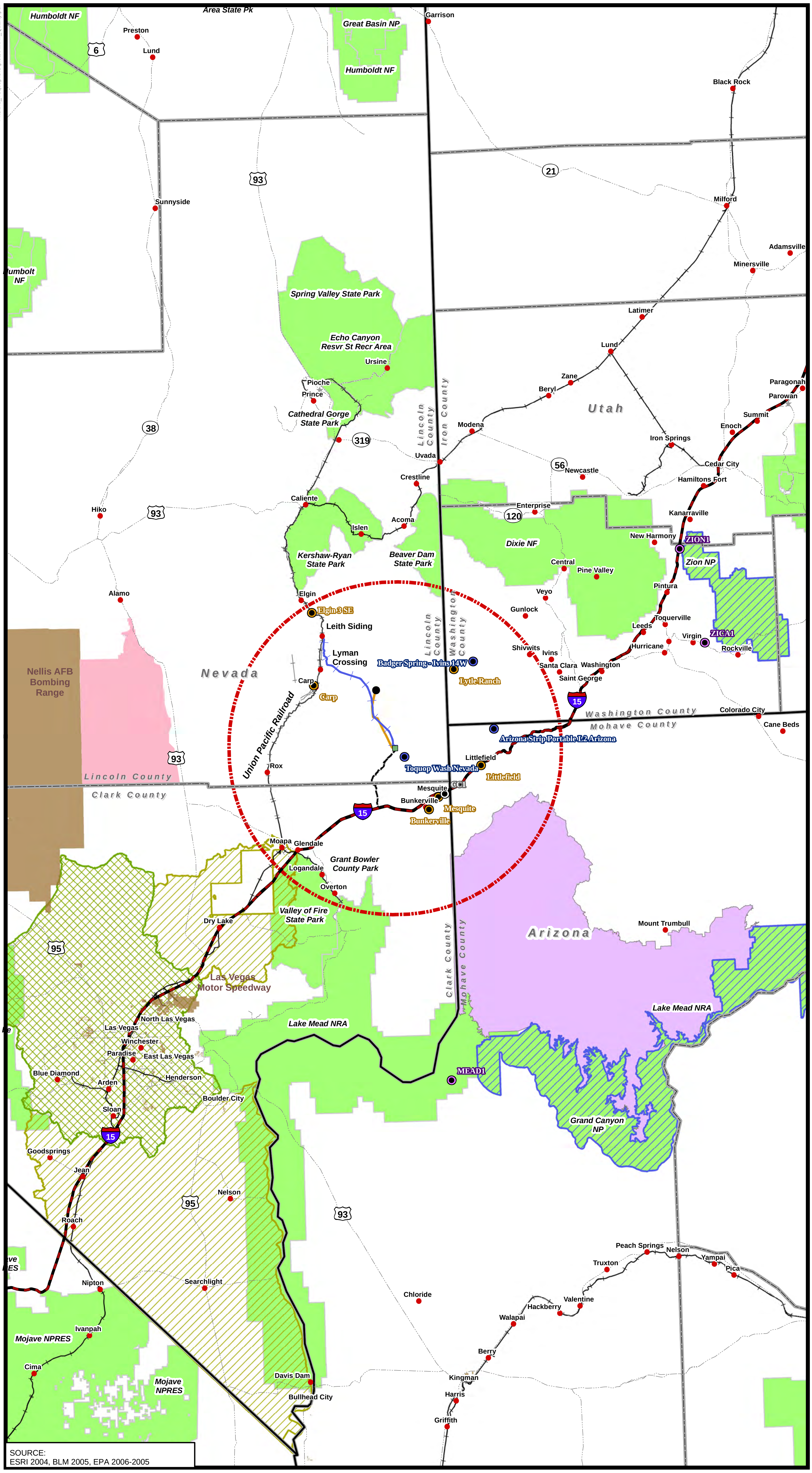


SOURCE: ENSR Corporation 2006
NOTE: m/s = meters per second

Figure 3-2
Onsite Data Wind Rose at 200-Meter Level



SOURCE: ENSR Corporation 2006
NOTE: m/s = meters per second



Air Quality

Toquop Energy Project EIS
Lincoln County, Nevada

LEGEND

Monitoring Stations
- Air Quality
- Meteorological
- RAW
- IMPROVE

Class I Areas
- Class I Areas

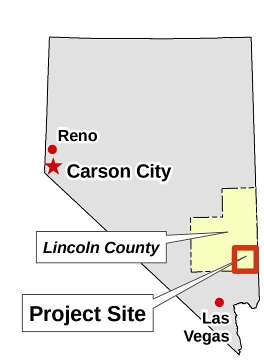
Non-Attainment Area
- Ozone (8-hour standard)
- Particulate Matter (PM10)

Surface Management
- Desert Wildlife Refuge
- Parashant National Monument

Study Area
- 50-Kilometer Distance from Plant Site

General Features
- Proposed Rail Line
- Proposed Plant Site (640 acres)
- Permitted Well Field
- Permitted Water Pipeline
- Permitted Access Road

Reference Features
- Existing Road
- Interstate
- Existing Railroad
- National Forest/State Parks
- Major Landmarks
- County Boundary
- State Boundary
- Town/Point of Interest



0 10 20
Kilometers

Map 3-6

24-hour averaging times) were established for pollutants with acute health effects; long-term standards (i.e., annual averaging times) were established for pollutants with chronic health effects. Recently, additional standards have been promulgated for 8-hour average O_3 concentrations and for 24-hour and annual $PM_{2.5}$ concentrations.

The NAAQS were set at levels to provide an ample margin of safety in protecting public health and the environment. Primary standards were adopted to protect public health, which includes "sensitive" populations, such as asthmatics, children, and the elderly. Secondary standards set limits that are intended to protect public welfare against decreased visibility as well as damage to animals, crops, vegetation, and buildings. Recently the EPA has made two significant changes to NAAQS and non-attainment area designations, as follows: (1) due to lack of evidence linking health problems to long-term exposure to coarse particle pollution the annual PM_{10} standard has been revoked effective December 17, 2006; and (2) to attain the 24-hour $PM_{2.5}$ standard the 3-year average of the 98^{th} percentile of 24-hour concentrations at each population-orientated monitor within an area must not exceed 35 µg/m^3, effective December 17, 2006. The values for the primary and secondary NAAQS are provided in Table 3-4.

Table 3-4
National Ambient Air Quality Standards

Pollutant	Averaging Period	NAAQS	
		Primary	Secondary
Sulfur dioxide (SO_2)	3-hour	—	0.5 ppm
	24-hour	0.14 ppm	—
	annual	0.03 ppm	—
Particulate matter less than or equal to 10 microns in diameter (PM_{10})	24-hour	150 µg/m^3	150 µg/m^3
Particulate matter less than or equal to 2.5 microns in diameter ($PM_{2.5}$)	24-hour	35 µg/m^3	35 µg/m^3
	annual	15 µg/m^3	15 µg/m^3
Carbon monoxide (CO)	1-hour	35 ppm	—
	8-hour	9 ppm	—
Nitrogen dioxide (NO_2)	annual	0.053 ppm	0.053 ppm
Lead (Pb)	quarterly	1.5 µg/m^3	1.5 µg/m^3
Ozone (O_3)	1-hour	0.12 ppm	0.12 ppm
	8-hour	0.08 ppm	0.08 ppm

SOURCES: U.S. Environmental Protection Agency 2006b, 2006c, 2006d, 2006e, 2006f, 2006g, 2006h, 2006i, 2006j
NOTES: µg/m^3 = micrograms per cubic meter
ppm = parts per million
NAAQS = National Ambient Air Quality Standards

Geographic areas, which may not coincide with political boundaries, are designated as attainment, non-attainment, or unclassified for each of the six criteria pollutants with respect to the NAAQS. If sufficient monitoring data are available, the EPA may designate an area as attainment if air quality is shown to meet the NAAQS. Areas in which air-pollutant concentrations exceed the NAAQS are designated non-attainment for specific pollutants and averaging times. Typically, non-attainment areas are urban regions and/or areas with higher-density industrial development. Because the status of an area is designated separately for each criteria pollutant, one geographic area may have all three classifications.

Approximately 62 miles (100 km) from the Proposed Action Alternative site, the Las Vegas Valley is designated as non-attainment with respect to the following NAAQS: 8-hour O_3, CO and PM_{10}. More specifically all of Clark County is listed as serious nonattainment for CO, which means the area has a design value for CO of 16.5 parts per million (ppm) or greater, while portions of Clark County are listed as serious non-attainment for PM_{10} and as subpart I non-attainment for 8-hour O_3. The remaining portions of the air-quality study area are designated as attainment or unclassified. An unclassified designation indicates that the status of attainment has not been verified through data collection. When permitting new sources, an unclassified area is treated as an attainment area.

Under the Federal CAA, areas meeting similar criteria for relatively pristine air quality may be designated as Class I areas. Specific provisions are included in Federal, state, and county air-quality regulations to preserve the pristine air quality in Class I areas. One pristine quality airshed, the Grand Canyon National Park Class I Wilderness, is located approximately 59 miles (95 km) southeast of the Proposed Action Alternative site (refer to Map 3-6). The next closest Class I areas include Zion National Park and Bryce Canyon National Park, which are located in Utah, more than 62 miles (100 km) northeast from the Proposed Action Alternative site.

All areas not designated as Class I are, by default, identified as Class II areas. Certain areas deserving of preservation, including Wilderness established by the Wilderness Act of 1964, may be designated as Class II Wilderness, and state or county requirements or permitting policies may be promulgated to protect the air quality in these areas. Class III areas are specially designated areas within which a greater amount of new air pollution is allowed. However, no Class III areas have ever been designated in the United States.

New Source Review (NSR)/PSD Permitting Program. Since the project would be a "major source" of criteria air pollutants, it is therefore subject to the Federal NSR (preconstruction) regulations. A portion of these rules applicable in attainment areas is the PSD regulations. PSD review is a pollutant-specific review and a federally mandated program. It applies to new emission sources in which the area is designated as attainment or unclassified and applies only to pollutants for which a project is considered major. In order to be subject to PSD review, the potential to emit for a criteria pollutant must exceed the PSD thresholds of 100 tons per year if the source is one of the 28 named source categories or 250 tons per year for all other sources. The Toquop Energy Project is a fossil-fuel steam-generating plant with heat input greater than 250 million British thermal units per hour, which is one of the 28 named categories. Therefore the applicable PSD threshold is 100 tons per year. The main requirements of the PSD review process are to demonstrate that the project would incorporate Best Available Control Technology, evaluate existing ambient-air quality in the area of the project, demonstrate that the project would not cause or significantly contribute to a violation for the NAAQS or PSD increments, determine the impacts on soils, vegetation and visibility at Class I areas, and determine the air-quality impacts resulting from the indirect growth associated with the project.

New Source Performance Standards (NSPS). The NSPS promulgated by the EPA pursuant to Section 111 of the CAA establishes emission limitations, work-practice standards, and provisions for monitoring, recordkeeping, and reporting applicable to new stationary sources. The NSPS are codified at 40 Code of Federal Regulations (CFR) Part 60. Since the Toquop Energy Company, LLC (Toquop Energy) facility would be capable of combusting more than 73 megawatts (250 million British thermal units per hour) of heat input from fossil fuel and construction is to be commenced after September 18, 1978, the NSPS set forth in 40 CFR Part 60, Subparts A (General Provisions) and D (Standards of Performance for Electrical Utility Steam Generating Units Constructed After September 18, 1978), are applicable to the Proposed Action Alternative.

National Emission Standards for Hazardous Air Pollutants. The National Emission Standards for hazardous air pollutants include emission limitations, work-practice standards, and provisions for monitoring, recordkeeping, and reporting for pollutants not covered by the NAAQS. These standards were promulgated pursuant to Section 112 of the CAA and are codified at 40 CFR Parts 61 and 63. The Part 63 standards apply to specific source categories and require affected facilities to implement Maximum Achievable Control Technology for specific hazardous air pollutants specified in each subpart.

A few subparts of Part 63 would appear to potentially apply to the Proposed Action Alternative; however, electric-utility steam-electric generating units are exempted from these requirements.

CAA Title IV Acid Rain Program. Title IV of the CAA established the Federal Acid Rain Program, which aimed to reduce SO_2 emissions from fossil-fuel-fired electric generation plants to 50 percent of 1980 levels. The implementing EPA regulations are codified at 40 CFR Parts 72 through 78. The Acid Rain Program is a market-based initiative managed by the EPA Clean Air Markets Division. The primary components of the program include acid-rain permits, marketable SO_2 "allowances," and comprehensive requirements for continuous emissions monitoring systems (CEMS). The Toquop Energy facility would be a coal-burning electrical generation plant subject to this Federal program. Consequently, Toquop Energy is required to file an acid-rain permit application and a compliance plan to the Title V permitting authority, receive SO_2 allowances and registration under the program, and to install, certify, and operate a sophisticated computerized CEMS for SO_2, nitrogen oxide, a diluent stack gas (oxygen or carbon dioxide), stack flow, and opacity. The regulations pertaining to CEMS, codified at 40 CFR Part 75, include extensive installation, certification, data validation, system quality-assurance checks, and quarterly electronic data submittals to the Clean Air Markets Division.

CAA Title V Operating Permit Program. Under the Federal Operating Permit program established by Title V of the 1990 CAA Amendments, Federal, state, and local agencies delegated the authority to administer and enforce the program shall issue air-quality operating permits to major stationary sources of air-pollutant emissions. The implementing EPA regulations are codified at 40 CFR Parts 70 and 71. Unlike the preconstruction review type of permit, as required under the Federal NSR/PSD program, Title V permits simply serve to identify all applicable requirements under the act, create a "permit shield," and establish requirements for monitoring, recordkeeping, reporting and annual compliance certifications. The NDEP was delegated authority to administer the Federal Title V permit program in all areas of Nevada except Clark County. Therefore, the Toquop Energy facility would be required to submit a Title V air permit application to the NDEP within one year after commencement of initial operation (i.e., "first firing").

Clean Air Interstate Rule (CAIR). The EPA issued the CAIR to assure that Americans continue to breathe cleaner air by reducing air pollution that moves across state boundaries. CAIR sets a permanent cap on SO_2 and nitrogen oxides across 28 eastern states and the District of Columbia that contribute to unhealthy levels of ground level O_3, fine particulate matter, or both in downwind states. The Toquop Energy Project is to be located in southeastern Nevada, which is not one of the 28 states identified in the rule. Therefore the CAIR rule does not apply to the Toquop Energy facility.

Clean Air Mercury Rule (CAMR). On May 18, 2005, the EPA promulgated the CAMR, which sets a permanent cap on mercury (Hg) emissions from coal-fired power plants, making the United States the first country in the world to regulate utility Hg emissions. The implementing regulations are set forth at 40 CFR §60.45Da – Standard for Mercury. The CAMR sets standards of performance and establishes a cap-and-trade program to reduce nationwide Hg emissions in two phases. The first cap has been set at 38 tons, while the second cap would reduce emissions to 15 tons by 2018. States were given until November 17, 2006, to impose stricter controls. Mercury allowances or credits then would be distributed to each state and two tribes by the EPA. Under CAMR, a facility must hold enough allowances for the Hg emitted in any given year. Pursuant to 60.45Da(2)(i), an affected unit located in a county-level geographical area receiving less than or equal to 25 inches per year mean precipitation (based on U.S. Department of Agriculture 30-year data) may not discharge into the atmosphere in excess of 97×10^{-6} pounds Hg per megawatt hour or 0.097 pounds Hg per gigawatt hour on an output basis. The Toquop Energy facility would be subject to the CAMR.

State Laws and Regulations

The NDEP has been delegated the authority to administer and enforce the CAA and Federal and state regulations and standards in Lincoln County, Nevada, where the Proposed Action Alternative site would be located. Portions of Clark County, Nevada, Arizona, and Utah are located within 31 miles (50 km) from the Proposed Action Alternative site. The CCDAQEM, ADEQ, and UDEQ enforce air-quality regulations in those areas.

Nevada Laws and Regulations. Nevada Department of Environmental Protection air-quality regulations are codified in the Nevada Administrative Code (NAC) 445B.001 through 445B.899 (Nevada Department of Environmental Protection 2006). These regulations establish ambient-air-quality standards that are equivalent to the NAAQS. The NAC also includes promulgated emission limits and workplace standards for specific source categories that may be applicable to certain activities within the air-quality study area and to the Proposed Action Alternative. NAC 445B.210 includes requirements that reasonable precautions be taken to assure that fugitive-dust emissions are minimized when conducting construction activities. The PSD application was submitted to the NDEP, which is the agency that would issue the permit. The Proposed Action Alternative would be required to obtain a Class I-B operating permit before construction activities can begin (445B.3361). Other air-control regulations that would need to be addressed are the various general provisions (445B.220 through 445B.283) dealing with visible emissions, excess emissions, notification of construction, notification of initial startup and various monitoring systems requirements. The Toquop Energy facility also may have to comply with NDEP's Mercury Air Emissions Control Program (445B.3611 thru 445B.3689) and the Nevada Clean Air Mercury Rule Program (445B.3711 thru 445B.3791).

Clark County Laws and Regulations. Portions of Clark County, Nevada are located within 31 miles (50 km) of the proposed facility site. The CCDAQEM air quality regulations are provided in Sections 00 through 94 of the Clark County regulations. These regulations include promulgated emission limits and workplace standards for specific source categories that may be applicable to certain activities within the air-quality study area. The NDEP would be required to consult with CCDAQEM, pursuant to the "other affected states" provisions of the PSD rules, prior to issuance of a final preconstruction permit.

Arizona Laws and Regulations. Portions of Arizona are located within 31 miles (50 km) of the proposed facility site. ADEQ air quality regulations are provided in Title 18, Chapter 2 of the Arizona Administrative Code (Arizona Secretary of State 2006). These regulations establish ambient-air-quality standards for the state that are equivalent to the NAAQS. The Arizona Administrative Code also includes promulgated emission limits and workplace standards for specific source categories that may be applicable to certain activities within the air quality study area. The NDEP would be required to consult with ADEQ, pursuant to the "other affected states" provisions of the PSD rules, prior to issuance of a final preconstruction permit.

Utah Laws and Regulations. Portions of Utah are located within 31 miles (50 km) of the proposed facility site. UDEQ air-quality regulations are provided in Title R307 of the Utah Administrative Code (UDEQ 2006). These regulations include promulgated emission limits and workplace standards for specific source categories that may be applicable to certain activities within the air-quality study area. The NDEP would be required to consult with UDEQ, pursuant to the "other affected states" provisions of the PSD rules, prior to issuance of a final preconstruction permit.

3.7.2.3 Existing Emission Sources

Four permitted major sources of air-pollutant emissions are located within 31 miles (50 km) of the Proposed Action Alternative site (Table 3-5). A major source is categorized as a source that has the potential to emit more than 100 tons per year of a criteria pollutant or more than 10 tons per year of any hazardous air pollutant or more than 25 tons per year of any combination of hazardous air pollutants.

Table 3-5
Major Sources Located Within and Near the Air Quality Study Area

Facility Name	Facility Type	Location	Approximate Distance from Proposed Site	Direction from Proposed Site	Permitting Authority
Lasco Bathware Inc.	Plastic plumbing fixture manufacturing	Moapa Valley, Nevada	29 mi (47 km)	SW	CCDAQEM
Royale Cement Company	Portland cement manufacturing	Logandale, Nevada	27 mi (43 km)	SW	CCDAQEM
Reid Gardner Station	Electric utility	Moapa, Nevada	29 mi (47 km)	SW	CCDAQEM
Simplot Silica	Industrial sand	Overton, Nevada	30 mi (48 km)	SSW	CCDAQEM

SOURCE: U.S. Environmental Protection Agency 2006a
NOTE: Emissions include criteria pollutants (O_3, CO, NO_2, SO_2, particulate matter, Pb) and hazardous air pollutants.
mi = miles
km = kilometer
CCDAQEM = Clark County Department of Air Quality and Environmental Management

Minor sources located within 31 miles (50 km) of the Proposed Action Alternative site include smaller industrial and commercial operations. A minor source is categorized as a source that has the potential to emit less than 100 tons per year of a criteria pollutant or less than 10 tons per year of any hazardous air pollutant or less than 25 tons per year of any combination of hazardous air pollutants. The prevalent types of portable sources include rock and construction-product industries (e.g., portable crushing and screening plants), hot-mix asphalt plants, and concrete-batch plants (CCDAQEM 2006).

Mobile source emissions from vehicles consist of volatile organic compounds, NO_2, CO, and PM_{10}, which may warrant consideration in an assessment of ambient air quality in the air-quality study area. Consideration of major traffic routes located within the air-quality study area may be reasonably limited to the I-15 corridor, which extends laterally across the southern portion of the air-quality study area. Currently no railroad or access roads exist on the proposed site.

3.7.2.4 Visibility Conditions

The Cooperative Institute for Research in the Atmosphere operates a network of visibility monitoring stations in or near Class I areas, and publishes Interagency Monitoring of Protected Visual Environments (IMPROVE) data. The purpose is to identify and evaluate patterns and trends in regional visibility. Data from four IMPROVE monitors within and near the air-quality study area show that fine ($PM_{2.5}$) and coarse (PM_{10}) particulates were the largest contributors to the impairment of visibility. These particulates impact the standard visual range from each monitor location. The standard visual range is the distance that can be seen on a given day. Standard visual ranges for each of the four monitors on their best (highest visibility), intermediate (average visibility), and worst (lowest visibility) days are provided in Table 3-6.

Table 3-6
Standard Visual Ranges from IMPROVE Monitors Near the Air-Quality Study Area

Monitor [1]	Direction from Proposed Action Alternative Site	Best Visibility Days	Intermediate Visibility Days	Worst Visibility Days
Bryce Canyon National Park, Utah	ENE	148 mi (239 km)	110 mi (177 km)	74 mi (119 km)
Meadview, Arizona	SSE	117 mi (189 km)	102 mi (165 km)	65 mi (105 km)
Zion Canyon, Utah	ESE	132 mi (212 km)	95 mi (153 km)	63 mi (102 km)
Zion National Park, Utah	ESE	173 mi (279 km)	116 mi (186 km)	77 mi (124 km)

SOURCE: Interagency Monitoring of Protected Visual Environments 2006
NOTES: IMPROVE = Interagency Monitoring of Protected Visual Environments
[1] The timeframe of the data for each of the monitors is as follows: Bryce Canyon National Park (2000-2004); Meadview (2004), Zion Canyon (2004); Zion National Park (2001-2003).
mi = miles
km = kilometers

As evidenced in this table, Zion National Park, located on the eastern edge of the air-quality study area, experienced the highest standard visual ranges in each category. The two monitors that demonstrated the worst standard visual range are Meadview and Zion Canyon.

3.7.2.5 Air-Quality Monitor Data

One ambient-air-quality monitoring station is located at Mesquite, Nevada, approximately 13 miles (21 km) southeast of the Proposed Action Alternative site. This station measures ambient concentrations of NO_2, PM_{10}, and O_3. Ambient-air-pollutant concentration data for this monitor, as reported by the EPA, are summarized in Table 3-7.

Table 3-7
Air-Quality Monitor Data from the Air-Quality Study Area

Pollutant	Averaging Period	Measured Concentration			Primary NAAQS
		2003	2004	2005	
PM_{10}	24-hour	254 μg/m^3	134 μg/m^3	316 μg/m^3	150 μg/m^3
	Annual	26 μg/m^3	22 μg/m^3	26 μg/m^3	50 μg/m^3
Nitrogen dioxides (NO_2)	1-hour	0.052 ppm	0.045 ppm	0.049 ppm	-
	Annual	0.009 ppm	0.007 ppm	0.007 ppm	0.053 ppm
Ozone (O_3)	1-hour	0.085 ppm	0.088 ppm	0.106 ppm	0.12 ppm
	8-hour	0.080 ppm	0.084 ppm	0.092 ppm	0.08 ppm

SOURCE: U.S. Environmental Protection Agency 2006k
NOTES: PM_{10} = particulate matter less than or equal to 10 microns
μg/m^3 = micrograms per cubic meter
ppm = parts per million

As is evidenced in this table, annual NO_2, 1-hour O_3, and annual PM_{10} concentrations were below the NAAQS. However, the maximum recorded 8-hour O_3 and 24-hour PM_{10} concentrations were above the NAAQS.

The EPA determines there has been an 8-hour O_3 NAAQS exceedance when the fourth highest value in a given year, rounded to the nearest 0.01 ppm, exceeds the primary NAAQS. There were no monitored O_3 exceedances in 2003. In 2004 the highest maximum 8-hour O_3 concentration was above the NAAQS, but all other values for this year were less than the NAAQS. In 2005, the highest and second highest maximum 8-hour O_3 concentrations were above the NAAQS, but all other values for that year were less than the NAAQS. In each of those years, the fourth highest value, when rounded to the nearest 0.01 ppm, did not exceed the NAAQS. Therefore, no 8-hour O_3 NAAQS exceedances were deemed to have occurred at the Mesquite, Nevada, monitor during 2003 through 2005.

The EPA determines that there has been a 24-hour PM_{10} NAAQS exceedance when the number of days that the PM_{10} concentration is above the NAAQS is greater than one. In 2003 and 2005, the highest maximum 24-hour PM_{10} concentration was above the NAAQS. In both years, only the highest maximum 24-hour PM_{10} concentration was above the NAAQS. All other values for each of those years were less than the 24-hour PM_{10} NAAQS. Therefore, no 24-hour PM_{10} NAAQS exceedances were deemed to have occurred at the monitor during 2003 through 2005.

Onsite background air-quality concentrations were monitored concurrent with the onsite meteorological data. These background values would be added to the modeled maximum impacts to obtain estimates of total ambient-air-quality concentrations for comparison against the NAAQS, and are presented in Chapter 4. The highest monitored background concentrations of NO_2, SO_2, PM_{10}, and Pb are presented below in Table 3-8.

As is evidenced in this table, the highest annual monitored concentrations for NO_2; 3-hour, 24-hour, and annual SO_2; 24-hour PM_{10}; and quarterly Pb were all below the NAAQS.

Table 3-8
Highest Monitored Onsite Background Concentrations

Pollutant	**Averaging Period** [1]	**Measured Concentration** ($\mu g/m^3$)	**Primary NAAQS** ($\mu g/m^3$)
Nitrogen oxides (NO_2)	Annual	8.5	100
Sulfur dioxide (SO_2)	3-Hour	28.0	-
	24-Hour	19.1	365
	Annual	7.1	80
PM_{10}	24-hour	37.1	150
	Annual	26.6	Revoked
Lead (Pb)	Quarterly	0.002	1.5

SOURCE: ENSR Corporation 2006c
NOTES: [1] Data based on six months (May 2006 – October 2006) of monitoring at the Toquop Energy Project site.
$\mu g/m^3$ = micrograms per cubic meter
PM_{10} = particulate matter less than or equal to 10 microns

3.8 NOISE

3.8.1 Data Collection Methods

Section 3.6.2 in the 2003 EIS addressed existing noise sources and levels in the vicinity of the Proposed Action Alternative and provided the basis for the characterization of existing conditions. The noise and vibration resource area potentially is affected by the Proposed Action Alternative differently from the previously proposed gas-fired project for the following reasons:

- The proposed coal-fired power plant has a different and larger site plan than the previously analyzed gas-fired plant to accommodate the coal and coal-handling facilities (which are also noise sources).
- A rail line would be constructed for transporting coal to the power plant site. This component of the project (and the alternative rail line location) would traverse areas not previously evaluated regarding noise or vibration issues.

Simply defined, noise is "unwanted sound." The sound may be unwanted for a variety of personal or societal reasons. In terms of environmental impact analysis, the sound or noise must not be only audible but must unduly and substantially interfere with desirable activities. A brief discussion of noise was presented in the 2003 EIS.

An assessment of the potential for a project to result in adverse noise effects requires an evaluation of the following basic components:

- **Noise-Sensitive Receptor(s)**. With respect to human activities, these are typically residential areas, but also include passive parks and monuments, schools, hospitals, churches, and libraries. The critical questions are whether any of these land uses are present in the vicinity of the project, and if so, whether they are close enough to be affected adversely by project noise. There would be standards for noise protection for plant employees.
- **"Transmission Path" or Medium**. For sound or noise, this is most often the atmosphere (i.e., air). For vibration, the medium is the earth or a structure. The transmission path must support the free propagation of the small vibratory motions comprising the sound and vibration energy. Barriers and/or discontinuities that attenuate the flow of sound or vibration energy may compromise the path.
- **Source**. The sources of sound and vibration are any generators of small back-and-forth motions that transfer their motional energy to the medium where it is propagated. The acoustic characteristics of the source are very important. Sources must generate sound or vibration of sufficient strength, appropriate pitch, and duration such that the sound or vibration may be perceived and is capable of causing adverse effects. The new sources of project noise/vibration are discussed further in Chapter 4.

Without a sensitive receptor located relatively close to project alternatives, there can be no adverse noise or vibration effects. This is why the EIS methodologies used by the U.S. Department of Transportation's Federal Railroad Administration (2005) and Federal Transit Administration (2006) use a simple "screening distance" criteria as the first test of whether noise or vibration impact is likely to occur.

Similarly, if the airborne "path" between the source and the receptor has natural landform or manmade obstructions, or there are discontinuities or non-efficient soil propagation characteristics in the vibration path, or the distance between receptor and source is very large for either air or ground pathways, the sound and/or vibration would be reduced substantially and of insufficient strength to cause adverse effects (or be perceived).

3.8.2 Existing Conditions

3.8.2.1 Results of Previous Analysis

According to the 2003 EIS, the existing noise environment in the vicinity of the Proposed Action Alternative is consistent with its undeveloped and generally uninhabited nature. The sound levels range from 25 A-weighted decibels (dBA) to 50 dBA. The plant site is located many miles from any developed urban areas or sensitive receptors.

3.8.2.2 Power Plant Site

The proposed coal-fired power plant has a different and larger site plan than the previously analyzed gas-fired plant. However, the additional land is within the area previously analyzed in the 2003 EIS and the same conclusions regarding noise apply. Specifically, the existing noise environment is the same for the expanded plant area. Also, no noise- or vibration-sensitive receptors are located in proximity to the additional machinery associated with onsite movement and unloading of the coal-supply train (e.g., shakeout); transport and onsite stockpiling of coal, limestone, or other materials; and mechanized processing (e.g., pulverization, onsite conveyance).

3.8.2.3 Proposed Rail Line

A new rail line would be constructed to allow a train to transport coal from the UPRR main line at or near Leith Siding to the plant site approximately 31 miles to the southeast. Based on evaluation of satellite imagery and field reconnaissance in the area that would be traversed by the proposed rail line, the land use appears to be predominantly of a similar nature to that of the previously analyzed project site, namely undeveloped land with a typically low existing noise environment and no noise- or vibration-sensitive land uses in proximity to the railroad line route. The sound levels are expected to range from 25 dBA to 50 dBA. The only difference is in the vicinity of the line's connection to the existing UPRR line where train activity on the main track presently contributes to elevated sound levels. The project area occasionally is subject to short-duration but noisy overflights by military airplanes and helicopters.

The only perceptible ground vibration in the area of the proposed rail line is likely to be found within approximately 100 feet of the existing UPRR line.

3.8.2.4 Regulatory Setting

There are a number of laws and guidelines at the Federal level relevant to the assessment of ground transportation noise and vibration impacts. These include the following:

- National Environmental Policy Act of 1969 (42 United States Code [U.S.C.] 4321, et. seq.) (PL-91-190) (40 CFR 1506.5)
- Noise Control Act of 1972 (42 U.S.C. 4910)
- Federal Transit Administration Guidelines (FTA-VA-90-1003-06, May 2006; supersedes DOT-T-95-16, April, 1995)
- Federal Railroad Administration Guidelines (Report No. 293630-1, December 1998)
- Occupational Health and Safety Administration Occupational Noise Exposure; Hearing Conversation Amendment (Federal Register 48(46), 9738-9785)
- EPA Railroad Noise Emission Standards (40 CFR 201)
- Federal Railroad Administration Railroad Noise Emission Compliance Regulations (49 CFR 210)
- Federal Railroad Administration Final Rule on the Use of Locomotive Horns at Highway-Rail Grade Crossings (49 CFR Parts 222 and 229)
- U.S. Surface Transportation Board Environmental Rules (49 CFR 1105.7(6))

There are no BLM noise regulations applicable to the project area, or specific noise regulations contained in BLM's Caliente Management Framework Plan (BLM 1999). However, during the project approval process, compliance with the Noise Control Act are responsibilities of the proponent. The Federal Railroad Administration and EPA noise-emission criteria for locomotives and rail cars, and the new Federal Railroad Administration regulation governing the sounding of locomotive warning horns, along with the Occupational Health and Safety Administration rules, are the primary Federal noise regulations applicable to operation of the proposed rail line.

There are no State of Nevada or local-jurisdiction noise regulations or standards applicable to the Proposed Action Alternative (Lincoln County Zoning Ordinance or Washoe County Comprehensive Plan).

3.9 GEOLOGY, SOILS, AND MINERALS

3.9.1 Data Collection Methods

The soils at the power plant site, along the proposed rail line route, and an approximately 1-mile-wide study area surrounding the project area are evaluated. Information on soils was acquired from the U.S. National Resource Conservation Service Web Soil Survey. The Web Soil Survey application contains nationwide soil information digitized from printed soil surveys as well as the State Soil Geographic Database and the Soil Survey Geographic Database. The project area is specifically covered under the National Resource Conservation Service Soil Survey of Lincoln County, Nevada, South Part (National Resource Conservation Service 1990).

Data on geology and minerals were collected and reviewed for southern Lincoln County, with an emphasis on the project area. The data sources include the United States Geological Survey (USGS) maps and online Mineral Resource Data System databases, the BLM LR2000 System Land and Mineral Records (BLM 2007b), the Fluid Minerals Potential Report for the Ely BLM District RMP prepared by ENSR (ENSR 2004a), the Minerals Potential Report for the Ely BLM District RMP prepared by ENSR (ENSR 2004b), and the 2003 EIS for the Toquop Energy Project issued by BLM (BLM 2003a). These reports were reviewed, and existing and potential mineral resources were analyzed for the study area.

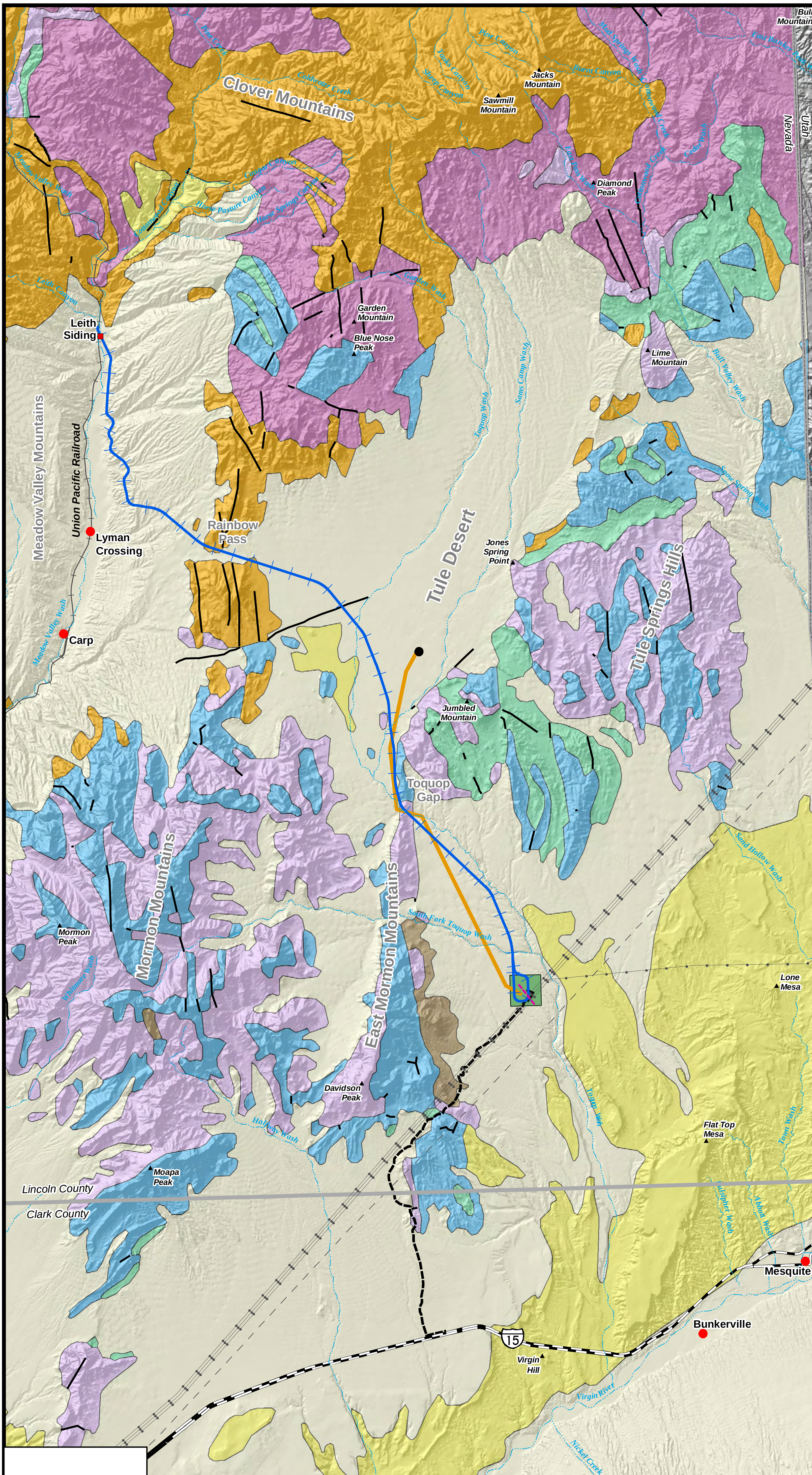
3.9.2 Existing Conditions

3.9.2.1 Regional Overview

The project area is located in the southeastern corner of Lincoln County, Nevada. The project area includes the low hills around Rainbow Pass, the low-lying Tule Desert, and the gently southward-sloping valley of Toquop Wash. These features are situated between the Clover Mountains to the north, the Mormon Mountains to the west, and the Tule Springs Hills to the east.

The project area is located within the Basin and Range physiographic province, which covers a broad area of the western United States. The Basin and Range province is typified by north-south trending mountain ranges and valleys formed by periods of compression and extension resulting in geologic features known as horsts and grabens, which create mountains and valleys. The mountain ranges in Lincoln County are composed of stratigraphic units that range in age from late Precambrian to Tertiary (ENSR 2004a, 2004b). Most of the crustal compression (mountain building) occurred during the Mesozoic period, while the regional extension occurred during the middle to late Tertiary period. The result of the extension was the north-south-trending valleys and mountain ranges separated by typically normal faults. The Mormon Mountains, East Mormon Mountains, and Tule Springs Hills primarily are composed of limestone and dolomite ranging in age from Cambrian to Pennsylvanian. The low hills between those mountains contain Permian to Triassic limestones, and red-bed sandstone, siltstone, and shale. The intermountain basin fill materials are composed primarily of Quaternary alluvial deposits composed of silt, sand, and coarse gravel (Map 3-7).

The project area includes the Meadow Valley Mountains to the west of Leith Siding and Lyman Crossing; the Mormon Mountains, Clover Mountains, East Mormon Mountains, and Tule Desert in the central portion of the project area; and Toquop Wash and the Tule Springs Hills in the eastern portion of the project area. Elevations in the project area range several thousand feet from the valley floor to the mountain top. The geology of the project area is typified by Devonian through Triassic and Tertiary lithologic units including dolomite, limestone, shale, and siltstone, including the well-known Triassic



Geology

Toquop Energy Project EIS
Lincoln County, Nevada

LEGEND

Geology

- Alluvial and playa deposits
- Upper volcanic rocks, 6-17 Ma
- Tuffaceous sedimentary rocks, 6-17 Ma
- Lower volcanic rocks, mostly 17-43 Ma
- Sedimentary, volcanic, and intrusive rocks, Mesozoic
- Carbonate and other sedimentary rocks, upper Paleozoic
- Metamorphic and intrusive rocks, Early and Middle Proterozoic
- Carbonate and other sedimentary rocks, lower Paleozoic and Late Proterozoic
- Fault

General Features

- Proposed Rail Line
- Proposed Plant Site (640 acres)
- Permitted Well Field
- Permitted Water Pipeline
- Permitted Natural Gas Pipeline and Transmission Line Interconnection
- Permitted Access Road

Reference Features

- Existing Road
- Interstate
- Existing Railroad
- Existing Transmission Line
- Existing Natural Gas Pipeline
- River, Stream, or Wash
- Mountain Peak
- Town
- Point of Interest

Reno
Carson City
Lincoln County
Project Site
Las Vegas

0 2 4
Miles

Map 3-7

Chinle and Moenkopi Formations, sandstone, tuffaceous sedimentary rocks, and younger alluvial fan deposits (refer to Map 3-7).

The main factor determining soil type in the study area is geography. To characterize soils, the area can be divided into three regions, as follows: (1) from the power plant site through Toquop Gap; (2) from Toquop Gap through Rainbow Pass; and (3) north of Rainbow Pass. Each region differs by parent rock materials, soil textures, and soil chemical properties. Generally, soils in the site vicinity are characterized by coarse textures, hardpans, and rock outcrops. Hardpans are soils that have been cemented by mineral precipitation, usually calcite cement (known as caliche), in desert climate. Soils also characteristically have high erosion factors and corrosivity to steel due to high soil pH (from 7.5 to more than 8.2). Soils may contain biological crusts in some areas.

Mineral deposits are present throughout southeastern Nevada. Lincoln County contains deposits of locatable minerals, including metallic minerals, non-metallic minerals, and salable mineral materials. There are three mining districts in southeastern Lincoln County relevant to this project (USGS 2006). Gourd Springs District is located in the East Mormon Mountains and on Jumbled Mountain and primarily contains gypsum, anhydrite, and barite. Vigo District is located in the Tule Springs Hills and contains gypsum, anhydrite, and manganese. Buckhorn District is located in the Tule Desert flatlands and contains kaolinite clay. Metallic mineral deposits in Lincoln County include gold, manganese, molybdenum, copper, mercury, tungsten, and polymetallic minerals including lead, zinc, and silver. Non-metallic mineral deposits in Lincoln County include perlite, gypsum, vermiculite, barite, clay, and volcanic ash. Salable mineral materials in Lincoln County include sand, gravel, and decorative rock, which are mainly found along mountain fronts (ENSR 2004b) (Map 3-8).

3.9.2.2 Power Plant Site

Geology

The proposed power plant site is located east of the East Mormon Mountains and south of Tule Springs Hills along the northern edge of the Virgin River Depression. According to Langenheim et al. (2001), the Virgin River Basin is one of the deepest alluvial basins in the Basin and Range physiographic province. The power plant site is located in an alluvial basin, west of Toquop Wash. The alluvial material is composed of erosional material from the local mountain ranges and generally consists of fine- to coarse-grained sand, silt, and gravel. Much of the basin fill material in and near the study area consists of the Muddy Creek Formation. Outcrops of the Muddy Creek Formation consist of poorly sorted coarse- to fine-grained sand, and sandstone interbedded with siltstone and mudstone (Kowallis and Everett 1986).

The proposed plant site and rail line are located near eight geologic faults. The closest faults to the power plant site are the Toquop Wash fault located to the north of and the Gourd Spring fault located to the west of the southern half of the alignment. The East Mormon and Camp Boad faults are located farther to the west of the Gourd Springs fault. These faults exhibit considerable lateral and vertical displacement; however, none of these faults are considered active and the potential for damage resulting from movement on these faults is unlikely. The nearest active faults are associated with the Piediment fault zone located approximately 20 miles to the east near the Virgin and Beaver Dam mountains. The seismic impact on the proposed site and associated railroad alignment is likely to be relatively low compared to other areas within the Basin and Range province (Von Seggern and Brune 2000). The closest, most significant earthquake to the proposed site was a magnitude 6.1 earthquake in Caliente that occurred in 1966. This earthquake was approximately 62 miles north of the proposed site (Von Seggern and Brune 2000). In fact, the earthquake hazard map for southern Nevada developed by the USGS indicates a very low earthquake potential and ground acceleration at the site (USGS 1996).

The proposed plant site and rail line are underlain by shallow to thick alluvial sedimentary deposits. The valley fill material located near the proposed well field in the Tule Desert and near the proposed plant site is several hundred to 1,000 feet thick. Well data indicate that these deposits consist of unconsolidated and consolidated sands and gravels with silts and clays to 200 feet. Below these sands and gravel there is a thick (greater than 500 feet) layer of silts, clays, and sands. Below 600 feet, the proportion of coarse-grained sands and gravels increases. A shallow layer of caliche (2 to 5 feet thick) typically overlies alluvial deposits near and around the proposed site.

Soils

The dominant soil series at the proposed power plant site is the Mormon Mesa series. These soils are fine sandy loams over petrocalcic hard pans. Depth to the hardpan layer is between 10 and 20 inches below the surface and may extend to 60 or more inches below the surface in areas. Slopes in the area of the site are listed as between 1 percent and 5 percent. Erosion potentials due to wind are high and moderate due to water runoff. These soils are not classified as prime farmland. The main issue regarding this soil is the shallow depth to the hardpan layer (U.S. Department of Agriculture 2000). A soils map of the area is available online at http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx.

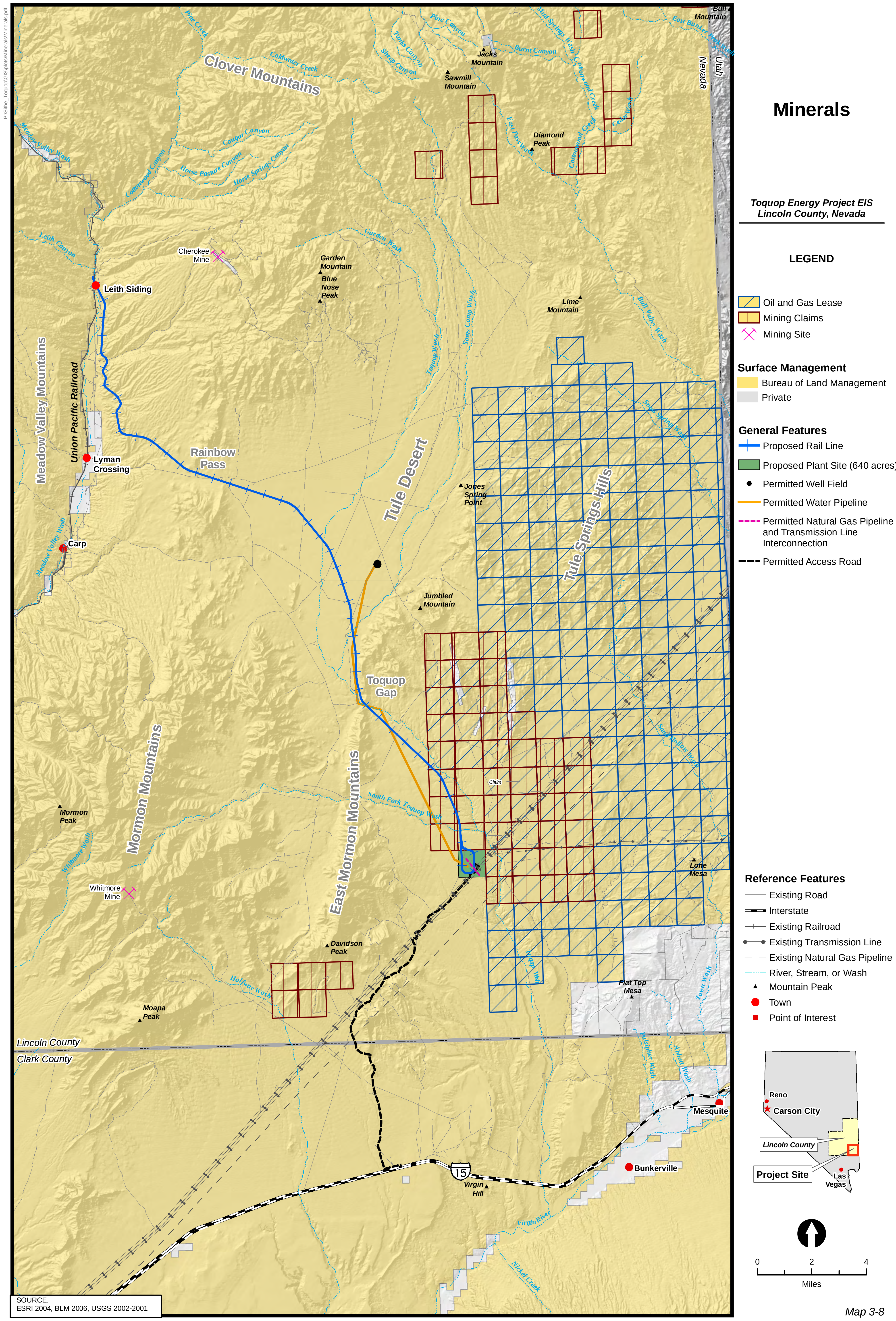
Minerals

The potential for occurrence of minerals in the study area is discussed below. Mineral resource potential, as defined by BLM and reported in the two ENSR reports (ENSR 2004a; 2004b) has four categories as follows:

- **No Potential.** The geologic environment, inferred geologic processes, and lack of mineral occurrences do not indicate potential for accumulation of mineral resources.
- **Low Potential.** The geologic environment and inferred geologic processes indicate low potential for accumulation of mineral resources.
- **Moderate Potential.** The geologic environment, inferred geologic processes, and reported mineral occurrences or valid geochemical/geophysical anomaly indicate moderate potential for accumulation of mineral resources.
- **High Potential.** The geologic environment, inferred geologic processes, and reported mineral occurrences or valid geochemical/geophysical anomaly, and known mines or deposits indicate high potential for accumulation of mineral resources.

Locatable Minerals. There are no mineral resources reported in the 640-acre area where the proposed power plant would be sited. Mineral deposits could occur in the bedrock beneath the alluvial cover at the power plant site. Because the alluvium is 2 to 5 feet thick, and there is lack of economic interest in exposed minerals occurrences in the region, so it is unlikely that any potential deposits would be developed. However, there are several reported metallic and non-metallic mineral deposits in the adjacent mountain ranges. Mineral exploration in areas adjacent to the study area would likely continue. With low mineral potential for tungsten and barite, and moderate mineral potential for gypsum and kaolinite, mineral exploration would likely focus more on the non-metallic minerals.

There is a moderate potential for metallic minerals in the southern portion of the Clover Mountains, north of the study area. Several mining claims are present throughout this area. The mineral potential includes polymetallic minerals such as silver, lead, zinc, copper, cadmium, antimony, and manganese. In addition, there is a low mineral potential for metallic minerals in the East Mormon Mountains, west of the study area. There are several mining claims throughout this area where there is low mineral potential for tungsten, barite, and manganese (ENSR 2004b; USGS 2006).



Minerals
Toquop Energy Project EIS
Lincoln County, Nevada
LEGEND
Oil and Gas Lease
Mining Claims
Mining Site
Surface Management
Bureau of Land Management
Private
General Features
Proposed Rail Line
Proposed Plant Site (640 acres)
Permitted Well Field
Permitted Water Pipeline
Permitted Natural Gas Pipeline and Transmission Line Interconnection
Permitted Access Road
Reference Features
Existing Road
Interstate
Existing Railroad
Existing Transmission Line
Existing Natural Gas Pipeline
River, Stream, or Wash
Mountain Peak
Town
Point of Interest
Reno
Carson City
Lincoln County
Project Site
Las Vegas
0
2
4
Miles
SOURCE:
ESRI 2004, BLM 2006, USGS 2002-2001
Clover Mountains
Meadow Valley Mountains
Union Pacific Railroad
Rainbow Pass
Tule Desert
Tule Springs Hills
Toquop Gap
Mormon Mountains
East Mormon Mountains
Leith Siding
Lyman Crossing
Carp
Cherokee Mine
Whitmore Mine
Garden Mountain
Blue Nose Peak
Jacks Mountain
Sawmill Mountain
Diamond Peak
Lime Mountain
Jones Spring Point
Jumbled Mountain
Mormon Peak
Davidson Peak
Moapa Peak
Lone Mesa
Flat Top Mesa
Bull Mountain
Virgin Hill
Lincoln County
Clark County
Mesquite
Bunkerville
Nevada
Utah
15
Claim
Pine Creek
Coldwater Creek
Cougar Canyon
Horse Pasture Canyon
Horse Springs Canyon
Cottonwood Canyon
Meadow Valley Wash
Leith Canyon
Pine Canyon
Tunk Canyon
Sheep Canyon
Burnt Canyon
Mud Springs Wash
East Bunker Wash
Garden Wash
Sams Camp Wash
Toquop Wash
Bull Valley Wash
South Fork Toquop Wash
Whitmore Wash
Halfway Wash
Virgin River
Nickel Creek
Town Wash

Map 3-8

There are abundant mining claims for non-metallic minerals in areas adjacent to the proposed power plant site. There is a moderate potential for kaolinite clay on the east flank of the Mormon Mountains, west of the study area. There are two areas with moderate potential for gypsum—one in the Mormon Mountains and one in the Tule Springs area east of the site (ENSR 2004b; USGS 2006). Mining claims and other minerals data are shown on Map 3-8.

Salable Minerals. Because the power plant site is composed of gravel-bearing alluvium, the potential for salable minerals is high; however, no mineral material disposals have ever been recorded in the vicinity of the power plant.

Fluid (Leasable) Minerals. The proposed power plant site is located in the Toquop alluvial basin, which has high potential for oil and gas mineral resources (ENSR 2004a). There currently is an existing oil and gas lease (BLM Lease #NVN 050916) approximately 5 miles southeast of the proposed power plant site west of Flat Top Mesa (refer to Map 3-8).

There is medium potential for geothermal resources in the Toquop alluvial basin (ENSR 2004a). There currently are no geothermal resource leases in the area.

3.9.2.3 Proposed Rail Line

Geology

The ROW for the proposed rail line trends northwest along Toquop Wash, passes through the Toquop Gap, transverses west-northwest uphill through Rainbow Pass, and then proceeds downhill and north to Leith Siding. The proposed rail line ROW crosses three alluvial basins, transverses a pass in the East Mormon Mountains, and transverses a pass between the Mormon Mountains and the Clover Mountains. The alluvial material in the alluvial basins is composed of erosional material from the local mountain ranges and generally consists of sand, silt, and gravel. The geology of the Toquop Gap consists of dolomite and limestone of Devonian to Cambrian age; limestone with minor amounts of dolomite and shale of Mississippian age; and limestone and sparse dolomite, siltstone, and sandstone of Permian and Pennsylvanian age. The geology of the Rainbow Pass area consists of welded and non-welded silicic ash-flow tuffs and basalt flows, both of Tertiary age.

The northern half of the proposed railroad alignment crosses the East Tule Desert fault, and the terminus is located west of this fault. Three other faults (West Tule Desert, Tule Corral, and East Tule Springs Hills) are located near the northern portion of the alignment. The nearest active faults and earthquake hazards are described in Section 3.9.2.2.

Soils

Soils along the proposed rail line are primarily defined by geographical area. From the power plant site through Toquop Gap, the dominant soils are in the Mormon Mesa series, described in Section 3.9.2.2.

Through the Toquop Gap area, soils are in the St. Thomas-Zeheme-Rock Outcrop association. These soils are shallow, very cobbly loams over bedrock. Depth to bedrock is often less than 14 inches. These soils are moderately vulnerable to both wind and water erosion.

Between Toquop Gap and Rainbow Pass, soils are in two associations—the Aymate-Canutio association and the Geta-Arizo association. These associations are both sandy loams. Aymate-Canutio has a petrocalcic hardpan starting approximately 3 feet below the ground surface. Geta-Arizo soils generally do not have a hardpan layer. Both associations generally have slopes between 1 percent and 3 percent, are highly susceptible to wind erosion, moderately susceptible to water erosion, and are not classified as prime farmland.

North of Rainbow Pass, the dominant soil type is the Cave-Tencee association. These soils are shallow gravelly sandy loams over petrocalcic hardpans. Slopes are generally less than 10 percent. Soils are moderately susceptible to wind erosion and mildly susceptible to water erosion. They are not classified as prime farmland. A second series is present west of the subject area in the streambed area. These soils are in the Arizo-Bluepoint association. These fine sandy soils are moderately susceptible to water and wind erosion, have a 1 percent to 3 percent slope, and are not classified as prime farmland.

Minerals

Locatable Minerals. The proposed rail line transverses the East Mormon Mountains, which have low metallic mineral potential. Several mining claims are present in this area and the mineral potential includes tungsten, barite, and manganese (ENSR 2004b; USGS 2006). Mineral deposits could occur in the bedrock beneath the alluvial cover at the proposed rail line. Because the alluvium is 2 to 5 feet thick, and there is lack of economic interest in exposed minerals occurrences in the region, so it is unlikely that any potential deposits would be developed.

There is moderate potential for metallic minerals in the southern portion of the Clover Mountains, north of the study area. Several mining claims are present throughout this area and the mineral potential includes minerals such as silver, lead, zinc, copper, cadmium, antimony, manganese, and fluorspar (ENSR 2004b; USGS 2006).

There are no additional mineral resources along the proposed rail line. However, there are several reported non-metallic mineral deposits in the adjacent mountain ranges. Mineral exploration in areas adjacent to the rail line area would likely continue. With low mineral potential for tungsten and barite, moderate mineral potential for gypsum and kaolinite, and high mineral potential for perlite, mineral exploration would likely trend more to development of non-metallic minerals.

There are mining claims near the proposed plant site for non-metallic minerals along the proposed rail line. There is high potential for perlite in the Meadow Valley Mountains, located west of Leith Siding. There is a moderate potential for kaolinite on the east flank of the Mormon Mountains. There are two areas of moderate potential for gypsum, one in the Mormon Mountains and one in the Tule Springs area (ENSR 2004b; USGS 2006) (refer to Map 3-8).

Salable Minerals. There are no reported salable mineral resources in the vicinity of the proposed rail line. Sand and gravel are present, but no permits have been issued. The potential for sand and gravel is high.

Fluid (Leasable) Minerals. The proposed rail line would traverse the Tule Desert, cross over the Toquop Gap, and enter the Toquop Basin. Tule Desert and Toquop Basin have high potential for oil and gas mineral resources (ENSR 2004a). Although oil and gas development potential is high, there is low potential where the route crosses Tertiary basalt flows and Paleozoic sedimentary rocks. The proposed route of the rail line traverses oil and gas leases near the proposed power plant site.

Throughout the entire region there is medium geothermal resource potential and, in particular, where the proposed rail line would traverse Tule Desert and Toquop Basin (ENSR 2004a). There is low potential where the route crosses Tertiary basalt flows and Paleozoic sedimentary rocks. There currently are no geothermal resource leases along the proposed route.

3.10 GROUNDWATER RESOURCES

3.10.1 Data Collection Methods

This section characterizes the local groundwater system and its relationship to the regional groundwater system. The scale evaluated for the regional groundwater system encompasses southern Nevada. The groundwater system is directly linked to the geological conditions described in Section 3.9, Geology, Soils, and Minerals. A discussion of the relationship between groundwater and surface flows in the Virgin River, as it relates to potential project-induced impacts, also is presented in this section. The data sources reviewed for this EIS include USGS reports and maps; Nevada Division of Water Resources reports and data obtained from the internet; reports by various scientific organizations (e.g., the Department of Geoscience at the University of Nevada, Las Vegas); the 2003 EIS (BLM 2003a); and consultants' reports specific to the area (e.g., BLM 2003a). Consultants' reports prepared on the regional and local hydrogeology contain a more detailed discussion and analysis of many of the groundwater-related topics presented in this EIS.

3.10.2 Existing Conditions

3.10.2.1 Regional Overview

Regionally, the project area is located within the Basin and Range physiographic province (refer to Section 3.9, Geology, Soils, and Minerals). Hydrologically, Nevada is subdivided into 14 principal hydrographic basins, which are subdivided into a total of 256 hydrographic areas or sub-areas. The proposed site is located in the Colorado River Basin, designated as Basin 13. Within the Colorado River Basin, the proposed site is located within the Tule Desert (Hydrographic Area / Sub-Area 221), the Virgin River Valley (Hydrographic Area/Sub-Area 222), and the Lower Meadow Valley Wash (Hydrographic Area/Sub-Area 205) (Map 3-9).

The proposed power plant site is located within the Virgin River Valley, which abuts the Tule Desert to the north. A singular topographic basin has formed in this area, in which all surface-water drainage is toward the Virgin River and Lake Mead south of the project area. Geologically, much of the Virgin River Valley sits above a deep tectonic basin in which the underlying bedrock is 6 miles below the valley floor (refer to Section 3.9, Geology, Soils, and Minerals).

The Tule Desert or Clover Valley would supply water for the proposed power plant. The Tule Desert is an elongated basin trending in a generally north-northeast direction. The Tule Desert is a singular topographic basin that is surrounded by the Clover Mountains to the north and northwest, the Tule Springs Hills to the east, the East Mormon Mountains to the south, and the Mormon Mountains southwest. With a length of approximately 32 miles and a width of approximately 12 miles, the area of Tule Desert is approximately 125,000 acres. The topography of the floor of the Tule Desert slopes from all directions toward the Toquop Gap, which separates the East Mormon Mountains from the Tule Springs Hills. The Toquop Gap is a significant topographic feature that forms the only natural hydrologic outlet from the Tule Desert. Through this low-lying area, the Toquop Wash drains ephemeral surface-water runoff from the Tule Desert.

Within the Clover Valley Hydrographic Area, all surface water draining the northern portion of the project area flows in a northerly direction into Clover Creek. Clover Creek is an ephemeral drainage that joins the perennial Meadow Valley Wash just north of the town of Caliente. Pine Wash and several small, unnamed drainages originate in the Clover Mountains. These are ephemeral drainages that flow only for short durations as a result of significant precipitation events.

The proposed rail line would be located in three hydrographic areas/sub-areas, with only about 3.2 miles of the rail line in the Lower Meadow Valley Wash (refer to Map 3-9). Meadow Valley Wash is a perennial stream incised through volcanic rocks in the northern part and primarily through basin-fill deposits in the southern part of the Lower Meadow Valley Wash Hydrographic Area.

Groundwater Occurrence

Basin and Range Province. Groundwater occurs within the Basin and Range province in the sediments that have filled the valleys to their current elevations (basin-fill deposits) and in the underlying bedrock. The bedrock also comprises the surrounding hills and mountains. In the Tule Desert and Virgin River Valley, groundwater is stored and conveyed through two principal aquifer systems, as follows: (1) poorly consolidated saturated basin-fill deposits, consisting mainly of silty and clayey sands with occasional clay and gravel layers; and (2) the underlying fractured sedimentary (e.g., limestone, dolostone) or volcanic rocks. A more detailed description of the lithology of these aquifers is presented in Section 3.9, Geology, Soils, and Minerals.

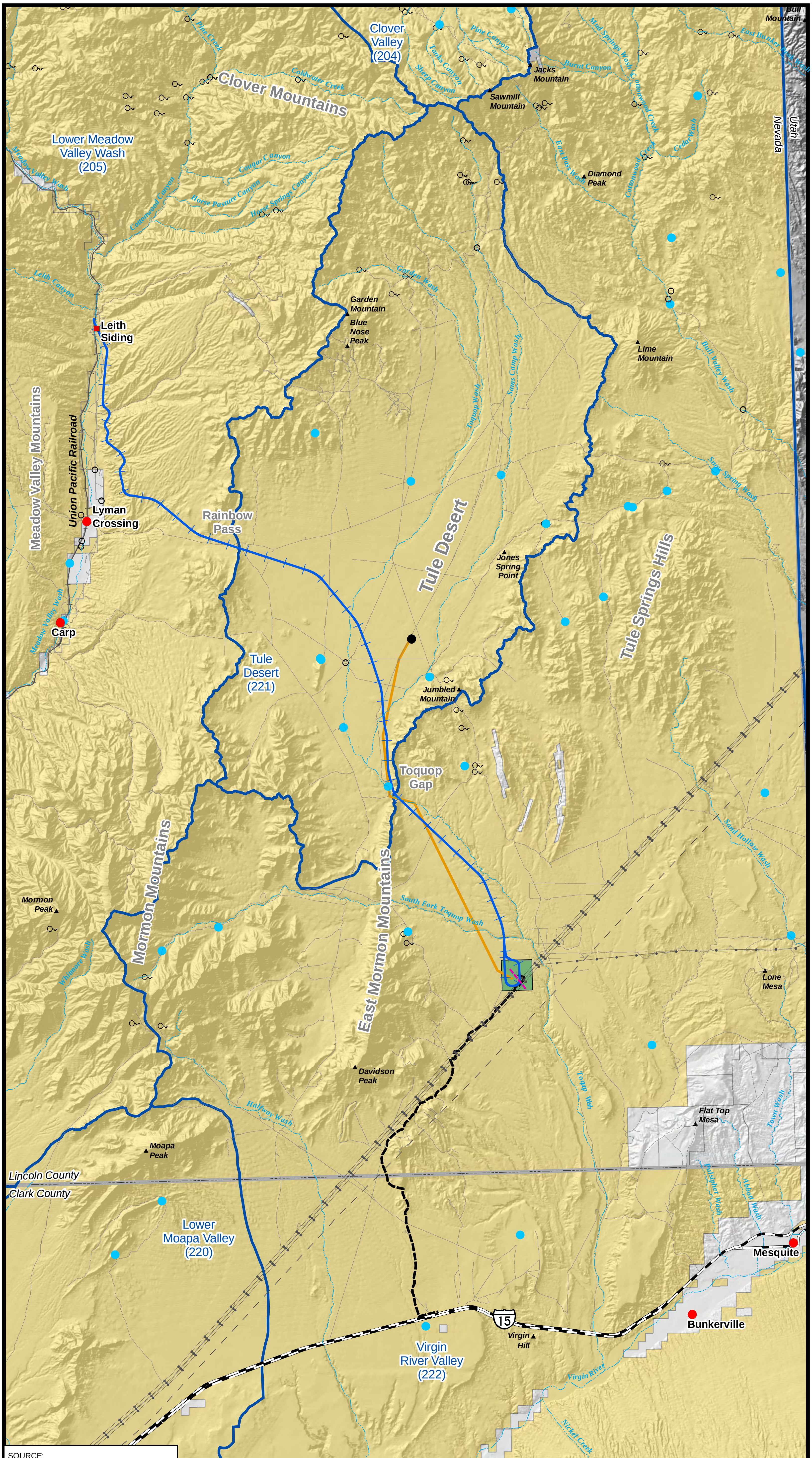
Some basin-fill aquifer systems in the Basin and Range province are localized and relatively shallow. In these deposits, the direction of groundwater flow generally follows topography (from high to low elevation). Groundwater can flow between hydrographic areas, or basins, where basin-fill deposits from adjacent areas merge. An example of this is found at the Toquop Gap, where the basin-fill deposits of the Tule Desert are continuous with those of the Virgin River Valley.

Fractured-rock aquifer systems, beneath the basin-fill deposits, are regional features in which groundwater flow does not coincide with the local topography. Groundwater flow in deep fractured-rock aquifer systems occurs in response to the regionally controlled hydraulic gradient. Regionally, the hydraulic gradient is driven by regional recharge and discharge areas. In general, the regional hydraulic gradient is not significantly influenced by conditions in the overlying basin-fill aquifer systems. Additionally, although individual rock formations are laterally discontinuous and typically highly deformed structurally, the basic rock types are essentially continuous. These formations transcend the boundaries of the hydrographic areas, and as a result, it is very difficult if not impossible to place lateral bounds around the fractured-rock aquifer systems. Further discussion on the basic principles of flow through fractured rock is presented in CH2M HILL (2002a).

Carbonate-Rock Province. For substantial portion (approximately 200 million years) of the geologic history, a portion of the Basin and Range province involved the deposition of massive sequences of carbonate rocks (limestone and dolostone) over much of what is now eastern Nevada, western Utah, and the northwestern tip of Arizona. The geologic history of this portion of the Basin and Range province, including approximately 50,000 square miles in Nevada alone, has formed what is commonly referred to as the carbonate-rock province (Dettinger et al 1995; Mifflin and Hess 1979; Prudic et al. 1995).

The carbonate-rock province is a descriptive term used by geologists in general, but its definition also includes a reference to groundwater used by hydrogeologists. Specifically, Dettinger et al. (1995) describe the carbonate-rock province as “that part of the Basin and Range Province in which groundwater flow is predominately or strongly influenced by carbonate-rock aquifers of Paleozoic age.”

Dettinger et al. (1995) and Plume (1996) show the Tule Desert and Virgin River Valley hydrographic areas located just within the southeastern edge of the carbonate-rock province. While carbonate rocks comprise a significant portion of the local mountains and hills that rim the Tule Desert, the lithology does not necessarily comprise the fractured-rock aquifer formations at shallow depths within the Tule Desert and Virgin River Valley hydrographic areas.



Hydrographic Basins and Groundwater Sources

Toquop Energy Project EIS
Lincoln County, Nevada

LEGEND

Hydrographic Basins

Groundwater Sources
- Reservoir
- Spring
- Well

Surface Management
- Bureau of Land Management
- Private

General Features
- Proposed Rail Line
- Proposed Plant Site (640 acres)
- Permitted Well Field
- Permitted Water Pipeline
- Permitted Natural Gas Pipeline and Transmission Line Interconnection
- Permitted Access Road

Reference Features
- Existing Road
- Interstate
- Existing Railroad
- Existing Transmission Line
- Existing Natural Gas Pipeline
- River, Stream, or Wash
- Mountain Peak
- Town
- Point of Interest

Reno
Carson City
Lincoln County
Project Site
Las Vegas

0 2 4
Miles

Map 3-9

Dominated by limestones and dolostones, the carbonate rocks in the southern Nevada region are brittle and subject to fracturing. With the necessary geochemical conditions, the rocks can be subject to dissolution. This dissolution results in what is known as karst, which can form sink holes at the surface and cavities, or even caves, at depth. Karst development leads to secondary porosity in a rock unit that can further enhance the ability of these rocks to store and transmit groundwater. The large geographic area underlain by these carbonate rocks, together with their secondary porosity and demonstrated capacity to transmit large volumes of groundwater, is evidence that the carbonate rocks of Nevada comprise aquifer systems of regional scale and significance (Dettinger et al. 1995).

The carbonate-rock province has been studied extensively on a regional scale by the USGS (Harrill and Prudic 1998) because of its significance. Computer models of the regional carbonate aquifer systems, developed by the USGS, indicate that the total volume of groundwater that flows through these aquifers is approximately 1.5 million acre-feet per year (af/yr). This volume is for the entire carbonate rock province, and is based on fairly sparse data. Specifically, within the Nevada portion of the Colorado River Basin, the flow through the carbonate aquifer is estimated by the USGS to be more than 200,000 af/yr. These estimates are based on very general assumptions for conditions in the Tule Desert and Virgin River Valley. It is important to note that data on the carbonate rock aquifer system in these areas were limited at the time of the Harrill and Prudic (1998).

3.10.2.2 Local Conditions

Tule Desert Hydrogeology

General studies of the hydrogeology of the Tule Desert area can be found in published literature dating back to the early twentieth century (Carpenter 1915). Specific data were not available until recently, because the groundwater resources of the Tule Desert had been developed only minimally in the past.

As part of the preparation of the 2003 EIS for the Toquop Energy Project (BLM 2003a), an investigation of the feasibility of using groundwater from the Tule Desert for the proposed power plant was conducted. Several monitoring wells and one pilot production well were installed, sampled, and tested in the area of the proposed well field under the original EIS. Information presented in this section is a summary of fieldwork presented in CH2M HILL (2002a), as well as in the 2003 EIS (BLM 2003a).

Groundwater in the Basin-Fill. Borehole data obtained during the preparation of the 2003 EIS (BLM 2003a) showed the boreholes drilled in the well field area of the Tule Desert to contain basin-fill deposits, which consist of older alluvium of probable Pleistocene age (approximately 10,000 to 1.7 million years old) and perhaps Pliocene age (approximately 1.7 to 5 million years old). These deposits are believed to be derived from erosional debris from the surrounding areas that were subject to uplift from faulting (refer to Section 3.9, Geology, Soils, and Minerals). Although these deposits consist principally of unconsolidated coarse sands and gravel with some silt and clay within the uppermost 100 to 200 feet, they typically transition rapidly thereafter to a massive sequence dominated by either silty or clayey sands that are 300 or more feet thick. In some locations, layers of coarse-grained sediments (silty sands and gravel) and layers of clay occur at depths of 600 feet or more (CH2M HILL 2002a).

The available data also suggest that a general pattern to the layering is discernible, but that discrete layers within the basin-fill deposits are laterally discontinuous or of limited areal extent. Although the lower portions of the basin-fill are saturated, a single continuous aquifer unit was not easily identified (BLM 2003a). Consequently, groundwater is likely to be locally perched, which means that it occurs as laterally discontinuous pockets of saturated sediments that are independent of a specific basin-fill aquifer.

Studies conducted for the 2003 EIS (BLM 2003a) revealed that the depth to groundwater in the basin-fill is generally very deep, and based on the water-level data, it also confirmed the potential for more than one groundwater source in the area. This was based on available data showing that the depth to groundwater for three wells, in proximity to each other, varied by over 320 feet. The water-level data demonstrates that the wells are not hydraulically connected.

Geophysical studies reported in Langenheim et al. (2001) indicate that the thickness of the basin-fill deposits generally increases toward the center of the Tule Desert. Additional discussion of this can be found in the 2003 EIS for the Toquop Energy Project (BLM 2003a).

The Nevada Department of Water Resources (1971) estimated the total volume of groundwater in storage within the uppermost 100 feet of saturated sediments in the Tule Desert to be approximately 530,000 acre-feet. This is based on a specific yield of 10 percent. Specific yield represents the water-storage properties of the basin-fill deposits. The value of specific yield is estimated from the technical literature (CH2M HILL 2002b). There are no field data available to determine the storage properties of the basin-fill deposits directly.

Recharge to groundwater in the Tule Desert basin-fill deposits comes from direct precipitation on the surrounding upland areas, particularly those portions of the Clover Mountains and Tule Springs Hills. The Tule Springs Hills are within the watershed of the Tule Desert. The precipitation in the Clover Mountains and Tule Springs Hills areas percolates down through the subsurface and reaches groundwater in amounts proportional to elevation. As such, as the elevation increases, the proportion of precipitation contributing to recharge increases.

The approach most commonly taken in the hydrologic literature (Glancy and Van Denburgh 1969; Maxey and Eakin 1949; Prudic et al. 1995) is to make the conservative assumption that precipitation falls on the valley floor, but does not infiltrate and recharge groundwater. This is primarily because of the high potential for evaporation. It is important to note that Dixon and Katzer (2002) believe that significant groundwater recharge occurs through the infiltration of runoff in the principal ephemeral washes feeding the Toquop Wash, and that the Toquop Wash contributes to groundwater recharge.

Estimates of groundwater recharge in the Tule Desert vary significantly from 2,100 af/yr (Glancy and Van Denburgh 1969) to approximately 8,968 af/yr (Katzer et al. 2002). Recharge to the basin-fill deposits also could be occurring due to upward leakage from the underlying fractured-rock aquifer (BLM 2003a), but no quantification exists of this potential recharge component. The potential for interconnection between groundwater in the basin-fill and the underlying rock is addressed in the next section and in CH2M HILL (2002a). The CH2M HILL (2002a) report also contains additional discussion on recharge estimates.

Groundwater flow through the Tule Desert is believed to occur in the basin-fill deposits toward the Toquop Gap (BLM 2003a). Some portion of the basin-fill groundwater leaves the Tule Desert hydrographic area and enters the Virgin River Valley hydrographic area. The Toquop Gap, however, is too small to accommodate all of the basin-fill groundwater discharge that, along with current local withdrawals and locally recharged spring flows, must balance the recharge estimates. The reason for this is that high-end estimates of the range of potential discharge rates through the basin-fill deposits in the Toquop Gap are much less than 10 af/yr (CH2M HILL 2002a). Based on this, some groundwater in the basin-fill deposits must enter the underlying fractured-rock aquifer system and flow into the Virgin River Valley through that medium.

Groundwater in the Fractured Rock. The specific composition of the fractured-rock aquifer in the Tule Desert varies laterally across the basin as a result of vertical offset from faulting and local deposits of volcanic origin. Detailed descriptions of the rocks encountered in the test boreholes for the 2003 EIS

(BLM 2003a), presented in CH2M HILL (2002a), showed the uppermost rock formation to be predominantly gray limestone interfingered with brown and red limey siltstone and bands of gray quartzite down to a depth of 2,000 feet in the vicinity of proposed power plant. To the north, in the vicinity of well MW-2 (refer to Map 3-8) (BLM 2003a), the limestone component is generally absent and the limey siltstone component predominates.

The composition of the bedrock in the vicinity of the wells near the power plant is generally consistent with descriptions of the Triassic-aged Moenkopi Formation (205 to 240 million years old), as reported in the geologic literature (Plume 1996; Tschanz and Pampeyan 1970). The siltstone component also is similar to outcrops of the Moenkopi Formation in the Tule Springs Hills, just east of the well field area (refer to Map 3-9). The Moenkopi Formation is identified as being the uppermost (youngest) formation that contains aquifers in carbonate rock (Plume 1996). This is consistent with the predominance of limestone encountered in the boreholes in the vicinity of the proposed power plant site and is supported by local water-chemistry data, which indicate that groundwater from the fractured rock in this area is directly related to groundwater in the regional carbonate aquifer system (BLM 2003a).

To the west of the proposed power plant location, Tertiary-aged volcanic rocks are present to a depth of 2,000 feet (BLM 2003a). These volcanic rocks are part of the Clover Mountains, and include discrete layers of basalt, rhyolite, and tuff, interspersed with layers of clay up to 200 feet thick. In addition, these volcanics likely extend under much of the northern third of the Tule Desert. The rocks also likely comprise the bedrock beneath the basin fill south of the northern third of the Tule Desert along the eastern edge of the Clover Mountains.

All of the rock types encountered in the boreholes (limestone, siltstone, quartzite, and the various volcanic rocks) show evidence of fracturing (BLM 2003a). This fracturing creates a secondary porosity, which provides additional void space to store and transmit groundwater.

Despite the variability in the rocks that comprise the fractured-rock aquifer of the Tule Desert, the groundwater chemistry data indicate a common groundwater flow system within the different rock types. The deuterium analysis (a stable isotope of hydrogen contained in water molecules), used to help differentiate between waters of different origins (CH2M HILL 2002b, Appendix A) in the 2003 EIS (BLM 2003a), indicated similarities between groundwater at the proposed power plant site and a deep upgradient well despite different dominant rock types in the wells (BLM 2003a).

Water chemistry data also indicates a link between the groundwater in the Tule Desert fractured-rock aquifer and regional carbonate-aquifer groundwater (BLM 2003a; CH2M HILL 2002b). Along with being highly depleted in deuterium, the chloride concentrations analyzed from reliable samples were very low (approximately 8 milligrams per liter [mg/L]) (CH2M HILL 2002a). These data collectively comprise a unique chemical signature that is only duplicated in groundwater of the regional carbonate-aquifer system, which is similarly highly depleted in deuterium and typically does not provide a source of chloride (CH2M HILL 2002b).

Additional evidence that groundwater in the fractured rock underlying the Tule Desert Basin-fill is part of the regional aquifer system of the carbonate-rock province comes from carbon-14 data, another isotopic analysis. The application of carbon-14 data, presented in CH2M HILL (2002b), Appendix A, indicates that the groundwater in the fractured rock at this location is very old because the unstable carbon content has almost completely decayed (BLM 2003a). Based on the carbon-14 data, the groundwater originated as precipitation many tens of thousands of years ago and has taken that long to travel to the point where it was extracted. Groundwater of this age is consistent with the age of groundwater in the regional carbonate-aquifer system, which similarly requires several thousand years to flow from the point of recharge across the carbonate-rock province (BLM 2003a).

Water-level data presented in the 2003 EIS (BLM 2003a) from fractured-rock wells in the Tule Desert indicate that water levels in wells penetrating the fractured rock are typically very deep, but remain above the top of rock. This also indicates that the groundwater in the fractured rock is confined under pressure. Additional confirmation that the groundwater is under pressure in the fractured rock is confirmed by the water-level data from immediately adjacent basin-fill wells (BLM 2003a), which reveal water levels that are different from the water levels in the rock.

The fractured-rock data also were analyzed spatially on a map (BLM 2003a) and indicate the magnitude of the horizontal component of hydraulic gradient, approximately 0.02, to be consistent with the relatively poor ability of the fractured rock to transmit water, as discussed below. Although the direction of groundwater flow is dictated locally by the orientation of individual fractures, the direction of groundwater flow is considered to be generally parallel to the direction of hydraulic gradient at the scale of the entire hydrographic area. What this means is that the available water-level data indicate that groundwater flows south through the Tule Desert (BLM 2003a). This agrees with regional studies on the carbonate-rock aquifer systems that have concluded the regional groundwater flow in the fractured-rock aquifer is generally south in the vicinity of the Tule Desert and the northern portions of the Virgin River Valley hydrographic areas (Dettinger 1992; Harrill and Prudic 1998; Prudic et al. 1995).

Unlike groundwater in the basin-fill deposits, groundwater in the fractured rock is recharged in part outside the hydrographic area. Water-chemistry data from springs and wells north of the Tule Desert compared with similar data from the test wells drilled for the 2003 EIS (BLM 2003a) indicate that groundwater enters the Tule Desert fractured-rock aquifer north of the Clover Mountains.

A detailed discussion of the geochemical data from fractured-rock wells of the Tule Desert, and surrounding hydrographic sub-basins, is provided in the 2003 EIS (BLM 2003a). These data show a chemical signature of the Tule Desert hydrographic sub-basin, which is known only to exist in carbonate springs approximately 30 miles north of the northern edge of the Tule Desert hydrographic sub-basin. It can be concluded that groundwater recharge to the Tule Desert must involve southerly interbasin groundwater flow from basins to the north before entering the Tule Desert through faults and fractures in the subsurface volcanic rocks of the Clover Mountains (BLM 2003a). The data used in the 2003 EIS were obtained from Hydrosystems Inc. (2001) and Thomas et al. (2001), and are presented and analyzed in CH2M HILL (2002a).

Several conclusions about the groundwater environment can be reached based on the results of aquifer testing previously conducted in the well field area, as described in CH2M HILL (2002a). The first conclusion is that the ability of the fractured-rock aquifer in the vicinity of the production well to transmit water (aquifer transmissivity) is relatively low (BLM 2003a). The values of transmissivity presented for the fractured-rock aquifer were found to range between 14,500 and 27,000 gallons per day per foot (gpd/ft) of aquifer thickness (BLM 2003a).

Aquifer transmissivity and the magnitude of the horizontal component of hydraulic gradient allows the amount of groundwater flowing through the aquifer to be estimated by multiplying the product of these two parameters by a representative value of the width of the aquifer. By using a conservative value of transmissivity (14,500 gpd/ft, which is the lowest value calculated), along with the observed hydraulic gradient (0.02), and a minimum representative value for the width of the Tule Desert (which for these would be 20,000 feet or approximately 3.8 miles), the flow through this portion of the Tule Desert near the proposed power plant site is approximately 6,500 af/yr (CH2M HILL 2002a). This is a reasonably conservative estimate within the Tule Desert. Outside of this approximately 4-mile-wide width, the values of the parameters used in such a calculation are unknown. Specifically, groundwater also flows within the Tule Desert fractured-rock aquifer outside and parallel to the 4-mile-wide width selected for the calculation above. Although this additional amount cannot be definitively calculated at this time, it would presumably raise the total above 6,500 af/yr.

Significant additional groundwater undoubtedly flows beneath the Tule Desert, but at depths deeper than that for which the transmissivity value used in the calculation above is representative. Additional unquantifiable amounts of groundwater flow within deeper fractured-rock aquifer units (e.g., deep Paleozoic carbonate rocks not encountered within the depths of the wells drilled for the 2003 EIS) beneath the Tule Desert. The support for this premise is based on the existence of very deep (between 3,400- and 10,000-feet deep) wells reported to penetrate the regional Paleozoic carbonate aquifer system (Dettinger et al. 1995, Table 6).

The aquifer testing conducted by CH2M HILL (BLM 2003a) also allowed the ability of the aquifer to store groundwater (storativity) to be determined. Storativity, which is the volume of water pumped by a well, per foot of water-level decline, per unit area of the fractured-rock aquifer, was calculated to range between approximately 0.005 and 0.012 (BLM 2003a). Storativity values this small indicate that the pumping resulted in very little loss of groundwater from storage and confirms the observation that the groundwater is confined under pressure within the fractures of the rock based on typical values of storativity (Fetter 1994; Freeze and Cherry 1979). Based on the value of 0.005 for aquifer storativity, the volume of groundwater within the uppermost portion of the fractured-rock aquifer (i.e., an aquifer thickness of no more than 1,000 feet) is estimated to be approximately 400,000 acre-feet (CH2M HILL 2002a).

Aquifer testing also demonstrated that water levels in the rock and overlying basin-fill deposits behave very similarly in response to pumping, although with much less water-level decline in the basin fill (BLM 2003a). As a result, it appears that there is significant hydraulic interconnection between the two aquifers, and that they effectively act as one unit (BLM 2003a). This conclusion was made at the scale of the proposed well field area for the 2003 EIS (BLM 2003a). The vertical component of hydraulic gradient (change in pressure) also was assessed as slightly upward in the area, which implies that the groundwater has a slight tendency to flow from the rock, where it is under greater pressure, upward into the basin-fill deposits in this area.

Farther to the north of the proposed power plant location, and laterally upgradient, the vertical gradient is downward (BLM 2003a). This downward gradient implies that groundwater tends to flow from the basin-fill deposits into the fractured rock in this area. Although the results of aquifer testing indicate groundwater in the basin-fill and groundwater in the fractured-rock aquifer respond to pumping essentially as a single unit, groundwater in the two aquifers originates from different sources and flows differently, if not independently, through the Tule Desert (BLM 2003a).

The available water-chemistry data indicate groundwater in the basin-fill within the Tule Desert and groundwater in the fractured-rock aquifer within the Tule Desert have different chemical compositions, which reflects different origins (BLM 2003a). This conclusion is based on the similarity to the regional carbonate-rock aquifer system, with no detectable tritium (an unstable isotope of hydrogen). Tritium, if detected, is indicative of water less than 50 years old because high levels of tritium originated with aboveground nuclear testing in the late 1950s. Groundwater in the basin-fill, however, was shown to be less depleted in deuterium, higher in chloride, and to contain detectable tritium.

The results of the aquifer testing also provide insight into how much water the wells can pump (well yield). While the production well was pumped at a rate as high as 1,400 gallons per minute (gpm) for several days, the resulting water-level response indicates that long-term sustained safe yield to be approximately 550 gpm or about 887 af/yr (BLM 2003a).

Springs. Numerous small springs discharge groundwater within and around the Tule Desert (refer to Map 3-9). Most of these springs are located in the Clover Mountains, and a few are in the Tule Springs Hills and East Mormon Mountains. Discharge rates from these springs are typically very low. In general, the discharge from the springs is generally less than 1 gpm, and most of the rates are 0.5 gpm or less (Walker 2002).

Additionally, several springs are located outside the project area. These springs include the Littlefield Springs; the Muddy Springs, located in Moapa Valley approximately 20 miles west-southwest of the project area; and the series of springs that rim the Overton Arm of Lake Mead.

A deuterium analysis was used on samples of spring water to provide the general origin of the water that discharges from a given spring (CH2M HILL 2002b, Appendix A). Deuterium data from the springs within both the Tule Desert and the Virgin Valley hydrographic areas indicate the springs are recharged by local precipitation and the water likely travels a relatively short distance, a few miles or less, before discharging (BLM 2003a).

Higher values of deuterium (lower negative values) represent water that originated as precipitation at relatively lower elevations. The lowest elevation springs (e.g., Gourd, Peach, Tule, Summit, Snow, Sam's Camp #4) are in the East Mormon Mountains and Tule Springs Hills, as well as the foothills of the Clover Mountains. These springs all have values of deuterium that range between -76.5 per mil (parts per thousand) from Peach Springs and -83 per mil from Tule Spring with most around -77 per mil (BLM 2003a).

Springs in the Mormon and Clover mountains are typically at higher elevations than the Tule Springs Hills (for example, Davies, Horse and Hackberry in the Mormon Mountains; Garden, Box, Upper Box, Sam's Camp #1, #2 and #3, Shoemake #1, #2 and #3, Sheep, and Mud Hole in the Clover Mountains), and have correspondingly lower (more negative) values of deuterium relative to the springs at lower elevations (BLM 2003a). The lower the deuterium value is, the more "depleted" the sample is. As such, the springs are more depleted in deuterium. This is based on the deuterium values for these Clover and Mormon mountains springs being between -86 per mil and -88 per mil.

Both sets of deuterium values, the values from the lowest elevation springs and the higher elevation Mormon and Clover mountains springs, contrast with values of deuterium on the order of -100 per mil that correspond to deep, regionally flowing groundwater in the carbonate aquifer systems (BLM 2003a). Accordingly, local recharge is the source for all of the springs that are near the well field area (Peach, Gourd, Tule, and Summit). This is consistent with the findings by Prudic et al. (1995), who states that many small springs in the local mountains typically represent perched local systems that are not connected to surrounding and underlying groundwater. Further discussion on the origin of the discharge of the local springs can be found in CH2M HILL (2002a).

The origin of the water that discharges from some of the principal springs outside the project area is regional, but not related to the groundwater in the fractured rock within the Tule Desert (BLM 2003a). The sources of the Littlefield Springs reportedly include both a portion of the Virgin River that infiltrates upstream in Utah and emerges downstream at Littlefield, and local recharge from the Beaver Dam Mountains (Cole and Katzer 2000; Trudeau et al. 1983). In addition, the available water-chemistry data from the Littlefield Springs indicate that the spring discharge is chemically unrelated to the groundwater in the fractured-rock aquifer within the Tule Desert (BLM 2003a). Specifically, relative to groundwater from wells in the Tule Desert, the Littlefield Springs are less depleted in deuterium, and contain significantly higher concentrations of chloride, sulfate, and total dissolved solids (TDS) relative to the test wells in the Tule Desert (CH2M HILL 2002a).

The source of water to the Muddy Springs, 20 miles west-southwest of the project area, is from the regional carbonate-rock aquifer system recharged north of the Clover Mountains, but the discharge of these springs has no relation to the groundwater in the Tule Desert (BLM 2003a). A comparison of the water chemistry of these springs with groundwater from wells in the Tule Desert indicates that the Muddy

Springs are less depleted in deuterium, and contain considerably higher concentrations of chloride and TDS.

Water discharging from springs around the Overton Arm of Lake Mead has been found to be of multiple origins, with most of the discharge resulting from local recharge (such as the discharge at Kelsey Spring) (Pohlmann et al. 1998). Rogers Spring appears, however, to have a regional carbonate-aquifer origin, but from sources that are not common with the fractured-rock aquifer of the Tule Desert (Pohlmann et al. 1998). The discharge from Rogers Spring is much less depleted in deuterium and is significantly higher in chloride and TDS than groundwater from wells drilled in the Tule Desert for the 2003 EIS (BLM 2003a).

Clover Valley Hydrogeology

Groundwater Occurrence. Limited hydrogeology data are available for the Clover Valley hydrographic area. Recent well siting investigations conducted by the Lincoln County Water District (LCWD) are the most comprehensive hydrogeology information for the area to date. It is anticipated that water from a regional source would be encountered between 1,200 to 1,500 feet below ground surface (bgs). This estimate is based on an unpublished water-level contour map of the groundwater basins to the north of Clover Valley and water-level data from LCWD-constructed monitor and test wells in Tule Desert to the south of Clover Valley. The direction of groundwater flow is likely south-southeast.

No wells have been completed in carbonate rocks in the Meadow Valley area; therefore, water levels within the carbonate rocks are not known. Water levels within the basin-fill are shallow throughout most of the area. Measured depth to groundwater from six wells located in the Lower Meadow Valley Wash area varied between 13 to 58 feet bgs (BLM 2007c).

The few wells that have been drilled in Clover Valley serve domestic and stock-watering purposes. These wells are between 38 and 499 feet bgs deep, with water levels ranging between 8 and 299 feet bgs (BLM 2007c). These wells are likely completed in the younger alluvium or from one of the extrusive volcanic units and produce water from those zones. They may produce enough water to sustain a family ranch, but they would not be useful for providing a sustainable municipal water supply.

Groundwater Recharge and Flow. Recharge from surrounding Clover and Delamar mountains was estimated by Rush (1964) to be 1,300 af/yr. Recharge from Meadow Valley Mountains, estimated to be 1,000 af/yr, probably flows southward toward the Muddy River Springs area and does not significantly contribute to Meadow Valley Wash hydrographic area (Burbey 1997).

Groundwater flow within the Meadow Valley Wash area in both shallow alluvium and carbonate rocks is inferred to be from north to south. It is estimated that between 4,000 and 8,000 af/yr of groundwater may leave the area as a subsurface outflow near Glendale, located at the southernmost part of the valley (BLM 2007c). The amount of discharge surpasses the amount of recharge; therefore, additional sources of recharge must be available. These sources include (1) recharge from volcanic rocks in the northern part of the hydrographic area, (2) infiltration of surface water, and/or (3) subsurface inflow from outside the hydrographic area (Burbey 1997).

The first two sources are not believed to be significant. There are two distinct subsurface flow systems in the Meadow Valley Wash area. The first system likely extends from Clover and Delamar mountains in the north toward southwest and supports spring discharge in the Muddy Springs area. The second flow system extends as a narrow zone southward from the Mormon Mountains, and may recharge Rogers and Blue Point springs located in the Overton Arm of Lake Mead (Burbey 1997).

The groundwater storage in the carbonate rocks of the Lower Meadow Valley Wash area has been estimated to be about 2.7 million acre-feet, while local storage (within the basin-fill) has been estimate at about 700,000 acre-feet (Burbey 1997).

Springs. As noted in the Tule Desert section above, there are several existing wells and springs in the Clover Valley hydrographic area; however, none are representative of deep water sources nor are they highly productive. Springs are recharged locally from the surrounding hills and mountains and are likely structurally controlled by extensive faulting in the area. The springs exhibit limited discharge, with likely increases in flow during the spring snow melt and summer monsoons.

Virgin River Valley Hydrogeology

Groundwater Occurrence. A great deal of the Virgin River Valley sits above a structural depression with the underlying bedrock as much as 6 miles deep below the valley floor (refer to Section 3.9, Geology, Soils, and Minerals). Due to this, the accessible groundwater occurs predominantly in the various deposits comprising the basin-fill of this hydrographic sub-basin.

The basin-fill principally consists of the Muddy Creek Formation, which typically is overlain by a veneer of Older Alluvium where alluvial fans and terraces abut the local mountains and hills (Glancy and Van Denburgh 1969; Metcalf 1995). The Older Alluvium consists of the full range of sediments from silt and clay to gravel and boulders. This unit generally thickens toward the center of the valley, and is essentially indistinguishable from the Muddy Creek Formation. Along the floodplain of the Virgin River, the river has cut through the Older Alluvium and deposited sediments commonly referred to as Younger Alluvium (Glancy and Van Denburgh 1969; Woessner et al. 1981).

Groundwater Recharge and Flow. Groundwater enters the Virgin River Valley from the north via the regional flow system, described above, that applies to the Tule Desert. In addition, groundwater flow comes from areas to the east of the Tule Desert. Groundwater also enters the Virgin River Valley as recharge from the east, coming from Beaver Dam Wash and mountain-front recharge from the Beaver Dam and Virgin mountains (Las Vegas Valley Water District and The MARK Group 1992). Groundwater in the Virgin River Valley also is recharged directly by the Virgin River, and locally by residual irrigation water applied to crops in the Virgin River floodplain. Once in the Virgin River Valley, the direction of groundwater flow is generally toward the southwest parallel to the Virgin River (Dixon and Katzer 2002; Las Vegas Valley Water District and The MARK Group 1992).

Conceptually, groundwater flow from the Tule Desert into the Virgin River Valley occurs primarily through the fractured-rock aquifer and provides very little direct hydraulic communication between saturated portions of the basin-fill materials of each hydrographic area (i.e., Toquop Gap, which is much less than 1 mile wide, is the only area where basin-fill sediments of each area merge). Groundwater also flows from the Tule Desert generally southward in the fractured-rock until the rock is truncated by the northern edge of the Virgin River Depression (CH2M HILL 2002a). From that point, groundwater discharges into the basin-fill (Muddy Creek and underlying unconsolidated or semiconsolidated formations) of the Virgin River Depression (BLM 2003a). Once in the basin-fill aquifer system of the Virgin River Valley, groundwater flows southwest, parallel to the Virgin River, toward the Overton Arm of Lake Mead (Dixon and Katzer 2002; Las Vegas Valley Water District and The MARK Group 1992).

Published literature contains a range of estimates of the amount of ground inflow, including groundwater recharge, to the Virgin River Valley. Glancy and Van Denburgh (1969) roughly estimated the combined inflow and recharge to be approximately 6,700 af/yr Prudic et al. (1995), using the USGS computer models of groundwater flow through the regional carbonate aquifer system, estimated the flow to be approximately 14,000 af/yr. The computer-derived estimate, however, is based on very general assumptions for conditions. At the time of that analysis, there were no available data from the Tule

Desert. More recently, Dixon and Katzer (2002) performed a comprehensive water-budget analysis on the Virgin River Valley and have concluded that the total recharge to the Virgin River groundwater system is on the order of 85,000 af/yr.

Aquifer Characteristics. Transmissivity for the Muddy Creek Formation in the Virgin River Valley is reported to be relatively low with typical values less than 10,000 gpd/ft (Johnson 2000). Higher transmissivity has been discovered within the Muddy Creek Formation where faulting has reportedly facilitated the development of potential localized conduits between the Muddy Creek Formation and the underlying fractured rock (Johnson 2000). The total volume of groundwater in storage within the uppermost 100 feet of saturated sediments in the Nevada portion of the Virgin River Valley has been reported by Las Vegas Valley Water District and The MARK Group (1992) to be approximately 2.9 million acre-feet, based on a specific yield of 10 percent.

Dixon and Katzer (2002) estimate the available perennial yield of the basin-fill aquifer system in the Virgin River Valley to be approximately 40,000 af/yr, which includes estimates of the current level of pumping (12,000 af/yr). The perennial yield of a groundwater basin is commonly defined as the rate at which water can be withdrawn continuously, from year to year, without producing an undesirable effect (Todd 1980).

River/Groundwater Interaction. The Virgin River is considered a “losing” river within the project area, which means that water from the river infiltrates the subsurface and recharges groundwater. This classification is based on the following:

- Observed reductions in river flow downstream, as reported by Glancy and Van Denburgh (1969), Metcalf (1995), and Woessner and others (1981).
- Lower water levels for groundwater relative to the elevation of the river, reported in Las Vegas Valley Water District (Las Vegas Valley Water District and The MARK Group 1992).
- Water-chemistry data indicating the groundwater in the Younger Alluvium immediately adjacent to the river is chemically similar to the Virgin River, but dissimilar to groundwater in other basin-fill deposits (Older Alluvium and Muddy Creek Formation) (Metcalf 1995).
- Water-chemistry data indicating that the Virgin River downstream of Littlefield is composed exclusively of flows from Beaver Dam Wash, Littlefield Springs, and upstream (Utah) Virgin River flow. Evidence that the local and regional groundwater systems in the Virgin River Valley do not flow into the Virgin River is specifically addressed in CH2M HILL (2002a).

3.10.2.3 Groundwater Quality

Tule Desert

Water samples from the wells in the vicinity of the proposed well field indicate that the water quality of the basin-fill deposits appears to be generally very good (BLM 2003a). This is based, however, on data from only two wells that are screened exclusively in the basin-fill deposits. The TDS concentration provides a general indication of water quality, and these TDS concentrations are 320 mg/L and approximately 200 mg/L, respectively, which represents very good quality water (BLM 2003a). Based on samples from the Tule Well, the general character of the groundwater in the basin-fill deposits is calcium-sodium sulfate.

The database on the quality of water in the fractured rock also is quite limited. TDS values from wells completed in the fractured-rock aquifer are approximately 520 mg/L and 500 mg/L, respectively. These data are representative of good quality water, but not quite as good as the groundwater in the overlying basin-fill. The general character of the groundwater in the fractured rock is sodium sulfate, based on the chemical data presented by CH2M HILL (2002b).

In addition to the generally lower values of TDS in the basin-fill groundwater, relative to the fractured-rock groundwater, other differences in the chemistry and water quality between these two aquifers are indicative of the separate nature of these aquifers, despite their tendency to act hydraulically as a single unit in response to pumping. Specifically, when compared with the basin-fill aquifer, the values in the fractured-rock aquifer are significantly lower with respect to chloride, significantly higher with respect to silica, and significantly lower with respect to deuterium (BLM 2003a).

Clover Valley

Water-quality data from seven springs located in the Clover Valley hydrographic area were obtained as a part of hydrogeochemical study designed to determine the mineral resource potential in the area (BLM 2007c). The water from these springs may be classified as calcium bicarbonate and calcium-sodium bicarbonate. The concentration of TDS provides a general indication of water quality. TDS concentrations from these springs varied between 150 mg/L to 345 mg/L, indicating a very good quality of water. Concentration of arsenic from one spring was measured at 0.025 mg/L, exceeding the primary Federal drinking water standard of 0.01 mg/L. No water-well-quality data were available from Clover Valley hydrographic area.

Virgin River Valley

Water-quality data described in Glancy and Van Denburgh (1969), Las Vegas Valley Water District and The MARK Group (1992), and Metcalf (1995) indicate the general character of the groundwater in the floodplain of the Virgin River to be mixed sodium, potassium, or magnesium-sulfate-type water. Groundwater from wells above the floodplain tends to have a composition of predominantly sodium sulfate plus chloride (BLM 2003a). TDS concentrations in wells along the river are very high with values ranging from approximately 2,100 mg/L to over 3,000 mg/L, which indicates relatively poor quality water. The TDS concentrations in wells above the floodplain are generally much lower, around 400 mg/L to 620 mg/L. Some of these wells above the floodplain, however, have TDS values that approach 2,000 mg/L. Wells operated by the Virgin Valley Water District that penetrate the Muddy Creek Formation have had problems in the past producing water that meets drinking-water standards, but the water quality tends to improve in the immediate vicinity of faulted areas (Johnson 2000).

3.10.2.4 Groundwater Use

Tule Desert

Basin-fill deposits in the Tule Desert are not extensively developed for water supply. Only one well that taps groundwater in the basin-fill is known to exist within the Tule Desert, and this well supports seasonal livestock grazing. In addition, some springs in the Tule Desert hydrographic area, particularly in the Clover Mountains, have been tapped to provide stock water (BLM 2003a).

Groundwater in the fractured-rock aquifer within the Tule Desert has not been developed. Permitted groundwater rights filed with the Nevada State Engineer’s Office are limited to one LCWD well, with diversion rate of 6 cubic feet per second (cfs) (4,345 af/yr). Other active water-well rights include one LCWD and three Virgin Valley Water District wells that have been protested. Diversion rates for these wells vary between 6 and 10 cfs (4,345 and 7,242 af/yr), and are associated with municipal or quasi-municipal use. An additional six applications for 30 cfs (21,725 af/yr) were filed by LCWD in March 2007 and are still pending (BLM 2007c).

Clover Valley

Groundwater rights within the Clover Valley hydrographic area are associated with municipal, irrigation, and stock water use. Permitted yields vary between 0.001 and 6 cfs (0.7 and 4,345 af/yr). Four LCWD applications for a total of 20 cfs (14,480 af/yr) that were filed in 2001 are being protested (BLM 2007c).

Virgin River Valley

The basin-fill deposits in the Virgin River Valley, principally the Muddy Creek Formation, have been developed to supply both potable water to the communities of Mesquite and Bunkerville, Nevada, and to provide water for irrigation along the Virgin River (BLM 2003a). Currently, the Virgin Valley Water District maintains wells that pump approximately 4,000 af/yr. Within the Arizona portion of the Virgin River Valley, groundwater pumping for primarily agricultural use is reported currently to be approximately 8,000 af/yr (Dixon and Katzer 2002). The current total groundwater withdrawal from the Virgin River Valley hydrographic area is therefore approximately 12,000 af/yr.

In addition, Tule, Gourd, and Snow Water springs along the eastern flanks of the East Mormon Mountains and Tule Springs Hills have been tapped to provide stock water.

As the underlying carbonate rocks within the Virgin River Valley are at tremendous depths, this source of groundwater has not been developed.

3.11 SURFACE WATER RESOURCES

3.11.1 Data Collection Methods

This section addresses surface water hydrology, wetlands, riparian areas, floodplains, and waters of the United States. Additional hydrologic information is presented in Section 3.10, Groundwater Resources.

Data on surface water flows for washes that cross the project area are not recorded by the USGS for this part of southern Lincoln County. The closest surface water data recorded by the USGS are from gaging stations located on the Virgin River, Beaver Dam Wash, Meadow Valley Wash, and the Muddy River. The data sources reviewed for this EIS include USGS water reports and topographic maps, Nevada Division of Water Resources reports and data, reports by various scientific organizations (e.g., the National Oceanic and Atmospheric Administration), and the 2003 EIS (BLM 2003a).

Wetlands, riparian areas, floodplains and waters of the United States were identified using a combination of field surveys and a review of the available data for the Proposed Action Alternative area. Recent aerial photographs and topographic maps were examined to identify potential jurisdictional waters within the project area. Additionally, National Wetlands Inventory maps were examined to identify the presence of any previously mapped wetlands within or near the project area. Federal Emergency Management Agency floodplain maps were reviewed to identify the types of floodplains in the area.

Teams conducted field investigations to determine the extent of jurisdictional waters occurring within the footprint of the proposed power plant and a 200-foot-wide corridor along the proposed rail line alignment. The team also recorded information concerning the jurisdictional limits of the washes and presence of desert riparian vegetation within the project area.

Following the field surveys, the data that were collected, including the width and approximate length of each channel segment, were compiled and mapped. The total acres of jurisdictional waters within the project area was determined by multiplying the average width of each wash segment by its length, and then totaling the values of all segments. Additional information is included in the jurisdictional delineation submitted to the U.S Army Corps of Engineers (USACE).

3.11.2 Existing Conditions

3.11.2.1 Regional Overview

The proposed power plant site and rail line are located in the Colorado River Basin. Specifically, the proposed rail line is located within the Tule Desert hydrographic area, the Virgin River Valley hydrographic area, and the Lower Meadow Valley Wash hydrographic area within the Colorado River Basin. All surface water in the entire project area eventually flows into Lake Mead, and ultimately the Colorado River, via either the Virgin River or the Muddy River.

In general, the average annual precipitation within the Tule Desert hydrographic area, the Virgin River Valley hydrographic area, and the Lower Meadow Valley Wash hydrographic area is less than 10 inches per year. This rainfall is the source of surface water within the project area. The greatest amount of rainfall within these three hydrographic areas occurs during January through March with summer thunderstorms occurring from July through September. In elevations greater than 4,000 feet above mean sea level, annual precipitation can exceed 10 inches and can average between 13 to 16 inches per year (Walker 2002).

Surface water is linked to groundwater due to infiltration of surface water into the alluvial sediments within the hydrographic basins. Surface water is one source for groundwater in the area. The surface water system also is directly linked to the geological conditions described in Section 3.9, Geology, Soils, and Minerals. A discussion of the relationship between surface water flows and groundwater in the Virgin River, as it relates to potential project-induced impacts, also is presented in this section.

Surface Water Hydrology

The principal surface water feature in the vicinity of the project area is the Virgin River, which flows southwesterly about 13 miles south of the project area. The Virgin River originates in southern Utah, flows through a gorge in the Beaver Dam Mountains, and crosses through the lower Virgin River Valley until it reaches the Overton Arm of Lake Mead on the Colorado River. Seasonal flow in the Virgin River is quite variable, ranging from 162,200 af/yr (Glancy and Van Denburgh 1969) to as high as 933,000 af/yr (Holmes et al. 1997) The principal flows into the Virgin River include seasonal runoff, inflow from the local tributaries (i.e., Beaver Dam Wash and Toquop Wash), direct rainfall, and irrigation return flows.

Toquop Wash, the South Fork of the Toquop Wash, Sam's Camp Wash, Garden Wash, Whitimore Wash, Halfway Wash, and the Meadow Valley Wash are the major ephemeral washes located in the project area (BLM 2003a). These washes contribute surface water flows to the Virgin River and Muddy rivers only during significant localized thunderstorm events and broader regional rainstorms. These washes capture surface runoff from the Tule Springs Hills, the Tule Desert, the Mormon Mountains, and East Mormon Mountains, and flow southward (BLM 2003a). Although Meadow Valley Wash, at the western boundary of the project area (west of the UPRR), is larger, Toquop Wash is the most prominent wash crossing through the project area.

Small springs have been identified in the hills and mountains that surround the project area (BLM 2003a). Based on observation, however, these springs do not contribute to surface water in the washes that cross the area. Flows from these springs are generally very low (less than 1 gallon per minute) and are either captured for stock water, evaporate, or seep into the alluvial soils. The identification and discussion of these springs is presented in Section 3.10.

Surface Water Quality

Most surface-water-quality data in the area have been collected for the Virgin River. The Virgin River typically has a moderate-to-high silt load during most of the year, except at low flows. These suspended solids create the muddy appearance of the river. The estimated annual quantity of suspended solids passing Littlefield is reported by Glancy and Van Denburgh (1969) to be 2.7 million tons. TDS in the river range from 1,000 to 3,000 mg/L (Glancy and Van Deburgh 1969; Woessner et al. 1981). These TDS compounds include calcium, sodium, sulfate, and chloride (BLM 2003a). When flows in the river are low, TDS is typically higher than when the flows are high. Springs and irrigation returns to the river generally increase the TDS in the river (BLM 2003a).

Wetlands, Riparian Areas, Floodplains, and Waters of the U.S.

Wetland and riparian habitats in Nevada cover a very small percentage of the total area of the state; however, because of the type of habitat that they provide, they have a comparatively high species diversity and endemism and provide essential habitat for wildlife. Wetlands are areas that are saturated by water for a sufficient amount of time to support vegetation that is adapted to saturated soil conditions. The presence of vegetation, like cottonwood, willow (*Salix* spp.), mesquite (*Prosopis*, spp.), desert willow (*Chilopsis linearis*), or catclaw (*Acacia* spp.), serves as an indication that sufficient water is available throughout the year for these riparian species. Desert riparian vegetation also provides cover and habitat for wildlife species. Ephemeral washes, washes that generally carry flows only during flood events and/or spring runoff, are ecologically important because they convey flood flows, perform floodplain functions, serve as travel corridors for wildlife, and provide habitat for wildlife species.

Wetlands and other jurisdictional/navigable waters are regulated by the USACE through Section 404 of the Clean Water Act (CWA). The EPA enforces the regulations of the CWA. The USACE can claim jurisdiction over wetlands and require permitting activities for any disturbance if the wetlands meet criteria set forth in Section 404 of the CWA. The USACE also can claim jurisdiction over stream channels and ephemeral washes that connect to jurisdictional/navigable waters. The USACE's jurisdiction on a stream channel or ephemeral wash is limited to the ordinary high-water mark (OHWM). The OHWM for non-tidal streams is defined as follows:

> [the] line on the shore established by the fluctuations of water and is indicated by physical characteristics, such as a clear, natural line impressed on the bank, shelving, changes in the character of the soil, destruction of terrestrial vegetation, the presence of litter or debris, or other appropriate means that consider the characteristics of the surrounding area (33 CFR Part 328.3).

Any action within jurisdictional waters requires a permit from the USACE prior to groundbreaking activities taking place. USACE permit mechanism thresholds are based on the type of project and amount of potential disturbance. Isolated, intrastate wetlands that do not connect to jurisdictional waters are not considered within the jurisdiction of the USACE.

There are no wetlands, as defined by the USACE, within the proposed power plant site, or along the proposed rail line. The site and rail line route are located in an area designated as Zone D on the Federal Emergency Management Agency floodplain maps. Flood hazards in Zone D areas are considered possible but as of yet are undetermined, as an analysis of flood hazards has not been conducted.

The Toquop Wash originates in the Clover Mountains north of the entire project area and travels in a south-southeasterly direction through the Toquop Gap. Floodwaters within the Toquop Wash eventually flow into the Virgin River. The South Fork of the Toquop Wash originates in the Mormon Mountains west of the project area and travels in an easterly direction until it joins with the Toquop Wash northeast of the proposed plant site. Sam's Camp Wash and Garden Wash also originate in the Clover Mountains north of the project area and travel in a south-southeasterly direction, generally paralleling the Toquop Wash across the Tule Desert. All three washes—Sam's Camp Wash, Garden Wash, and the Toquop Wash—eventually join together near the Toquop Gap. The Whitimore Wash originates west of the Mormon Mountains and eventually joins the Muddy River south of Glendale. Halfway Wash originates in the Mormon Mountains and eventually flows into the Virgin River. The perennially flowing Meadow Valley Wash eventually connects with the Muddy River, and ultimately Lake Mead and the Colorado River. With the exception of the Meadow Valley Wash, all other washes in the project area are ephemeral washes, carrying flows only in flood situations. All of the other, unnamed washes within the project area are tributaries to the named washes discussed above.

3.11.2.2 Power Plant Site

A major surface water feature within the vicinity of the power plant site is Toquop Wash. As previously discussed, Toquop Wash is an ephemeral stream and produces surface water flows only during significant localized thunderstorm events and broader regional rainstorms. Generally, surface water flows in this wash soak into the surrounding alluvial sediment or evaporate. Toquop Wash captures surface runoff from the Tule Springs Hills, Tule Desert, and East Mormon Mountains.

There are no springs within the footprint of the power plant site. Additional information on springs in the project area can be found in Section 3.10, Groundwater Resources.

Surface water quality within the power plant site would be very poor with the amount of sediment and minerals picked up and transported by seasonal rainstorm flows.

No major washes traverse the power plant site; however, several smaller, ephemeral washes traverse the plant site and eventually connect with the Toquop Wash. A jurisdictional delineation defining the widths of the washes identified in the power plant site has been submitted to the USACE.

3.11.2.3 Proposed Rail Line

The major surface-water features in the vicinity of the proposed rail line are Meadow Valley Wash, a perennial stream, and Toquop Wash, an ephemeral stream. Generally, surface water flows in these washes soak into the surrounding alluvial sediment or evaporate, although flows in the Meadow Valley Wash can be more significant due to the larger basin area of the wash. Meadow Valley Wash captures surface runoff from the eastern side of the Meadow Valley Mountains, the western side of the Mormon Mountains, and portions of the Clover Mountains. Toquop Wash captures surface runoff from the Tule Springs Hills, the Tule Desert, the eastern side of the Mormon Mountains and East Mormon Mountains.

The proposed rail line would cross the following named washes—the South Fork of the Toquop Wash, Toquop Wash, Sam's Camp Wash, Garden Wash, and the Meadow Valley Wash. The South Fork of the Toquop Wash has an OHWM of 50 feet within the proposed ROW for the line. This wash is approximately 75 feet deep with sheer rock walls and riparian vegetation, mainly desert willows (*Chilopsis linearis*) . The rail line would cross the Toquop Wash at the Toquop Gap. The OHWM of the Toquop Wash within the proposed rail line corridor is 24 feet wide. The Toquop Wash contains riparian vegetation (mainly desert willows). Sam's Camp Wash has an OHWM of 70 feet in total width, and Garden Wash has an OHWM that ranges from 20 to 42 feet in the corridor of the proposed rail line.

After crossing the Tule Desert, the proposed rail line would cross the Meadow Valley Mountains and drop into the Meadow Valley Wash to connect with the UPRR at Leith Siding. The portion of the line route within the Meadow Valley Wash at Leith Siding was not assessed as part of the jurisdictional delineation, because the area has been disturbed by flooding and subsequent efforts by UPRR to repair flood damage to its rail line. Normal conditions no longer exist in this portion of the Meadow Valley Wash. The EPA is currently conducting a CWA investigation UPRR's activities in this portion of the Meadow Valley Wash. However, the washes that are tributaries to the Meadow Valley Wash were assessed. The results of the field investigations and descriptions of the washes that would traverse the proposed rail line are described in the jurisdictional delineation submitted to the USACE.

3.12 BIOLOGICAL RESOURCES

3.12.1 Data Collection Methods

USGS topographic maps, aerial photographs, and several technical documents on area resources were reviewed to assess the topography, predominant landforms, and major vegetation associations within and adjacent to the project area. Wildlife and special status species information presented is based on coordination with regulatory and resource agency personnel and the best available scientific information on the distribution and abundance of the affected species. This includes the most recent results of survey and monitoring efforts, consultation with technical experts, and detailed review of pertinent biological and management literature.

3.12.2 Existing Conditions

The project area has a variety of physical features that offer a diversity of habitat types, represented by a characteristic assemblage of plant species. Topography is characterized by mountain ranges punctuated with intervening valleys, broad basins, and dry lakebeds. The vegetation throughout the area is broadly classified as Mojave desertscrub, while Mojave-Great Basin Desert transitional species are more common at the higher elevations. The large size of the area, together with its geology, soils, climate, and anthropogenic influences, have combined to produce a mosaic of floristic components and associated wildlife species. Dry air masses, high summer temperatures, infrequent precipitation, and a high rate of evaporation characterize the climate of the study area and surrounding region. Precipitation averages less than 10 inches annually and occurs primarily during the winter months. For most of the region, the availability of water and soil moisture is a critical factor that determines the broad distribution of vegetation types and associated wildlife species.

3.12.3 Vegetation

The project area is located within the northeastern Mojave Desert region of the desert floristic province. Low, widely spaced shrubs dominate the Mojave Desert vegetation. The species composition of the Mojave Desert has common elements with the Great Basin to the north and many succulent species common to the Sonoran Desert to the south and east. The most widely distributed plant is the creosotebush (*Larrea tridentata*), which covers extensive areas in nearly pure stands, often in close association with white bursage (*Ambrosia dumosa*).

Vegetative communities of a given region are largely determined by prevailing environmental variation and disturbance history. Individual plant communities generally can be separated along environmental gradients (Whittaker 1967). Gradients in soil moisture, soil fertility, temperature, slope, and other physical parameters affect the distribution of individual species, and this in turn affects the type of plant community that develops at a given location. Since plant species generally respond individually to environmental gradients (Sawyer and Keeler-Wolf 1995), it is often difficult to differentiate recurrent and ecologically meaningful combinations of species as plant communities. Despite these limitations, plant community classification serves an important function in organizing vegetation data into relatively distinct units. These units occur with some consistency in the landscape and are amenable to study and management.

3.12.3.1 Vegetation Communities

Vegetative communities in the project area were identified using the Provisional Digital Land Cover Map for the southwestern United States (Southwest Regional Gap Analysis Project 2004). Within the project area, six major vegetation communities were identified as follows:

- Sonora-Mojave creosotebush-white bursage desertscrub
- Mojave mid-elevation mixed desertscrub
- North American Warm Desert bedrock cliff and outcrop
- North American Warm Desert wash
- Sonora-Mojave mixed salt desertscrub
- Inter-Mountain Basins Semi-Desert shrub steppe

Sonora-Mojave creosotebush-white bursage desertscrub is the predominant vegetation community and represents the largest area at approximately 90 percent (1,213 acres), followed by Mojave mid-elevation mixed desertscrub at about 7 percent (94 acres), and North American Warm Desert bedrock cliff at approximately 2 percent (27 acres). The remaining three vegetation communities represent 0.84 percent (11 acres) of the project area and include unvegetated features such as washes, cliff and outcrop areas, alluvial fans, dunes, and playas. The six plant community types identified in the project area are described below and depicted in Map 3-10. Several other vegetation communities are represented in the areas adjacent to the project area and also are included for reference in Map 3-10. The acreages for each of the six plant communities within the project area are presented in Table 3-9.

Table 3-9
Vegetation Communities in the Project Area

Vegetation Community	Area in Acres	Percent of Area
Sonora-Mojave creosotebush-white bursage desertscrub	1,213.43	90.16
Mojave mid-elevation mixed desertscrub	93.53	7.0
North American Warm Desert bedrock cliff and outcrop	27.12	2.0
North American Warm Desert wash	9.13	0.7
Sonora-Mojave mixed salt desertscrub	1.68	0.1
Inter-Mountain Basins Semi-Desert shrub steppe	0.51	0.04
Total	1,345.40	–

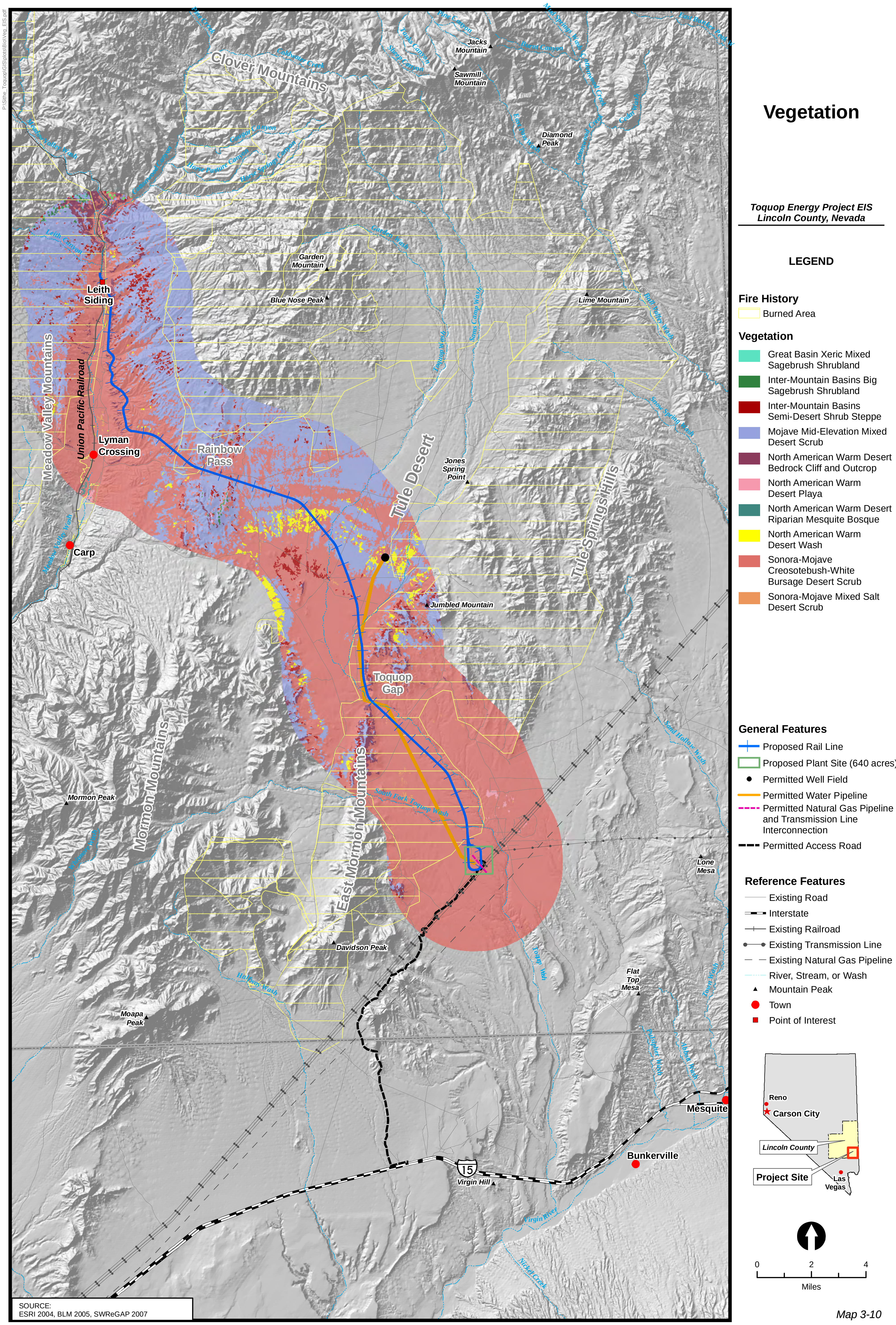
SOURCE: Southwest Regional Gap Analysis Project 2004

Sonora-Mojave Creosotebush-White Bursage Desertscrub

Sonoran-Mojave creosotebush-white bursage desertscrub land cover forms the vegetation community in broad valleys, lower bajadas, plains, and low hills in the Mojave and lower Sonoran deserts across approximately 90 percent of the project area (1,213 acres). This desertscrub is characterized by a sparse to moderately dense layer (2 to 50 percent cover) of small-leaved, drought-tolerant, and broad-leaved shrubs. Creosotebush and white bursage are typically dominants, but many different shrubs, dwarf-shrubs, and cacti may be present or form typically sparse understories.

Mojave Mid-Elevation Mixed Desertscrub

The second most prevalent vegetation association, Mojave mid-elevation mixed desertscrub, represents 7 percent (approximately 94 acres) of the total vegetation cover in the project area. This land-cover type represents the extensive desertscrub in the transition zone above creosote-burrobush desertscrub and below the lower montane woodlands that occurs in the eastern and central Mojave Desert, around


Vegetation
Toquop Energy Project EIS
Lincoln County, Nevada
LEGEND
Fire History
Burned Area
Vegetation
Great Basin Xeric Mixed Sagebrush Shrubland
Inter-Mountain Basins Big Sagebrush Shrubland
Inter-Mountain Basins Semi-Desert Shrub Steppe
Mojave Mid-Elevation Mixed Desert Scrub
North American Warm Desert Bedrock Cliff and Outcrop
North American Warm Desert Playa
North American Warm Desert Riparian Mesquite Bosque
North American Warm Desert Wash
Sonora-Mojave Creosotebush-White Bursage Desert Scrub
Sonora-Mojave Mixed Salt Desert Scrub
General Features
Proposed Rail Line
Proposed Plant Site (640 acres)
Permitted Well Field
Permitted Water Pipeline
Permitted Natural Gas Pipeline and Transmission Line Interconnection
Permitted Access Road
Reference Features
Existing Road
Interstate
Existing Railroad
Existing Transmission Line
Existing Natural Gas Pipeline
River, Stream, or Wash
Mountain Peak
Town
Point of Interest
Reno
Carson City
Lincoln County
Project Site
Las Vegas
0
2
4
Miles
Clover Mountains
Jacks Mountain
Sawmill Mountain
Diamond Peak
Garden Mountain
Blue Nose Peak
Lime Mountain
Leith Siding
Meadow Valley Mountains
Union Pacific Railroad
Lyman Crossing
Rainbow Pass
Tule Desert
Jones Spring Point
Tule Springs Hills
Carp
Jumbled Mountain
Toquop Gap
Mormon Mountains
East Mormon Mountains
Mormon Peak
South Fork Toquop Wash
Lone Mesa
Davidson Peak
Flat Top Mesa
Moapa Peak
Mesquite
Bunkerville
15
Virgin Hill
Virgin River
SOURCE:
ESRI 2004, BLM 2005, SWReGAP 2007
Map 3-10

elevations of 2,300 to 5,900 feet. It is also common on lower slopes in the transition zone into the southern Great Basin. The vegetation in this land-cover type is quite variable. Codominants and diagnostic species include blackbush (*Coleogyne ramosissima*), Eastern Mohave buckwheat (*Eriogonum fasciculatum* var. *foliolosum*), Nevada jointfir (*Ephedra nevadensis*), spiny hopsage (*Grayia spinosa*), spiny menodora (*Menodora spinescens*), beargrass (*Nolina bigelovii*), buckhorn cholla (*Opuntia acanthocarpa*), Mexican bladdersage (*Salazaria mexicana*), Joshua tree (*Yucca brevifolia*), and Mojave yucca (*Yucca schidigera*).

North American Warm Desert Bedrock Cliff and Outcrop

Two percent (27 acres) of the project area is characterized by the North American Warm Desert wash vegetation association. This ecological system is found from subalpine to foothill elevations and includes barren and sparsely vegetated landscapes (generally less than 10 percent plant cover) of steep cliff faces, narrow canyons, and smaller rock outcrops of various igneous, sedimentary, and metamorphic bedrock types. Also included are unstable scree and talus slopes that typically occur below cliff faces. Species present are diverse and may include elephant tree (*Bursera microphylla*), ocotillo (*Fouquieria splendens*), beargrass, teddy bear cholla (*Opuntia bigelovii*), and other desert species, especially succulents.

North American Warm Desert Wash

The North American Warm Desert wash association is found on 0.7 percent (9 acres) of the project area. This ecological system is restricted to intermittently flooded washes or arroyos that dissect bajadas, mesas, plains, and basin floors throughout the warm deserts of North America. Although often dry, the intermittent fluvial processes define this system, which are often associated with rapid sheet and gully flow. The vegetation of desert washes is quite variable ranging from sparse and patchy to moderately dense and typically occurs along the banks, but may occur within the channel. The woody layer is typically intermittent to open and may be dominated by shrubs and small trees such as catclaw (*Acacia greggii*), brickellbush (*Brickellia laciniata*), desert broom (*Baccharis sarothroides*), desert willow (*Chilopsis linearis*), burrobush (*Hymenoclea salsola*), mesquite (*Prosopis* spp.), desert smoke tree (*Psorothamnus spinosus*), desert almond (*Prunus fasciculata*), little leaf sumac (*Rhus microphylla*), bladder sage (*Salazaria mexicana*), or greasewood (*Sarcobatus vermiculatus*).

Sonora-Mojave Mixed Salt Desertscrub

Representing only a small amount of the total habitat, Sonora-Mojave mixed salt desertscrub covers approximately 0.1 percent (2 acres) of the project area. This land-cover type includes extensive open-canopied shrublands of typically salty basins in the Mojave and Sonoran deserts. Stands often occur around playas. Substrates are generally fine-textured, saline soils. Vegetation is typically composed of one or more saltbush species such as fourwing saltbush (*Atriplex canescens*) or cattle saltbush (*Atriplex polycarpa*). Iodinebush (*Allenrolfea occidentalis*), pickleweed (*Salicornia* spp.), seepweed (*Suaeda* spp.) or other halophytic plants are often present.

Inter-Mountain Basins Semi-Desert Shrub Steppe

Inter-Mountain Basin Semi-Desert scrub steppe is the least common vegetation association within the project area, representing only a small fraction 0.04 percent (0.5 acre) of the total vegetation cover. This land-cover type occurs throughout the intermountain western United States, typically at lower elevations on alluvial fans and flats with moderate to deep soils. This semi-arid shrub-steppe is typically dominated by grasses (less than 25 percent cover) with an open shrub layer, but includes sparse mixed shrublands without a strong grass layer. Characteristic grasses include Indian ricegrass (*Achnatherum hymenoides*), blue grama (*Bouteloua gracilis*), James's galleta (*Pleuraphis jamesii*), Sandberg bluegrass (*Poa secunda*), and alkali sacaton (*Sporobolus airoides*). The shrub layer is often a mixture of shrubs and dwarf-shrubs including fourwing saltbush, sand sagebrush (*Artemisia filifolia*), rabbitbrush (*Chrysothamnus* spp.), jointfir (*Ephedra* spp.), broom snakeweed (*Gutierrezia sarothrae*), and winterfat (*Krascheninnikovia lanata*).

3.12.3.2 Field Survey Results for Vegetation

Species identified in the project area during field surveys include creosotebush, white bursage, shadscale (*Atriplex confertifolia*), thornbush (*Lycium* spp.), and Joshua tree. Other species found in the area include ratany (*Krameria parvifolia*), rattlesnake weed (*Chamaesyce albomarginata*), burrobush , desert trumpet (*Eriogonum inflatum*), Nevada joint-fir and broom snakeweed. In the higher elevations, north of the Toquop Gap area, creosotebush is less prominent and blackbush becomes more common. Plant species within washes include blackband rabbitbrush (*Chrysothamnus paniculatus*), desert willow, jimsonweed (*Datura wrightii*), salt cedar (*Tamarix ramosissima*) and desert tobacco (*Nicotiana obtusifolia*).

A large-scale fire in June 2005 altered the plant composition along sizeable sections of the Proposed Action Alternative rail line. In these areas, annual invasive plants such as cheatgrass (*Bromus tectorum*), red brome (*Bromus rubens)*, Mediterranean grass (*Schismus* spp.) and filaree (*Erodium cicutarium*) were the dominant ground cover during surveys conducted in 2006. Cactus species that occur throughout the project area include buckhorn cholla, beavertail prickly pear (*O. basilaris*), golden cholla (*O. echinocarpa*), grizzly bear prickly pear (*O. erinacea*), hedgehog cactus (*Echinocereus engelmanii*) and barrel cactus (*Ferocactus cylindraceus*). Excluding golden cholla, cacti in the burned sections of the project area showed poor survival rates.

3.12.3.3 Noxious and Invasive Weeds

Invasive species refer to those non-native species that out-compete native vegetation, reducing the quantity and diversity of native plants. In Nevada, a noxious weed is, or is likely to be, detrimental or destructive and difficult to control or eradicate (NAC 555.010). While an invasive species may be designated as noxious, not all noxious species are invasive. A comprehensive list of the State of Nevada noxious weeds is located in Appendix C.

Nine species of noxious and/or invasive, non-native plant species were observed in the project area during surveys conducted in May and June 2006. Documented in or near the project area are red brome, cheatgrass, Mediterranean grass, salt cedar, Russian thistle (*Salsola tragus*), African mustard (*Malcolmia africana*), Sahara mustard (*Brassica tournefortii*), tall whitetop (*Lepidium latifolium*), and field dodder (*Cuscuta campestris*). Of these species, only red brome and Mediterranean grass were seen in large numbers within the project area, sometimes accounting for up to 100 percent of the ground cover. Additionally, hoary cress (*Cardaria draba*) and Russian knapweed (*Acroptilon repens*) are found in the surrounding areas and could potentially spread into the project area. Tall whitetop, Sahara mustard, hoary cress, Russian knapweed, and salt cedar are designated as noxious under Nevada statutes.

3.12.4 <u>Wildlife</u>

3.12.4.1 Wildlife Habitats

The project area has a variety of plant communities and landscape features that provide for a diversity of wildlife habitat types. While these habitat types correspond with the vegetation community types discussed in Section 3.12.3, they also are defined by a number of distinct landscape features such as springs and seeps, washes and gullies, rock outcrops, cliffs and taluses, and cave entrances. All contribute to the diversity and abundance of wildlife in the area as they generally provide microhabitats for wildlife uniquely adapted to or dependent on these features.

Most wildlife species are adapted to the local arid conditions, including sparse vegetative cover and limited sources of permanent water. However, seeps and springs provide perennial sources of water and a high concentration of vegetation and cover that contribute to increased wildlife diversity in these areas. Large mammals, such as desert bighorn sheep (*Ovis canadensis nelsoni*), coyote (*Canis latrans*), and mountain lion (*Puma concolor*), use these water sources and return to them regularly. Bats typically forage over these areas because of increased abundance of invertebrate prey. More common bird species may nest and forage in these areas year-round, while migratory bird species may forage and rest in these areas during their migration.

A number of unnamed washes and drainages occur throughout the project area. These areas generally have more structured and complex vegetative assemblages and higher wildlife diversity than the surrounding bajadas. Washes function as movement corridors for wildlife and serve as congregation and feeding areas for a variety of bird species.

Rocky terrain in the Tule Springs Hills and the East Mormon and Mormon Mountains provide habitat for many species of small mammals, birds, and reptiles. Along with different vegetation communities that normally occur with increasing elevation in these ranges, differences in slope and aspect result in a variety of microhabitats that support a number of wildlife species. Notable groups of species that occur in these areas include bats, which rely on rocky outcrops for roosting sites, and raptors, which use cliff faces and rocky ledges for roosting or nesting.

3.12.4.2 Mammals

Most desert mammals are nocturnal, but occasionally a few may be seen during the day. Several carnivores occupy the various habitats that occur in or near the project area. These include the bobcat (*Lynx rufus*), mountain lion, kit fox (*Vulpes macrotis*), gray fox (*Urocyon cinereoargentus*), and badger (*Taxidea taxus*). Several active kit fox and other predator dens were encountered during surveys.

Typical small mammal species that occur within the region include the black-tailed jackrabbit (*Lepus californicus*), desert cottontail rabbit (*Sylvilagus audobonii*), desert wood rat (*Neotoma lepida*), white-tailed antelope squirrel (*Ammospermophilus leucurus*), round-tailed ground squirrel (*Spermophilus*), pocket gopher (*Thomomys bottae*), kangaroo rat (*Dipodomys* sp.), various cricetid mice (*Onychomys* sp., *Reithrodontomys megalotis*, *Peromyscus* sp.), and pocket mice (*Chaetodipus* and *Pergonathus* sp.).

Mule deer (*Odocoileus hemionus)* and desert bighorn sheep reside in the region. Although they inhabit primarily mountainous terrain, portions of the project area are frequented regularly by these two species. In particular, the Toquop Gap acts as a year-round movement corridor for bighorn sheep between the Tule Springs Hills and the East Mormon Mountains. Evidence of both species was observed during surveys in the Toquop Gap area. Also, a variety of bat species such as the western pipistrelle (*Pipistrellus hesperus*), several species of myotis (*Myotis* sp.), and others make use of the project area either as resident foragers or migrants. Roosting habitat varies among the species, but it is characterized typically by steep rocky outcrops with crevices, caves, abandoned mines, or large trees. The only suitable roosting habitat in the project area was identified along Toquop Wash, which lies primarily in the Toquop Gap vicinity.

3.12.4.3 Birds

A wide variety of avian species occur in or migrate through this region of southern Nevada. However, because the project area is predominately a Mojave Desert environment, the diversity of breeding birds is fairly limited. Based on known habitat associations, typical nesting species found in the vicinity of the project area include the black-throated sparrow (*Amphispiza bilineata*), cactus wren (*Campylorhynchus brunneicapillus*), horned lark (*Eremophila alpestris*), greater roadrunner (*Geococcyx californianus*), ash-throated flycatcher (*Myiarchus cinerascens*), western kingbird (*Tyrannus vociferans*), chukar (*Alectoris sp.), Say's phoebe (*Sayornis saya*), verdin (*Auriparus flaviceps*), common raven (*Corvus corax*), lesser night-hawk (*Chordeiles acutipennis*), Gambel's quail (*Callipepla gambelii*), and the loggerhead shrike (*Lanius ludovicianus*).

Birds of prey that also might nest in or near the project area include the great-horned owl (*Bubo virginianus*), western burrowing owl (*Athene cunicularis*), prairie falcon (*Falco mexicanus*), American kestrel (*Falco sparverius*), red-tailed hawk (*Buteo jamaicensis*), golden eagle (*Aquila chrysaetos*), peregrine falcon (*Falco peregrinus*), and turkey vulture (*Cathartes aura*). A red-tailed hawk nest and fledgling were documented in the project area during field surveys.

3.12.4.4 Reptiles

Reflective of their adaptations to an arid environment, reptiles are well-represented in the project area and surrounding region. Some of the more common species include the side-blotched lizard (*Uta stansburiana*), western whiptail (*Aspidosceles tigris*), zebra-tailed lizard (*Callisaurus draconoides*), desert horned lizard (*Phrynosoma platyrhinos*), desert iguana (*Dipsosaurus dorsalis*), chuckwalla (*Sauromalus ater*), long-nosed leopard lizard (*Gambelia wislizenii*), desert collared lizard (*Crotaphytus bicinctores*), western banded gecko (*Coleonyx variegatus*), desert tortoise, and the Gila monster (*Heloderma suspectum*).

Species of snakes that may be encountered in the area include the western blind snake (*Leptotyphlops humilis*), ground snake (*Sonora semiannulata*), spotted leaf-nose snake (*Phyllorhynchus decurtatus*), coachwhip (*Masticophis flagellum*), patch-nosed snake (*Salvadora hexalepis*), gopher snake (*Pituophis catenifer*), glossy snake (*Arizona elegans*), long-nosed snake (*Rhinocheilus lecontei*), common king snake (*Lampropeltis getula*), night snake (*Hypsiglena torquata*), lyre snake (*Trimorphodon biscutatus*), sidewinder (*Crotalus cerastes*), Mojave rattlesnake (*C. scutulatus*), and speckled rattlesnake (*C. mitchellii*).

3.12.4.5 Amphibians

A number of amphibians occur in the northeastern Mojave Desert. For the most part, these are restricted to areas around ephemeral or permanent water sources. Amphibian species that potentially may occur within or near the project area in Meadow Valley Wash include the Great Basin spadefoot (*Spea intermontana*), western toad (*Bufo boreas*), red-spotted toad (*Bufo punctatus*), Great Plains toad (*Bufo cognatus*), Pacific tree frog (*Hyla regilla*), bull frog (*Rana catesebiana*), and the southwestern toad (*Bufo microscaphus*).

3.12.5 Special Management and Special Status Species

Conservation management and special protections for flora and fauna are provided for mainly by state and Federal laws, regulations and policies, with management carried out by authorized agencies.

3.12.5.1 State Authorities

The State of Nevada provides for and authorizes conservation management and protection for a number of species under Nevada Revised Statutes (NRS), NAC, and various policies and regulations. Laws and authorities addressing wildlife as defined by the State of Nevada are found principally in NRS chapters 501 through 506 and corresponding NAC chapters 501 through 505. Laws and authorities addressing wild land plants are in NRS chapters 525 and 528 and corresponding NAC chapters 527 and 528.

Administration of the state's wildlife and wild land plants is by the Nevada Department of Wildlife and the Nevada Division of Forestry, respectively. Mule deer, bighorn sheep, mountain lion, cottontail rabbit, chukar, Gambel's quail, and mourning dove are among wildlife classified as game species; whereas bobcat, kit fox, and gray fox are among those classified as fur-bearing species. In general, management methods and intensities are based on a sustainable-population principle with protection against illegal harvest enforced. The Nevada Division of Forestry similarly manages wildland plants, notably coniferous species. However, because certain wildlife and flora are vulnerable to decline, special management status and protections may be asserted. Under NRS chapter 501, wildlife may be classified as protected with further classifications of sensitive, threatened, or endangered as warranted. Similarly under NRS 527.270, native plants may be declared as threatened with extinction and protected.

By nature, authorities to manage plant and animals overlap between the state and Federal natural resource management agencies.

3.12.5.2 Migratory Birds

The Migratory Bird Treaty Act (16 U.S.C. 703 et seq.) and Executive Order 13186, Responsibilities of Federal Agencies to Protect Migratory Birds, state that all migratory birds and their parts (including eggs, nests, and feathers) are fully protected in the United States. This is, in part, to assure that environmental analyses of Federal actions required by NEPA or other established environmental review processes evaluates the effects of agency actions and agency plans on migratory birds. Therefore, this treaty protects almost all birds that occur, or migrate through, the project area. The following species are not protected under the treaty order: European starling (*Sturnus vulgaris*), rock pigeon (*Columba livia*), and house sparrow (*Passer domesticus*). For migratory game, the treaty order is carried out cooperatively with the states (e.g., Nevada Department of Wildlife), which set and enforce legal harvest laws and regulations.

3.12.5.3 Special Status Species

Special status species include those declared as threatened or endangered under the Federal ESA, as amended; candidate species proposed for ESA listing; species of concern or those identified by the U.S. Fish and Wildlife Service (USFWS), BLM, or the State of Nevada as unique or rare. Nye milkvetch, straw milkvetch, and meadow valley sandwort do not have special designations but are identified by a resource specialist as unique or rare. Table 3-10 provides a list of special status species in the project area.

Table 3-10
Special Status Species in the Project Area

SPECIES		STATUS		
Common Name	**Scientific Name**	**USFWS**	**BLM**	**State**
PLANTS				
Three-corner milkvetch	*Astragulus geyeri* var. *triquetrus*	XC2	N	CE
Nye milkvetch	*Astragulus nyesis*			
Sticky buckwheat	*Eriogonum viscidulum*	XC2	N	CE
Las Vegas buckwheat	*Eriogonum corymbosum*		N	CE
Straw milkvetch	*Astragalus lentiginosus*			
White bearpoppy	*Astragalus merriami*		S	
Las Vegas bearpoppy	*Astragalus califorinica*		N	CE
Meadow Valley sandwort	*Arenaria stenomeres*			
Beaver Dam breadroot	*Pediomelum castoreum*	XC2		
FISH				
Virgin River chub	*Gila seminuda*	LE	S	P
Woundfin	*Plagopterus argentissimus*	LE	S	P
Meadow Valley Wash speckled dace	*Rhynichthys osculus* ssp. *11*		N	
Meadow Valley Wash desert sucker	*Catostomus clarkii*	XC2	N	P

SPECIES		STATUS		
Common Name	**Scientific Name**	**USFWS**	**BLM**	**State**
AMPHIBIANS				
Southwestern toad	*Bufo microscaphus*		N	
REPTILES				
Desert tortoise	*Gopherus agassizii*	LT	S	P
Western chuckwalla	*Sauromalus obesus ater*	XC2	N	
Gila monster	*Heloderma suspectum*	XC2	N	P
BIRDS				
Southwestern willow flycatcher	*Empidonax traillii extimus*	LE	S	P
Western yellow-billed cuckoo	*Coccyzus americanus*	C	S	P
Yuma clapper-rail	*Rallus longirostris yumanensis*	LE		P
Golden eagle	*Aquila chrysaetos*		S	P
Ferruginous hawk	*Buteo regalis*	XC2	S	P
Swainson's hawk	*Buteo swainsoni*		N	P
Loggerhead shrike	*Lanius ludovicianus*	XC2	S	P
Burrowing owl	*Athene cunicularia*	XC2	S	P
Prairie falcon	*Falco mexicanus*		S	P
Phainopepla	*Phainopepla nitens*		N	
Le Conte's thrasher	*Toxostoma lecontei*		N	
Crissal thrasher	*Toxostoma crissale*		N	
Peregrine falcon	*Falco peregrinus*	D	N	P
MAMMALS				
Pallid bat	*Antrozous pallidus*		N	P
Townsends big-eared bat	*Corynorhinus townsendii*		N	P
Big brown bat	*Eptesicus fuscus*		N	
Spotted bat	*Euderma maculatum*	XC2	S	P
Greater western mastiff bat	*Eumops perotis californica*	XC2	N	
Allen's big-eared bat	*Idionycteris phyllotis*	XC2	N	P
Silver-haired bat	*Lasionycteris noctivigans*		N	
Western red bat	*Lasiurus borealis*		N	P
California leaf-nosed bat	*Macrotus californicus*	XC2	N	P
California myotis	*Myotis californicus*		N	
Western small-footed myotis	*Myotis ciliolabrum*	XC2	N	
Long-eared myotis	*Myotis evotis*	XC2	N	
Little brown myotis	*Myotis lucifugus*		N	
Fringed myotis	*Myotis thysanodes*	XC2	N	P
Cave myotis	*Myotis velifer*	XC2	N	
Long-legged myotis	*Myotis volans*	XC2	N	
Yuma myotis	*Myotis yumanensis*	XC2	N	
Big free-tailed bat	*Nyctinomops macrotis*	XC2	N	
Brazilian free-tailed bat	*Tadarida brasiliensis*		N	P
Western pipistrelle	*Pipistrellus hesperus*		N	
Hoary bat	*Lasiurus cinereus*		N	
Desert Valley kangaroo mouse	*Microdipodops megacephalus albiventer*		N	
Desert bighorn sheep	*Ovis canadensis nelsoni*		S	G

SOURCE: Nevada Natural Heritage Program 2007; U.S. Fish and Wildlife Service 2007

NOTES: BLM = Bureau of Land Mangement USFWS = U.S. Fish and Wildlife Service

LE: USFWS listed, endangered
CE: Critically endangered flora, protected by Nevada state law
LT: USFWS listed, threatened
D: Endangered Species Act -delisted
XC2: USFWS former category 1 or 2 candidate for listing, now listed as "species of concern"
S: BLM sensitive species - USFWS listed, proposed or candidate for listing, or protected by Nevada state law
N: BLM sensitive species, listed as sensitive by BLM state office
P: Protected wildlife by Nevada Revised Statutes
G: Managed as game species by State of Nevada

The ESA requires that all Federal agencies undertake programs for the conservation of endangered and threatened species and are prohibited from authorizing, funding, or carrying out any action that would jeopardize a listed species or destroy or modify its critical habitat. A species may be classified as "endangered" when it is in danger of extinction within the foreseeable future throughout all or a significant portion of its range. A "threatened" designation is provided to those animals and plants likely to become endangered within the foreseeable future throughout all or a significant portion of their ranges. Federally designated critical habitat is defined as the geographic area containing the physical or biological features essential to the conservation of a listed species or as an area that may require special management considerations or protection.

BLM sensitive species are those species that are not already included as special status species under federally listed, proposed, or candidate species; or State of Nevada protected species. BLM sensitive species designation is normally used for species that occur on BLM-administered lands, where BLM is able to significantly affect the conservation status of the species through management.

3.12.5.4 Special Status Plant Species

No federally listed threatened or endangered plant species were identified as occurring in or near the project area. The following plant species were identified for consideration by BLM and/or USFWS: sticky buckwheat (*Eriogonum viscidulum*), three-corner milkvetch (*Astragalus geyeri* var. *triquetrus*), Beaver Dam breadroot (*Pediomelum castoreum*), Las Vegas bearpoppy (*Arctomecon californica*), Meadow Valley sandwort (*Arenaria stenomeres*), straw milkvetch (*Astragalus lentiginosus*), white bearpoppy (*Arctomecon merriamii*), Las Vegas buckwheat (*Eriogonum corymbosum*), and all cacti and yucca (which are protected by Nevada state law [NRS 527.060-.120]). The only species found during surveys were the Meadow Valley sandwort, which was identified in small numbers along the banks of Toquop Wash in the Toquop Gap area, and Las Vegas buckwheat northeast of the proposed power plant site. Yucca and cacti species are also present in the project area.

The white bearpoppy (*Arctomecon merriamii*) and Las Vegas buckwheat are BLM sensitive species that were identified as potentially occurring in the project area. These species typically on well-developed gypsum or rocky limestone habitats. No white bearpoppy or suitable habitat was documented in the project area. Las Vegas buckwheat is known to occur at one locality outside the project area, near Toquop Wash; however, targeted surveys within the proposed power plant site or ROWs did not document its presence. No other special status plant species were documented in or near the project area.

3.12.5.5 Special Status Wildlife

Consultation with the USFWS indicated that there are six ESA-protected species that may be in the project area—the Virgin River chub (*Gila seminuda*), woundfin (*Plagopterus argentissimus*), southwestern willow flycatcher (*Empidonax traillii extimus*), yellow-billed cuckoo (*Coccyzus americanus*), Yuma clapper rail (*Rallus longirostris yumanensis*), and desert tortoise. Of these, only the desert tortoise is known to occur in the project area. The two species of fish identified are found in the Virgin River approximately 16 miles south of the project area. The three species of birds identified are dependent on either aquatic or riparian habitats such as those associated with Meadow Valley Wash or the Virgin River. The closest suitable habitat for these species within Meadow Valley Wash is outside the project area, approximately 4 miles upstream from Leith Siding. Recent floods and alteration of the landscape in Meadow Valley Wash have eliminated any potential habitat that may have been present in the project area.

Virgin River Chub and Woundfin

The Virgin River chub and woundfin both occur within the Virgin River, which is located approximately 16 miles south of the project area. Toquop Wash, which flows into the Virgin River, crosses the project area approximately 16 miles upstream of its confluence with the Virgin River. The range of both fish species extends from La Verkin Springs, Utah, downstream to Lake Mead (USFWS 1994a). The present distribution of this species includes the mainstream Virgin River from La Verkin Springs, Utah, downstream to near the Mesquite Diversion, Nevada. Critical habitat has been designated for part of the Virgin River from La Verkin Springs, Utah, to the confluence with Halfway Wash. Toquop Wash is ephemeral and flows only during periods of heavy rainfall. There is no aquatic habitat for either fish species within Toquop Wash or any other place within the project area. Habitat within the Virgin River would not be affected by the use of 2,500 af/yr of water from the proposed well field (refer to Section 4.10).

Southwestern Willow Flycatcher

The southwestern willow flycatcher, listed as federally endangered, has been documented in Meadow Valley Wash approximately 20 miles north of the beginning of the proposed rail line at Leith Siding. The breeding range of the southwestern willow flycatcher includes Arizona, southern California, New Mexico, southern Utah and Nevada, southwestern Texas, and northwestern Mexico. Dense thickets of willow, salt cedar, and/or cottonwoods along riparian corridors typically characterize breeding habitat for this species. The area of Meadow Valley Wash associated with the project area is heavily disturbed, lacks surface water, and is characterized by creosotebush scrub. No breeding habitat (as described above) for flycatchers occurs in the project area. The closest suitable nesting habitat for this species is located a minimum of 4 miles north (outside) of the project area, where mature cottonwoods, willows, and salt cedar gradually emerge. Potential habitat exists approximately 1 mile west of the proposed rail line (Figure 3-11).

Western Yellow-billed Cuckoo

The western yellow-billed cuckoo, a candidate for Federal listing, has been documented along the Meadow Valley Wash, approximately 9 miles north of the project area. However, populations in southern Nevada are considered small and disjunct, with the most recent record of nesting pairs documented in Beaver Dam Wash in 1979 (USFWS 2004), approximately 40 miles southeast of the project area. Since 1990, there have been only sporadic sightings of single birds throughout the state (Neel 1999). Yellow-billed cuckoos nest in tall poplar or cottonwood trees and willow riparian woodlands in the West, and require large patches of dense trees. No habitat of this nature is found in or near the project area. The closest potential habitat for this species is located in Meadow Valley Wash approximately 4.5 miles upstream of the beginning of the rail line at Leith Siding.

Yuma Clapper Rail

The Yuma clapper rail is federally listed as an endangered species. Its preferred habitat is sedimented, shallow-water cattail (*Typha* spp.) and bulrush (*Scirpus acutus*) marshes. Nests are commonly found at or near the water's edge. Stands of cattail and bulrush dissected by narrow stream channels apparently support the densest populations of Yuma clapper rails. Records for this species typically are associated with the lower Colorado River south of Lake Mead. Minimal potential habitat for this bird species is present within Meadow Valley Wash, outside of the project area. The lack of occurrence records for this species in this region of Nevada indicates that this species likely does not occur this far north. There is no potential habitat for the Yuma clapper rail within the project area.

Desert Tortoise

Desert tortoises in the Mojave Desert are generally confined to warm creosotebush, white bursage, and shadscale scrub habitats with well-drained sandy loam soils. Soil friability, or its tendency to break apart, is an indicator of tortoise habitat. Desert tortoises need soils they are capable of digging into for burrows or accessible rocky outcrops with openings (caves) that provide adequate coverage. These rocky outcrops are often located along the banks of large washes and are typically composed of caliche. The Mormon Mesa critical habitat unit is located adjacent to the southernmost end of the proposed rail line, south of the section permitted for the Toquop Energy power plant (Map 3-11). No critical habitat is located in the area of the proposed power plant and ancillary facilities, except where the permitted access road would cross critical desert tortoise habitat as discussed in the 2003 EIS (BLM 2003a).

Biologists conducted 100 percent coverage, presence-or-absence tortoise surveys per established BLM and USFWS tortoise survey protocols for the entire rail line 200-foot ROW (100 feet on each side of centerline). Consultation with USFWS biologists determined that standard zone-of-influence surveys would be inefficient and unnecessary considering the terrain and the amount of recently burned habitat. Therefore, to assess the population outside the project area, USFWS recommended 8 to 10 equilateral triangles (0.5 mile on each side) placed adjacent to the project area. Locations for these triangle transects were selected to represent the various vegetation associations, topographic features, and habitat conditions (grazed, burned, etc.) in the region. The relative abundance of tortoises in the areas was then determined using the "total corrected sign" methodology. Total sign was 97 and total corrected sign was 95. No surveys west of Meadow Valley Wash were conducted since the County Road, the wash, and the existing UPRR pose substantial barriers to tortoises crossing into the project area.

A total of three live tortoises and one carcass were found within the 679-acre project area. Sixty-six tortoise burrows were found in the project area; however, only eight of these showed signs of recent (i.e., present year) activity. Scat groupings also were found scattered throughout the project area in proximity to burrows. The northern section of the project area contains moderately dense tortoise populations (fewer than 5 tortoises per 100 acres), while the remaining middle and southern sections exhibited low density (fewer than 1 tortoise per 100 acres). Triangular surveys found the same pattern in density, with the northernmost transects documenting more tortoise sign than the southern portions of the project area. Detailed information on the tortoise surveys is located in the Desert Tortoise Survey Report (JBR Environmental Consultants Inc. 2006).

BLM Sensitive Species

Desert bighorn sheep are found in dry, generally inaccessible mountainous areas, in foothills near rocky cliffs, and near seasonally available water sources. Bighorn sheep require access to freestanding water during the summer months, and throughout the year during drought conditions. The diet of bighorn sheep consists primarily of grasses, shrubs, and forbs. The desert bighorn sheep is known to occur within the project area. This species is protected by a designation by BLM as a sensitive species and by Nevada state law, and the desert bighorn is managed by the Nevada Division of Wildlife (NDOW) as a game species. The Toquop Gap locality within the project area is occupied desert bighorn habitat and sign was observed during field surveys.

Some of the BLM sensitive species of bats listed in Table 3-10 may forage over or migrate through the project area. However, the paucity of roosting habitat (large trees, cliffs, caves, etc.) and available water precludes the majority of these species from roosting within the project area. Within Toquop Gap there is an area of potential roosting habitat for species of bats that utilize cliff roosts. A tank with clean water is located approximately 328 feet from this habitat. The tank provides bats (and other wildlife) with an open water source, which is uncommon in this area. These chiropteran species have been assigned to the BLM sensitive species list because their foraging habitats in forested or riparian areas and their roosting sites are under threat by human-caused disturbances. Likewise, the NDOW is looking more carefully at the conservation of all bats in Nevada and recently published a conservation plan on this topic.

One heteromyid mouse, the Desert Valley kangaroo mouse (*Microdipodops megacephalus albiventer*), which has been listed by BLM as a sensitive species, is documented in the project area where fine-grained substrates and shrub-steppe habitats exist. Individuals of this species were particularly abundant near the Tule water wells. This species is designated with special status by BLM because it is an endemic taxon to Nevada and nearby Utah that encompasses an extremely small geographic range; also its ecology and population status are uncertain at this time. NDOW has classified this subspecies as imperiled, but mentions that its taxonomic status is in need of genetic review.

Habitat for the western burrowing owl occurs within the flat, open areas along the project area. Burrowing owls do not dig their own burrows and are reliant on abandoned burrows to nest. They are commonly found alongside desert tortoises and often use abandoned tortoise burrows or kit fox dens to nest. Burrowing owls were documented within the project area during field surveys. The burrowing owl's special status has resulted primarily from increased disturbance to and subsequent loss of breeding habitats throughout the range of the species.

Other raptor species that are listed as BLM sensitive species and that might nest in the project area include the peregrine falcon (*Falco peregrinus*), prairie falcon, ferruginous hawk (*Buteo regalis*), Swainson's hawk (*Buteo swainsoni*), and golden eagle. Many of these raptor species use cliff faces and rocky ledges of mountain ranges on which to roost or nest. Numerous threats from humans (hunting and capture of individuals, habitat loss, and exposure to synthetic chemicals) were the cause for special status listing of most of these species listed herein.

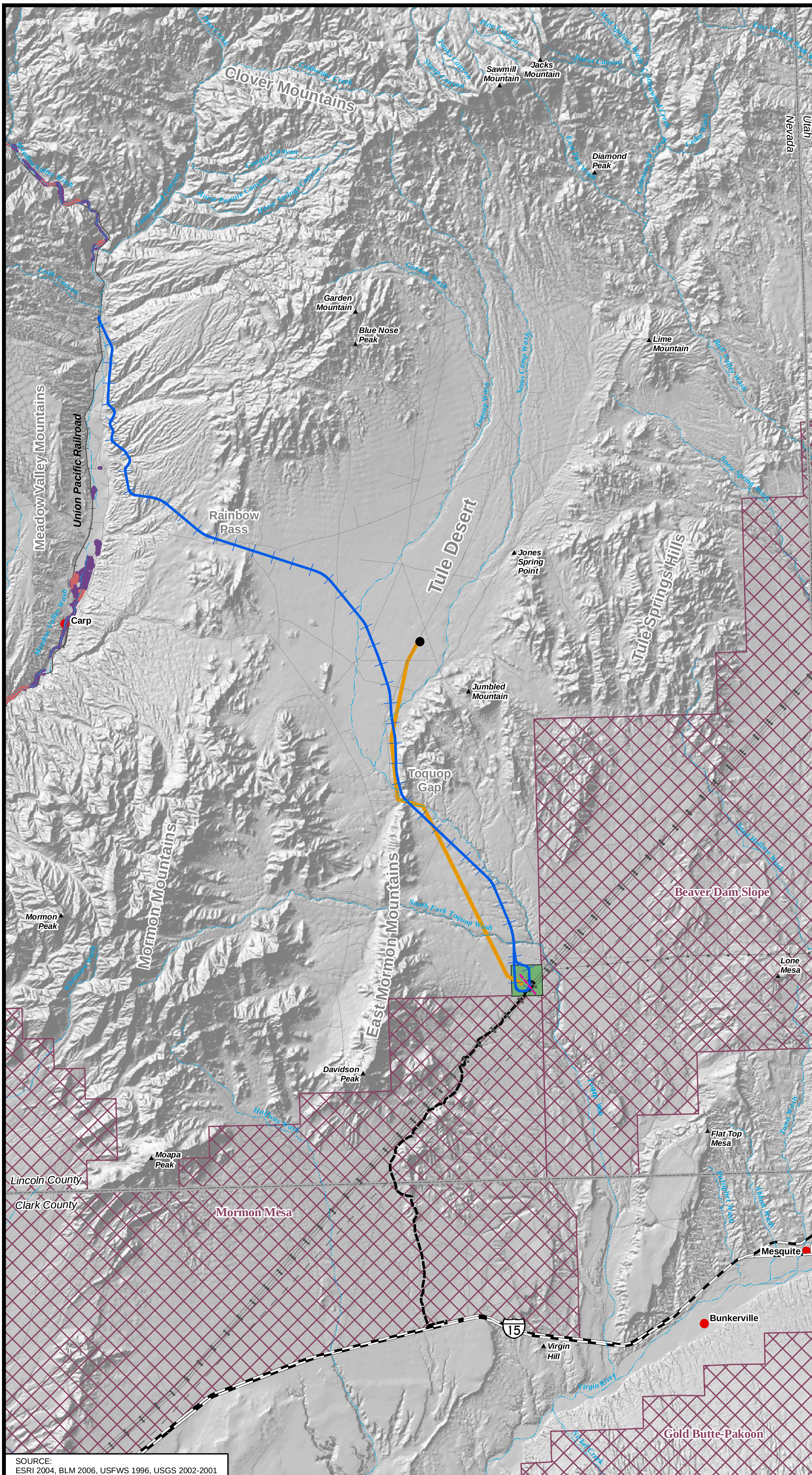
Four passerine species designated by BLM as sensitive species—southwestern willow flycatcher, LeConte's thrasher (*Toxostoma lecontei*), Crissal thrasher (*T. crissale*), and phainopepla (*Phainopepla nitens*)—occur or potentially occur in the project site. These species characteristically inhabit brushy areas in desert shrub-steppe habitats or in dense woody vegetation near riparian areas. Their designation as special status species is attributable to habitat degradation and a potential for population decline. Also, these species exist at the margin of their respective ranges in the project area—where resources would be expectedly less predictable and the probability of local extirpation by stochastic factors expectedly higher.

Two BLM sensitive species of fish, the Meadow Valley Wash desert sucker (*Catostomus clarki*) and the Meadow Valley Wash speckled dace (*Rhinichthys osculus* ssp. 11), are known to occur in the Meadow Valley Wash. Both species are known to occur approximately 1.5 miles north of the project area; however, neither has been recorded near or in the project area. While neither species were recorded in the project area, it is reasonable to assume they are at least periodically present.

The only BLM sensitive species among amphibians in the region is the southwestern toad (*Bufo microscaphus*). This species inhabits a wide array of riparian habitats in the region, and its population is continuous throughout the Virgin and Muddy river systems. Additionally, this is a protected species in Nevada, Utah, and Arizona, and the major threat to its survival is hybridization with *Bufo woodhousii*, which is facilitated by construction of dams in the region. Other threats to its survival include human-induced habitat degradation and destruction with subsequent changes to the population dynamics of native competitors. The BLM-sensitive Gila monster and chuckwalla potentially occur in the project area. Of the two, only the Gila monster is protected by the State of Nevada.

Desert Tortoise Critical Habitat & Southwestern Willow Flycatcher Habitat

Toquop Energy Project EIS
Lincoln County, Nevada



LEGEND

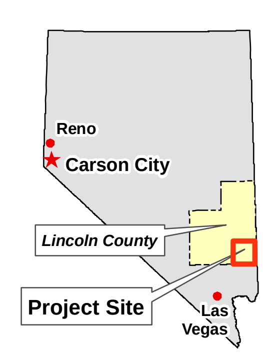
- Desert Tortoise Critical Habitat
- Southwestern Willow Flycatcher Suitable Habitat
- Southwestern Willow Flycatcher Potential Habitat

General Features

- Proposed Railroad Line
- Proposed Plant Site (640 acres)
- Permitted Well Field
- Permitted Water Pipeline
- Permitted Natural Gas Pipeline and Transmission Line Interconnection
- Permitted Access Road

Reference Features

- Existing Road
- Interstate
- Existing Railroad
- Existing Transmission Line
- Existing Natural Gas Pipeline
- River, Stream, or Wash
- Mountain Peak
- Town
- Point of Interest



0 2 4
Miles

Map 3-11

Suitable habitat for both the Gila monster and chuckwalla in the project area is mostly restricted to the various larger washes that cross the project area. Chuckwallas are typically found within large, rocky outcrops where they can escape predators and high ambient temperatures. Sporadically exposed caliche formations within the larger washes provide this type of suitable habitat for chuckwallas. These large, open desert washes also provide potential habitat and movement corridors for the Gila monster. Several occurrence records for Gila monsters have been documented near the project area (Nevada Natural Heritage Program 2005).

3.13 WILD HORSES AND BURROS

3.13.1 Regional Overview

On December 15, 1971, Congress enacted the Wild and Free-Roaming Horse and Burro Act, authorizing BLM to manage wild horses and burros on public lands and mandating that wild and free-roaming horses and burros be protected from unauthorized capture, branding, harassment, or death. Those areas of public land that were used as habitat for wild horses and burros in 1971 were delineated as herd-management areas (HMAs).

The Blue Nose Peak HMA includes approximately 10 square miles of the project area. The BLM has designated one as the appropriate management level for this HMA, which refers to the number of wild horses that can be sustained by the available resources in that area. In the Draft Ely RMP and EIS (BLM 2005a), alternatives proposed include the removal of the Blue Nose Peak HMA from its current status due to lack of suitable habitat.

3.14 ARCHAEOLOGY AND HISTORICAL PRESERVATION

3.14.1 Data Collection Methods

Cultural resource inventories were conducted to identify archaeological and historic resources in two separate project components—the proposed power plant site (640 acres) and the proposed 31-mile-long, 200-foot-wide rail line construction ROW (752 acres)—each defined as areas of potential effects for direct impacts from construction. A Class I existing information inventory provided the locations of previously recorded sites in the proposed power plant site and rail line ROW, as well as sites within a 1-mile radius, defined as areas of potential effects for indirect impacts. The results of the Class I inventory provided the groundwork for development of site expectations and a Historic Properties Identification Plan, used to guide the Class III intensive field survey of the proposed power plant site and rail line ROW. During the field survey, archaeologists walked parallel transects, 15 to 30 yards apart. When artifacts were encountered, the isolate or site boundary was mapped using a global positioning system (GPS) and was recorded on Intermountain Antiquities Computer System (IMACS) forms. No artifacts were collected during the survey.

3.14.2 Existing Conditions

3.14.2.1 Regional Overview

The cultural history of the region is briefly summarized in this section and is based on archaeological and historic research compiled in the 2003 EIS. Additional background information can be found in BLM's draft Ely Resource Management Plan (2005b) and the State Historic Preservation Office's Archaeological Element (Lyneis 1982).

The project area is in the Mojave Desert, where humans have lived for approximately 12,000 years, mostly as mobile hunter-gatherers (Lyneis 1982; Willeg and Aikens 1988). Early Paleoindian groups focused heavily on hunting large game. Later Archaic peoples put greater emphasis on plant resources, as evidenced by an increasing profusion and sophistication of ground-stone technology through time. The archaeological record indicates that over the past 8,000 years, increasing population density in the Great Basin restricted the movement of groups, and stimulated groups to exploit a diversity of indigenous foods collected during well-planned rounds of seasonal movements throughout their territory (Fowler and Madsen 1971).

Virgin River and Muddy River Anasazi farming settlements, which began to be developed around A.D. 300, represent a shift from the hunter-gather lifeway typical of the rest of the Great Basin (Fowler and Madsen 1971). These Anasazi groups were more sedentary—living in pit houses overlooking horticultural fields near rivers. The Anasazi farmers continued to also hunt and gather indigenous plant foods in surrounding lands, such as the Toquop Wash and Meadow Valley Wash area, much as earlier groups had, although perhaps less intensively. Approximately 1,000 to 1,200 years ago, a rapid population decline occurred in the area and, again, hunter-gather groups occupied the area.

Considerable debate exists as to the nature of this shift and whether it represents a change in settlement and subsistence patterns (perhaps in response to climate change), or a replacement of Anasazi peoples by Numic-speaking groups expanding from the southeastern California area (Fowler and Madsen 1971; Madsen and Rhode 1994). When European explorers arrived, the Southern Paiute inhabited the project area. The Mojave and Walapai lived south of the Southern Paiute, and the territory of the Western Shoshone was northwest of the Southern Paiute.

Historic-era use of the area was limited because of the generally rugged terrain and lack of mineral resources (Sterner and Ezzo 1996; White et al. 1991). Travelers commonly followed a corridor along the Virgin River Valley, and mining interests generally were limited to small-scale operations in the adjacent mountains. In the mid-nineteenth century, Mormons began settling on farms and ranches along the Virgin River and Muddy River valleys. Springs, such as Abe Spring and Tule Springs, were used historically as watering holes for livestock.

3.14.2.2 Power Plant Site

The Class I inventory identified eight previously recorded cultural resources in the area of potential effect for indirect impacts. These include three prehistoric rock alignments, one historic dump, one can scatter, one isolated Elko projectile point, and two cryptocrystalline flakes. In addition, nine previously recorded cultural resources were identified in the proposed power plant site. These include six prehistoric rock alignments, one prehistoric lithic scatter, one historic telephone line, and one isolated Great Basin stemmed projectile point.

During the Class III intensive field survey, two additional prehistoric rock alignments were identified in the proposed power plant site.

In summary, 19 cultural resources are situated in the areas that might be affected by the proposed project activities. Seven prehistoric rock alignments are recommended as eligible for nomination to the National Register of Historic Places, while 12 sites are recommended as ineligible.

3.14.2.3 Proposed Rail Line

The Class I inventory identified two previously recorded cultural resources in the area of potential effect for indirect impacts. These include the historic Leith Siding and one isolated cryptocrystalline flake.

During the Class III intensive pedestrian survey, ten additional cultural resources were identified in the proposed rail line construction ROW. These include the historic Lone Tree Ranch irrigation ditch and nine isolated artifacts (five flakes, one obsidian cobble, one millingstone fragment, one historic can, and a crevice-placed stick).

In summary, 12 cultural resources are situated in areas that might be affected by project activities. Two historic sites (Leith siding and Lone Tree Ranch irrigation ditch) are recommended as eligible for nomination to the National Register of Historic Places, while ten sites are recommended as ineligible.

3.15 PALEONTOLOGICAL RESOURCES

3.15.1 Data Collection Methods

Local geologic maps and literature were reviewed to identify the potential for paleontological resources to be present in the project area.

3.15.2 Existing Conditions

According to the Lincoln County geologic maps, the project area is in an area of old alluvial gravels cemented together by calcium carbonate (Tschanz and Pampayan 1970). The environmental assessment for the Lincoln County Land Act of 2000 reported fossil-bearing strata east of the project area (Livingston 2001), particularly in the Badland soil series. The Kern River 2003 Expansion Project reported fossils in Quaternary sediments and soils of the Muddy Creek Formation (Dames & Moore 1992, 1990). However, no paleontological resources were identified during the pedestrian survey of the project area.

3.16 PUBLIC SAFETY, HAZARDOUS MATERIALS, AND SOLID WASTE

3.16.1 Data Collection Methods

On June 23, 2006, URS conducted a Phase I environmental site assessment in and around the project area.. The assessment followed the proposed rail alignment from its termination point near the power plant site north to the location where it would meet with the existing UPRR, north of Leith Siding. The site visit was conducted by means of a "windshield" survey using a four-wheel-drive vehicle to access roads in the vicinity of the alignment. Approximately 60 miles of desert roads were surveyed. When objects of interest or manmade structures were found, the investigator stopped to visually observe the areas on foot.

3.16.2 Existing Conditions

3.16.2.1 Regional Overview

The project area is generally undeveloped.

3.16.2.2 Power Plant Site

The site is generally undeveloped, and no hazardous- or solid-waste concerns were identified.

3.16.2.3 Proposed Rail Line

The following locations were observed visually, and potential hazardous-material or solid-waste concerns were noted as follows:

- A line camp and ranch about 0.125-mile north of Toquop Gap, along the proposed rail line, three abandoned trailers, two abandoned trucks, and other items such as fencing, an outhouse, a watering pool, and an unused storage tank were observed. A newly installed well in the area was fenced off and locked.
- An abandoned line camp near the intersection of the proposed rail line and Garden Wash, at the Tule Desert Well. No environmental concerns were observed.
- The Lyman Crossing area, approximately 0.5-mile west of the proposed rail line, active farms, a log-type cabin, and a trailer were observed on private land. The potential for hazardous material issues does exist; however, no inventory has been conducted on private land.
- Approximately 2 miles north of the Lyman Crossing and 0.25-mile east of the proposed rail line, an abandoned farm was observed on private land. The potential for hazardous material issues does exist; however, no inventory has been conducted on private land.

Overall, visual survey of the proposed rail line concluded that the area is primarily undisturbed desert environment.

3.17 SOCIOECONOMIC CONDITIONS

3.17.1 Data Collection Methods

The following characterization of existing social and economic conditions describes employment, income, demographics, fiscal and budgetary information, and community facilities in the region that may be affected by the Proposed Action Alternative. Socioeconomic data from various Federal, state, and local sources are used in this analysis. Census data for 1990 and 2000 are the most uniform detailed data series at the regional and local levels. NEPA guidelines direct the use of some additional data series. Other data serve to update the existing conditions descriptions post-Census 2000. Some of the more recent data series are available only for the larger geographic units.

The social and economic conditions of the study area include regional and local areas that may be affected economically and socially by the Proposed Action Alternative due to the proximity of project facilities. For the regional analysis, data were collected to depict social and economic conditions for Lincoln and Clark counties in Nevada. For the local analysis, data were collected for cities—Mesquite, Caliente, Ivins, Santa Clara, and St. George—within commuting distances of the Proposed Action Alternative.

3.17.1.1 Areas of Influence

The local area of influence comprises communities within commuting distance of the project sites that would likely have daily intersection or connection with project activities. It is defined by distance (taking the road network into account); the locations of the water resources connected to the project; and social, economic, and health-care characteristics.

The region of influence includes additional areas that would not necessarily have as much daily interaction with the project sites, but would maintain other connections to the project.

Local Area of Influence

The local area of influence is defined as the area within 50 miles of the power plant site or the northern end of the rail line. The local area of influence includes the cities of Caliente and Mesquite located, respectively, in Lincoln and Clark counties. Although driving distance from the proposed power plant site to Caliente is more than 50 miles, the town may provide employees for the Proposed Action Alternative.

The portion of Arizona within a 50-mile radius of the study area is very sparsely populated. The cities of St. George and Santa Clara, and the town of Ivins in Washington County, are in the state of Utah and are considered because they are 35 miles east of the city of Mesquite, just within commuting distance of the site of the proposed power plant. The perimeter of the local area is, on average, about 55 miles by road from the project site, a distance that could be traveled in 80 to 100 minutes (Map 3-12).

Regional Area of Influence

The regional area of influence was defined as both Lincoln and Clark counties in Nevada because of the existing communities in the area that might provide services to communities within the local area of influence. Lincoln County has one incorporated city, which is Caliente, but also has four unincorporated communities—Panaca, Ash Springs, Alamo, and Pioche. The areas from which the bulk of scoping comments were received, and the content of those comments, also are considered in the definition of the region of influence. Also included in the regional area of influence is Washington County in southwestern Utah.

3.17.2 Existing Conditions

3.17.2.1 Population

The U.S. Census Bureau was the primary source of data pertaining to demographics, social conditions, and economics. The Nevada Small Business Development Center Web site also was used to acquire population estimates for 2005. As illustrated in Table 3-11, the United States and Lincoln County had similar annual growth rates between 1990 and 2000, whereas Clark County experienced a surge in population with an annual growth rate of 6 percent. The city of Mesquite experienced an annual growth rate of 13.4 percent and, as evidenced by the population estimate of 2005, just over 7,000 residents were added within 5 years. The number of households in Mesquite also increased dramatically by more than 2,900 within the last decade. Overall, Lincoln County did not experience significant growth in the number of households from 1990 to 2000, and remains a rural area. Cities within the study area in the state of Utah also experienced growth. From 1990 to 2000, the city of St. George increased by over 20,000 residents and experienced a 4.5 percent annual growth rate. The town of Ivins had an annual growth rate of 7.7 percent between those years and the city of Santa Clara had 5.5 percent.

Table 3-11
Population and Households in the Area of Influence

	Population (1990)	Population (2000)	Population Estimate (2005)[1]	Percent Annual Growth 1990-00	Households (1990)	Households (2000)
United States	248,709,873	281,421,906	296,410,404	1.2	91,947,410	105,480,101
Counties						
Lincoln	3,775	4,165	4,391	1.0	1,325	1,540
Clark	741,459	1,375,765	1,796,380	6.0	287,025	512,253
Washington	48,560	90,354	118,885	5.0	15,256	29,939
Cities/Towns						
Mesquite	1,871	9,389	13,523	13.4	596	3,564
Caliente	1,111	1,123	1,148	0.1	393	411
St. George	28,502	49,663	64,201	4.5	9,450	17,359
Ivins	1,630	4,450	6,738	7.7	470	1,432
Santa Clara	2,322	4,630	5,864	5.5	584	1,220

SOURCES: Nevada Small Business Development 2007; St. George Chamber of Commerce 2007; U.S. Census Bureau 1990, 2000
NOTE: [1] July 1, 2005, U.S. Census Bureau population estimates

Population projections by county are illustrated in Table 3-12. According to the Nevada Small Business Development Center, it is anticipated that by 2010, Lincoln County will have grown by 22.3 percent and Clark County by 27.0 percent. According to the St. George Chamber of Commerce, Washington County, Utah, will experience the highest growth at 30.0 percent. By 2020, Lincoln County will have increased its growth by 19.7 percent over its 2010 figures, while Clark County is expected to increase by 33.5 percent and Washington County by 55.0 percent. Increases in home value and cost of living, as well as lack of available land for development throughout Clark County, are expected to increase population growth in Lincoln County. Also, those who prefer to live in rural settings as opposed to urban surroundings might be drawn to the area. Two planned communities proposed in Lincoln County include one in the Coyote Springs Valley along Highway 93, and one in the Toquop Township area. Roughly 40,000 residents are expected in the Toquop Township area once developed. It is anticipated that within the next 30 years, the combined population from these two developments could be as high as 250,000.

Table 3-12
Population Projections By County

	2005	2010	2020
Lincoln County, Nevada	3,886	4,754	5,694
Clark County, Nevada	1,796,380	2,281,997	3,045,813
Washington County, Utah	125,010	162,544	251,896

SOURCE: St. George Chamber of Commerce, Nevada Small Business Development Center

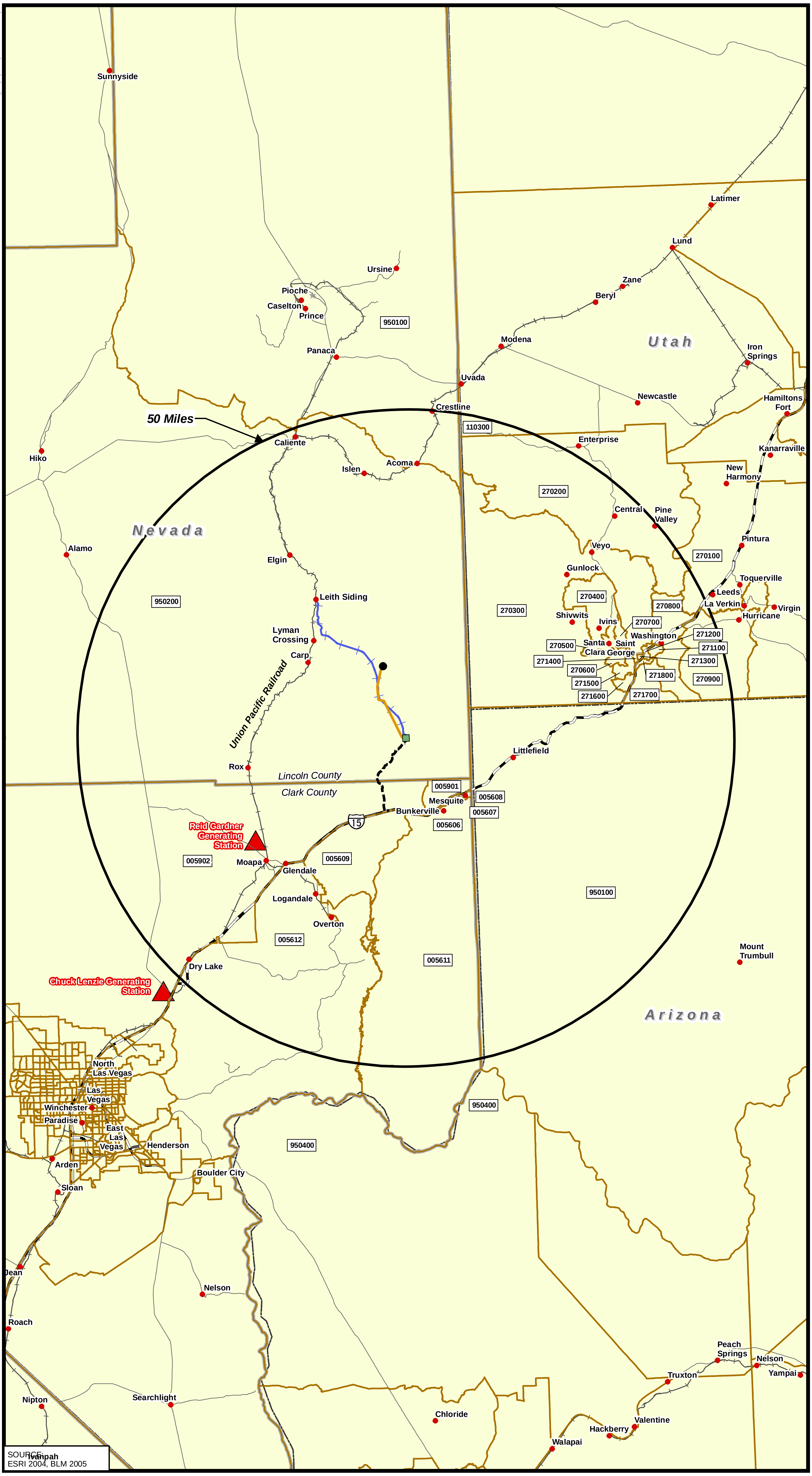
According to the St. George Chamber of Commerce, Washington County has the highest rate of annual growth in the state at 3.9 percent (St. George Chamber of Commerce, 2007). Between 2004 and 2005, approximately 4,900 individuals moved to Washington County from other counties in Utah, while 5,600 individuals relocated from other states (St. George Chamber of Commerce, 2007).

3.17.2.2 Employment and Economy in the Areas of Influence

The U.S. Census Bureau and Bureau of Economic Analysis databases were used to determine total employment by industry. The Bureau of Economic Analysis Regional Economic Information System (BEA REIS) includes only states, counties, and metropolitan areas and was used to describe the regional area of influence. The BEA REIS determines total employment by industry by place of employment. The 2000 U.S. Census was used to describe total employment by industry for cities within the local area of influence including Caliente, Mesquite, Santa Clara, and St. George, as well as the town of Ivins.

Regional Area of Influence

In 2003, the median income for Lincoln County was $36,032 (U.S. Census Bureau 2005). The total number of jobs and percentage of total employment by industry in Lincoln County for 2004 are illustrated in Table 3-13. Most of the recent data for Lincoln County were not available for disclosure; however, based on available data, government and government enterprises were the highest sector of employment at 31.6 percent with the state and local sector accounting for the majority of county earnings. The retail trade sector also was a large employer at 13.3 percent.



Local Area of Influence

Toquop Energy Project EIS
Lincoln County, Nevada

LEGEND

Census Data

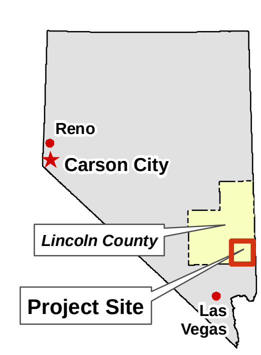
- Census Tract Limits
- 110700 Census Tract ID#

General Features

- Proposed Rail Line
- 50-Mile Distance from Plant Site
- Generating Station
- Proposed Plant Site (640 acres)
- Permitted Well Field
- Permitted Water Pipeline
- Permitted Access Road

Reference Features

- Existing Road
- Interstate
- Existing Railroad
- Town/Point of Interest



0 10 20
Miles

Map 3-12

Table 3-13
2004 Lincoln County, Nevada – Total Employment by Industry

Industry	Jobs	Percentage of Total
County total	1,946	100.0
Farm employment	147	7.6
Non-farm employment	1,799	92.4
Agricultural services, forestry, fishing, and other	(D)	(D)
Mining	(D)	(D)
Construction	(D)	(D)
Manufacturing	(D)	(D)
Transportation and public utilities	58	3.0
Wholesale trade	(D)	(D)
Retail trade	258	13.3
Finance, insurance, and real estate	(D)	(D)
Services	(D)	(D)
Government and government enterprises	615	31.6
Federal, civilian	41	2.1
Military	(L)	(D)
State and local	566	29.1
State	(D)	(D)
Local	(D)	(D)

SOURCE: Bureau of Economic Analysis Regional Economic Information System 2004
NOTES: (D) Not shown to avoid disclosure of confidential information, but the estimates for this item are included in the totals.
(L) Less than 10 jobs, but the estimates for this item are included in the totals.

In 2003, the median income for residents of Clark County was $43,728 (U.S. Census Bureau 2005). The BEA REIS reported that for 2004, Clark County had a total employment of 997,791. Table 3-14 shows the total number of jobs by industry and percentages of total employment in 2004. In Clark County, the service industry (including hotel, gaming, and tourism) accounted for 26.7 percent of the county earnings, followed by the retail trade industry at 10.7 percent.

Table 3-14
2004 Clark County, Nevada – Total Employment by Industry[1]

Industry	Jobs	Percentage of Total
County total	997,791	100.0
Farm employment	343	0.03
Non-farm employment	997,448	99.9
Agricultural services, forestry, fishing, and other	318	0.03
Mining	1,511	0.2
Construction	100,449	10.1
Manufacturing	25,175	2.5
Transportation and public utilities	34,452	3.5
Wholesale trade	24,094	2.4
Retail trade	106,795	10.7
Finance, insurance, and real estate	101,079	10.1
Services	266,023	26.7
Government and government enterprises	93,993	9.4
Federal, civilian	10,487	1.1
Military	11,362	1.1
State and local	72,144	7.2
State	13,600	1.4
Local	58,544	5.9

SOURCE: Bureau of Economic Analysis Regional Economic Information System 2004
NOTE: [1] Includes both full- and part-time employment.

In 2003, the median income for residents of Washington County was $39,738 (U.S. Census Bureau 2005). The BEA REIS reported that for 2004, Washington County had a total employment of 58,633. As illustrated in Table 3-15, the service industry accounted for 33.3 percent of the county's earnings followed by retail trade at 14.6 percent and construction at 12.6 percent.

Table 3-15
2004 Washington County, Utah – Total Employment by Industry[1]

Industry	Jobs	Percentage of Total
County total	58,633	100.0
Farm employment	528	0.9
Non-farm employment	58,105	99.1
Agricultural services, forestry, fishing, and other	(D)	(D)
Mining	(D)	(D)
Construction	7,373	12.6
Manufacturing	2,958	5.0
Transportation and public utilities	2,868	4.9
Wholesale trade	985	1.7
Retail trade	8,532	14.6
Finance, insurance, and real estate	5,664	9.7
Services	19,522	33.3
Government and government enterprises	5,912	10.1
Federal, civilian	479	0.8
Military	547	0.9
State and local	4,886	8.3
State	894	1.5
Local	3,992	6.8

SOURCE: Bureau of Economic Analysis Regional Economic Information System 2004
NOTE: [1] Includes both full- and part-time employment.
(D) Not shown to avoid disclosure of confidential information, but the estimates for this item are included in the totals.

Local Area of Influence

Because data for the town of Ivins and the cities of Mesquite, Caliente, St. George, and Santa Clara were retrieved from different data sources, categories in the county and city tables would differ. The U.S. Census Bureau records employment for cities by place of residence.

Per capita income for the city of Mesquite in 1999 was $20,191 (U.S. Census Bureau 2000). The service industry accounted for the earnings of half of the city's residents. Similar to the city of Caliente, the retail trade sector accounts for 10 percent of jobs (Table 3-16).

Table 3-16
2000 City of Mesquite, Nevada – Total Employment by Industry

Industry	Jobs	Percentage of Total
City total	3,727	100.0
Agricultural services, forestry, fishing, and other	6	0.2
Mining	7	0.2
Construction	295	8.0
Manufacturing	101	2.7
Transportation and public utilities	82	2.2
Wholesale trade	40	1.1
Retail trade	372	10.0
Finance, insurance, and real estate	188	5.0
Services	1,876	50.3
Educational, health and social services	313	8.4

SOURCE: U.S. Census Bureau 2000

Per capita income for the city of Caliente in 1999 was $20,555 (U.S. Census Bureau 2000). In 2000, the educational, health, and social services sector accounted for 25.1 percent of the city's annual earnings, followed by 16.1 percent in retail trade (Table 3-17).

Table 3-17
2000 City of Caliente, Nevada – Total Employment by Industry

Industry	Jobs	Percentage of Total
City total	335	100.0
Agricultural services, forestry, fishing, and other	10	3.0
Mining	14	4.2
Construction	21	6.3
Manufacturing	3	1.0
Transportation and public utilities	21	6.3
Wholesale trade	5	1.5
Retail trade	54	16.1
Finance, insurance, and real estate	17	5.1
Services	28	8.4
Educational, health and social services	84	25.1

SOURCE: U.S. Census Bureau 2000

Per capita income for the city of St. George in 1999 was $17,022 (U.S. Census Bureau 2000). In 2000, the educational, health, and social services sector accounted for 18.1 percent of the city's annual earnings, closely followed by the retail trade sector at 17.4 percent (Table 3-18).

Table 3-18
2000 City of St. George, Utah – Total Employment by Industry

Industry	Jobs	Percentage of Total
City total	20,118	100.0
Agricultural services., forestry, fishing, and other	113	0.6
Mining	37	0.2
Construction	2,499	12.4
Manufacturing	1,171	5.8
Transportation and public utilities	783	3.9
Wholesale trade	600	3.0
Retail trade	3,503	17.4
Finance, insurance, and real estate	1,338	6.7
Services	2,741	13.6
Educational, health and social services	3,651	18.1

SOURCE: U.S. Census Bureau 2000

Per capita income in the town of Ivins in 1999 was $16,743 (U.S. Census Bureau 2000). In 2000, the educational, health, and social services sector accounted for 16.8 percent of the town's annual earnings, closely followed by the retail trade sector at 16.5 percent, the services sector at 13.9 percent, and the construction sector at 12.6 percent (Table 3-19).

Table 3-19
2000 Town of Ivins, Utah – Total Employment by Industry

Industry	Jobs	Percentage of Total
Town total	1,858	100.0
Agricultural services, forestry, fishing, and other	13	0.7
Mining	2	0.1
Construction	234	12.6
Manufacturing	109	5.9
Transportation and public utilities	126	6.8
Wholesale trade	48	2.6
Retail trade	307	16.5
Finance, insurance, and real estate	72	3.9
Services	258	13.9
Educational, health and social services	313	16.8

SOURCE: U.S. Census Bureau 2000

Per capita income in the city of Santa Clara in 1999 was $15,957 (U.S. Census Bureau 2000). The educational, health, and social services sector accounted for 22.4 percent of the city's annual earnings, followed by construction at 11.1 percent, and services at 10.9 percent (Table 3-20).

Table 3-20
2000 City of Santa Clara, Utah – Total Employment by Industry

Industry	Jobs	Percentage of Total
City total	1,914	100.0
Agricultural services, forestry, fishing, and other	8	0.4
Mining	2	0.1
Construction	213	11.1
Manufacturing	65	3.4
Transportation and public utilities	75	3.9
Wholesale trade	45	2.4
Retail trade	327	17.1
Finance, insurance, and real estate	155	8.1
Services	208	10.9
Educational, health and social services	428	22.4

SOURCE: U.S. Census Bureau 2000

Construction and utilities are key industries that could be affected by the Proposed Action Alternative. Census tract-level data were used to determine the number of employees who are already employed in these sectors within the local area of influence and who might provide a labor pool for the proposed project . As illustrated in Table 3-21, there were a considerable number of local employees who worked in the construction industry in 2000. In Census Tract 9502 in Lincoln County, Nevada, where all of the construction on the project would take place, there is a relatively high percentage (14 percent) of the population employed by the construction industry. Less than 0.2 percent is employed by the utilities industry in Census Tract 9502. In all of the census tracts located in Nevada, 10.5 percent of the employees worked in the construction industry while 1.6 percent was employed in the utilities industry. In Arizona, the percentage was higher in the construction industry at 22.3 percent, while those in the utilities industry were still low at 1.9 percent. Census tracts in Utah demonstrate similarity to employees with previous experience in the proposed construction area at 13.4 percent and 0.6 percent.

Table 3-21
Distribution of Employment in the Local Area of Influence, Year 2000 Employment by Industries of Importance to the Project

Census Tracts	Employed Civilian Population 16 Years and Over				
	Total	Number in Two Selected Industries		Percentage in Two Selected Industries	
		Construction	Utilities	Construction	Utilities
Nevada	**6,339**	**666**	**102**	**10.5**	**1.6**
9502	813	114	2	14	0.2
56.06	783	19	0	2.4	0
56.07	1,334	136	0	10.2	0
56.08	648	58	13	9.0	2.0
56.09	384	40	28	10.4	7.3
56.11	449	40	21	8.9	4.7
56.12	395	48	14	12.2	3.5
59.01	962	82	7	8.5	0.7
59.02	571	129	17	22.6	3.0
Utah	**35,646**	**4,776**	**208**	**13.4**	**0.6**
2701	2,295	323	14	14.1	0.6
2702	877	104	17	11.9	1.9
2703	2,616	391	19	15.0	0.7
2704	1,758	216	20	12.3	1.1
2705	2,127	241	12	11.3	0.6
2706	2,059	217	12	10.5	0.6
2707	2,888	518	0	18.0	0
2708	2,941	471	12	16.0	0.4
2709	3,189	536	18	16.8	0.6
2710	1,268	196	0	15.5	0
2711	2,640	253	27	9.6	1.0
2712	989	174	0	17.6	0
2713	1,768	155	0	8.8	0
2714	1,482	267	12	18.0	0.8
2715	1,779	194	20	10.9	1.1
2716	1,506	144	0	9.6	0
2717	2,476	306	17	12.4	0.7
2718	988	70	8	7.1	0.8
Arizona					
9501	1,915	428	37	22.3	1.9

SOURCE: U.S. Census Bureau 2000

The top employers in the area as of 2005 appear in Table 3-22. The largest employers in Clark County are actually located in Las Vegas, Nevada, which falls about 6 miles outside of the local area of influence. Like Clark County, the majority of employers in Mesquite are in the casino and hotel industries, as well as in public school districts. Employment in Lincoln County is largely in the public and healthcare sector, with one of its largest employers in the technology industry. In St. George, the major employers hire between 2,000 and 2,999 employees in the public education, retail, and health care sectors.

Table 3-22
Major Employers in the Areas of Influence

	Employer	Category	Number of Employees
Lincoln County, Nevada	Applied Technology Division, LLC	Engineering services	100 to 199
	Lincoln County School District	Elementary and secondary schools	100 to 199
	Lincoln County	Executive and legislative offices combined	100 to 199
	Grover C. Dils Medical Center	General medical and surgical hospitals	80 to 89
	Child and Family Division	Residential mental and substance abuse care	70 to 79
Clark County, Nevada	Clark County School District	Elementary and secondary schools	>10,000
	Bellagio, LLC	Casino hotels	9,500 to 9,999
	Clark County	Executive and legislative offices combined	9,000 to 9,499
	Wynn Las Vegas, LLC	Casino hotels	8,500 to 8,999
	MGM Grand Hotel, LLC	Casino hotels	8,000 to 8,499
	Mandalay Corporation	Casino hotels	8,000 to 8,499
City of Mesquite, Nevada	Oasis Resort	Entertainment and recreation	970
	Casablanca Resort	Entertainment and recreation	958
	Virgin River Resort	Entertainment and recreation	855
	Eureka Hotel and Casino	Casino hotels	350
	Mesquite Vistas	Real estate	160
	Clark County School District	Education	156
	Primex Plastics	Retail, trade, and personal services	136
	City of Mesquite	Public administration	125
	Mesa View Regional Hospital	Health services	100+
	Smith's Food and Drug	Retail, trade and personal services	100
St. George, Utah	Wal-Mart	Retail, trade and personal services	2,000 to 2,999
	Washington County School District	Elementary and secondary schools	2,000 to 2,999
	IHC – Intermountain Health Care	Health care	2,000 to 2,999
	Dixie College	Higher education	500 to 999
	St. George City	Local government	500 to 999
	Federal Government	Federal government	250 to 499
	SkyWest Airlines	Air transportation	250 to 499
	Washington County	Local government	250 to 499
	Cross Creek Manor	Residential care	250 to 499

SOURCES: City of Mesquite 2003; Nevada Workforce 2006; St. George Chamber of Commerce 2007

It can be assumed that a significant portion of residents from the town of Ivins and the city of Santa Clara work in both the public school and retail sectors, as well as commute to the larger city of St. George for employment opportunities. Census data support this assumption as the majority of employed residents in the town of Ivins have reported a commute time of 10 to 34 minutes. The majority of employed residents in the city of Santa Clara typically commute 10 to 24 minutes to their places of employment.

Unemployment rates could determine the proportion of potential construction workers and permanent employees from within the local and regional area of influence that would be employed by the Toquop Energy Project. As seen in Table 3-23, the unemployment rate for Lincoln County in 2006 was similar to that of the United States while Clark County's unemployment rate was similar to Nevada's at 4 percent. The city of St. George was 0.1 percent higher than Washington County, with the state of Utah having a 2.9 percent unemployment rate, lower than both the United States and Nevada. Unemployment rates for the cities of Mesquite, Caliente, Ivins, and Santa Clara are undetermined, as the U.S. Department of Labor does not report unemployment rates for cities and towns with a population of fewer than 25,000 residents.

Table 3-23
Percentage of Unemployment,
Areas of Influence, 2006

	2006
United States	4.6
States	
Nevada	4.2
Utah	2.9
Counties	
Clark County, Nevada	4.0
Lincoln County, Nevada	4.8
Washington County, Utah	2.6
Cities	
St. George, Utah	2.7

SOURCE: U.S. Department of Labor 2005

Wages

Because the Proposed Action Alternative would take place in Lincoln County, Nevada, county wages would apply. According to the State of Nevada's Department of Training, Rehabilitation and Employment, 2006 mean wages for occupations in the construction service varied from $19.09 to $19.95 an hour. Mean wages for other related forms of employment for the project are listed in Table 3-24. According to the Nevada Department of Employment, Training, and Rehabilitation, wages for construction and extraction workers in 2006 were ranked among the highest in Lincoln County, with the county's median income listed at $52,000. General and operations managers had an annual mean income of $92,817, while the income for business and financial operations occupations was $52,265 (Nevada Department of Training, Rehabilitation and Employment 2007). Because these incomes are more than 30 percent below the median income, workers are considered able to afford living in this area.

Table 3-24
2006 Wages for Lincoln County, Nevada

Occupation	Mean Wages	Total Annual Income
Construction and extraction	$19.09	$39,707
Construction trades workers	$19.95	$41,496
Installation, maintenance, and repair occupations	$13.73	$28,558
Vehicle and mobile equipment mechanics, installers	$15.65	$32,552
Other installation, maintenance and repair	$13.34	$27,747
Maintenance and repair workers, general	$14.98	$31,158
Transportation and material moving	$13.70	$28,496
Materials moving workers	$15.04	$31,283

SOURCE: Nevada Department of Training, Rehabilitation and Employment 2007

Fiscal Conditions

Because 98 percent of land in Lincoln County, Nevada, is managed by BLM and the project would be located on Federal public lands, the Payment in Lieu of Taxes Act of 1976, as amended (31 U.S.C. 6901-6907) would apply. Payments in Lieu of Taxes (PILT) are Federal payments to local governments that help offset a lack of opportunity for property taxes, since Federal land is nontaxable. Land eligible for PILT includes BLM-administered public land and Federal land in the National Forest System and National Park System. PILT payments are determined on a formula basis, with the number of Federal acres constituting the principal determining variable. The logic behind PILT is that Federal land within county boundaries is not part of the county's tax base. Therefore, the county should be compensated for lost revenue opportunities. PILT payments are based on the number of acres of Federal entitlement land, as defined in 31 U.S.C. 6902, within each county. The number of qualified acres is multiplied by a dollar amount per acre set by law. Payments are subject to limitations based on population. Congress sets annual PILT program funding limitations that also may affect the amount of the payments under the program. The payments provide additional support to county governments that have certain Federal land within their boundaries. Examples of how PILT payments have been used include the improvement of local school, water, and road systems. Payment eligibility is reserved for local governments that provide services such as those related to public safety, environment, housing, social services, and transportation, and that contain nontaxable Federal lands. PILT payments are made for tax-exempt Federal land administered by BLM, National Park Service, and USFWS (all agencies of the U.S. Department of the Interior), land administered by the Forest Service, and for Federal water projects and some military installations (U.S. Department of the Interior 2006). The 2006 entitlement acreage by agency is shown for Lincoln County and the state in Table 3-25.

Table 3-25
2006 Entitlement Acreage by Agency in Lincoln County and the State of Nevada

Area	BLM	Forest Service	U.S. Bureau of Reclamation	NPS	USACE	USFWS	Total	BLM as Percentage of Total
Lincoln County	5,615,527	30,672	0	0	205	764,302	6, 410,706	87.6
Nevada	47,824,624	5,840,289	88,203	774,668	205	2,244,909	56,772,898	84.2

SOURCE: U.S. Department of the Interior 2006
NOTE: BLM = Bureau of Land Management, NPS = National Park Service, USACE = U.S. Army Corps of Engineers, USFWS = U.S. Fish and Wildlife Service

In 2006, BLM-managed land accounted for 87.6 percent of all entitlement acreage in Lincoln County as compared to 84.2 percent of BLM share statewide. It is the greatest source of PILT payments in Lincoln County. These entitlement acreages have varied slightly in recent years, but the relative share of agency PILT payments has remained fairly constant. PILT payments are computed and disbursed by BLM on or before September 30 of each year. In 2006, PILT payments in Lincoln County from BLM were $419,802 for 6,410,706 acres (U.S. Department of the Interior 2006).

3.17.2.3 Housing Values

Potential employees of the Proposed Action Alternative who would commute to and from the site may choose to reside to purchase a home or rent in the regional area of influence. In the year 2000, the median value of homes in Lincoln County was $80,300, and in Caliente it was $64,500. Clark County had a higher median value at $139,500, with Mesquite at $133,500. Washington County was comparable to Clark County, with a median home value of $139,800 for the county and $143,200 in St. George. Given the real estate boom in housing in recent years, home values have increased in many areas of the United States.

In 2005, the median home value in Lincoln County rose to $96,300, while Clark County saw a dramatic increase with a reported median home value of $289,300, more than double the value reported in 2000. Washington County reported a median home value of $203,400. Home values for the towns and cities within the local area of influence were not reported for 2005.

In 2006, the fair market rent in Lincoln County ranged from $517 a month for a one-bedroom apartment to $875 a month for a three-bedroom (City-data.com 2007). According to the Lincoln County master plan, approximately one-quarter of the 1,678 existing homes in the county are available for rental purposes. In Clark County, fair market rent was higher and ranged from $728 a month for a one-bedroom apartment to

$1,195 a month for a three-bedroom apartment. In Washington County, fair market rent was similar to that of Lincoln County, where prices ranged from $529 a month for a one-bedroom and $875 a month for a three-bedroom apartment.

Housing authorities within the local area of influence such as the city of St. George have programs in place to assure affordable housing for low-income families and individuals, including Federal and state housing programs (City of St. George 2002). According to both the city of St. George and Clark County's Housing Authority, low-income residents can qualify for Section 8 housing, which would enable them to rent private homes at affordable prices if their income falls below 30 percent of the area's median income.

3.17.2.4 Public Facilities and Services

Local Utility Service

Utility companies that might provide services to the proposed power plant and associated facilities would be located in Lincoln County and the city of Mesquite. Lincoln County has the following power providers in the area: Alamo Power District, Lincoln County Power District Number 1, Panaca Power and Light, and Penoyer Valley Electric. Lincoln County Power District 1 services all of Lincoln County with electricity generated at Hoover Dam. The telephone provider for the county is Lincoln County Telephone Systems Inc., which also provides internet service.

The electric power provider for the city of Mesquite is Overton Power District Number 5 and the telephone provider is Rio Virgin Telephone. Overtown Power District Number 5 services cities and towns in the northwest quadrant of Clark County. Rio Virgin Telephone services residents and businesses from mile marker 100 in Clark County up to the Utah state line. Mesquite falls within the Virgin Valley Water District.

Education and Training

The public school districts that cover the bulk of the local and regional areas of influence are the Lincoln County, Clark County, Santa Clara, and Washington school districts. The closest schools to the proposed project site are in the town of Ivins and the cities of Mesquite, Caliente, St. George, and Santa Clara. In Lincoln County, there are four elementary schools, two middle schools, and two high schools (Lincoln County 2006). There are a total of 660 students enrolled. Currently, there is available space for 50 more students; however, given expected increases in population in both the Coyote Spring and Toquop areas, the school district is developing policies to accommodate that growth by adding new sites and facilities (Lincoln County 2006). Due to population projections for the remaining counties, there are policies in place to accommodate growth by creating new facilities including the expansion of roads and utilities to serve future development. For example, the city of St. George is working closely with the school district to identify and reserve lands for additional educational facilities (City of St. George 2002).

Health Conditions and Health Care

There are no hospitals or medical-care facilities in the study area. The nearest is the Grover C. Dils Medical Center, a 20-bed facility (Hospital-Data n.d.) owned by Lincoln County and located in the city of Caliente. Dixie Regional Medical Center (DRMC), a 137-bed facility (Hospital-Data n.d.) in St. George, also serves residents living in the city of Mesquite and surrounding areas. In November 2003, DRMC added a 64-bed facility that specializes in cardiovascular medicine (St. George Chamber of Commerce 2006). Currently, DRMC has a medical staff of 132 full-time physicians and 25 part-time physicians with plans of expanding services through the development of two new facilities (City of St. George 2002). The town of Ivins also has the Snow Canyon Clinic, which provides additional health care.

Public Safety

In terms of public safety, communities that would provide immediate services to potential employees or residents within the study area were evaluated. According to the Lincoln County master plan, the Lincoln County Sheriff's Department provides services throughout the project area and has a total of 20 employees who work from the County Correctional Facility in Pioche and a substation in Alamo. Equipment includes one patrol car for each of the 11 patrol officers, the sheriff, and the captain. Also, there are multiple vehicles including a van for transporting prisoners to the correctional facility, two pickup trucks, one unmarked vehicle, and six four-wheel drive vehicles (Lincoln County 2006). The response time to the project area is two hours. Also providing assistance on major roadways is the Nevada Highway Patrol.

3.18 ENVIRONMENTAL JUSTICE

BLM is responsible for abiding by environmental justice mandates including Title VI of the Civil Rights Act of 1964, as amended (42 U.S.C. 2000d to 2000d-71), Executive Order 12898 of 1994, and the implementing regulations for both. Title VI prohibits recipients of Federal financial assistance from discriminating on the basis of race, color, or national origin in their programs or activities.

In accordance with Executive Order 12898, it is the responsibility of Federal agencies to identify and address "disproportionately high and adverse human health or environmental effects of its activities on minority populations and low-income populations." The general purposes of the Executive Order are to (1) focus the attention of Federal agencies on the human-health and environmental conditions in minority and low-income communities with the goal of achieving environmental health, (2) foster nondiscrimination in Federal programs that substantially affect human health or the environment, and (3) give minority communities and low-income communities public participation in, and access to, public information on matters relating to human health and the environment. The first task in such an endeavor is to identify minority and low-income population groups at geographic levels of analysis appropriate to the project under study.

The Council on Environmental Quality subsequently prepared Environmental Justice: Guidance Under the NEPA (Council on Environmental Quality 1997). That document includes guidelines for each major phase of the NEPA process, including the phase that characterizes the existing conditions of the affected environment. The guidance was applied to an evaluation of the populations that would potentially be affected by the Toquop Energy Project to determine their status as environmental justice populations.

3.18.1 <u>Data Collection Methods</u>

Demographic data obtained from the U.S. Census Bureau were used to compare the demographic profiles of the counties and municipalities within the areas of influence to those of the state of Nevada. A key indicator of the potential for environmental justice concerns is whether an area's proportion of minority and/or low-income population exceeds the proportion of such populations in a larger area of reference (such as the statewide population).

3.18.2 <u>Existing Conditions</u>

The data in Table 3-26 indicate that the majority of residents in the region of influence are white. According to the U.S. Census Bureau, the term "Hispanic" is used to reference ethnicity and not race. Therefore, a person can be counted as being both white and Hispanic.

Lincoln County and several of the closest cities to the proposed project site (Mesquite and Caliente) generally have smaller proportions of minority populations than is represented in the overall state population. In Mesquite, there is a slightly larger proportion of Hispanic residents (24.8 percent) than in overall Clark County (22 percent) or the State of Nevada (19.7 percent). The data also indicate that the percentages for minority populations in Clark County are similar to those for the state, as Clark County contains the majority of the population of Nevada. The counties and towns in Utah that are closed to the proposed project area also are overwhelming white populations, with the percentage of white residents ranging from 92 to over 97 percent. These proportions are larger than is found statewide in Utah.

The percentage of individuals below the poverty level within city and county boundaries also is shown in Table 3-26. The data indicate that the proportions of low-income individuals in both the city of Mesquite and Clark County are similar to statewide proportions. Data for Lincoln County and the city of Caliente show higher rates of individuals living below the poverty line than Clark County or the state overall. In Utah, to the proportion of the population living below the poverty line is somewhat higher in Washington County (11.2 percent) and St. George (11.6 percent).

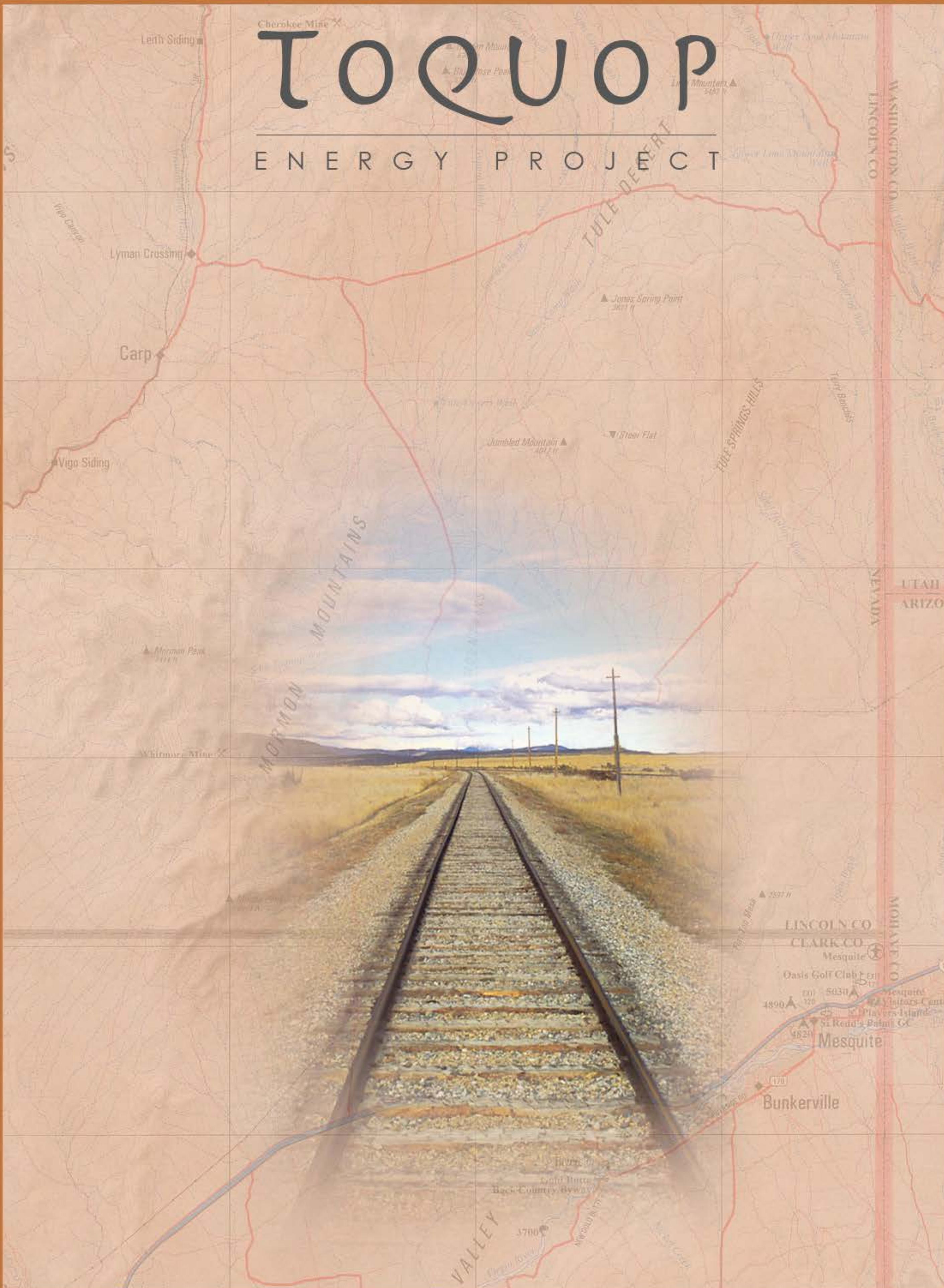
Table 3-26
Distribution of Minority and Poverty Population in the Areas of Influence (percent)

	City of Mesquite	City of Caliente	Lincoln County	Clark County	State of Nevada	City of St. George	Town of Ivins	City of Santa Clara	Washington County	State of Utah
Demographic characteristics										
Race										
White alone	80.3	87.3	91.5	71.6	75.2	92.3	94.0	97.3	93.6	89.2
Black or African-American alone	0.6	2.0	1.8	9.1	6.8	0.2	0.1	0.2	0.2	0.7
Asian	1.3	0.6	0.3	5.3	4.5	0.6	0.3	0.3	0.4	1.7
American Indian and Alaska Native	1.0	3.0	1.8	0.8	1.3	1.6	1.2	0.3	1.5	1.3
Some other race[1]	14.7	3.7	2.7	9.1	8.4	3.5	2.3	0.8	2.6	4.8
Two or more races	2.2	3.5	1.9	4.2	3.8	1.8	2.1	1.1	1.6	2.3
Hispanic	24.8	7.3	5.3	22.0	19.7	6.7	3.9	2.0	5.2	9.0
Individuals below poverty level	10.2	22.3	16.5	10.8	10.5	11.6	6.8	3.5	11.2	9.4

SOURCE: U.S. Census Bureau 2000
NOTE: [1] Includes Native Hawaiian and other Pacific Islanders

TOQUOP

ENERGY PROJECT



CHAPTER 4.0 - ENVIRONMENTAL CONSEQUENCES

4.0 ENVIRONMENTAL CONSEQUENCES

4.1 INTRODUCTION

This chapter characterizes the potential impacts on the environment that would result from the implementation of the alternatives described in Chapter 2. The analyses of predicted direct and indirect impacts on each resource or resource use are discussed below, and a brief discussion of methods used in the analysis is provided in each section. As needed, mitigation measures are identified to reduce, avoid, or compensate potential impacts. At the end of each resource discussion, a summary of the residual impacts identifies expected impacts that would occur after mitigation is applied and provides a comparison of alternatives.

Cumulative impacts are described for all resources and resource uses in Section 4.18. The final sections of the chapter summarize unavoidable adverse impacts, short-term uses of the environment, long-term productivity, the irreversible and irretrievable commitments of resources, and energy requirements and conservation potential.

Definitions of "significant," "minimal," and "negligible" as used with respect to impacts, are defined in the glossary, unless otherwise qualified (e.g., Climate and Air Quality).

4.2 LANDS

4.2.1 Methods

The lands impact analysis evaluated the potential effects caused by the construction, maintenance, and operation of the Proposed Action Alternative and the No-Action Alternative on land use and Bureau of Land Management (BLM) land and realty actions in the project area. The analysis is based on a review of existing and planned land uses to determine direct, indirect, and cumulative impacts locally and regionally. An adverse impact on lands would occur if a proposed project would be incompatible with existing or planned land uses, or a land use would be displaced or otherwise affected (e.g., because of changes in access to the area) by the project.

4.2.2 No-Action Alternative

4.2.2.1 Impacts

The construction of the power plant would insert an industrial use into the area, although no other incompatible, developed land uses (such as residences) are present. The power plant's co-location with existing transmission lines and a natural-gas pipeline takes advantage of the access to those facilities, and additional linear facilities would not need to be built to transmit the power.

Lincoln County has planned future residential development on the parcels that were transferred to private ownership under the Lincoln County Land Act. However, this area is approximately 9 miles from the power plant site, and separated visually by topographical features (see Visual Resources, Section 4.7).

The transference of public land to private ownership would result in a net loss of acreage available for public use. Grazing and recreation would continue in the vicinity of the power plant site (these issues are discussed in Section 4.3 and 4.4 respectively). The construction of the power plant would not impact the ability to develop existing mining claims in the area.

4.2.2.2 Mitigation

Any temporary disturbance to rangelands as a result of construction of project facilities would be restored to its prior conditions.

4.2.3 Proposed Action Alternative

4.2.3.1 Impacts

Impacts would be similar to the No-Action Alternative since the power plant site would be in the same location. The addition of the rail line would result in the development of acreage beyond what is proposed for the No-Action Alternative.

4.2.3.2 Mitigation

Any temporary disturbance to rangelands as a result of construction of project facilities would be restored to its prior conditions.

4.2.4 Summary of Impacts

No impacts are expected to occur on land use from the alternatives.

4.3 LIVESTOCK GRAZING AND RANGELANDS

4.3.1 Methods

To analyze impacts on grazing and rangeland that the No-Action Alternative and Proposed Action Alternative might have on the grazing allotments in the project area, the BLM Ely Field Office, Resource Management Plan (RMP)/Environmental Impact Statement (EIS) was used to identify existing grazing allotments, authorized animal unit months (AUMs), and season of use. An impact on grazing would occur if grazing were displaced from an area, AUMs were reduced, or range improvements and forage were affected.

4.3.2 No-Action Alternative

4.3.2.1 Impacts

The location of the gas-fired plant lies within the Gourd Spring grazing allotment. As noted in Chapter 3, livestock grazing was excluded from the power plant site as a result of the construction of the boundary fence meant to protect the Mormon Mesa Area of Critical Environmental Concern (ACEC). No AUMs would be lost by the construction of the power plant. Ancillary facilities such as the well sites, monitoring well, and storage tanks, however, would remove about 12 acres from use for the life of the project. Overall livestock management would not be affected, however, due to the spacing of the facilities and the small number of acres involved.

The permitted water pipeline would originate in the Gourd Spring allotment, pass through Summit Spring, and terminate at the Garden Springs allotment. Construction activities along the water pipeline could disturb up to 90 acres of rangeland that is currently managed for livestock use, with the effect of displacing forage temporarily. Vegetation within the temporary right-of-way would be reclaimed after construction.

Construction of the pipeline also could affect range improvements, such as fencing.

4.3.2.2 Mitigation

If construction activities cause damage to existing range improvements, the range improvements would be repaired using material that meets or exceeds the quality of the existing improvement. If damage occurs, the BLM and livestock operator would be notified immediately. If damage occurs during active livestock grazing, repairs would be made within 24 hours.

4.3.3 Proposed Action Alternative

4.3.3.1 Impacts

Impacts would be the same as that in the No-Action Alternative, except with respect to the rail line. Construction activities along the right-of-way of the proposed rail line would temporarily reduce available forage in those areas. After construction, grazing would be displaced on up to 356 acres within the permanent right-of-way for the rail line. Four grazing allotments would be affected—Gourd Spring (153.9 acres), Garden Springs (23.3 acres), White Rock (54.5 acres), and Henrie Complex (124.6 acres). The number of acres affected within each allotment represents a small fraction of each total allotment. The construction of the rail line would displace existing fences in four locations (Map 3-1).

4.3.3.2 Mitigation

Mitigation would be the same as the No-Action Alternative. In addition, where required, tortoise fencing would be approximately 18 to 24 inches high, consisting of welded mesh attached to small stakes so cattle should be able to move over it.

4.3.4 Summary of Impacts

Livestock grazing would be displaced from some areas under both alternatives. Under the No-Action Alternative, a total of 12 acres would be displaced within allotments with active AUMs. Under the Proposed Action Alternative, an additional 356 acres would be displaced as a result of the construction of the rail line. These acre totals represent a small fraction of the overall allotments (which range in size from 355,024 acres to over 1.8 million acres). No effect on authorized AUMs would be expected.

4.4 RECREATION AND ACCESS

4.4.1 Methods

The environmental consequences on recreation resources and access were identified and measured by comparing the existing conditions described in Chapter 3 to the conditions that would be expected after implementation of the action. The analysis evaluated impacts on the transportation network in the project area based on assumptions regarding project access requirements during construction, operation, and long-term maintenance identified in the 2003 EIS (No-Action Alternative) and Appendix A (Proposed Action Alternative). Impact descriptions include the type of recreational activity affected, sensitivity of the landscape, whether the impact is direct or indirect, and duration of impact. Most impacts on recreation would be related to the disturbance of or lack of access to recreation areas.

4.4.2 No-Action Alternative

4.4.2.1 Impacts

Transferring the 640-acre parcel from public to private ownership (Toquop Energy Company, LLC [Toquop Energy]) would preclude the continuation of existing public access opportunities on the fenced portion of the parcel. However, as noted in the 2003 EIS, recreational use does not require direct use of the power plant site. Recreational use is mainly casual, including wildflower and bird viewing in the spring, primitive camping, and off-highway-vehicle (OHV) driving for pleasure. Careful groundwater well siting would minimize potential future conflicts between OHV users and the aboveground production wells. Some hunting (primarily to the west in the foothills of the East Mormon Mountains) also occurs in the area, and impacts on hunting are not anticipated.

Implementation of the action approved in the 2003 EIS would not create additional demand for recreational opportunities in the project area, but it would provide improved access for individuals who wish to pursue recreational opportunities nearby (BLM 2003a). During the early portion of the construction phase, the activity to widen, straighten, and level Halfway Wash Road would temporarily and intermittently disrupt recreational access. During construction of the power plant or the water pipeline, the presence of construction vehicles also would temporarily and intermittently disrupt recreational access.

As the power plant is constructed, a temporary increase in average daily traffic would occur on Interstate 15 (I-15) near the East Mesa Interchange. Travel flow at the East Mesa Interchange would be heaviest at the start and end of work shifts, particularly between 3:00 and 4:00 p.m., when work shift changes coincide with existing peak traffic levels on I-15. To improve traffic flow at the one-lane underpass, mitigation measures are recommended.

Increases in nighttime traffic during construction would not be expected to impact existing conditions, since existing traffic levels are already low at that time. During the operation of the plant (25 plant employees), the number of trips on the access road and I-15 would be reduced from traffic levels during construction (500 construction employees). No impacts on roadway condition would be expected, because I-15 was designed to handle interstate traffic, and the access road to the power plant site would be improved to accommodate equipment deliveries and other traffic.

4.4.2.2 Mitigation

Mitigation would not be required for recreational resources. In the 2003 EIS, several transportation management measures were identified as standard operating procedures that would be implemented as part of the No-Action Alternative, including the following:

- Providing a traffic flag person at both ends of the one-lane underpass (construction phase only) to direct traffic during periods of heavy traffic flow.
- Scheduling project vehicles during peak construction periods so that they arrive at the one-lane underpass at intervals considered suitable to provide smooth traffic-flow patterns.
- Scheduling materials/equipment vehicle deliveries so that they do not arrive at the one-lane underpass during the beginning or end of a work shift.

Additional mitigation measures that are related to traffic and transportation are included in the sections addressing Air Quality and Noise.

4.4.3 Proposed Action Alternative

4.4.3.1 Impacts

Impacts would be the same as the No-Action Alternative with regard to the power plant site. The 31-mile-long rail line would traverse the Tule Desert, where recreational uses historically have included OHV use and hunting. OHV use has increased in recent years. Recreational users traverse the area via several existing roads. Primarily, hikers and horse packers use the Clover Mountains north of the project area (BLM 2006) where the terrain is too rugged for OHV use. In addition to recreational users, other users of Lyman Crossing Road include primarily ranching and grazing permittees.

In approximately 10 locations, the proposed rail line would cross primitive/unimproved roads still associated with grazing and ranching and now also used by OHVs. During the construction phase, the rail line construction activity would temporarily and intermittently disrupt recreational access in these locations.

A popular destination for OHV users in the project area is the Toquop Wash area. The Proposed Action Alternative would have little to no effect on the access to Toquop Wash as the approach to this area is from I-15, exit 100, and along Halfway Wash.

There is little potential for the proposed rail line to affect other recreational opportunities in the area such as camping, hiking, and nature study. Most camping and hiking in the project area takes place to the west of the rail line in the Mormon Mountains Wilderness.

Most upland and big-game hunting near the project area occurs in the East Mormon Mountains and Meadow Valley Wash. Fur trapping and varmint hunting would likely occur throughout the project area, but at an unknown level. The permitted access road would provide improved access to the East Mormon Mountains and potential for increased recreational use.

There would be no impacts on developed recreation sites.

4.4.3.2 Mitigation

Mitigation would be the same as the No-Action Alternative.

4.4.4 Summary of Impacts

Under the No-Action or Proposed Action alternatives, there would be minor displacement of dispersed recreational uses that would not be expected to impact overall recreational use in the area.

Potential impacts on traffic patterns would be temporary and would be mitigated through traffic management, such as road closures/detours, temporary signage, and speed-limit adjustments.

4.5 WILDERNESS AND SPECIAL MANAGEMENT AREAS

4.5.1 Methods

This analysis addresses the potential impacts on Wildernesses and ACECs from the No-Action and Proposed Action alternatives. The environmental consequences are identified and measured by comparing the existing conditions described in Chapter 3 to the conditions that would be expected after implementation of the action. The analysis is based on review of the management objectives for existing Wilderness and special management areas in the project area. An impact on wilderness and other special management areas would occur if the construction and implementation of a project would affect the achievement of management objectives in specially designated areas.

4.5.2 No-Action Alternative

4.5.2.1 Impacts

There would be no direct impacts on designated wilderness areas because all project facilities would be located outside of wilderness areas. The access road is an allowable use within the Mormon Mesa ACEC.

The Mormon Mesa ACEC is managed as a right-of-way (ROW) avoidance area in both Lincoln and Clark counties. As an upgrade to an existing road, the proposed upgrades would meet ACEC requirements in Lincoln County according to stipulations contained in the Caliente Management Framework Plan that call for the use of existing roads for construction in the ACECs and the avoidance of areas outside of corridors within ACECs (BLM 2000). The Mormon Mesa ACEC within Clark County would be subject to the following management stipulations: “Require reclamation of temporary roads. Authorize new roads in response to specific Proposed Action Alternatives where no feasible alternative exists. Ensure access to private property” (BLM 2003a). Therefore, the improvement of the existing graveled road to the proposed power plant site would be in conformance with the Las Vegas RMP.

The improved permitted access road would result in easier vehicular access to points within 3 miles of the Mormon Mountains Wilderness. This could lead to a small increase in the number of Wilderness visitors.

4.5.2.2 Mitigation

Mitigation would not be required.

4.5.3 Proposed Action Alternative

4.5.3.1 Impacts

Impacts would be the same as the No-Action Alternative since the power plant site and rail line would not directly impact specially designated areas and the access road would be the same as proposed in the No-Action Alternative.

4.5.3.2 Mitigation

Mitigation would not be required.

4.5.4 Summary of Impacts

The implementation of the No-Action Alternative or the Proposed Action Alternative would not impact the achievement of management objectives within specially designated areas. Although the access road would cross the Mormon Mesa ACEC, this is allowed use.

4.6 VISUAL RESOURCES

4.6.1 Methods

Impacts on visual resources resulting from the No-Action and Proposed Action alternatives would vary depending upon the degree of perceived change to the visual resource and the viewers' response to that change. Visual contrasts typically result from (1) landform modifications that are necessary for construction of the proposed action, (2) removal of vegetation or soil to construct project facilities and maintain right-of-way and clearance zones, and (3) introduction of new structures or lighting to the landscape. Three distance zones were considered to describe visual impacts—foreground (0 to 0.5 mile), middleground (0.5 mile to 3 miles) and background (beyond 3 miles).

4.6.2 No-Action Alternative

4.6.2.1 Impacts

Construction of project facilities would introduce structures that would have potential visual impacts in the project area as described in the 2003 EIS. The power plant may be visible from the ridges in the Mormon Mountains Wilderness, about 5.5 miles away. In addition, nighttime lighting for operational safety and security would create a new source of light in an area of very little night lighting. During construction, temporary impacts on visual resources would result from (1) generation of fugitive-dust, (2) presence of construction equipment, and (3) increased light during possible nighttime construction.

Visual impacts resulting from construction and presence of the water pipeline would be limited to the construction phase. The pipeline would be buried and areas of ground disturbance would be restored.

Implementation of the No-Action Alternative would be consistent with BLM Visual Resources Management (VRM) Class IV designation, which applies to most of the project area. The permitted access road that lies within Clark County would be consistent with BLM objectives for the VRM Class III designation, as upgrading the frontage and dirt roads would not degrade the existing view from 1-15 and would not attract or focus the attention of the casual viewer away from the mountains in the distance (BLM 2003a).

4.6.2.2 Mitigation

To mitigate the contrast between project facilities to the existing landscape and to reduce the effect of lighting, the 2003 EIS identified the following measures as standard operating procedures that would be implemented as part of the No-Action Alternative:

- All structures, stacks, buildings, and tanks would be constructed of materials that would restrict glare and would be finished with flat tones intended to blend with the surrounding environment. The project applicant would consult with Lincoln County and BLM regarding the final selection of colors for the features of the property.
- All fencing would be constructed of non-reflective materials and would be treated or painted to blend with the surrounding environment.
- Signs at the plant site would be constructed of non-glare materials and would be painted using unobtrusive colors.
- Lighting would be limited to areas required for safety and security and would be shielded and directed downward to the greatest extent possible.
- Lighting would be directed and shielded to reduce light scatter and glare. Highly directional, high-pressure sodium-vapor fixtures (or other fixtures that meet the criteria specified) would be used where practicable.
- Switches would be used as appropriate to allow lighting to be used only when needed.
- The transmission structures would be finished with flat, neutral gray tones that would relate to the colors of the structures in the existing transmission corridors and that would blend with the surrounding environment. Non-specular conductors and non-reflective and non-refractive insulators would be used to reduce conductor and insulator visibility.

4.6.3 <u>Proposed Action Alternative</u>

4.6.3.1 Impacts

Impacts would similar to those identified for the No-Action Alternative, but would differ due to those impacts associated with rail line and power plant facilities.

The plant would be visible in the background from I-15, 10 miles south of the site. Landform screening effectively limits these views to intermittent segments along I-15; however, because of the interstate's distance from the proposed power plant, individual power-plant features would not likely be discernible during daytime viewing. Plant features may be more apparent at night due to nighttime lighting. The proposed plant would increase the amount of light emitted from the project site. Appendix B contains photographs of existing conditions, as well as simulations of the proposed plant as taken from a key observation point.

The proposed power plant would be visible in the background from peaks in the Mormon Mountains Wilderness; however, views would be limited (refer to Map 3-5). The East Mormon Mountains provide an effective screen for most of the wilderness.

Toquop Township is located approximately 6 miles southeast of the power plant site and has the potential for future residential development. Flat Top Mesa acts as a screen to approximately two-thirds of Toquop Township; however, the plant features may be seen in the background from atop the Mesa.

Construction and use of the proposed rail line would introduce structural contrast to the natural landscape of the Tule Desert and Meadow Valley Wash. The proposed rail line would be visible from the northeastern portion of the Mormon Mountains Wilderness, as well as in the southern tip of the Clover Mountains Wilderness (refer to Map 3-6). The portion of the Mormon Mountains Wilderness closest to Toquop Gap would be subject to middle-ground views, where the rail line would be located approximately 1 mile from the wilderness boundary. Other locations in the Mormon Mountains Wilderness would have views of the rail, but the feature would be in the background and not likely obvious due to the low elevation of the rail and the height of surrounding vegetation. When construction is complete, the desert vegetation would be restored in the temporary construction right-of-way, leaving no more than 356 acres of permanent disturbance.

Foreground views of the rail and its construction would be visible from the southernmost tip of the Clover Mountains Wilderness. Views would be impacted by landform modifications needed to accommodate the rail line, as construction would involve cutting into the eastern hillside of the Upper Meadow Valley Wash. Previous modifications to the Upper Valley Meadow Wash include the existing Union Pacific Railroad (UPRR). Appendix B contains photographs of existing conditions, as well as a simulation of the proposed rail line taken from a key observation point in the Upper Valley Meadow Wash, to illustrate these landform modifications.

There are two existing residences near Lyman Crossing. The proposed rail line is situated in a hillside northeast of the homes. Both homes are located on the eastern side of Meadow Valley Wash. Existing landforms screen the rail line from viewers. The residences currently have direct views of the existing UPRR.

Potential impacts on visual resources would occur as a result of landscape modifications within the South Fork tributary corridor and Toquop Gap. These impacts would be the result of the rail line placement, resulting in a landform contrast with the surrounding natural setting.

Impacts on haze conditions are negligible and impacts on visibility related to air emissions are described under Section 4.7, Air Quality.

Implementation of the Proposed Action Alternative (coal-fired plant and rail line) would meet the objectives of the BLM VRM Classes III and IV designations of that land.

4.6.3.2 Mitigation

Mitigation measures outlined in the No-Action Alternative would be applied to the Proposed Action Alternative, which are in accordance with the BLM's best management practices for visual resource management. (For detailed information about the BLM's best management practices, see http://www.blm.gov/wo/st/en/prog/energy/oil_and_gas/best_management_practices.html).

4.6.4 Summary of Impacts

Under both alternatives, the introduction of new structures would create contrast with the existing natural environment.

4.7 CLIMATE AND AIR QUALITY

4.7.1 Methods

This section presents a discussion of the potential impacts associated with the No-Action Alternative and the Proposed Action Alternative and their potential effects on air quality in the project area. In most instances, impacts are categorized and described in general terms without reference to facility type or any site-specific resources. It is also important to note that the information presented here is simply a summary. Additional technical information is provided within the technical support document located in Appendix D.

Estimated emissions of criteria pollutants and hazardous air pollutants from the power plant under the Proposed Action Alternative were extracted from the air-quality permit application prepared by ENSR Corporation (ENSR) for Toquop Energy, which was submitted to the Nevada Division of Environmental Protection (NDEP), pursuant to the Federal Prevention of Significant Deterioration (PSD) program. In addition, ENSR performed dispersion modeling to evaluate air-quality impacts of the plant emissions on local and regional air quality. Construction and vehicle emissions not covered by ENSR's air application were calculated by URS Corporation.

For purposes of the air-quality impact analysis, the following qualitative terms were used to describe the potential impact levels in terms of the relationship to established standards for air quality:

- **Major**. Ambient air quality could be permanently degraded, as a direct result of implementing the proposed project, to the extent that re-designation of the project area by the U.S. Environmental Protection Agency (EPA), with respect to one or more of the National Ambient Air Quality Standards (NAAQS) pollutants, from "attainment" or "unclassified" to "non-attainment" is possible. An air-quality degradation increment, applicable to attainment and unclassified areas under the Federal PSD program regulations, could be consistently exceeded; regional haze could be consistently worsened by 5 percent visibility extinction or more; or cumulative regional emissions might increase, causing one or more of the above results.
- **Moderate**. Discernible degradation of regional air quality that does not consistently exceed applicable NAAQS, PSD increments, or Federal/state visibility protection standards.
- **Minor**. Insignificant degradation of regional or local ambient air quality at levels less than 20 percent of applicable standards; temporary or transient emissions occurring within a defined time period.
- **Negligible**. Indiscernible or immeasurable degradation of regional or local ambient air quality or visibility.
- **None**. No air pollutant emissions occur.

ENSR calculated mercury (Hg) emissions from the main stack and performed dispersion modeling to predict maximum deposition rates for both vaporous and particulate Hg within 40 kilometers (km) of the proposed plant site. The deposition rates were modeled using the same meteorological dataset that was used for the Class II American Meteorological Society/EPA Regulatory Model (AERMOD) modeling in support of the PSD permit application. This dataset consisted of one full year of data from an onsite measurement tower. For deposition modeling, this processed meteorological dataset was supplemented with precipitation data from Overton, Nevada, the nearest and most representative station, and with relative humidity and station pressure data from St. George, Utah.

The receptors used for the modeling analysis consisted of a square grid extending 40 km in all directions from nearby the Toquop Energy Project main stack at a 1-km resolution. The terrain elevations for these receptors were developed using AERMAP, AERMOD's terrain processor. The stack parameters and emission rates used for this analysis were consistent with those used in the PSD application's supporting modeling. This source has the following release characteristics: Height: 222.5 meters; Diameter: 7.44 feet; Velocity: 19.81 meters/second; and Temperature: 327.59 Kelvin.

4.7.2 No-Action Alternative

4.7.2.1 Impacts

Dispersion modeling was performed to predict the maximum nitrogen oxides (NO_x), carbon monoxide (CO), particulate matter with aerodynamic diameter less than 10 microns (PM_{10}), and sulfur dioxide (SO_2) concentrations as a result of air emissions under the No-Action Alternative. Table 4-1 presents the predicted impacts from the No-Action Alternative and compares them to the Class II increment and NAAQS. None of the maximum predicted impacts exceeded the PSD increments or the NAAQS.

Table 4-1
Estimated Air-Quality Impacts during Plant Operations and Comparison to PSD Increments and NAAQS

Pollutant	Averaging Period	Maximum Predicted Impacts ($\mu g/m^3$)[1]	SIL ($\mu g/m^3$)	Percent of SIL	PSD Class II Increment ($\mu g/m^3$)	Percent of Incr.	NAAQS ($\mu g/m^3$)	Percent of Ambient Standard
Nitrogen dioxide (NO_2)[2]	Annual	12.6	1	1,260	25	50	100	13
Sulfur dioxide (SO_2)	Annual	0.9	1	90	20	5	80	1
	24-hour	4.5	5	90	91	5	365	1
	3-hour	21.8	25	87	512	4	1,300	2
PM_{10} [3]	Annual	2.1	1	210	17	12	Revoked[4]	NA
	24-hour	9.4	5	188	30	31	150	6
Carbon monoxide (CO)	8-hour	51.7	500	10	NA	NA	10,000	1
	1-hour	406.6	2,000	20	NA	NA	40,000	1

SOURCE: Bureau of Land Management 2003b

NOTES: $\mu g/m^3$ = micrograms per cubic meter
SIL = significant impact level
PSD = Prevention of Significant Deterioration
NAAQS = National Ambient Air Quality Standards
NA = not applicable

1 Other than PM_{10} these impacts do not include any background concentrations.
2 Nitrogen dioxide (NO_2) is one type of nitrogen oxide(NO_x); NO_x is a general term for all oxides of nitrogen.
3 Maximum predicted particulate matter with aerodynamic diameter less than 10 microns (PM_{10}) impacts include background of 9 $\mu g/m^3$ (annual average) and 10.2 $\mu g/m^3$ (24-hour average).
4 Due to lack of evidence linking health problems to long-term exposure to PM_{10}, the U.S. Environmental Protection Agency has revoked the annual PM_{10} standard effective December 17, 2006.

4.7.2.2 Mitigation

Several fugitive-dust mitigation measures (excerpted from Appendix B of the 2003 EIS) are described in Appendix D.

4.7.3 Proposed Action Alternative

This section addresses the predicted or anticipated impacts on local and regional air quality attributable to the Proposed Action Alternative, including the following sources:

- Air pollution emissions from construction activities, including fugitive dust from earthmoving activities (plant and rail line construction) and tailpipe emissions from construction vehicles and equipment (Appendix D, Section 4.1).
- Particulate emissions from materials handling [including coal, ash, gypsum, lime, powdered activated carbon, and coal combustible products (CCP)] and due to vehicular traffic on roads during operations Appendix D, Section 4.2).

- Emissions of criteria air pollutants from the power plant operations, which includes the combustion of coal; the operation of air-pollution-control equipment; the combustion of fuel oil in the auxiliary boilers, fire-water pump engine, emergency generator, and onsite locomotive engines; working and evaporative losses from fuel- and oil-storage tanks; and emissions from employee and vendor vehicles (Appendix D, Section 4.3).

4.7.3.1 Predicted Ambient Air Quality Impacts

Table 4-2 summarizes the predicted ambient-air-quality impacts of the power plant, based on AERMOD modeling results. The maximum predicted ambient concentrations for SO_2 (24-hour and annual) and CO (1-hour and 8-hour) are below the Significant Impact Level (SIL) for those pollutants. In accordance with the EPA document *Guideline on Air Quality Models* (EPA 1999), no further analysis of these pollutants (i.e., Class I impacts and increment consumption), for the specified averaging times, is required under the PSD regulations. The maximum predicted ambient concentrations for NO_x (annual), SO_2 (3-hour), and PM_{10} (24-hour and annual) are above the corresponding SIL. There are no promulgated SILs for lead (Pb). None of the predicted maximum ambient-pollutant concentrations exceeded the corresponding PSD Class II degradation increment or the NAAQS.

Table 4-2
Maximum Predicted Air Quality Impacts from the Proposed Action Alternative

Pollutant	Averaging Period	Maximum Modeled Conc. (µg/m³)	Distance km (mi)	Bearing (Deg.)	SIL (µg/m³)	Percent of SIL	PSD Class II Increment (µg/m³)	Percent of Incr.	NAAQS (µg/m³)	Percent of Ambient Standard
Nitrogen dioxide (NO_2)	Annual	4.758	0.4 mi (0.6 km)	193	1	476	25	19	100	5
Sulfur dioxide (SO_2)	3-hour	30.505	3.5 mi (5.7 km)	279	25	122	512	6	1,300	2
	24-hour	3.193	3.5 mi (5.7 km)	279	5	64	91	4	365	1
	Annual	0.413	6.0 mi (9.6 km)	19	1	41	20	2	80	1
PM_{10}	24-hour	14.450	0.6 mi (1.0 km)	80	5	289	30	48	150	10
	Annual	3.722	0.4 mi (0.6 km)	193	1	372	17	22	Revoked	NA
Carbon monoxide (CO)	1-hour	107.480	3.5 mi (5.7 km)	279	2,000	5	NA	NA	40,000	0.3
	8-hour	28.951	0.4 mi (0.6 km)	200	500	6	NA	NA	10,000	0.3
Lead (Pb)	Quarterly	0.011	3.5 mi (5.7 km)	279	NA	NA	NA	NA	1.5	1

SOURCE: ENSR Corporation 2007a
NOTES: µg/m³ = micrograms per cubic meter
Conc. = concentration
mi = mile
km = kilometer
Deg. = degree
SIL = significant impact level
PSD = Prevention of Significant Deterioration
Incr. = increment
NAAQS = National Ambient Air Quality Standards
PM_{10} = particulate matter with aerodynamic diameter less than 10 microns
NA = not applicable
Nitrogen dioxide (NO_2) is one type of nitrogen oxide (NO_x); NO_x is a general term for all oxides of nitrogen.

Mercury emissions are estimated to total approximately 0.098 tons per year. This figure was calculated based on maximum expected mercury concentration in coal of 0.15 parts per million (ppm) and the assumption that 80 percent control of mercury would be achieved by the proposed project, as further detailed in Appendix 5 of the PSD application (ENSR 2006a). The 0.15 ppm mercury concentration in the coal was provided by a fuel data specification sheet from Utility Engineering. The 0.15 ppm concentration is the maximum expected value over the range of fuels. The mercury value of the coal was multiplied by the maximum annual boiler-firing rate, assuming 6,048 million British thermal units per hour 8,760 hours per year, with a coal heating value of 8,078 British thermal units per pound (the lower heating value of the coal, as identified on the Utility Engineering fuel data specification sheet) and an 80-percent control efficiency from the control equipment (ENSR 2007b). These values provide a conservative estimate of the mercury emission rate, since they account for maximum boiler operation and no boiler downtime.

The mercury deposition modeling analysis utilized the AERMOD model, which has specialized routines to simulate vaporous and particulate deposition of primary pollutants. AERMOD has commonly been applied in conducting risk assessments for combustion sources. Mercury is present in both vaporous and particulate form, for which the deposition mechanisms vary. A fraction of the mercury would be emitted in particulate form because it condenses on the surface of pre-existing particulates in the flue gas, and the balance is emitted as vapor. AERMOD was run twice to estimate the contribution to the total mercury deposition from each form. For the analysis, it was assumed that, of the total mercury emitted from the stack, 80 percent would be in vaporous form and 20 percent would adhere to particulates, which is recommended by the EPA Office of Solid Waste as a conservative approach (Office of Solid Waste 1998).

AERMOD was run to generate annual average deposition rates for mercury in both vaporous and particulate form at each modeled receptor. These deposition rates were then summed to estimate the total mercury deposition at each receptor in units of grams per square meter per year (grams/m^2/yr). Modeled mercury deposition ranged from $1.0E^{-6}$ to $1.2E^{-5}$ g/m^2/yr within the 40-km radius. The highest modeled deposition rate occurred approximately 3.25 miles (5.2 kilometers) northeast of the proposed power plant (ENSR 2007c). This information is evaluated further in Section 4.12 in terms of potential effects on biological resources.

4.7.3.2 Mitigation

Construction Emissions

Refer to Section 4.7.2.2 of this document, as the mitigation measures for the Proposed Action Alternative would be the same as those for the No-Action Alternative.

Plant Operations

The air pollution controls proposed for the power plant include low-NO_x burners, selective catalytic reduction (SCR), a baghouse, and wet scrubbers. Refer to Appendix D for further technical details.

4.7.4 <u>Summary of Impacts</u>

During construction, both the No-Action and Proposed Action alternatives would result in temporary and localized increases in ambient air concentrations of NO_x, CO, SO_2, PM_{10}, particulate matter with aerodynamic diameter less than 2.5 microns ($PM_{2.5}$), and volatile organic compounds (VOCs) from exhaust emissions of worker vehicles, heavy construction equipment, diesel generators and other machinery and tools. In addition, fugitive-dust emissions would result from vehicular travel on unpaved ground surfaces and from excavation and earthmoving activity. The No-Action Alternative is associated with fewer of these types of impacts, because it would not require construction of the rail line included under the Proposed Action Alternative. These impacts would be mitigated through measures such as wet suppression, use of gravel on unpaved surfaces, and travel and speed restrictions.

The operation of the plant under either alternative would cause criteria pollutant emissions. The Proposed Action Alternative would result in higher emissions of SO_2, PM_{10}, NO_x, CO, and Pb during plant operations. Under either alternative, none of the maximum predicted impacts from plant emissions would exceed the PSD Class II increments (the maximum allowable ambient air quality deterioration allowed under the PSD program) or the NAAQS (the pollutant concentrations below which no adverse human health or environmental impacts would occur).

Table 4-3 compares the maximum emissions due to construction activities from the No-Action and Proposed Action alternatives. The emissions of CO, NO_x, and PM_{10} would be greater for the Proposed Action Alternative due to construction of the rail line. The majority of the PM_{10} emissions (approximately 99 percent) would be due to earthmoving activities. Since these emissions would occur at ground level, it is unlikely that the emissions would be transported more than a few kilometers, except on unusually windy days. In addition, all of these emissions would be temporary, spatially distributed over a large area, and spread out over construction schedules ranging from 6 to 50 months. The mitigation measures would be expected to reduce these impacts.

Table 4-3
Comparison of Maximum Pollutant Emissions for the Duration of Construction Activities

Criteria Pollutant	No-Action Alternative[1] (1,100-MW Plant) (tons)	Proposed Action Alternative[2] (750-MW Plant) (tons)
Carbon monoxide (CO)	24.7	486.2
Nitrogen oxides (NO_x)	115.7	1,657.2
Sulfur dioxide (SO_2)	17.8	1.5
PM_{10}	399.3	1,795.9

SOURCES: [1] URS calculations (based on Bureau of Land Management 2003a)
[2] ENSR Corporation 2006a

NOTES: Construction activities and duration of project elements vary.
MW = megawatt
PM_{10} = particulate matter less than 10 microns in diameter

Table 4-4 compares the maximum emissions due to plant operations from the No-Action and Proposed Action alternatives. Consequently, the total annual emissions of VOC, CO, NO_x, SO_2, and PM_{10} for the No-Action Alternative would be less than estimated for the Proposed Action Alternative. The Proposed Action Alternative would have lower efficiency and higher emissions per unit of power produced.

Table 4-4
Comparison of Maximum Pollutant Emissions from Plant Operations

Criteria Pollutant	No-Action Alternative[1] (1,100-MW Plant) (tons)	Proposed Action Alternative[2] (750-MW Plant) (tons)
Volatile organic compounds (VOC)	79	82
Carbon monoxide (CO)	967	2,656
Nitrogen oxides (NO_x)	356	1,614
Sulfur dioxide (SO_2)	202	1,352
PM_{10}	435	875
Hazardous air pollutants (HAPs)	19.4	87.1

SOURCE: [1] Bureau of Land Management 2003a
[2] ENSR Corporation 2006a
NOTES: MW = megawatt
PM_{10} = particulate matter less than or equal to 10 microns

4.8 NOISE

4.8.1 Methods

An assessment of the potential for a project to result in adverse noise or vibration impacts requires an evaluation of the basic components listed in Section 3.8.1.

4.8.2 No-Action Alternative

4.8.2.1 Impacts

No noise-sensitive receptors would be close enough to the plant to be adversely affected.

4.8.2.2 Mitigation

Mitigation would not be required.

4.8.3 Proposed Action Alternative

4.8.3.1 Impacts

The proposed coal-fired power plant would have a different and larger site plan than the previously analyzed gas-fired plant to accommodate the coal and coal-handling facilities that would provide additional noise sources. The overall acoustic emission from the 750-megawatt (MW) plant, including the coal-processing facilities, is estimated to be approximately equal to those associated with the higher-power-output (1,100-MW) plant. Therefore, the power generation facilities would create an equal or smaller acoustical footprint than the No-Action Alternative. Additionally, no noise- or vibration-sensitive receptors are located in proximity to the additional machinery associated with onsite movement and unloading of the coal-supply train (e.g., shakeout); transport and on site stockpiling of coal, limestone or other materials; mechanized processing (e.g., pulverization, onsite conveyance) of materials.

During final construction, a method used to clean piping and testing called “steam blows” can produce noise as loud as 130 A-weighted decibels (dBA) at a distance of 100 feet. A steam blow results when high-pressure steam is allowed to escape into the atmosphere through the steam piping to clean it. A series of short steam blows, lasting 2 or 3 minutes each, would be performed several times daily over a period of 2 or 3 weeks. Steam blows are necessary after erection and assembly of the feedwater and steam systems because the piping and tubing that comprise the steam path accumulate dirt, rust, scale, and construction debris. Steam blows prevent debris from entering the steam turbine

This 31-mile-long rail line would traverse areas not previously evaluated regarding noise or vibration issues. This rail line is proposed to operate one full and one empty train per day (a total of two train pass-bys per day). The trains typically would consist of two to three locomotives and 80 to 100 railcars.

The throttle setting of the locomotive was assumed to be in notch 8, a very typical setting. There are no noise- or vibration-sensitive uses in proximity to the rail line, except possibly in the vicinity of the proposed rail line's connection to the existing UPRR line, where train activity on the mainline track presently contributes to elevated sound levels. Through use of the Federal Railroad Administration/ Federal Transit Administration screening methodologies, it was determined that no sensitive uses are present in the vicinity of the project's power generation facility or along the proposed rail alignment; therefore, they are not close enough to be affected by project noise or vibration. The train speed would average 30 miles per hour with a maximum speed of 45 miles per hour. Because there are no public-highway and one at-grade railroad crossings along the project route, the sounding of the locomotive warning horn would be rare and would not contribute to the ordinary noise emission of the trains.

The Section of Environmental Analysis of the U.S. Surface Transportation Board assesses the potential noise effects from future train operations. They study whether predicted noise levels at noise-sensitive receptors (if any) along the rail routes under consideration would exceed 65 dBA, based on the Day-Night Average Sound Level (L_{dn}), and whether those receptors would experience a 3 dBA or greater increase above existing noise levels. However, even if sensitive uses were present, modeling of the potential railroad noise emissions (away from the junction with the UPRR line) indicate that 65 dBA L_{dn} would occur only within 50 feet of the new rail line, and at distances greater than 200 feet, the average sound level of 55 dBA is not exceeded, which is the EPA-recommended noise level for sensitive land. The additional project train would not cause a 3-dBA increase in the existing L_{dn} near the existing line under any circumstances. No noise-sensitive receptors would be close enough to the plant to be adversely affected.

4.8.3.2 Mitigation

Steam blows would be limited to daytime hours. The piping would be equipped with a silencer that would reduce noise levels by 20 dBA to 30 dBA.

4.8.4 Summary of Impacts

No noise or vibration impacts are expected due to the lack of noise-sensitive receptors and the low volume of train traffic along the rail line.

4.9 GEOLOGY, SOILS, AND MINERALS

4.9.1 Methods

The environmental consequences resulting from implementation of the No-Action Alternative or the Proposed Action Alternative are identified and measured by comparing the current conditions described in Chapter 3 to the conditions that would be expected after implementation of the action. Field visits and review of topographic and geologic maps and aerial photography were performed to assess the geology of the project area. The impacts on geology, soils, and mineral resources are characterized by a description of the impact, including the location of the impact and the type of impact (how the resource is affected). Impacts are characterized further by quantifying the impact by area or acreage, where possible. Two categories of disturbance were evaluated—temporary disturbance and long-term disturbance. Temporary disturbance are areas impacted only during construction activities, and long-term disturbance refers to those areas impacted during the operation of the project.

4.9.2 <u>No-Action Alternative</u>

4.9.2.1 Impacts

Geology

There are no unique geologic features or geologic resources within the project area that would be impacted by construction of the power plant (BLM 2003a). Groundwater withdrawal to meet the water requirements of the proposed project would not affect important geological features in the area. Since groundwater pumping would occur in the deep carbonate rock aquifer rather than valley fill deposits, these activities would not be expected to contribute to land subsidence in the area.

Soils

The No-Action Alternative would result in soil disturbance on approximately 963 acres at the power plant site and on all construction rights-of-way. Because the project is designed to minimize disturbance to soils and temporary rights-of-way would be reclaimed, 199 acres would be impacted in the long term by the construction of project facilities. Temporary impacts would include removal and disruption of surface soils over a broad area, including equipment and material staging areas, railroad alignment, access road, and the facility footprint. Temporary impacts due to stormwater exposure or construction activities could be mitigated using best management practices for erosion containment of sediments. Permanent impacts from stormwater and construction events could be mitigated through facility design parameters including stormwater-flow-control and erosion-control structures. By implementing standard best management practices for construction activities and long-term facility operations, the impact to soils and the geology could be minimized.

Soils at the project area are predominately Mormon Mountain, Mormon Mesa, Tule Desert, and Toquop Wash fine sandy and silty loams. Increased and concentrated runoff of stormwater from the project facilities on the power plant site would have some minimal impact on erosion of these soils at discharge locations. Over time, channeling of runoff would cause downward and head-ward erosion of soils due to the moderate permeability of the loam. The depth of this erosion would likely be limited, however, by shallow caliche present beneath areas of the proposed project. Impacts to the younger and older alluvium and the Muddy Creek Formation, typified by horizontal units of bedded sands, silts, and sandy/clayey silts with layers of coarse sands and gravels, would be limited by the presence of the caliche.

During project construction, the disturbances to soil may result in temporary increases in wind-blown dust and erosion. When construction is completed, the implementation of best management practices and standard operating procedures would mitigate impacts to soils (see Section 4.9.2.2). Increased soil disturbance may result from paving the access road, which would increase the potential for localized runoff and erosion and would allow access by OHVs, and therefore disturbance, to more areas.

Poor soil development in the arid climate, and natural surface erosion by wind and water, are conducive to the formation of biological soil crusts: cryptogrammic soil that consists of algae and bacteria masses that slowly form a congealing crust on loose sand and silt on the ground surface, forming the first stage of a soil horizon. If disturbance areas include biological soil crusts, its loss would be a permanent and direct impact because it is slow to form, fragile, and easily damaged or destroyed during construction.

Minerals

Although there are known mineral deposits and mining claims in nearby mountains, and there are fluid-mineral leases southeast of the plant site, there are no known mineral resources, mining claims, or leaseholds in the area that would be disturbed by construction of the project. Future conditions for mineral resources are expected to be the same as current conditions because of the limited resource potential in the project area. Thus, there would be no impacts to mineral resources or resource uses within the project area.

4.9.2.2 Mitigation

Some soil would be disturbed during construction, but most areas would be reclaimed. Note that best management practices and mitigation measures identified under biological resources (for vegetation) would have coincident beneficial effects on soils by mitigating loss of vegetative cover.

The 2003 EIS identified the following measures as standard operating procedures that would be implemented as part of the No-Action Alternative:

- Mitigating the disturbance to biological soil crust in construction areas could be warranted as part of permitting and site reclamation activities. A pre-construction survey would identify and map areas having biological soil crust. Prior to construction, these areas could be protected by fencing or the relocation of certain plant-site facilities to minimize impacts to soil crust. Methods to reclaim or restore damaged biological soil crust also could be researched and implemented where practical.
- Planting native grasses, forbes, trees, or shrubs beneficial to wildlife, or placing riprap and other materials as appropriate, would be used to prevent and minimize the potential for erosion and siltation during construction of project features and during the period needed to reestablish permanent vegetative cover on disturbed sites. Sediment fences would be used where appropriate to limit wind and water erosion, and water trucks would be used in disturbed areas during construction to limit wind erosion.
- Final erosion control and site restoration measures would be initiated as soon as a particular area is no longer needed for construction, stockpiling, and access. Clearing schedules will be arranged to minimize exposure of soils.
- Cuts and fills for access roads and utility corridors would be sloped to prevent landslides and to facilitate revegetation.
- Signs would be placed along the access road to discourage OHV use of adjacent areas.
- Borrow areas would be contoured and shaped to carry the natural contour of adjacent undisturbed terrain into the borrow area.
- Soil or rock stockpiles, excavated materials, or excess soil materials would not be placed near sensitive habitats, including washes, where they might erode into these habitats or be washed away by high water or storm runoff. Plastic would be placed over stockpiles to prevent wind erosion if the stockpiles would be intended for long-term use. Waste piles would be revegetated using suitable native species after they had been shaped to provide a natural appearance.
- Treading on areas that are not immediately involved in project construction activities would be avoided to reduce potential wind erosion and fugitive dust generated during construction.

4.9.3 Proposed Action Alternative

4.9.3.1 Impacts

Geology

Impacts would be the same as the No-Action Alternative.

Soils

Soils at the project area are predominately Mormon Mountain, Mormon Mesa, Tule Desert, and Toquop Wash fine sandy and silty loams. Increased and concentrated runoff of stormwater from the project facilities on the power plant site would have some minimal impact to erosion of these soils at discharge locations. Over time, channeling of runoff would cause downward and head-ward erosion of soils due to the moderate permeability of the loam. The depth of this erosion would likely be limited, however, by shallow caliche present beneath areas of the proposed project. Impacts to the younger and older alluvium and the Muddy Creek Formation, typified by horizontal units of bedded sands, silts, and sandy/clayey silts with layers of coarse sands and gravels, would be limited by the presence of the caliche.

The types of impacts would be the same as described for the No-Action Alternative. Because an additional 1,073 acres would be disturbed during construction at the plant site and along the rail line, there would be more wind-blown dust and erosion compared to the No-Action Alternative, and more acreage with the potential for long-term soil damage to biological soil crusts.

The common soil types in the disturbed areas are Mormon Mesa Series at the plant site and along the rail line north to Toquop Gap; Aymate-Canutio and Geta-Arizo Associations along the rail line between Toquop Gap and Rainbow Pass; and Cave-Tencee Association along the rail line from Rainbow Pass to Leith Siding (U.S. Department of Agriculture 1980; National Resource Conservation Service 1990). Most of these soil types have a characteristic hardpan (caliche horizon) at depths from 10 to 36 inches. There could be restrictions on construction activities where deeper excavations occur and encounter the hardpan layer, such as for pipelines and subgrade features (BLM 2003a). However, the construction activities would not have an adverse effect on hardpan soils.

Minerals

Mining claims are located adjacent to the plant site and along the area of the proposed rail line, but there are no active mining operations near or within the proposed areas of disturbance. Future conditions for mineral resources are expected to be the same as current conditions because of the limited resource potential in the project area. There is some potential for the new access road to provide greater access to nearby mineral deposits. There also may be an increase in local demand for mineral materials for construction of the power plant. Thus, there may be minor impacts to mineral resources, particularly mineral materials, or their uses within the project area.

4.9.3.2 Mitigation

Mitigation would be the same as the No-Action Alternative.

4.9.4 Summary of Impacts

Impacts on soils related to disturbance during construction and operation of the Proposed Action Alternative would be mitigated through survey for biological soil crusts, as well as measures to reduce erosion potential.

No impacts on geologic or minerals resources are anticipated.

4.10 GROUNDWATER RESOURCES

4.10.1 Methods

Impacts on groundwater resources are characterized by a description of the impact, including the geographic area of the impact, and how the resource would be affected. Impacts are measured by changes in aquifer levels and water quality. The impacts not only included the potential project-induced effects on groundwater resources, but also the potential project-induced effects on springs and surface-water bodies.

Much of the information for this groundwater section is drawn directly from the 2003 EIS. No new data were generated for this EIS. It is currently recognized, as it was then, that there is a lack of data in three principal areas associated with the assessment of the environmental consequences to groundwater resources:

- The amount and movement of groundwater in the basin-filled deposits within the Tule Desert and Clover Valley.
- The amount and movement of groundwater in the fractured-rock aquifer underlying the Tule Desert, Clover Valley, and Virgin River Valley hydrographic areas.
- The location and amount of groundwater discharge and recharge from the fractured-rock aquifer underlying the Tule Desert and Clover Valley.

This lack of data may lead to differences in scientific opinion on the degree of potential environmental consequences both to groundwater resources and to flows in the Virgin River Valley as a result of implementation of any of the alternatives.

4.10.2 No-Action Alternative

4.10.2.1 Impacts

The 2003 EIS evaluated the potential impacts associated with pumping groundwater from the Tule Desert hydrographic basin to supply up to 7,000 acre-feet of water per year (af/yr) for 42 years to the permitted gas-fired generating plant project. An assessment of environmental impacts to groundwater resources and to the relationship between withdrawing groundwater in the Tule Desert and flows in the Virgin River was completed to support the 2003 EIS. The analysis and discussion is presented in the separate *Water Resources Technical Report* (CH2M HILL 2002a) on the regional and local hydrogeology for the 2003 EIS for the Toquop Energy Project.

It was determined through analysis in the 2003 EIS that pumping water from the fractured-rock aquifer in the Tule Desert in the amount and at rates necessary to serve the permitted gas-fired generating plant would not result in a substantial decline of groundwater levels or a significant reduction in groundwater resources. Groundwater levels in the Tule Desert would be lowered as a result of project pumping, but not to the extent that a significant reduction in the amount of available groundwater resources would occur. Pumping outside of the Tule Desert, specifically in the Virgin River Valley hydrographic area, would not result in changes to groundwater levels.

Based on aquifer test results and an analysis to estimate potential water-level decline (drawdown) presented in CH2M HILL (2002b), groundwater levels, within a radius of about 1,000 feet from a representative production well in the Tule Desert, would be lowered approximately 45 feet. The maximum amount of drawdown or water-level decline would remain above the top of the fractured-rock aquifer. No dewatering of the fractured-rock aquifer would occur at a pumping rate of 1,100 gallons per minute (1774.4 af/yr).

The same representative well would draw down the groundwater level 0.5 foot at a distance of roughly 1.5 miles in all directions from the well. Farther away from the well, or at distances greater than 1.5 miles from the well, water-level declines would be less than 0.5 foot. It was determined in the 2003 EIS that project pumping would not result in a substantial water-level decline outside of the Tule Desert because the well field would be designed so that the wells would be (1) spaced far enough apart to minimize additive effects on drawdown and (2) located at least 1.5 miles from the edge of the Virgin River Valley hydrographic area.

These results can be explained by the physical properties of the Tule Desert fractured-rock aquifer. The aquifer is characterized by a steep lateral hydraulic gradient. This is indicative of the relatively poor ability of the Tule Desert fractured-rock aquifer to transmit groundwater; it also limits the distance from a pumping well that would be affected by water-level declines. Additionally, the steep gradient means that most of the water entering the proposed supply wells would do so from the upgradient direction (from an area of higher elevation or from the north in the Tule Desert), causing the water-level declines to be less at a similar distance south of the production wells toward the downgradient (or lower elevation) Virgin River Valley.

Analysis conducted for the 2003 EIS indicated that the amount of annual groundwater flow through an approximately 4-mile-wide portion of the basin within the fractured-rock aquifer was approximately 6,500 af/yr, slightly less than the amount of water required for the gas-fired generating plant (up to 7,000 af/yr).

In the Tule Desert basin-fill deposits, the actual extent of groundwater-level decline that would be caused by project pumping is unknown because of the aquifer's complexity and limited available data. However, the amount of groundwater decline in the basin-fill aquifer would be no greater than estimated for the fractured-rock aquifer, and most likely would be considerably less based on the low ability of the basin-fill deposits to transmit water and because groundwater in the basin fill is assumed to be unconfined.

The results of the analysis previously conducted by CH2M HILL (2002a) indicate that No-Action Alternative pumping in the Tule Desert would not result in either substantial groundwater declines or a substantial loss of groundwater resources within the Virgin River Valley. This is very important because groundwater is a critical source of water for municipalities and agriculture in the region. As presented by Dixon and Katzer (2002), the available perennial yield in the lower Virgin River Valley is approximately 40,000 af/yr, even after the current local pumping in the valley, reported to be about 12,000 af/yr, is taken into account. Furthermore, the volume of groundwater in storage in the upper 100 feet of saturated sediments in the Virgin River Valley is estimated to be approximately 3 million acre-feet. Even in the absence of perennial yield, this much water in storage effectively mitigates the extent of water-level decline caused by local pumping.

Notably, based upon radiocarbon dating (carbon 14) data from the fractured-rock aquifer in the Tule Desert with the available data from municipal wells in the Virgin River Valley, it is clear that the age of the groundwater differs significantly between the two areas. This implies a different water source for each water type. Pumping in the Tule Desert, therefore, would not affect the existing municipal wells in the Virgin River Valley because they have independent sources.

Spring Discharge

Assessment of spring discharge for the 2003 EIS indicated that pumping water from the fractured-rock aquifer in the Tule Desert in the amount and rates necessary to serve the No-Action Alternative would not result in a change in the flows of springs in the hills and mountains that rim the Tule Desert. The elevations of all the local springs are several hundred feet above the local and regional groundwater levels. This indicates that the springs are not connected to the groundwater systems of the Tule Desert.

Groundwater Quality

Groundwater quality in the fractured-rock aquifer of the Tule Desert would not be degraded as a result of the No-Action Alternative. The quality of the groundwater in the fractured-rock aquifer of the Tule Desert is likely to be highly variable across the basin because of the different compositions of the rock types (e.g., limestone or volcanic rocks). As a result, the quality of the groundwater pumped in the Tule Desert could change over time as groundwater flows from different rock types to the wells and as the influence of the specific fractures that contribute groundwater to the wells changes. These potential changes in the quality of the water pumped, however, would not imply degradation in water quality of the aquifer.

The temporary handling and storage of potential chemical substances and waste products have a slight potential to affect groundwater quality adversely at the plant location should there be a release of these substances to the environment. The potential for groundwater-quality degradation is minimal, however, because the climate is arid, which reduces the potential for infiltration of chemicals into the ground, and because the depths of the groundwater are in the range of several hundred feet.

Flow in the Virgin River

There would be no impact to the flow in the Virgin River due to pumping in the Tule Desert with this alternative. The Virgin River is not recharged by regional groundwater systems as it flows into Lake Mead.

4.10.2.2 Mitigation

No mitigation would be required.

4.10.3 Proposed Action Alternative

4.10.3.1 Impacts

Under this alternative, the demand for water would be 2,500 af/yr which is substantially less than that required for the No-Action Alternative. Based on the results of the 2002 analysis by CH2M HILL, the effects of utilization of 7,000 af/yr of groundwater from the Tule Desert were reviewed in the 2003 EIS and determined to be minimal. Therefore, the effects on the drawdown for the Proposed Action Alternative would be proportionately less than for the No-Action Alternative. The analysis conducted for the 2003 EIS indicated that the amount of annual groundwater flow through a 4-mile wide portion of the basin within the fractured-rock aquifer was approximately 6,500 af/yr, substantially more than the amount of water required for the coal-fired generating plant (only 2,500 af/yr).

Although not established at this time, there is also the possibility that water for the proposed power plant would be drawn from the Clover Valley, as the pipeline from the Lincoln County Land Act Water Development Project would commingle water from the Tule Desert and Clover Valley. Available information on local hydrogeology of the Clover Valley is limited. To date, no studies have been done to identify the location and amount of groundwater recharge and discharge from the fractured-rock aquifer and its interconnection with overlying basin-fill in the area. In the absence of this site-specific information, the results of modeling analysis for Tule Desert well field were used to consider the potential impacts from drawdown (BLM 2007c). The drawdown analysis for the Tule Desert well field was based on four wells, each pumping 1,100 gallons per minute (gpm), which translates to 1,774 af/yr. The proposed pumping rate in Clover Valley would be lower-approximately 1,450 af/yr from each well. Besides the pumping rate, the magnitude and extent of drawdown is also dependent on hydraulic characteristics of the aquifer, recharge and discharge locations, confining zones, and other boundary conditions. Assuming comparable hydrogeologic conditions in the Clover Valley, the effects of drawdown may be similarly limited to distance of 1.5 mile from the pumping well. The impacts of groundwater pumping will be addressed in more detail in a Draft EIS for the Lincoln County Land Act Groundwater Development Project, which is the probable water source for the Toquop Energy Project.

There are no current users of groundwater from the fractured-rock aquifer within 1.5 mile of the wells that are proposed as part of the Lincoln County Land Act Groundwater Development Project in either the Tule Desert or Clover Valley. Therefore, no impacts on local users are expected to result from the groundwater pumping that would support the proposed power plant.

Groundwater levels in the basin fill are generally several hundred feet deep (CH2M HILL 2002a), and therefore no impacts to the groundwater resources resulting from surface disturbances due to construction of the coal-fired generating plant and proposed rail line would occur. Similar to the No-Action Alternative, the temporary handling and storage of potential chemical substances and waste products have the potential to affect groundwater quality adversely at the plant location should there be a release of these substances to the environment. However, a Stormwater Pollution Prevention Plan would be prepared in advance of construction. Stormwater runoff would be managed to ensure a zero-discharge facility, and to meet requirements of the U.S. Army Corps of Engineers (USACE).

4.10.3.2 Mitigation

No mitigation would be required. Under the Nevada Revised Statutes, the Nevada State Engineer governs well drilling within the state and would evaluate and issue permits to appropriate groundwater. Additional consideration or mitigation may be applied to the Lincoln County Land Groundwater Development Project through that process, or through the National Environmental Policy Act (NEPA) process that is underway for that project.

4.10.4 Summary of Impacts

It was determined through analysis in the 2003 EIS that pumping water from the fractured-rock aquifer in the Tule Desert in the amount and at rates necessary to serve the permitted gas-fired generating plant would not result in substantial declines in groundwater levels or in a significant reduction in the amount of available groundwater. Groundwater levels in the Tule Desert would be lowered as a result of project pumping, but not to the extent that a substantial depletion of groundwater resources would occur. The Proposed Action Alternative would be expected to have a comparatively smaller effect (i.e., 2,500 af/yr compared to 7,000 af/yr) on groundwater resources, since substantially fewer acre-feet of water would be required each year. The Lincoln County Land Act Groundwater Development Project Draft EIS will provide additional information on potential impacts.

4.11 SURFACE WATER RESOURCES

4.11.1 Methods

Field visits and review of various topographic and geologic maps and aerial photographs of the project area were performed to assess the site-specific surface topography within the project area. In general, Meadow Valley and Toquop Valley are southerly trending topographic lows surrounded by mountains or hills to the north, east, and west, with numerous small and larger meandering washes including Meadow Valley Wash and Toquop Wash. In evaluating the impacts on surface water, two categories of disturbance were evaluated: temporary disturbance areas and permanent disturbance areas. Temporary disturbance areas refer to those areas impacted only during construction activities, such as lay-down areas for construction supplies. Permanent disturbance areas refer to those areas impacted during the operation of the proposed power plant, such as the railroad, plant facilities, and access road. It should be noted that potential impacts evaluated under these two categories of disturbance would only occur if sufficient direct rainfall occurs.

Impacts to wetlands, riparian areas, floodplains and waters of the United States were assessed quantitatively and qualitatively based on a review of available resource data and field surveys. There are no wetlands (as defined by USACE) in the project area that would be affected by any of the alternatives. Geographic information system analysis was used to determine the acreage of potential jurisdictional waters impacted by the alternatives.

4.11.2 No-Action Alternative

4.11.2.1 Impacts

Although annual rainfall amounts are less than 10 inches per year, locally high-intensity rainfall events could cause the local ephemeral or intermittent washes in the project area to carry high volumes of runoff for brief periods of time. There are limited features of all alternatives that would be located within a Zone D flood area (undetermined flood hazards) as designated by the Federal Emergency Management Agency.

The flooding potential, however, results mainly from flows in secondary and tertiary ephemeral washes and not from flash flows in either the Toquop Wash or the South Fork Toquop Wash, the two principal ephemeral surface-water drainages in the project area. This conclusion is based on the fact that each of these larger washes has cut deep canyons or arroyos within the project area that are anticipated to contain flows that correspond to a maximum 100-year runoff events.

Six small, unnamed washes cross the power plant site. The specific disturbed area where the plant structures would be constructed straddles one of these ephemeral washes. That particular wash would, therefore, be filled and its watercourse diverted to one or more adjacent washes. As a result, the amount and rate of flow in the washes that receive the diverted flow would increase when local rainfall amounts are great enough to generate runoff.

Construction of a power plant under any of the alternatives would create areas that are impervious (covered by impermeable surfaces such as roofs, roads, or parking areas), which would increase the amount and rate of flow of runoff from local storms. The total power plant area that would be rendered impervious would be approximately 15 acres.

During both construction and operation, the linear facilities associated with the permitted power plant (such as roads, utility corridors, water pipeline, and electricity to the well field) would not affect the ephemeral washes they cross. Utilities would be buried under washes deeply enough that they would not be affected by floods or erosion. Access roads crossing washes would use culverts to channel stormwaters under the roads. They would be appropriately sized according to local requirements.

The wellhead structures associated with each well would occupy an area of 1 acre or less within the Tule Desert and would be located away from any ephemeral washes and other low-lying areas susceptible to flooding. The impervious area around each well would be small (less than 300 square feet). Construction and operation of the well field in the Tule Desert would not have any perceptible affect on surface-water hydrology.

Jurisdictional Waters

The No-Action Alternative would affect a number of named and unnamed ephemeral washes. Named ephemeral washes that would be affected by the No-Action Alternative include Halfway Wash, Toquop Wash, South Fork Toquop Wash, and Sam's Camp Wash. Grady McNure of the USACE reviewed the jurisdictional delineations of the waters of the United States during a site visit and consultation on November 14, 2002. It was determined that the access road, the power plant site, and the water line associated with the No-Action Alternative would impact a total of approximately 0.8 acre of jurisdictional waters in the form of named and unnamed ephemeral washes.

Potential for Surface-Water Quality Degradation

Both construction and operation of the power plant would provide the opportunity potentially to affect the surface-water quality of the local washes and, in turn, the Virgin River. Water quality in the washes could be degraded by the addition of both suspended solids (sediment) and dissolved constituents (substances commonly found in stormwater runoff from parking lots and industrial areas).

During construction, earthmoving activities could increase the potential for erosion from precipitation, which in turn, would contribute additional suspended solids (sediment load) to the runoff in the local washes. During operation, diverted runoff from the wash that would be filled in to accommodate construction of the power plant could increase the potential for erosion, and, therefore, result in increased sediment loads in the receiving washes. Additionally, runoff from parking surfaces and possibly areas where plant equipment could come in contact with precipitation could add low concentrations of dissolved petroleum hydrocarbons, metals, and possibly other substances in negligible quantities to runoff to local washes. With implementation of the mitigation measures identified in the 2003 EIS, Appendix B (see Section 4.11.2.2 below), no impacts to surface-water quality are anticipated from the utilities that link the well field to the permitted power plant site or from the development and operation of the well field.

4.11.2.2 Mitigation

The 2003 EIS identified the following measures as standard operating procedures that would be implemented as part of the No-Action Alternative:

Construction activities would be scheduled to avoid exposure to flash flood waters to minimize the exposure of personnel and equipment.

A groundwater monitoring plan would be developed by the project proponent and approved by BLM. Results of monitoring would be provided to U.S. Fish and Wildlife Service (USFWS) and the Nevada State Engineer annually.

Pumped groundwater would be monitored periodically to ensure its quality is suitable for power plant operation.

All Federal and state laws related to control and abatement of water pollution would be complied with. All waste material and sewage from construction activities or project-related features would be disposed of according to Federal and state pollution-control regulations.

Activity with a high potential for causing sediment movement into washes would not be conducted during potentially high runoff periods, typically during July and August.

All disturbed ephemeral washes considered to be jurisdictional waters would be reclaimed as soon as possible according to the conditions of a Section 404 Clean Water Act permit. The highest standards for aesthetic value would be adhered to during restoration of the washbed. Where appropriate and as required by conditions of the Section 404 permit, native species capable of bank stabilization would be used to revegetate all disturbed banks.

Diversion structures would be used to redirect flows from the wash potentially impacted by the southern plant site and would be designed to minimize potential destabilization and erosion of adjacent and downgradient ephemeral washes.

Stormwater management plans would be implemented for project construction and facility operation to minimize and control erosion from stormwater runoff. Stormwater during project construction would be managed in compliance with applicable state and Federal regulations, including compliance with requirements of the National Pollutant Discharge Elimination System stormwater general permits, which would be obtained for the project. Stormwater management elements include the following:

- Application of best management practices for erosion, sedimentation, and stabilization control during construction activities, and management of oils and other substances during operation to minimize contact with stormwater
- Structural controls during operation that could include stabilized stormwater conveyance systems (swales), oil-water separators for runoff that comes in contact with affected power plant site surfaces, and sedimentation detention basins
- Monitoring and maintenance to assure long-term effectiveness of the management system

A stormwater retention basin would be constructed with sufficient dimensions to accommodate runoff from impervious surfaces at the power plant site generated by the local maximum daily rainfall event with a return frequency of 100 years or less. All runoff from the impervious surfaces would be directed to this retention basin prior to being released to the natural drainage system at flow rates equivalent to pre-development conditions. As part of coal-dust mitigation, a surfactant (e.g., Dust Tarbt) would be applied to the coal-storage pile. According to the manufacturer, the surfactants are ecologically safe. Stormwater runoff likely to contain contaminants would flow first to onsite treatment facilities (such as an oil-water separator), as appropriate, prior to being directed to the stormwater retention basin.

Construction specifications would require construction methods that prevent entrance or accidental spillage of pollutants into flowing or dry watercourses and groundwater sources. Potential pollutants and wastes include refuse, garbage, cement, concrete, sewage effluent, industrial waste, oil and other petroleum products, aggregate processing tailings, mineral salts, drilling mud, and thermal pollution.

Any construction wastewater discharged into surface waters would be essentially free of settling material. Wastewater from aggregate processing, concrete batching, or other construction operation would not enter drainages without water quality treatment. Turbidity control methods would include settling ponds, gravel-filter entrapment dikes, recirculation systems for washing aggregates, or other approved methods.

4.11.3 Proposed Action Alternative

4.11.3.1 Impacts

Impacts on the power plant site and Tule Desert well field would be the same as described in the No-Action Alternative. Where the rail line would cross ephemeral washes, bridges and culverts would be used to prevent any modifications to surface-water hydrology. Following a short-term period of increased erosion potential during construction, there should be little or no impact to surface-water hydrology due to construction and operation of the Proposed Action Alternative.

Construction activities could result in the disturbance of soils and possibly young sediments (Muddy Creek Formation). Temporary impacts would include sediment transport across the site and in shallow washes near Toquop Wash. Temporary impacts resulting from sediment uptake in stormwater could be mitigated using best management practices for erosion containment (see Section 4.11.2.2). Permanent impacts from sediment uptake could be mitigated through facility design parameters including stormwater-control and erosion-control structures. By implementing specific temporary and permanent best management practices for construction activities and long-term facility operations, the impact to surface water would be minimized.

In the event that rainfall exceeds a normal 24-hour event or is classified as a 50-year or 100-year flood, there is the potential that surface water at the Virgin River could be impacted by sediment base load and/or suspended or dissolved solids. Construction and facility operational best management practices could be developed to mitigate this possibility.

Jurisdictional Waters of the United States

The power plant site includes 2.2 acres of potential jurisdictional waters of the United States that could be impacted by construction of the Proposed Action Alternative. The proposed rail line would impact 9.6 acres of potential jurisdictional waters during construction and 4.8 acres of potential jurisdictional waters during operations of the rail line. All potential jurisdictional waters impacted would be named and unnamed ephemeral washes, with the exception of the perennially flowing Meadow Valley Wash.

Direct impacts to potential jurisdictional waters would result from construction activities such as vegetation clearing, grading, and deposition of fill materials in the ephemeral washes. Properly sized and engineered culverts or bridges (per USACE guidance) would be installed in the ephemeral washes along the railroad alignment. Therefore, there would be no indirect impacts to the function of the washes.

Construction activities within or near potential jurisdictional waters along the railroad construction ROW may result in the removal or destruction of plant materials or organic growing media, through the deposition of fill material for construction, or by accidental release of hazardous materials into the jurisdictional waters. Such disturbances have the potential to alter permanently the vegetation community within the ephemeral washes and reduce the value of these areas for use by wildlife species.

Because the Proposed Action Alternative would result in the placement of dredge or fill within potential waters of the United States, a detailed jurisdictional determination would need to be submitted to the USACE for concurrence. If the USACE determined that the ephemeral washes within the plant site and the rail line alternative were jurisdictional, permits would need to be obtained prior to construction activities commencing in accordance with Section 404 of the Clean Water Act. As part of that permitting process, in accordance with the Section 404 (b)(1) Guidelines, a detailed evaluation of the Proposed Action Alternative would be required to assess the potential impacts.

Potential for Surface-Water Quality Degradation

The types of impacts on surface-water quality degradation would be the same as described for the No-Action Alternative, although more surface area would be disturbed under the Proposed Action Alternative.

4.11.3.2 Mitigation

Best management practices (identified as standard operating procedures Section 4.11.2.2) would also be applied to the Proposed Action Alternative.

Avoiding, to the extent possible, disturbances within potentially jurisdictional waters would minimize impacts along the rail line. Bridges and culverts would be installed along the rail line to avoid jurisdictional waters. In the areas where avoidance would not be possible, established best management practices and site-specific measures would be developed to minimize the impacts. These minimization and mitigation measures would be developed as part of the consultation process with the USACE in accordance with the Clean Water Act Section 404 permit process. Measures to minimize and mitigate impacts to jurisdictional waters may include onsite measures, such as design modification of culverts and bridges, and restoration of areas identified for short-term use during construction, such as the construction

ROW of the rail line. Offsite mitigation, such as restoration or enhancement of wetlands or wetland mitigation banking, also may be considered if onsite impacts cannot be sufficiently minimized.

4.11.4 Summary of Impacts

The potential for impacts related to stormwater flow and sediment transport would be mitigated through construction of a retention basin and the implementation of best management practices (see Section 4.11.2.2). Jurisdictional waters along the rail line would be avoided through installation of bridges and culverts, and additional mitigation may be identified through consultation with the USACE.

4.12 BIOLOGICAL RESOURCES

4.12.1 Methods

This section presents a discussion of the potential impacts associated with the No-Action and Proposed Action alternatives as they affect biological resources within the project area. In most instances, impacts are categorized and described in general terms without reference to facility type or any site-specific resources. An impact on biological resources would occur if construction and/or operation of the proposed facilities would cause substantial changes to the existing abundance, diversity, distribution, or habitat value of existing plant or animal populations.

4.12.2 No-Action Alternative

4.12.2.1 Impacts

Vegetation

Construction and operation of the proposed natural-gas-fired power plant and associated facilities under the No-Action Alternative would result in direct and indirect impacts to natural vegetation communities within the project area. Direct effects on vegetation would occur from disturbance or removal of vegetation at the power plant site, along access roads, and at the water pipeline and the well field. Vegetation would be removed as a result of surface-disturbing activities associated with blading, grading, vehicular traffic, and trenching. Areas adjacent to the proposed power plant site, access roads, and water pipeline would experience temporary disturbance associated with equipment access, materials, stockpile locations, and workspace requirements. Indirect impacts would include the increased potential for the establishment and spread of invasive and noxious weeds, destruction of biotic soil crusts, exposure of soils to accelerated wind and water erosion, shifts in vegetation community composition, increase in the potential for fires, and loss of biodiversity.

Surface disturbances resulting from construction under the No-Action Alternative would be the least significant of all alternatives considered. Implementation of the No-Action Alternative would result in the direct disturbance of approximately 963 acres of native vegetation. This includes about 782 acres of Sonora-Mojave creosotebush-white bursage desertscrub, 5 acres of Mojave mid-elevation mixed desertscrub, and 1 acre of Sonora-Mojave mixed salt desertscrub (Table 4-5). Following construction, the water pipeline ROW, extra workspace areas, and unused portions of roads would be reclaimed. Thus, under the No-Action Alternative, total permanent vegetation disturbance would be reduced from approximately 963 acres to 199 acres.

Table 4-5
Vegetation Acres Affected by No-Action Alternative

Cover Type	Power Plant		Access Road		Water Pipeline		Rail Line		Well Field (Wells, Roads, Pumps)	
	Temporary Disturbance	Permanent Disturbance	Temporary Disturbance	Permanent Disturbance	Temporary Disturbance	Permanent Disturbance	Temporary Disturbance	Permanent Disturbance	Temporary Disturbance	Permanent Disturbance
Inter-Mountain Basins Semi-Desert shrub steppe	–	–	–	–	–	–	NA	NA	–	–
Mojave mid-elevation mixed Desertscrub	–	–	–	–	4.8	2.4	NA	NA	–	–
North American Warm Desert bedrock cliff and outcrop	–	–	–	0.1	–	–	NA	NA	–	–
North American Warm Desert playa	–	–	–	0.4	–	–	NA	NA	–	–
North American Warm Desert wash	–	–	–	–	0.5	0.3	NA	NA	–	–
Sonora-Mojave creosotebush- white bursage desertscrub	640	100	–	40.2	85.1	42.5	NA	NA	17	12
Sonora-Mojave mixed salt desertscrub	–	–	–	0.8	–	–	NA	NA	–	–
Total acres	640	100	216*	41.5	90.4	45.2	–	–	17	12

SOURCE: Southwest Regional Gap Analysis Project 2004
NOTES: NA = not available
* Spatial data were not available to calculate the acres of vegetation within the construction right-of-way for the access road. However, the 2003 environmental impact statement (Bureau of Land Management 2003a) indicated that a total of 216 acres would be within the temporary construction ROW for the road, and it can be concluded that the greatest proportion of this area would be Sonora-Mojave creosotebush-white bursage desertscrub.

The duration of impacts on vegetation would depend, in part, on the success of mitigation and revegetation efforts and the time needed for natural succession to return revegetated areas to predisturbance conditions. Since recovery in arid environments is extremely slow, this is likely to be on the order of 20 to 30 years for Sonora-Mojave creosotebush-white bursage desertscrub.

Effective reclamation of project-related disturbances would begin after the completion of site cleanup and would be accomplished following the measures identified in Appendix E. The reclamation recommendations presented in Appendix E were developed based on the physical and biological characteristics of the project area as well as on observations of successful reclamation efforts on similar energy development projects. Therefore, assuming these measures are effectively applied, significant impacts that relate to reclamation success are not likely to occur.

Disturbance of vegetation cover would not have appreciable effects because the vegetation types that would be disturbed are common, have high frequencies of occurrence, and have wide distributions. The extent of disturbance to these vegetation types would be expected to decrease with the onset of reclamation efforts on many of the disturbed areas.

Noxious and Invasive Weeds

Construction and operation of the proposed natural-gas-fired power plant, access roads, and waterline would result in direct and indirect impacts to invasive and noxious weed species. Disturbances from construction would increase the potential for the establishment and spread of invasive and noxious weed species. These plants tend to be aggressive colonizers of disturbed areas where the native vegetation has been removed. Therefore, disturbances associated with construction of the proposed power plant, access roads, water pipeline, and well field would provide opportunities for invasive and noxious weeds to quickly establish. Once established, noxious and invasive weeds would increase fuel levels and the potential for increased intensity and numbers of wildfires. Wildfire within the project area, where vegetation is generally intolerant of fire, could potentially lead to mortality of native plant species and transform the vegetation community from native vegetation to non-native grasslands. To minimize the potential for adverse effects from invasive and noxious weed establishment, monitoring for invasive and noxious weeds would be necessary. If noxious weeds were found, control and eradication measures would be implemented as outlined in an integrated pest management plan. Further information is available in the weed risk assessment completed for this project in Appendix C Additional indirect construction-related impacts could include soil compaction, disruption of microphytic crusts, and an increased potential for wind and water erosion of disturbed surfaces prior to reclamation. However, indirect disturbance effects from construction would be reduced to non-significant levels with the implementation of recommended and required mitigation measures.

Wildlife

Construction and operation of the proposed natural-gas-fired power plant, access roads, and waterline would result in direct and indirect impacts on wildlife and wildlife habitats. The principal impacts to terrestrial wildlife likely to be associated with the No-Action Alternative include (1) the loss of certain wildlife habitats due to construction activities such as earthmoving at the plant site and access roads, (2) habitat fragmentation, (3) direct mortality and/or displacement of some wildlife species, and (4) an increase in the potential for illegal killing and harassment of wildlife. The magnitude of impacts on wildlife and wildlife habitats would depend on a number of factors, including the type and duration of disturbance, species of wildlife present, time of year, and implementation of recommended and required mitigation measures.

Implementation of the No-Action Alternative would result in the direct disturbance of 963 acres of wildlife habitat (refer to Table 4-5). Direct disturbance to wildlife habitat includes activities such as ground-surface grading and excavation, tree and shrub removal, and/or scraping of road surfaces that disturbs surface and subsurface soils. Each of these activities could effectively remove and/or degrade existing habitat, thereby reducing its availability to local wildlife populations.

Following construction, the water pipeline right-of-way, extra workspace areas, and unused portions of roads would be reclaimed. These areas would be revegetated with seed mixes approved by BLM, some of which are specifically oriented to enhance wildlife use. The duration of impacts on vegetation would depend, in part, on the success of mitigation and reclamation efforts and the time needed for natural succession to return revegetated areas to predisturbance conditions. Grasses and forbs are expected to become established within the first several years following reclamation; however, an estimated 10 to 20 years would be required for shrub establishment and production of useable forage (Environmental Studies Board 1974; Fisser 1981; Plummer et al. 1968; Wasser and Shoemaker 1982). Thus, under the No-Action Alternative, total vegetation disturbance would be reduced from approximately 963 acres to 199 acres.

Permanent and temporary loss of habitat as a result of construction activities could affect some small mammal, reptile, and/or amphibian species with very limited home ranges and mobility. Although there is no way to accurately quantify these effects, the impact is likely to be moderate in the short term and be reduced over time as reclaimed areas produce suitable habitats. Most of these wildlife species would be common and widely distributed throughout the project area, and the loss of some individuals as a result of habitat removal would have a negligible impact on populations of these species throughout the region.

Indirect effects due to displacement of wildlife also would occur as a result of construction activities associated with the No-Action Alternative. In response to the increase in human activity (e.g., equipment operation, vehicular traffic, and noise), wildlife may avoid or move away from the sources of disturbance to other habitats. This avoidance or displacement could result in underutilization of the physically unaltered habitats adjoining the disturbances. The net result would be that the desirability of habitats to wildlife near the disturbances would be decreased, and previous distributional patterns would be altered. The habitats would not support the same level of use by wildlife as before the onset of the disturbance. Additionally, it is anticipated that some wildlife would be displaced to other habitats, leading to some degree of overuse and degradation to those habitats.

Increases in vehicular traffic on the permitted access road could have impacts on the Mormon Mesa ACEC if the traffic were to impede wildlife activity (BLM 2003a). Public vehicle use of roads built to access facilities can have a similar, additive, or possibly a synergistic influence on reducing wildlife use of adjacent habitats, as well as cause additional impacts. Public access to new and upgraded roads in the project area would increase the potential for mortality and general harassment of wildlife. Closure of some new and existing roads to public use following construction would be one of the most effective measures that could be implemented to offset this impact.

The evaporation pond for the power plant would be located in an area with few other water sources. Because of this isolation, the pond may serve as an attractant for waterfowl, shorebirds, and other migratory birds. Evaporation ponds generally contain highly saline water. While the ions present in the pond water are generally non-toxic, the concentration levels of sodium are expected to reach up to 147,963 parts per million (BLM 2003a). Concentrations at this level can result in adverse effects to birds through salt encrustation on feathers, resulting in loss of flight, induced fatigue, dehydration, and death. Similar outcomes apply to bats and terrestrial wildlife.

Bird collisions with cooling towers are rare; however, when strikes occur, it is generally when (1) a cooling tower transects a daily flight path used by a concentration of birds and (2) migrants are traveling at reduced altitudes and encounter tall structures in their path (Brown 1993). Collision rates generally increase in low-light conditions; during inclement weather, such as rain or fog; during strong winds; and during panic flushes when birds are startled by a disturbance or are fleeing imminent danger. Collisions are more probable near wetlands, valleys, and within narrow passes where towers intersect flight paths. Although there is no way to accurately quantify these potential impacts, effects would be minor as the project area is not considered a significant migration corridor for birds.

No direct or indirect impacts on aquatic habitats and fisheries of the Virgin River would result from groundwater pumping from the No-Action Alternative. No short-term impacts from groundwater pumping on the availability of water for wildlife are anticipated.

Special Status Species

In general, construction and operation impacts of the No-Action Alternative on special status plant and wildlife species and their habitats would be similar to those discussed in the preceding sections for vegetation communities and wildlife. However, these impacts can be more severe for special status plant and wildlife species, since the distribution and abundance of many of these species are limited in the project area and surrounding region.

No federally listed plant species were identified as occurring within or near the project area. However, the water pipeline traverses several high-density areas of cacti and Joshua trees, which are protected species under Nevada state law. The proposed water pipeline associated with this project is likely to lead to the removal of some of these cacti and Joshua trees. Where these plants cannot be avoided, they would be salvaged and transplanted out of harm's way, as directed by the BLM botanist.

Special status wildlife species most likely to be affected adversely by construction activities associated with the natural-gas-fired power plant and associated facilities include the desert tortoise, Gila monster, and western burrowing owl. Construction activities could directly kill or injure these species through vehicle strikes and through animals becoming crushed or buried as a result of construction, digging, and earthmoving activities. These activities could also affect the desert tortoise, Gila monster, and burrowing owl by substantially reducing or eliminating associated habitat for these species.

With regard to special status wildlife species, impacts from the construction of the proposed power plant and associated facilities would likely be greatest for the desert tortoise. Approximately 640 acres of desert tortoise habitat would be disturbed, 120 of which would be permanent, as a result of construction of the natural-gas-fired power plant. An additional 216 acres, 42 of which would be permanently disturbed for the access road for the power plant, are within critical desert tortoise habitat.

Any potential adverse impacts on the desert tortoise under the No-Action Alternative would be mitigated by implementation of the specific terms and conditions to reduce take of desert tortoises issued by USFWS in its Biological Opinion of July 23, 2003. The specific terms and conditions of the Biological Opinion specify that the access road and the facility would be fenced to meet the requirements for tortoise exclusion from the power plant and to minimize or eliminate the potential for mortality from vehicle strikes. In addition, tortoise undercrossings would be constructed on the access road at intervals of no greater than 1 mile to decrease potential habitat fragmentation associated with linear facilities.

4.12.2.2 Mitigation

In the 2003 EIS, the following measures were identified as standard operating procedures that would be implemented as part of the proposed project to ensure minimal adverse effects to existing vegetative communities, wildlife, and special status plants and animals.

Vegetation

To the maximum extent practicable, all trees, native shrubs, and other vegetation would be preserved and protected during construction operations, and equipment except where clearing operations are required for permanent structures, approved construction roads, and excavation operations.

To the maximum extent practicable, all maintenance yards, field offices, and staging areas would be arranged to preserve trees, shrubs, and other native vegetation. The width of all new permanent access roads shall be kept to the absolute minimum needed for operation, avoiding sensitive areas and trees where possible, and limiting disturbance to vegetation.

When and where applicable, landscaping standards, including clearing of native vegetation, would be followed as prescribed by local land use and management agencies when work is within their jurisdictions.

Vegetation salvage and replanting would be implemented and completed as required by BLM in accordance with its established guidelines. Adopting roadway signage that discourages off-road travel would help protect vegetation along road margins.

Agency review and assessment of project-associated impacts on vegetation may precipitate a mitigation requirement to salvage various plants located inside the construction zone. Protected or otherwise sensitive plants (such as Joshua trees and numerous species of cacti and yucca) would have to be identified and removed from the construction corridor prior to the onset of construction. Salvaged plants would then be held for replanting along construction zone margins, other project-affected areas (e.g., former equipment staging grounds), or alternative lands. Plant salvage activities would probably have the greatest likelihood for success if they are not carried out in the spring flowering season.

The upper 12 to 18 inches of soil would be removed from the trench area and stockpiled for later use.

Wildlife

Bird nests encountered during land-disturbing construction activities would be avoided while the birds are fledging. To the extent practicable, land-disturbing construction activities would be scheduled outside of the breeding season (March 15 through July 30). If construction is required during the breeding season, the area impacted would be surveyed for nests prior to construction.

Special Status Species

Desert Tortoise

The protective measures below would be implemented during project construction, operation, and maintenance to ensure minimal adverse effects to desert tortoises and their habitat. These measures incorporate the specific terms and conditions in the Biological Opinion issued by USFWS on July 23, 2003, to reduce the take of desert tortoises (USFWS 2003).

A qualified desert tortoise biologist would be present during surface-disturbing activities from March 1 through October 30 (the desert tortoise's active season) in areas that have not been enclosed with tortoise fence to assure that desert tortoises are not harmed inadvertently, unless BLM and USFWS have determined that the presence of a biologist would not be necessary. The biologist would be on call from October 16 through March 14 (the inactive season) and would check construction areas immediately before construction activities begin at all times. In addition, a qualified desert tortoise biologist would be on site during any construction within critical habitat.

If fence construction occurs during the desert tortoise's active season, a qualified tortoise biologist would be onsite during construction of the tortoise fence to assure that no tortoises are harmed. During the active season, temporary or permanent tortoise fencing would be required to be installed for all areas of surface-disturbing activities prior to the onset of construction activities. If the fence is constructed during the tortoise's inactive season, a biologist would thoroughly examine the proposed fence line and burrows for the presence of tortoises no more than three days before construction commences.

Any desert tortoises or their eggs found within the fence line would be relocated off the site by a qualified tortoise biologist in accordance with approved protocol (Desert Tortoise Council 1999). Tortoise burrows that occur immediately outside of the fence alignment that can be avoided by fence construction activities would be clearly marked to prevent them from being crushed. A temporary-fencing plan would be implemented during construction to protect tortoise habitat.

Permanent fencing to exclude tortoises would be required on the access road from I-15 to the proposed plant site. In addition, a tortoise fence would be constructed around the power plant site. In accordance with current specifications, fencing would consist of 1-inch-horizontal by 2-inch-vertical mesh. The mesh would extend at least 18 inches above ground and, where feasible, 6 to 12 inches below ground. In situations where it is not feasible to bury the fence, the lower 6 to 12 inches of the fence would be bent at a 90-degree angle towards potentially approaching tortoises and covered with cobble or other suitable material to make sure that tortoises or other animals cannot dig underneath and create gaps that allow passage. Along the access road tortoise undercrossings would be provided at intervals of not greater than 1 mile. It is anticipated that only two or three undercrossings specifically placed for tortoises would be needed to meet this objective, since most of the access road is in terrain that would require frequent culverts for drainage purposes that could also be designed to function as tortoise crossings.

The fence would be inspected on a quarterly basis and after major precipitation events to verify zero ground clearance. Any repairs would be completed within 72 hours from March 15 through October 15, and within 7 days from October 16 through March 14. Monitoring and maintenance would include regular removal of trash and accumulated sediment and the restoration of zero ground clearance between the ground and the bottom of the fence, including re-covering the bent portion of the fence, if not buried. Fencing may be removed upon termination and reclamation of the project, or when it is determined by BLM and USFWS that the fence is no longer necessary.

During surface-disturbing activities, tortoise burrows would be avoided whenever possible. If a tortoise is found on site during project activities that might result in take of the tortoise (harm, displacement, harassment, wounding, trapping, capture, or killing), such activities would cease until the tortoise moves or is moved. A qualified tortoise biologist would move the tortoise. All workers would also be instructed to check underneath all vehicles before moving them, and also within stockpiled materials. Tortoises often take cover under vehicles and construct burrows in stockpiled material.

Construction sites, staging areas, and access routes would be cleared by a qualified tortoise biologist before the start of construction. The project area would be surveyed for desert tortoise using survey techniques that provide 100 percent coverage. From March 15 through October 15, the preconstruction clearance shall take place no more than three days prior to initiation of construction; from October 16 through March 14, the preconstruction clearance would take place no more than 10 days prior to initiation of construction. All desert tortoise burrows, and other species' burrows that might be used by tortoises, would be examined to determine whether desert tortoises and other species occupy the burrow. Tortoise burrows would be cleared of tortoises and their eggs, and collapsed. Any desert tortoises or tortoise eggs found in the fenced area would be removed under the supervision of a qualified tortoise biologist in accordance with USFWS protocol (Desert Tortoise Council 1999).

BLM must approve the selected consulting firm/biologist to be used by the applicant to implement the terms and conditions of ROWs issued by BLM regarding the desert tortoise. Any biologist and/or firm not previously approved must submit a curriculum vitae and be approved by the BLM before being authorized to represent BLM in complying with the terms and conditions of the ROWs. BLM has the option of selecting an independent third-party contractor to act as an agent of BLM. Other personnel may assist with implementing terms and conditions that involve tortoise handling, monitoring, or surveys, only under direct field supervision by the approved qualified biologist.

Tortoises and nests would be handled and relocated by a qualified tortoise biologist in accordance with USFWS-approved protocol (Desert Tortoise Council 1999). Burrows containing tortoises or their nests would be excavated by hand, with hand tools, to allow removal of the tortoise or eggs. Desert tortoises moved during the tortoise's inactive season or those in hibernation, regardless of date, would be placed into an adequate burrow; if one is not available, one would be constructed in accordance with Desert Tortoise Council (1999) criteria. During mild temperature periods in the spring and early fall, tortoises removed from the site would not necessarily be placed in a burrow. Tortoises and burrows would only be relocated to federally managed lands. Verbal permission, followed by written concurrence, would be obtained from BLM and USFWS before relocating the tortoise or eggs to lands not managed by BLM.

Tortoises that are moved off the site and released into undisturbed habitat on public land would be placed in the shade of a shrub, in a natural unoccupied burrow similar to the hibernaculum in which it was found, or in an artificially constructed burrow in accordance with a USFWS-approved protocol (Desert Tortoise Council 1999).

After a project has been fenced and a tortoise clearance completed, if a desert tortoise is encountered in imminent danger, it would be moved out of harm's way and onto adjacent BLM land by personnel that have completed the training required in Terms and Conditions 8.h of the Desert Tortoise Council (1999) criteria. If the tortoise cannot be avoided or moved out of harm's way onto BLM land, it would be placed in a cardboard box or other suitable container and held in a shaded area until BLM personnel can retrieve the tortoise.

If possible, overnight parking and storage of equipment and materials, including stockpiling, would be in previously disturbed areas or areas to be disturbed that have been cleared by a tortoise biologist. If not possible, areas for overnight parking and storage of equipment would be designated by the tortoise biologist.

All vehicular traffic would be restricted to existing access roads or those roads approved by BLM in consultation with the USFWS.

Project activity areas would be clearly marked or flagged at the outer boundaries before the onset of construction. All activities would be confined to designated areas. Blading of vegetation would occur only to the extent necessary and would be limited to areas designated for that purpose by BLM or tortoise biologist.

Prior to issuance of any Federal permit, lease, or authorization for any surface-disturbing activity, the project proponent would pay a remuneration fee for each acre of surface disturbance. The amount and disposition of said fee would be determined in consultation with BLM and USFWS. This fee would be paid directly to the Lincoln County Habitat Conservation Section 7 Account, Attn: Cathy Hiatt. PO Box 416, Pioche, Nevada, 89043, administered by Clark County or any other administrator approved by both the USFWS and BLM. The administrator would serve as the banker of these funds and receive no benefit from administering these funds. These funds would be independent of any other fees collected by Clark County for desert tortoise conservation planning.

Projects resulting in residual impacts would require the submission of a BLM- and USFWS-approved reclamation plan, unless BLM and USFWS determine that reclamation rehabilitation is not necessary. The reclamation/rehabilitation plan would describe objectives and methods to be used, species of plants and/or seed mixture to be used, time of planting, success standards, and follow-up monitoring. Depending on the size and location of the project, reclamation could simply involve recontouring, rehabilitation and restriction of access points, or intensive reclamation over the entire area of surface disturbance. The plan would be prepared within 60 days following completion of the surface-disturbance phase of the project. Reclamation would be addressed on a case-by-case basis.

Upon receipt of an application or expression of interest in the expansion of a materials site right-of-way within desert tortoise ACECs, BLM would notify USFWS and initiate a 60-day evaluation period. During the evaluation period, BLM and USFWS would consider options to minimize impacts to desert tortoise habitat, such as relocation of areas outside ACECs, other potential sources, and other measures.

If a substantial level of disturbance occurs within a desert tortoise ACEC (e.g., expansion of materials sites within ACECs), the proponent would rehabilitate an equivalent number of acres within an ACEC in the same recovery unit, within six months, or relinquish a similar area to BLM. These actions would occur in addition to payment of remuneration fees and other minimization measures in the USFWS Biological Opinion.

A litter-control program would be implemented to minimize predation on tortoises by ravens drawn to the project site. This program would include the use of covered, raven-proof trash receptacles, removal of trash from project areas to the trash receptacles following the close of each work day, and proper disposal of trash in a designated solid waste disposal facility. Appropriate precautions must be taken to prevent litter from blowing out along the road when trash is removed from the site. A litter-control program would be implemented by the responsible Federal agency or its contractor to minimize predation on tortoises by ravens and other predators drawn to the project.

A tortoise-education program would be presented to all personnel working on the project or activities associated with the project. This program would be presented by a qualified tortoise biologist. The program would include information on the life history of the desert tortoise, legal protection for desert tortoises, penalties for violations of Federal and state laws, general tortoise-activity patterns, reporting requirements, measures to protect tortoises, terms and conditions of the BLM-issued ROWs, and personal measures that employees could employ to promote the conservation of desert tortoises. The definition of "take" would also be explained. Specific and detailed instructions would be provided on the proper techniques to capture and move tortoises that appear on site, in accordance with USFWS-approved protocol. Currently, USFWS-approved protocol is Desert Tortoise Council (1999).

The project applicant would notify BLM's authorized project officer at least 10 days before initiation of any project. Notification would be made to BLM staff in Caliente at (775) 726-8100, or Ely at (775) 289-1800.

BLM's Caliente or Ely offices and USFWS's Southern Nevada Field Office must be notified of any desert tortoise death or injury resulting from project implementation by close of business on the following work day. In addition, USFWS's Division of Law Enforcement would be notified in accordance with reporting requirements. BLM can be reached in Caliente at (775) 726-8100 and in Ely at (775) 289-1800; USFWS can be reached at (702) 647-5230.

All appropriate Nevada Department of Wildlife (NDOW) permits or letters of authorization would be acquired prior to handling desert tortoises and their parts, and prior to initiation of any activity that might require handling tortoises.

The project proponent must submit a document to BLM within 30 days of completion of the project, showing the number of acres disturbed; remuneration fees paid; and number of tortoises taken, which includes capture and displacement, killed, injured, and harassed by other means, during project activities covered under the USFWS's Biological Opinion.

All projects to be covered under the USFWS's Biological Opinion would be reviewed by BLM's wildlife staff to assure that appropriate measures have been incorporated into the BLM authorization (for example, material site, land sale, or OHV event) to minimize the potential take of desert tortoise and loss of habitat.

BLM would keep an up-to-date log of all actions taken under consultation; number of acres affected; results of tortoise survey and removal activities (including reported number of desert tortoises injured, killed, or removed from project site); date, rate (per acre adjusted for inflation) and amount of fees paid for each project; and progress of recovery actions. BLM would provide information to USFWS's Southern Nevada Field Office annually. Annual reports would be due on February 1, for the previous calendar year in which actions were covered under the USFWS's Biological Opinion. Information would be cumulative throughout the life of the consultation. Annual reports would include maps showing the location of actions within ACECs authorized under the Biological Opinion and any other information it requires.

For those actions identified in the Biological Opinion that require concurrence between BLM and the USFWS, written notification of proposed changes or actions would be made a minimum of 30 days in advance. Both agencies would coordinate to the maximum extent practicable to achieve resolution. This may include informal meetings or written correspondence to discuss Proposed Action Alternatives and reach concurrence.

In accordance with *Procedures for Endangered Species Act Compliance for the Mojave Desert Tortoise*, a qualified desert tortoise biologist should possess a bachelor's degree in biology, ecology, wildlife biology, herpetology, or closely related fields as determined by BLM. The biologist must have demonstrated prior field experience using accepted resource agency techniques to survey for desert tortoises and tortoise sign, which should include a minimum of 60 days of field experience. All tortoise biologists shall comply with the USFWS-approved handling protocol prior to conducting tasks in association with terms and conditions of the USFWS Biological Opinion. In addition, the biologist would have the ability to recognize tortoise sign and accurately record survey results.

A BLM representative(s) would be designated to be responsible for overseeing compliance with the reasonable and prudent measures, terms, and conditions, reporting requirements, and re-initiation requirements jointly agreed to by BLM and USFWS. The designated representative would provide coordination among the permittee, project proponent, BLM, and the USFWS.

In the event that blasting is required, prior to blasting a 200-foot area, the blasting site and surrounding areas would be surveyed for desert tortoises using 100-percent-coverage survey techniques. All tortoises found above ground or in pallets within this 200-foot radius of the blasting site would be moved 500 feet from the blasting site. Additionally, tortoises in burrows within 75 feet of the blasting would be placed into an artificial or unoccupied burrow 500 feet from the blasting site. This would prevent tortoises that leave their burrow upon translocation from returning to the blasting site. Tortoises in burrows at a distance of 75 to 200 feet from the blasting site would be left in their burrows. Burrow locations would be flagged and recorded using a global positioning system (GPS) unit and burrows would be stuffed with newspapers. Immediately after blasting, newspaper and flagging would be removed.

Miscellaneous Other Species

Collapsing suitable burrows or other potential nesting cavities within the construction zone prior to the nesting season could largely prevent direct impacts that might otherwise occur on burrowing owls. This would be accomplished, where appropriate, as part of the surveys for the desert tortoise. If owl-occupied burrows are located during their nesting or brooding season (mid-March through August), burrows would be avoided until the young owls leave the nest or it is determined that the nesting attempt failed.

Gila monsters in immediate danger from construction activities would be captured and confined in a cool, shaded environment by a biologist in accordance with NDOW protocols. Removal of a Gila monster requires authorization by NDOW. Injured Gila monsters would be transferred to a veterinarian. Dead Gila monsters would be preserved for NDOW.

Impacts on chuckwalla would be minimized by restricting activity in upland areas occupied by this species. Chuckwallas typically hide in rock crevices and other similar shelters when approached or threatened, making it difficult to capture and relocate them. However, trained personnel would remove them prior to construction if necessary. Permission from NDOW would be obtained prior to removing or relocating chuckwallas.

If significant bat roosts are located within or adjacent to a construction zone, the roosts would be avoided until the animals naturally vacate the site. Certain types of bat refuges, such as winter roosts used by non-hibernating California leaf-nosed bats, would be completely avoided if practicable. Certain naturally occurring caves, and even some abandoned mines, could provide the necessary temperature regimes critical to maintaining some local bat populations.

Signs warning of bighorn sheep crossings would be placed along the access road to reduce potential mortalities resulting from collisions with vehicles.

4.12.3 <u>Proposed Action Alternative</u>

4.12.3.1 Impacts

Vegetation

Impacts on vegetation under this alternative would be the same as the No-Action Alternative, except that the scope of effects would increase incrementally due to the addition of the rail line and increased size of the power plant. Approximately 1,661 acres of vegetation would be disturbed by construction activities under the Proposed Action Alternative. This includes at least 1,348 acres of Sonora-Mojave creosotebush-white bursage desertscrub, 98 acres of Mojave mid-elevation mixed desertscrub, 27 acres of North American Warm Desert bedrock cliff and outcrop, 10 acres of North American Warm Desert wash, 2 acres of Sonora-Mojave mixed salt desertscrub, and less than an acre of Inter-Mountain Basins Semi-Desert shrub steppe (Table 4-6).

Following reclamation efforts, disturbed acreage would be reduced to an estimated 731 acres. Vegetation would start to become reestablished along the water pipeline and unused portions of the access roads and railroad beginning the first year after site cleanup and project startup and continue throughout the 50-year life of the project.

Implementation of the Proposed Action Alternative also would increase the potential for occurrence of indirect effects and the scope of those effects. Disturbances from construction would increase the potential for indirect effects as described for the No-Action Alternative. However, the scope of the impacts would increase incrementally, as an additional 698 acres over the No-Action Alternative would be disturbed initially during construction of the rail line, with 356 acres being disturbed permanently.

Table 4-6
Vegetation Acres Affected by the Proposed Action Alternative

Cover Type	Power Plant		Access Road		Water Pipeline		Rail Line		Well Field (Wells, Roads, Pumps)	
	Temporary Disturbance	Permanent Disturbance	Temporary Disturbance	Permanent Disturbance	Temporary Disturbance	Permanent Disturbance	Temporary Disturbance	Permanent Disturbance	Temporary Disturbance	Permanent Disturbance
Inter-Mountain Basins Semi-Desert shrub steppe	–	–	–	–	–	–	0.5	0.1	–	–
Mojave mid-elevation mixed desertscrub	–	–	–	–	4.8	2.4	93.4	47.2	–	–
North American Warm Desert bedrock cliff and outcrop	–	–	–	0.1	–	–	27.2	13.7	–	–
North American Warm Desert playa	–	–	–	0.4	–	–	–	–	–	–
North American Warm Desert wash	–	–	–	–	0.5	0.25	9.1	4.1	–	–
Sonora-Mojave creosotebush-white bursage desertscrub	640	475	–	40.2	85.1	42.5	565.7	290.2	17	12
Sonora-Mojave mixed salt desertscrub	–	–	–	0.8	–	–	1.7	1.0	–	–
Total acres	640	475	216*	41.5	90.4	45.2	697.6	356.3	17	12

SOURCE: Southwest Regional Gap Analysis Project 2004
NOTE: * Spatial data were not available to calculate the acres of vegetation within the construction ROW for the access road. However, the 2003 environmental impact statement (Bureau of Land Management 2003a) indicated that a total of 216 acres would be within the temporary construction right-of-way for the road, and it is assumed that the greatest proportion of this area would be Sonora-Mojave creosotebush-white bursage desertscrub.

Noxious and Invasive Weeds

The increased area of disturbance would incrementally increase the indirect effects associated with noxious and invasive weeds. Additional effects related to the construction and operation of the proposed rail line include increased likelihood of weeds establishing and spreading along the proposed rail line during construction. These weeds would then be likely to spread along the length of the rail line increasing the effects described in Section 4.12.2.1.

Weeds and invasive non-native plants pose a threat, in that they overtake shrub steppe ecosystems and they increase the ground canopy, which in turn unbalances the natural fire regime by promoting more frequent and intense fires. The proposed rail line also would serve as a potential ignition source for wildfires. However, given the implementation of recommended and required mitigation measures, including development and implementation of an integrated pest management plan, significant impacts on vegetation are not expected to occur under the Proposed Action Alternative. Further information is available in the weed risk assessment completed for this project in Appendix D.

Increased levels of nitrogen in the soil surrounding the plant may occur as a result of deposition from nitrogen oxides in plant emissions. Increased levels of nitrogen may increase the establishment and spread of noxious and invasive weeds. Modeled total nitrogen deposition levels for the area within 40 km of the proposed plant range from 2.0 E^{-7} to 3.4 E^{-6} grams per square meter per year ($g/m^2/yr$) (ENSR 2007c). A study of the effects of nitrogen on non-native plants in the Mojave Desert found that rates of deposition of 3.2 g/m^2/year were sufficient to impact plant populations (Brooks 2003). While the study did not determine minimum levels for impacts from nitrogen deposition, the levels of deposition modeled for the Toquop Energy Project are 6 orders of magnitude lower than those observed having a significant impact in the study. Given the low levels of total nitrogen deposition and the implementation of recommended and required mitigation measures, including development and implementation of an integrated pest management plan, significant impacts are not expected to occur.

Wildlife

While the disturbance of wildlife habitat from construction of the power plant, access roads, and the water pipeline are generally the same as those described in the No-Action Alternative, an additional 698 acres of wildlife habitat (1,661 acres total) would be affected by construction of the proposed rail line and coal-fired plant. Following initial reclamation efforts, disturbed acreage associated with the construction of the proposed rail line and coal-fired plant would be reduced to an estimated 930 acres on which ongoing project activities remain throughout the 50-year life of the project. Low levels of impact would likely result to various species of non-game songbirds, small mammals, and reptiles in the short term. As with the No-Action Alternative, these impacts are not expected to adversely affect populations of these species because of their high reproductive potential and the availability of other suitable habitats within the project area and surrounding region.

Special Status Species

The potential impacts on special status plant and wildlife species are similar to those presented under the No-Action Alternative. Of those plant species listed in Chapter 3 for consideration by BLM or USFWS, the Meadow Valley sandwort and Las Vegas buckwheat were documented within the project area.

Meadow Valley sandwort is on the Nevada Native Plant Society watch list and is on the Nevada Natural Heritage Program's sensitive species list. A small number of sandwort plants were documented along the banks of Toquop Wash in the Toquop Gap area. The proposed rail line would pass through Toquop Gap and may affect the sandwort in this location if it is placed along the south bank of the wash. If the rail line is located on the south bank of the wash, this would lead to impacts on suitable habitat for this species. Impacts on this plant and its habitat potentially would be a significant impact, mitigable by preconstruction surveys and avoidance measures as described in Section 4.12.3. If the rail line is constructed on the north bank, then direct impacts from the Proposed Action Alternative would not be anticipated.

Las Vegas buckwheat is a BLM-sensitive species in Nevada and is recommended for full protection by the State of Nevada. It also is listed as threatened by the Nevada Native Plant Society. Due to recent threats to the limited remaining populations of the species, it has been submitted to USFWS to determine if it should receive candidate status under the ESA (Edwards 2007). The Proposed Action would not directly affect Las Vegas buckwheat or its habitat, as the species and its potential and occupied habitats are outside the proposed project ROWs and construction areas.

Indirect effects on Las Vegas buckwheat could occur with an increase in noxious and invasive weed establishment and spread. Invasive grasses such as red brome are present throughout the area and may directly compete with Las Vegas buckwheat for resources as well as change the fire regime in the area. Increased nitrogen levels in the soil from deposition related to the operation of the proposed coal-fired plant may favor an increase in non-native weedy species, which may result in an increase fuel levels for wildfires. An increase in fire intensities and shortened fire-return intervals due to the presence of invasive grasses could lead to the mortality of Las Vegas buckwheat and conversion of its habitat to non-native grasslands. Impacts on this plant and its habitat would be avoided and decreased by implementation of mitigation and avoidance measures as described in Section 4.12.3.

Special status wildlife species most likely to be affected adversely by construction activities associated with the proposed rail line include the desert tortoise, Gila monster, western burrowing owl, desert bighorn sheep, Virgin River chub, and woundfin.

No direct impacts on the Virgin River chub and woundfin are expected from the proposed action. The USFWS determined that it was unlikely that effects on surface water flows in the Virgin River would result from groundwater extraction required for the proposed project from the carbonate aquifer in the Tule Desert hydrographic area would be detectable or measurable (USFWS 2003). That determination was based on information obtained in discussion with hydrologists from the National Park Service, Virgin Valley Water District, and USFWS Region 1 office, along with hydrological reports (CH2M Hill 2002a, 2002b; Dixon and Katzer 2002; Thomas 2002).

The use of surfactants within the proposed plant site to minimize dust from the coal-storage pile could potentially impact the Virgin River, the Virgin River chub, and the woundfin if the surfactant were to travel down Toquop Wash to the river. This impact is unlikely to occur, as the proposed project would be a zero-discharge facility and all runoff would be captured and treated on site. A Stormwater Pollution Prevention Plan (SWPPP) would be developed for the power plant site to assure that any runoff from the site is captured on site in a stormwater retention basin. The stormwater retention basin would be constructed with sufficient dimensions to accommodate runoff from impervious surfaces at the power plant site generated by the local maximum daily rainfall event with a return frequency of 100 years or less.

No breeding habitat for southwestern willow flycatcher, yellow-billed cuckoo, and Yuma clapper rail occurs within the project area. The closest potential habitat is located approximately 1 mile west of the proposed rail line and the nearest suitable nesting habitat is a minimum of 4 miles north of the project area, where mature cottonwoods, willows, and tamarisk gradually emerge (Map 3-11). These areas would not be disturbed by the proposed action.

Fencing would be installed where necessary to restrict livestock from entering the rail line ROW. Construction and use of the livestock fencing potentially could have indirect effects on desert bighorn habitat use and movement patterns. Desert bighorn are sensitive to disturbance and may avoid habitats that are near the rail line when crews or trains are present. The fencing would be designed to allow bighorn sheep to cross the fence and would not be a barrier to bighorn movement (Appendix F).

Construction activities could affect and reduce habitat for the desert tortoise, Gila monster, and western burrowing owls. With regard to the desert tortoise, impacts from construction of the proposed coal-fired power plant, access road, water pipeline, and ancillary facilities are the same as those described in the No-Action Alternative; however, the increased size of the permanent area disturbed by the power plant (approximately 355 acres) would incrementally increase the effects from disturbance of desert tortoise habitat within this area. Construction of the rail line would affect an additional 698 acres of suitable habitat for the desert tortoise, with 356 acres being permanently disturbed. Impacts likely would be greatest in the northwestern portion of the project area because this area contains the highest densities of tortoise (greater than 5 tortoises per 100 acres) (JBR Environmental Consultants Inc. 2006).

The use of surfactants within the proposed plant site to minimize dust from the coal-storage pile could potentially impact desert tortoise if the surfactant were to blow off the site and come in contact with the tortoise forage plants. The effects of these surfactants if ingested by tortoises have not been studied. However, these impacts are unlikely to occur as the proposed passive-coal-storage pile where the surfactant would be applied is at a minimum distance of 700 feet from the outside of the proposed plant site, which would be fenced off with tortoise fencing. Additionally, the surfactant would be applied to the passive-coal-storage pile only after the pile was disturbed or after the surfactant had lost its effectiveness, so applications would likely only occur several times each year.

Operation of the proposed power plant would likely lead to increased levels of nitrogen and Hg deposition, albeit in low amounts, across some areas of desert tortoise habitat. Nitrogen deposition may aid in increasing noxious and invasive weed populations, some of which may serve as forage plants for tortoise when they are green. When dry, these same weeds may threaten desert tortoise habitat by modifying fire regimes. Desert tortoise may be impacted by Hg deposition due to their long life span, which may allow sufficient bioaccumulation of Hg to occur over time to impact their health. These impacts are likely to be minimal due to emissions controls for the power plant, low levels of emissions, and the low expected levels of deposition.

Total mercury deposition was modeled for a 40-km radius around the proposed plant. Modeled mercury deposition rates ranged from 1.0 E^{-6} to 1.2 E^{-5} $g/m^2/yr$ within the 40-km radius (ENSR 2007c). The highest deposition levels were found at two locations, both are approximately 3.25 miles from the power plant. The first location is west of the proposed plant in the East Mormon Mountains, and deposition rates for this area were 1.0 E^{-5} $g/m^2/yr$. The second area is northeast of the proposed plant and south of the Tule Springs Hills, where mercury deposition rates were modeled at 1.2 E^{-5} $g/m^2/yr$ (ENSR 2007c).

Mercury deposition from air emissions from the proposed plant has the potential to impact desert tortoise populations in the area. Mercury may be taken up by tortoises through plants that are consumed and through dust inhalation. Data indicating a link between disease and levels of mercury bioaccumulation in desert tortoise is lacking. However, Jacobson et al. (1991) found that tortoises with upper respiratory tract disease in the western Mojave Desert had levels of mercury in their livers approximately 11 times higher than those without the disease. Homer and Berry (2001) also found elevated but not toxic levels of mercury in desert tortoises. In general there is little information on mercury bioaccumulation in reptiles and no mortality of reptiles from heavy-metal intoxication has ever been reported, although ecotoxicological data for mercury in reptiles is lacking (Linder and Grillitsch 2000). The limited available data indicate that reptiles in general do not biomagnify heavy metals to an extent that would correspond to their trophic level (Linder and Grillitsch 2000). Nagy (2001) notes that the metabolic rate of reptiles results in much lower food requirements than birds and mammals. A 1-kilogram (kg) reptile would have dietary requirements of approximately 9 percent of a 1 kg bird of the same weight and 12 percent of a

1 kg mammal, resulting in lower levels of food consumption and thus mercury intake (Nagy 2001). Given the low levels of mercury deposition associated with the proposed plant, relatively low metabolic requirements of reptiles and thus decreased levels of mercury uptake, and limited biomagnification of heavy metals by reptiles, it is unlikely that the species would be impacted significantly by mercury deposition associated with the proposed power plant.

During the construction of the proposed rail line, an estimated 45 acres (30 acres of low density and 15 acres of moderate density) habitat for desert tortoise would be removed. These acreages are based on an estimate of the footprint of the rail bed; however, actual acreages may vary from those estimates depending on the final plan design of the rail line. No desert tortoise critical habitat would be affected by construction of the proposed rail line.

Tortoises may not be able to cross the rail lines, or may become trapped between rails. While individuals caught in between tracks are unlikely to be killed directly by the train (since estimated use of the railroad is one train per day), they would eventually die from starvation, dehydration, or exposure. This is a documented source of mortality for tortoises, as a total of eight carcasses were located between the rails along a 62-mile-long segment of rail lines in the eastern Mojave Desert (Boarman 2002). To avoid tortoise mortality from being trapped inside the rail line, it would be fenced with tortoise-proof fencing to prevent access. Since the fence could result in increased habitat fragmentation and act as a barrier to gene flow, a number of culverts and overpasses would be placed in strategic areas to promote access under or over the tracks. Assuming these measures are effectively applied, significant impacts to desert tortoise from implementation of the Proposed Action Alternative are not expected to occur.

The use of surfactants within the proposed plant site to minimize dust from the coal-storage pile could potentially impact the Virgin River and the Virgin River chub if the surfactant were to travel down Toquop Wash to the river. These impacts are very unlikely to occur, as the proposed project would be a zero-discharge facility and all runoff would be captured and treated on site. A SWPPP would be developed for the power plant site to assure that any runoff from the site is captured on site in a stormwater retention basin. The stormwater retention basin would be constructed with sufficient dimensions to accommodate runoff from impervious surfaces at the power plant site generated by the local maximum daily rainfall event with a return frequency of 100 years or less.

4.12.3.2 Mitigation

Vegetation

Recommended and prescribed mitigation measures for native vegetation communities under the Proposed Action Alternative include all measures discussed under the No-Action Alternative.

Removal and disturbance of vegetation would be kept to a minimum through construction site management (e.g. using previously disturbed areas and existing easements, limiting equipment/materials storage and staging area sites, etc.).

Reclamation normally would be accomplished with native seeds only. These would be representative of the indigenous species present in the adjacent habitat. Rationale for potential seeding with selected non-native species would be documented. Possible exceptions would include use of non-native species for a temporary cover crop to out-compete weeds. Where fires burn large acreages and seeding is required for erosion control, using all native species could be cost-prohibitive and not all species may be available. In all cases, seed mixes would be approved by BLM’s authorized officer prior to planting.

Noxious Weeds and Invasive Species

Prior to project approval, a site-specific weed survey would occur and a weed risk assessment would be completed. Monitoring would be conducted for a period no shorter than the life of the permit or until bond release and monitoring reports are provided to BLM. If the spread of noxious weeds is noted, appropriated weed-control procedures would be determined in consultation with BLM personnel and would be in compliance with the appropriate BLM handbook sections and applicable laws and regulations. All weed-control efforts on BLM-administered lands would be in compliance with BLM Handbook H-9011, H-9011-1 Chemical Pest Control, H-9014 Use of Biological Control Agents of Pests on Public Lands, and H-9015 Integrated Pest Management. Should chemical methods be approved, the lessee must submit a pesticide-use proposal to the authorized officer 60 days prior to the planned application date. A pesticide application report must be submitted to the authorized officer by the end of the fiscal year following the chemical application.

Prior to the entry of vehicles and equipment to a project area, areas of concern would be identified and flagged in the field by a weed scientist or qualified biologist. The flagging would alert personnel or participants to avoid areas of concern. These sites would be recorded using GPS or other BLM Ely Field Office-approved equipment and provided to the Field Office Weed Coordinator or designated contact person.

Prior to entering public lands, the contractor, operator, or permit holder would provide information and training regarding noxious-weed management and identification to all personnel who would be affiliated with the implementation and maintenance phases of the project. The importance of preventing the spread of weeds to uninfested areas and the importance of controlling existing populations of weeds would be explained.

To eliminate the transport of vehicle-borne weed seeds, roots, or rhizomes, all vehicles and heavy equipment would be free of soil and debris capable of transporting weed propagules. This would include all vehicles and equipment used for the completion, maintenance, inspection, or monitoring of ground-disturbing activities, for emergency fire suppression, or for authorized off-road driving. All such vehicles and equipment would be cleaned with power or high-pressure equipment prior to entering or leaving the work site or project area. Vehicles used for emergency fire suppression would be cleaned as a part of check-in and demobilization procedures. Cleaning efforts would concentrate on tracks, feet, and tires, and on the undercarriage. Special emphasis would be applied to axels, frames, cross-members, motor mounts, steps (on and underneath), running boards, and front bumper/brush guard assemblies. Vehicle cabs would be swept out, and refuse would be disposed of in waste receptacles. Cleaning sites would be recorded using GPS or other equipment and provided to the BLM Field Office weed coordinator or designated contact person.

To eliminate the introduction of noxious weed seeds, roots, or rhizomes, all interim and final seed mixes, hay, straw, hay/straw, or other organic products used for reclamation or stabilization activities, feed, or bedding would be certified free of plant species listed on the Nevada noxious weed list or specifically identified by the BLM Ely Field Office.

To eliminate the introduction of noxious weed seeds, roots, or rhizomes, all source sites such as borrow pits, fill sources, or gravel pits used to supply inorganic materials used for construction, maintenance, or reclamation would be inspected and found to be free of plant species listed on the Nevada noxious weed list or specifically identified by the BLM Ely Field Office. Inspections would be conducted by a weed scientist or qualified biologist.

Mixing of herbicides and rinsing of herbicide containers and spray equipment would be conducted only in areas that are a safe distance from environmentally sensitive areas and points of entry to bodies of water (e.g., storm drains, irrigation ditches, streams, lakes, or wells).

Methods used to accomplish weed- and insect-control objectives would consider seasonal distribution of large wildlife species.

No noxious weeds would be allowed on the site at the time of reclamation release. Any noxious weeds that become established would be controlled.

Wildlife

Recommended and prescribed mitigation measures for wildlife under the Proposed Action Alternative include all measures discussed under the No-Action Alternative as well as the following:

- To avoid the potential for mortality and harassment of wildlife, all firearms and dogs would be prohibited at the project site(s).
- Intentional feeding of wildlife would be prohibited at the project site(s).
- Trash and food items would be disposed of promptly in predator-proof containers with resealable lids. Trash containers would be removed regularly (at least once per week). This effort would reduce the attractiveness of the area to opportunistic predators such as coyotes, kit foxes, and common ravens.
- A maximum speed limit of 15 miles per hour would be maintained while traveling on the construction site, on unpaved access roads, and in storage areas. This effort would reduce the potential for vehicle-wildlife collisions.
- Following construction, a selected number of access roads that are subject to public vehicle use would be closed. This effort would reduce the potential for mortality and general harassment of wildlife.
- Any fuel or hazardous waste leaks or spills would be contained immediately and cleaned up at the time of occurrence. Contaminated soil would be removed and disposed of at an appropriate facility.

Special Status Species

Recommended and prescribed mitigation measures for special status species under the Proposed Action Alternative include all measures discussed under the No-Action Alternative. Further measures are discussed below.

Prior to construction, comprehensive rare plant surveys would be conducted for all special status plant species that have been identified within the project area and those plants with the potential to occur in the project area. Surveys would be conducted within appropriate areas susceptible to surface disturbance by construction and/or operations and maintenance activities. Surveys of site-specific facility areas would be appropriately timed to cover the blooming periods of the special status plant species known to occur or with the potential to occur in the area. If an individual(s) is observed, an avoidance and impact-minimization plan would be developed and implemented in coordination with BLM and USFWS.

Where construction of the Proposed Action Alternative would remove Meadow Valley sandwort (along the banks of Toquop Wash in the Toquop Gap area), the Las Vegas buckwheat (northeast of the proposed power plant), and yucca and cacti species, the species would be salvaged and transplanted in an appropriate location in the project area. All actions would be coordinated with the BLM botanist.

Tortoise fencing would be installed along the entire length of the rail line and access road, and around the power plant site. The fencing would be constructed as described in the mitigation for the No-Action Alternative and shown in Appendix F. In areas along the rail line where I may be necessary to restrict livestock access to the rail line ROW, the tortoise fence would be heightened, as shown in Appendix F. The fence would be constructed to prevent livestock access, but not preclude bighorn sheep movement.

All identified populations of special status plants species would be avoided to the greatest extent possible. If avoidance is not possible, steps would be taken to remove and salvage populations prior to construction. Salvage would be conducted in a detailed reclamation plan approved by BLM.

Prior to and outside of the western burrowing owl breeding season (mid-March through August), any western burrowing owl burrows, holes, crevices, and cavities that would be graded for the project would be collapsed. All areas to be collapsed would be surveyed prior to grading to prevent burying of burrowing owls in burrows.

Any occupied owl burrows found during the breeding season would be avoided to assure that the nest and young are not abandoned. The nesting cycle takes a minimum of 74 days, during which construction on site must cease. Generally, eggs may be laid between mid-March and the end of May, and young may be present from mid-April through August.

Live Gila monsters found in harm's way on the construction site would be captured and then detained in a cool, shaded environment (less than 85 degrees Fahrenheit [ºF]) by the project biologist or equivalent personnel until a NDOW biologist could arrive for documentation purposes. Removal of a Gila monster requires authorization by NDOW. Although a Gila monster is venomous, its relatively slow gait allows it to be easily coaxed or lifted into an open bucket or box while carefully using a long-handled instrument such as a shovel or snake hook. (It is not the intent of NDOW to request unreasonable action to facilitate captures; additional coordination with NDOW would clarify logistical points). For safe containment, personnel may use a clean 5-gallon plastic bucket with a secure, vented lid; an 18-inch by 18-inch by 4-inch plastic sweater box with a secure, vented lid; or a tape-sealed cardboard box of similar dimension. Additionally, written information identifying the mapped capture location (e.g., GPS record), date, time, and circumstances (e.g., biological survey or construction) and habitat description (e.g., vegetation, slope, aspect, substrate) would also be provided to NDOW.

Injuries to Gila monsters may occur during excavation, blasting, road grading, or other construction activities. In the event a Gila monster is injured, it would be transferred to a veterinarian proficient in reptile medicine for evaluation of appropriate treatment. Rehabilitation or euthanasia expenses would not be covered by NDOW. However, NDOW would be notified immediately during normal business hours. If an animal is killed or found dead, the carcass would be immediately frozen and transferred to NDOW with a complete written description of the discovery and circumstances, habitat, and mapped location.

Either personnel from NDOW or other appropriately qualified onsite personnel may be requested to remove and release the Gila monster out of harm's way. Should NDOW not be immediately available to respond for photo-documentation, a 35- millimeter camera or equivalent (5 mega-pixel digital minimum preferred) would be used to take good-quality images of the Gila monster at location at the location of live encounter or dead salvage. The pictures, preferably in .tif or .jpg digital format would be provided to NDOW. Pictures would include the following information: (1) encounter location (landscape with Gila monster in clear view); (2) a clear overhead shot of the entire body with a ruler next to it for scale (the Gila monster should fill the camera's field of view and be in sharp focus); and (3) a clear, overhead closeup of the head (the head should fill the camera's field of view and be in sharp focus).

Any livestock fencing that occurs along the rail line would be designed to allow movement of desert bighorn sheep. An example of fencing design is included in Appendix F.

4.12.4 Summary of Impacts

Under either alternative, impacts on vegetation would include the removal of cover types and the potential for invasive and noxious weed establishment. Disturbance of vegetation cover types within the plant site would not be important, because the vegetation types that would be disturbed are common, have high frequencies of occurrence and have wide distributions. The extent of disturbance to these vegetation types would be expected to decrease with the onset of reclamation efforts on many of the disturbed areas.

The implementation of the No-Action Alternative or Proposed Action Alternative would result in direct loss of wildlife habitat from surface disturbance associated with the construction of the power plant and associated roads and facilities. The acreages of wildlife habitats disturbed for the No-Action Alternative and Proposed Action Alternative would be 963 and 1,661 acres, respectively, and the nature of impacts on these resources would be identical. The severity of these impacts would be expected to decrease with the completion of the construction phase of the project and with the onset of reclamation efforts on many of the disturbed areas. In addition, some wildlife species would be indirectly impacted by displacement from habitats in the vicinity of the project area due to the presence of human activities associated with the construction and operation of project facilities.

No impacts to special status plants are expected under the No-Action Alternative due to the lack of suitable habitat for these species within the project area. Adoption of mitigation procedures described in Sections 4.12.2.2 and 4.12.3.2 would assure that potential adverse impacts on the Meadow Valley sandwort and Las Vegas buckwheat under the Proposed Action Alternative would be avoided.

With regard to the desert tortoise, impacts on designated critical habitat from surface disturbance associated with construction of the power plant, access road, water pipeline, and ancillary facilities under both alternatives would generally be the same. Adoption of mitigation procedures described in Sections 4.12.2.2 and 4.12.3.2 would ensure that adverse impacts to the desert tortoise and other special status wildlife species under the No-Action Alternative and Proposed Action Alternative are avoided.

4.13 WILD HORSES AND BURROS

Within the Proposed-Action Alternative area, the BLM is currently managing the Blue Nose Peak Herd Management Area with an Appropriate Management Level for wild horses and burros of one; it is unlikely that the Proposed-Action Alternative would lead to any impacts on wild horses and burros.

4.14 ARCHAEOLOGY AND HISTORICAL PRESERVATION

4.14.1 Methods

Cultural resources have been assessed for their eligibility for inclusion in the NRHP of Historic Places (NRHP) using Criteria A through D of the National Historic Preservation Act. To be eligible for the NRHP, properties must be 50 years old (unless they have special significance) and have national, state, or local significance in American history, architecture, archaeology, engineering, or culture. They also must possess integrity of location, design, setting, materials, workmanship, feeling, and association, and meet at least one of four criteria:

Criterion A: Be associated with important historical events or trends

Criterion B: Be associated with important people

Criterion C: Have important characteristics of style, type, or have artistic value

Criterion D: Have yielded or have potential to yield important information

Assessment of the potential effects on the cultural environment was based primarily on criteria defined by regulations for *Protection of Historic Properties*, which implement the National Historic Preservation Act. Those regulations define an effect as a direct or indirect alteration to the characteristics of a historic property that qualify it for inclusion in the NRHP. Effects are adverse when the alterations would diminish the integrity of a property's location, setting, design, materials, workmanship, feeling, or association.

The area of potential effect (APE) for direct impacts, associated with construction and operational-related activities that would physically disturb a cultural resource, includes the No-Action Alternative and the Proposed Action Alternative power plant (640 acres) and 31-mile-long rail line corridor (752 acres). The APE for indirect and cumulative impacts, which includes changes to the visual setting of the area or increased opportunity for human disturbance, includes a 1-mile radius of the proposed power plant and rail line corridor (Maps 3-5 and 3-6).

Treatment of effects from the Proposed Action Alternative would be guided by the State Protocol Agreement between the BLM and Nevada State Historic Preservation Office (SHPO) (BLM 1990), which contains stipulations to ensure that historic and prehistoric properties eligible for the NRHP would be treated to avoid or mitigate project related effects to the extent practicable. No mitigation or avoidance is required for ineligible cultural resources sites or isolated artifacts.

Effects to NRHP eligible properties would be mitigated through the development and implementation of a historic properties treatment plan that would delineate measures to avoid, reduce, or mitigate those impacts. A comprehensive evaluation of effects on each property would be completed and additional mitigation identified as appropriate.

The State Protocol Agreement provides specific procedures for handling unanticipated discoveries during construction. BLM would assure that any human remains, grave goods, items of cultural patrimony, or sacred objects encountered during the undertaking are treated with respect and in accordance with the State Protocol Agreement and the Native American Graves Protection and Repatriation Act and its implementing regulations (43 Code of Federal Regulations [CFR] 10).

4.14.2 No-Action Alternative

4.14.2.1 Impacts

Additional cultural resource inventories have been conducted within the No-Action Alternative power plant site (640 acres) since the 2003 EIS. All of the new and previously identified cultural resources within the APE for direct impacts, associated with construction and operational-related activities that physically would disturb a cultural resource, have been evaluated in terms of their eligibility for listing in the NRHP.

Construction of the No-Action Alternative power plant would result in direct and indirect impacts on 19 cultural resources. Of these, seven cultural resources (prehistoric rock alignments) are recommended as NRHP-eligible and 12 are ineligible sites or isolated artifacts.

4.14.3 Treatment

Of the 19 cultural resources identified within the No-Action Alternative power plant site, effects on the seven prehistoric rock alignments recommended as NRHP-eligible would be addressed and mitigated through the development and implementation of a historic properties treatment plan that would delineate measures to avoid, reduce, or mitigate those impacts. Mitigation or avoidance would not be required for the 12 ineligible sites or isolated artifacts.

4.14.4 Proposed Action Alternative

4.14.4.1 Impacts

Construction of the Proposed Action Alternative power plant (640 acres) would result in direct and indirect impacts on 19 cultural resources, the same impacts as the No-Action Alternative. Of these, seven cultural resources (prehistoric rock alignments) are recommended as NRHP-eligible and 12 are ineligible sites or isolated artifacts.

Construction of the Proposed Action Alternative rail line corridor (698 acres, excluding the acres on the 640-acre power plant site) would result in direct and indirect impacts on 12 cultural resources. Of these, two are recommended as NRHP-eligible and 10 are ineligible sites or isolated artifacts.

In total, construction of the Proposed Action Alternative power plant and rail line corridor would result in direct and indirect impacts on 31 cultural resources. Of these, nine are recommended as NRHP-eligible and 22 are ineligible cultural resources. NRHP-eligible resources include seven prehistoric rock alignments associated with the power plant site and two historic resources, the Lone Tree Ranch irrigation ditch and Leith Siding, associated with the rail line.

Direct impacts were considered as construction and operational-related activities that physically would disturb a cultural resource. Direct construction disturbances may affect adversely the potential of six prehistoric rock features to yield important information to regional prehistory (Criterion D) and may adversely affect the contributing elements of the historic Lone Tree Ranch irrigation ditch, which embodies distinctive characteristics of the type, period, or method of its construction (Criterion C).

Indirect impacts were considered in the form of visual intrusions and increased opportunity for human activity in the area. Visual effects to the historic Leith Siding as a component of the railroad landscape would, in all likelihood, not affect the integrity of the property. Increased human activity in the area may include vandalism, theft, or unauthorized excavation, and would likely affect the integrity of one prehistoric rock alignment.

4.14.4.2 Mitigation

Of the 31 cultural resources identified within the Proposed Action Alternative power plant and rail line corridor, effects to nine cultural resources recommended as NRHP-eligible would be addressed and mitigated through the development and implementation of a historic properties treatment plan that would delineate measures to avoid, reduce, or mitigate those impacts. Mitigation or avoidance would not be required for the 22 ineligible sites or isolated artifacts.

Additionally, effects on archaeological and historic sites from increased visitation in the area would be mitigated through continued visitation by members of the BLM Site Stewardship Program. Members of the Nevada Archaeological Site Stewardship Program are actively monitoring archaeological sites in the Mormon Mountains and Tule Desert area.

4.14.5 Summary of Impacts

The construction of the No-Action Alternative power plant may have the potential to affect 19 cultural resources. Of these, seven cultural resources (prehistoric rock alignments) are recommended as NRHP-eligible and 12 are ineligible sites or isolated artifacts.

The construction of the Proposed Action Alternative power plant and rail line corridor may have the potential to affect 31 cultural resources. Of these, nine are recommended as NRHP-eligible and 22 are ineligible sites or isolated artifacts. NRHP-eligible resources include seven prehistoric rock alignments associated with the power plant site and two historic resources, the Lone Tree Ranch irrigation ditch and Leith Siding, associated with the rail line corridor.

In accordance with the State Protocol Agreement, effects to NRHP eligible properties would be addressed through the development and implementation of a historic properties treatment plan that would delineate measures to avoid, reduce, or mitigate those impacts. Mitigation or avoidance would not be required for ineligible sites or isolated artifacts.

4.15 PUBLIC SAFETY, HAZARDOUS MATERIALS, AND SOLID WASTE

4.15.1 Methods

The proposed project potentially could have impacts from hazardous materials and environmental contamination. Handling, storage and disposal of hazardous materials, chemicals, substances, and wastes are governed by the Resource Conservation and Recovery Act (RCRA) and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1992. RCRA governs the generation, treatment, storage, and disposal of hazardous waste. Hazardous wastes are defined in 40 CFR parts 260 through 280. CERCLA controls cleanup of any release of hazardous substances to the environment. To meet the requirements of these acts, applicable pollution-control standards must be followed to prevent, control, and abate environmental pollution. The proposed project and resident facilities would be subject to these regulations. Pollution prevention at the proposed project is key to protecting the environment.

4.15.2 No-Action Alternative

4.15.2.1 Impacts

With the implementation of environmental controls outlined in the standard operating procedures for the No-Action Alternative, no environmental impacts related to hazardous and waste materials would be anticipated. A Spill Prevention Control and Countermeasures Plan (SPCCP) would be developed to provide procedures for cleaning up any future spill or release.

4.15.2.2 Mitigation

In the 2003 EIS, the measures below were identified to be implemented as part of the proposed project.

Contractors would be required to comply with Nevada state regulations established under the authority of the Federal Resources Conservation and Recovery Act of 1976.

As necessary, process-wastewater solid precipitant would be transported for disposal at a licensed landfill. Solid precipitant stored on site would be covered until transported off site for disposal.

Aboveground chemical tanks would be located within a containment structure that is paved and bermed and that is sufficient to contain a release from the largest tank within the area, plus sufficient freeboard to prevent overflow. Tanks would be registered, constructed, and managed using accepted engineering best practices, which may include high-level alarms or indicators to prevent overflow and locking valves. Tanks would be subject to a regular inspection regime.

The potential for adverse impacts from oil and fuel spills would be reduced through careful handling and designation of specific equipment repair and fuel storage areas.

Outdoor oil storage areas would be bermed with a capacity sufficient to contain the oil inventory in the single largest tank/equipment, plus sufficient freeboard to prevent overflow. These areas would be equipped with a normally locked valve. Regular inspections would determine if there had been a leak requiring special attention. Otherwise, the valve would be opened to drain any rainwater to a plant oil/water separator. Any oil collected in the separator would be pumped out and removed by a licensed oil disposal contractor and disposed of in an approved treatment or disposal facility in accordance with Federal, state, and local regulations, standards, codes and laws.

Outdoor chemical and hazardous waste storage areas would be within diked containment areas. Chemicals and waste would be stored in accordance with the fire safety, hazardous materials management, and hazardous waste management standards of practice, which include segregation of incompatibles, protection of water-reactive materials from precipitation or moisture, adequate aisle space, etc.

Waste materials known or found to be hazardous would be disposed of in approved treatment or disposal facilities in accordance with Federal, state, and local regulations, standards, codes, and laws.

Solid waste would be stored in closed on-site roll-off bins. Recyclable materials would be separated from the solid-waste stream. Solid waste would be collected periodically and transported to a local licensed landfill.

Generation of waste during construction would be minimized through detailed estimating of materials needed and through efficient construction practices. Any wastes generated during construction would be recycled as much as feasible. Concrete waste would be used as fill on site, or, if not suitable for reuse, would be removed to a local licensed landfill. Any non-recyclable wastes would be collected and transported to a local licensed landfill.

Fuels, lubricant chemicals, and welding gases used during construction would be in controlled storage until used. Any empty containers or waste material would be segregated in storage and properly recycled or disposed of by licensed handlers.

Concrete trucks would not be washed at construction sites. All spilled concrete would be removed from construction areas and disposed of properly in an approved location or facility in accordance with Federal, state, and local regulations, standards, codes, and laws.

Portable toilets would be provided for on-site sewage handling during construction and would be pumped out and cleaned regularly by a licensed contractor. Sewage would be treated on the site during operation of the power plant.

A SPCCP would be put in place for project features and would include the following:

- Program components and assignments
- Professional engineer certification coordinator
- Site information
- Site drainage and stormwater management
- Emergency procedures/spill response
- Emergency reporting contacts
- Tank schematics
- Material safety data sheets
- Management approval
- Plans reviews and amendments
- Personnel training
- Reporting procedures/emergency reporting contacts
- Site inspections

- Notice to tank truck drivers
- Spill, fire, and safety equipment

Operators of the Toquop Energy Project would provide on-site fire and emergency medical equipment and services and would develop a police, fire, and medical-aid agreement with Lincoln County to provide additional personnel and services to the project site.

To minimize the exposure of personnel and equipment to potential flood hazards, construction activities in the washes would be scheduled to occur when the probability for flash flooding is minimal.

4.15.3 Proposed Action Alternative

4.15.3.1 Impacts

Potential wastes that could be generated at the site include domestic non-hazardous solid waste, hazardous wastes or materials, and used wastes that can be recycled. These types of substances, materials, and wastes would likely be present during stages of construction, development, and operation of the facility. During every stage, controls for managing, handling, and disposal of these wastes are necessary. Contractors who bring these types of materials onto the project site during construction, or vendors and facility operators who use and store these materials on site, would be responsible for meeting RCRA and CERCLA requirements.

Potential impacts on the environment could occur under the Proposed Action Alternative, resulting from improper handling, storage, transport, and/or disposal of hazardous chemicals, materials, or wastes at the proposed site. Several steps could be taken to mitigate the potential for this occurrence. The following paragraphs discuss these steps.

A SPCCP would be prepared for power plant operations, contractors, or vendors who distribute, use, or produce hazardous materials or wastes. Contractors or vendors could also prepare their own plans. These plans would provide the framework for responding to spills of products or wastes.

A SWPPP also would be prepared for railroad and plant operations, contractors, or vendors who distribute, use, or produce petroleum products, or other chemicals. A SWPPP includes best management practices for handling, storage, and transport of chemicals. These best management practices would be developed to mitigate the potential impacts of exposure of chemicals to stormwater in order to protect the environment. Contractors or vendors would also prepare their own SWPPPs, as appropriate.

Although there is the potential for environmental impacts resulting from the construction and operation of the Proposed Action Alternative, following the steps outlined above and in Section 4.15.2.2 would mitigate the potential impacts.

4.15.3.2 Mitigation

Mitigation would be the same as the No-Action Alternative.

4.15.4 Summary of Impacts

Under both alternatives, requiring the preparation and implementation of SPCCP and SWPPPs would mitigate potential environmental impacts. In addition, requiring operators, contractors, and vendors to follow and comply with RCRA, CERCLA, and other environmental regulations would mitigate potential environmental impacts.

4.16 SOCIOECONOMIC RESOURCES

4.16.1 Methods

For the impact assessment, the project is considered as a whole, rather than as separate components. This is partly because all project components are in the same geographic area and employees would be drawn from the same labor market areas. Wages, salaries, training, and other employment benefits would affect the employees regardless of which project component employed them. Revenue would flow from the project operations into the same government treasuries, regardless of which project component is the source of the revenue. The phases of the project and their durations are defined as follows:

Construction:	50 months
Operations:	50 years
Decommissioning:	2 years

The environmental consequences are presented for each phase of the project. The project would have various types of effects, which are presented below. Assumptions have been based on existing labor markets, unemployment rates, the number of people currently employed in the construction and utilities industries, and related projects that would demand similarly skilled workers. Assumptions also were derived from existing commuting patterns between counties in the regional area of influence.

The assumptions made for purposes of the impact assessment include the following:

- There would be no substantial changes in the technology to be used over the life of the project. Technologies used for power plant construction, power plant operations, and water delivery would be the same as described herein.
- The government legislation and regulations would remain largely the same as they are currently. Legislation and regulations of particular importance to the project address taxation, employment, water resources, and environmental conditions.

To determine impacts on the regional area of influence, data for current and proposed projects in the area were compiled and analyzed. Social and economic data, including population projections from various Federal, state, and local sources were used in this analysis.

4.16.2 No-Action Alternative

4.16.2.1 Impacts

The disposal of public land under the No-Action Alternative would result in the reduction of payment-in-lieu-of-taxes that BLM currently pays to Lincoln County on a per-acre basis. However, the construction and operation of the project would generate revenue through property and sales taxes that would be paid to the State of Nevada, which in turn would redistribute it to all counties. It is anticipated that Lincoln County would collect $14 million during the construction period, along with a portion generated from a certain percentage of the cumulative tax rate (BLM 2003a). While these jobs would benefit the area, they would not change the overall makeup of employment by industry in the region.

Construction Phase

Under the No-Action Alternative, temporary employees from the local labor force would be needed for construction of the gas plant and ancillary facilities. These employees would be based in communities within the regional area of influence and would be expected to commute to the location, thus reducing the possibility that there would be any increase in the population of cities and or counties near the construction site. Construction of the facility would last for 26 months, and an average of 500 skilled workers would be hired. During peak construction of the first phase, it is anticipated that there would be

1,200 to 1,500 temporary positions open for skilled workers. Construction crews would be carried over into the second phase of project construction. Under the No-Action Alternative, peak employment during construction would be 950 with an average of 500 workers.

Operations Phase

Under the No-Action Alternative, in the operations phase, there would be a total of 25 permanent positions (BLM 2003a). It is expected that potential employees would come from the local area of influence. Employment at the power plant would have a local multiplier effect, generating 25 more jobs. Of those 25 jobs, 10 would be indirectly tied to the power plant, resulting from employment at local establishments that would support the power plant, and the remaining 15 would be from induced employment. Induced employment would result from employee spending, which creates a demand for retail and similar jobs.

Shutdown Phase

During the decommissioning phase, there would be a loss of jobs. Because the lifespan of the project would be at least 40 years, there would be ample time for external agencies such as Lincoln County and the City of Mesquite, Nevada to formulate economic development planning that would serve to replace any jobs lost.

Population and Housing

Because the local area of influence is projecting continued population growth, local jurisdictions currently are working to develop plans that would accommodate projected growth. For all projects in the region, temporary housing facilities could be needed and the added population during construction could place a burden on local social and public services. It is anticipated that the Toquop Energy Project would acquire 25 percent of its construction workers from outside of the region, but all of the operations workers would be from within the region. Millions of dollars could potentially filter through to local businesses from the temporary increase in population due to construction workers (BLM 2003a).

4.16.2.2 Mitigation

Should temporary housing be needed for the proposed project, Toquop Energy would coordinate with local jurisdictions or agencies to determine housing needs and locations and identify additional mitigation, as needed.

4.16.3 Proposed Action Alternative

4.16.3.1 Impacts

Most of the impacts of the Proposed Action Alternative would be similar to those of the No-Action Alternative, except that economic impacts would be greater as a result of a work force four times larger than was estimated for the No-Action Alternative (110 permanent employees versus 25 permanent employees).

Construction Phase

Under the Proposed Action Alternative, it is anticipated that, over the approximately four-year construction period, more than 1,000 temporary positions would be created requiring skilled workers. The construction phase would comprise 50 months. There would be a combined workforce of direct labor, which would be actual construction labor, and indirect labor, which would consist of support services (e.g., commuter bus driver, flagmen, or administrative staff).

Time periods within the construction phase and the associated total workforce levels are shown in Table 4-7. Months 1 through 14 and 39 through 50 (25 total months) would have the lowest workforce levels at fewer than 200 workers. Months 15 through 20 and 37 through 38 (9 total months) would have a workforce varying between 200 and 600 workers. Months 21 through 36 (16 total months) would have a workforce of more than 600 workers with a peak workforce of 1,100 in Month 29.

Table 4-7
Total Workforce Levels

Month	Number of Workers	Total Months
1 - 14	Fewer than 200	14
15 - 20	200-600 workers	7
21 - 36	Over 600 Workers (peak of 1,100 in Month 29)	16
37 - 38	200-600 workers	2
39 – 50	Fewer than 200	11

SOURCE: Toquop Energy Company, LLC 2006b

Considering that other employment opportunities in the local area of influence would compete for the same job candidates and that specialized skills would be necessary for certain aspects of the project's construction, the project would draw from the entire region of influence.

The incomes of all construction workers at the project would result in direct effects upon the area's economy. Additional income effects upon the region would occur as the result of purchases of goods and services to support the project. Finally, workers would spend their wages in the local economy and purchase additional goods and services; these purchases would constitute induced effects on the local economy.

The construction-phase employment effect on the local area of influence would include the creation of a workplace that for a period of two years would be the largest employer in Lincoln County. The plant's construction operation also would slightly exceed the employment of any one establishment in Mesquite (in Clark County), although two of the casinos in Mesquite have nearly 1,000 employees.

There would be an overlap between the skills required for construction jobs at the project and those required for utility jobs in the area. An example would be the skills of various types of equipment operators. Therefore, certain other employers in the area would compete for the same applicants, as would the project.

Population. Few employees would be expected to move into the area on other than a temporary basis during the construction phase. Therefore, there would be a negligible effect on the permanent resident population or the housing inventory in the local area of influence.

Economy and Employment. There would be induced economic effects from all the construction workers, whether or not they reside in the local area of influence. Those not from the local area of influence, however, may return to their permanent homes on weekends, so they would spend a smaller proportion of their incomes in the local area than the local residents.

Housing. Construction workers from the local area of influence generally would be expected to continue to reside in their current homes. There would be no onsite housing facilities at the power plant site. If construction workers from outside of the area of influence require temporary housing, Toquop Energy would coordinate efforts with the local jurisdiction to identify appropriate locations and obtain any necessary permits or land use approvals. A park-and-ride program would be developed to transport construction workers from the motor homes to the construction site. Toquop Energy would work with the city of Mesquite and local businesses to accommodate and support offsite employee parking.

Public Facilities and Services

Local Utility Service. There is a possibility that additional increases in the population of the workforce from outside of the areas of influence could burden the local utility services. However, because few employees would move into the area on other than a transient basis for the construction phase, it is not anticipated that there would be an adverse effect on the local utility service.

Education and Training. Most employees of the construction phase likely would be from the local area of influence with children already attending schools in the local school districts. If employees come from outside of the region, however, the added number of children would impact the school system. Because of projected population growth, districts within the local area of influence have been developing plans for expansion and analyzing potential sites to build new facilities. It is anticipated that money paid through state and local taxes from the developers of the proposed project, as well as developers from other projects, would be redistributed to counties, contributing to education funding.

Health Conditions and Health Care. Adverse effects on health-care facilities during the construction phase are not anticipated, as most workers would be from the local area of influence. Construction workers from outside of the area, however, could bring additional family members, which could potentially contribute to burdens on the health-care system. Currently, medical facilities within the local area of influence are anticipating projected growth and are developing plans to expand their services.

Public Safety. Currently, the Lincoln County Sheriff's Department provides services throughout the Toquop area. The response time to the Toquop area is 2 hours, which could pose a concern to employees working at the proposed project site should emergency medical services be required.

Operations Phase

There would be a total of 110 permanent employees at the power plant throughout the entire operations phase. This is more than four times the number of permanent employees that would be needed for the No-Action Alternative. Nearly all of the employees would be based at the power plant site. A few would provide support to both the power plant and ancillary facilities.

Population. Most potential employees probably would be from the local area of influence. Highly specialized workers most likely would be from outside the area and could bring additional family members. A substantial increase in population, however, is not expected as a result of permanent employment for the proposed project.

Economy and Employment. Due to the high number of operations-phase jobs, the power plant would rank in the top five largest private employers in Lincoln County. The stability of employment levels over a period of 50 years would be important to the stability of the region. Some of the establishments and entire industries represented in the current employment distribution in the area are not traditionally as stable.

The wages for workers at the project would be similar to those at existing power plants just outside of the regional area of influence. The wage scale would be somewhat higher than for construction-phase jobs.

Housing. Because most of the workers are expected to come from Mesquite or the local area of influence, it is not anticipated that housing would represent an significant incremental demand in the area. Potential employees coming from outside of the areas of influence with highly specialized skills would have a higher pay and would likely be able to afford housing within the local area of influence. To accommodate future growth, master-planned communities are already being planned and developed within the local area of influence, including the Riverside planned unit development and the Mesquite contiguity parcel in Mesquite, the Coyote Springs development, and the Hidden Valley Community project.

Public Facilities and Services

Local Utility Service. There is a possibility that additional increases in the population of the workforce from outside of the areas of influence could contribute to burdens on local utility services. Local utility companies, specifically those in Lincoln County, are planning to expand their services to accommodate future growth in the region by buying supplemental power from larger energy facilities. Telecommunication companies also are finding ways to accommodate that growth and have plans in place for expansion.

Education and Training. If potential employees come from outside of the region, the added number of children could impact the school system. Because of projected population growth, districts within the local area of influence have been developing plans for expansion and analyzing potential sites to build new facilities. It is anticipated that money paid through state and local taxes from the developers of the proposed project, as well as developers from other projects, would be redistributed to counties, contributing to education funding.

Health Conditions and Health Care. Highly specialized workers would most likely be from outside of the area and would bring additional family members, which potentially could burden the health-care system. Currently, medical facilities within the local area of influence are anticipating continued population growth and are developing plans to expand their services.

Public Safety. Currently, the Lincoln County Sheriff's Department provides services throughout the Toquop area. The response time to the Toquop area is 2 hours, which could pose a concern to employees working at the proposed project site. Projected needs for the Toquop area over the next 5 to 10 years include creating 6 patrol positions and 2.5 deputies per 1,000 individuals (Lincoln County 2006). Lincoln County also would provide fire department startup facilities specifically for the Toquop Township area.

Decommissioning Phase

During the decommissioning phase, there would be a loss of high-paying jobs. Because the lifespan of the project is known, there would be ample time for external agencies such as Lincoln County and the city of Mesquite to formulate economic development planning that would serve to replace any jobs lost.

4.16.3.2 Mitigation

Short-term mitigation measures would involve Toquop Energy coordinating with local jurisdictions and agencies to determine housing needs and locations should temporary housing be needed for the proposed project during the construction phase. In order to mitigate concerns with public safety, Toquop Energy would work with local jurisdictions to address how best to serve employees at the project site in case emergency medical service is required. .

4.16.4 Summary of Impacts

For both the No-Action and Proposed Action Alternatives, impacts during the construction phase would be temporary and are not anticipated to adversely affect populations of both the local and regional areas of influence. Construction workers most likely would come from the local area of influence and already would have homes in the community. However, local economies might benefit from workers coming from outside of the regional area of influence to meet the high personnel demands of construction. Workers would spend their wages in the local economy and purchase additional goods and services, inducing additional positive effects on local economies.

During the operations phase under both alternatives, there potentially could be employees from outside of the areas of influence that command higher pay for their specialized skills. It is expected that these employees would not find difficulty purchasing affordable homes due to their higher salaries. These employees, however, could add to burdens on public facilities and services. Additional family members of these employees also may burden local school districts. There would be positive induced effects on the local economies, however, as these employees would purchase goods and services thereby increasing sales and overall consumer spending. Higher response times for emergency services are a consideration during both the construction and operation phases, should any incidents occur at the proposed project site. To mitigate this concern, Toquop Energy would coordinate a strategy for emergency response services with local jurisdictions. Toquop Energy also would be required to coordinate with the appropriate local jurisdiction on land use approvals in the event that temporary housing is needed during the construction phase.

4.17 ENVIRONMENTAL JUSTICE

4.17.1 Methods

Information about the proportion of population that may be impacted by the alternatives and are characterized as minority and/or low-income is provided in Section 3.18. Overall, the data show that there is a slightly higher proportion of Hispanic residents in Mesquite, Nevada, and there are higher proportions of low-income populations in Caliente, Lincoln County and St, George, Utah. The potential for disproportionate, adverse impacts on the identified environmental justice populations was evaluated.

4.17.2 No-Action Alternative

4.17.2.1 Impacts

Income and revenue benefits associated with the project would be distributed throughout all areas, including environmental justice populations. Adverse impacts associated with the project would not be experienced disproportionately by an environmental justice population.

There are no special issues, such as housing, transportation access, or resource use in the project area that would affect the environmental justice population disproportionately.

4.17.2.2 Mitigation

Mitigation would not be required.

4.17.3 Proposed Action Alternative

4.17.3.1 Impacts

A key difference between the Proposed Action and No-Action alternatives would be the addition of a rail line. Caliente, as a potential employee resource pool, is much closer to Leith Siding than the power plant site. If the construction or operational employees were to report to work at the Leith Siding area, an employment opportunity for Caliente residents at that location would be more attractive than one at the power plant site.

As with the No-Action Alternative, adverse impacts associated with the project would not be experienced disproportionately by an environmental justice population, and no special issues were identified.

4.17.3.2 Mitigation

Mitigation would not be required.

4.17.4 Summary of Impacts

No disproportionate, adverse impacts on environmental justice populations would occur as a result of the construction and operation of any of the alternatives.

4.18 CUMULATIVE IMPACTS

4.18.1 Introduction

Regulations prepared by the Council on Environmental Quality (CEQ) for implementing NEPA require Federal agencies to analyze and disclose effects that could result from the incremental effect of an 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." Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR 1508.7).

This section addresses potential cumulative impacts that would result from the effects of the No-Action or Proposed Action alternatives when combined with the effects of other past, present, and reasonably foreseeable future projects. Interrelated projects, defined as those activities that could interact with the alternatives in a manner that would result in cumulative impacts, are noted in Table 4-8.

Table 4-8
Summary of Past, Present, and Future Actions

Activities	Location/Description	Status
UTILITIES, INDUSTRY AND PUBLIC SERVICE		
Reid Gardner station	Moapa, Nevada. 590-megawatt (MW) generating station consisting of four coal-fired steam boilers	existing
Reid Gardner expansion	Clark County, south of Moapa, Nevada. Approximately 240 acres for evaporation ponds and 320-acre expansion site for permanent storage yard for fly ash	future
Chuck Lenzie generating station	Apex, Clark County (about 20 miles northeast of Las Vegas). 1,200-MW combined-cycle power plant	existing
Southwest Intertie project	500-kilovolt project passing north/south approximately 40 miles west of the project site	future
Kern River Gas Transmission Company expansion pipeline	36-inch-diameter natural gas pipeline that crosses southeast corner of proposed plant site.	existing
Holly Energy Partners	12-inch-diameter pipeline extending approximately 400 miles from Salt Lake City, Utah, to the northern edge of Las Vegas, Nevada	future
White Pine Energy	White Pine County, Nevada. 1,500-MW coal-fired generating plant	future
Ely Energy Center project	White Pine County, Nevada. 2,500-MW coal-fired generating plant	future
Ash Grove cement plant	Moapa Indian Reservation. Cement kiln	future (2010)
Mesquite Airport	Mesquite, Nevada. General aviation replacement airport	future (2015)
Exit 109 Interchange	Mesquite, Nevada. Development of a "Change in Control of Access Report" for the proposed Interstate 15 at Exit 109 Interchange to serve new airport, developments, and Toquop Energy Project	future
Mesquite wastewater treatment plant expansion	Expansion of the existing wastewater treatment plant to 6.0 millions gallons per day	future (2007)
BLM MANAGEMENT ACTIVITIES		
Grazing	Grazing activities and range improvements throughout project area	past, existing, future

Activities	Location/Description	Status
Mining	Authorization of mining claims in project area	past, existing
Lincoln County Conservation Recreation and Development Act	Sale of up to 90,000 acres in Lincoln County as provided for by the Lincoln County Conservation Recreation and Development Act	future
Proposed Meadow Valley Wash Area of Critical Environmental Concern (ACEC)	This ACEC is included under the preferred alternative in the Draft Resource Management Plan for the Ely Field Office (under revision). The ACEC would be located along the Union Pacific Railroad and would be crossed by the proposed rail line for approximately 3 miles (near Leith Siding)	future
Yucca Mountain Rail	Department of Energy. Caliente alignment is approximate 50 miles north west of the proposed plant site	future
WATER DEVELOPMENT		
Kane Springs Valley water development project	Proposed by the Lincoln County Water District, would establish a production and distribution system to deliver water to planned developments	future
Lincoln County Land Act groundwater development project	The Lincoln County Water District proposes to construct groundwater facilities and ancillary utility infrastructure designed to pump and convey groundwater in the Clover Valley and Tule Desert Hydrographic Basins, primarily to meet future municipal needs in southeastern Lincoln County	future
Southern Nevada Water Authority, Vidler, Lincoln County Water District and interrelated water projects	Interrelated water projects concerning deep and shallow aquifer developments and pipelines in and through Lincoln and Clark counties	future
Virgin and Muddy rivers surface water development project	Southern Nevada Water Authority is proposing to build facilities to divert, treat and transmit its existing surface water rights on the Virgin and Muddy Rivers to the Las Vegas Valley. The proposed facilities would divert an annual average of approximately 71,000 acre-feet of water from the Virgin River and up to 11,000 acre-feet per year from the Muddy River.	future (2013)
RESIDENTIAL		
Riverside planned unit development	1,400 acres located east of Riverside Road (at I-15 exit 112) with future residential development programmed not to exceed 4,200 dwelling units. Commercial uses and public facilities would be integrated with the proposed residential.	future
Lincoln County Land Act (LCLA)	The LCLA identified for sale approximately 13,500 acres in the southeastern corner of Lincoln County near Mesquite, Nevada. It is likely that residential development will occur.	existing
Mesquite contiguity parcel	Upon approval of the Mesquite Airport EIS, a 5,080-acre parcel will be released to the City of Mesquite for development. The parcel is located next to the proposed Mesquite Replacement Airport.	future
Coyote Springs development	Planned community about 50 miles north of Las Vegas and 50 miles west of project site. Includes approximately 42,800 acres east of U.S. Highway 93 and north of State Route 168	future
Hidden Valley Community project	Moapa, Nevada. Hidden Valley Glendale LLC’s proposed 910-acre Hidden Valley Community project	future
Rural and suburban residential development	Throughout project area (Mesquite and Las Vegas, Nevada)	existing, future
ENVIRONMENTAL CONDITIONS		
Drought	Nevada, like much of the desert Southwest is experiencing drought conditions	past, existing

Activities	Location/Description	Status
Meadow Valley Wash flooding 2005	Repairs along the Union Pacific Railroad at Leith Siding in Meadow Valley Wash as a result of the 2005 flooding events	present (ongoing)
Wildland fire	Areas adjacent to existing and proposed rail lines, especially in those areas that become populated by weeds	past, present, future

4.18.2 Methods

It is important to note that cumulative impacts consider the *resource* "footprint" or area of influence or effect, rather than the *project* footprint. For example, air quality is likely to have a very large area of influence, while distribution of an endangered plant species may have a very small area of effect (footprint). Therefore, the geography represented by the projects noted in Table 4-8 is broad. Additionally, Council on Environmental Quality guidance on the assessment of cumulative impacts indicates that the analysis should consider issues identified during scoping. During scoping for this EIS, air quality and water resources received the highest level of public concern. Projects outside the area of immediate, local influence but within the sphere of effect for air and water quality have been identified to facilitate adequate analysis of cumulative impacts to those resources.

In some instances, available data are sufficient to provide a quantitative assessment of impacts. For some resources, impacts are discussed qualitatively. In addition, not all of the past, present, and future actions identified in Table 4-8 would interact with all resources.

4.18.3 Cumulative Impact Analysis

Cumulative effects are characterized below by resource or resource use, as appropriate. Each discussion specifies the additive or synergistic effects that the alternatives might have in combination with past, present, and reasonably foreseeable future actions as identified in Table 4-8.

4.18.3.1 Lands

Future projects in the region—including residential development, airport expansion, and transportation improvements—combined with each of the alternatives would have the cumulative effect of further urbanizing some areas of southeastern Lincoln County. Although the Lincoln County Land Act parcels are expected to develop into residential areas over the long term, potential land use incompatibilities with the industrial Toquop Energy Project would be minimal due to distance between the uses and the opportunity for land use developers to account for this interface as master plans are developed. Additionally, although there are several proposed power projects in the region both to the north and south of the Toquop Energy Project, cumulative effects on land use patterns would be minor as the facilities would be distant from each other and the opportunity exists for future transmission line interconnections to be constructed within established corridors (such as the Southwest Intertie Project corridor, located about 40 miles west of the proposed power plant site).

4.18.3.2 Grazing and Rangeland

Past actions in the southeastern Lincoln County have resulted in a reduction in grazing authorizations due to implementation of BLM's desert tortoise management plans and the land ownership shifts associated with Lincoln County Land Act. Reductions in authorized AUMs also have occurred as a result of drought conditions and actions taken to meet the public-land health standards for rangeland. Future water development projects in the area could result in competition between agricultural and residential water uses because some grazing allotments are tied to water-based rights. The impacts on grazing and livestock that would result from the alternatives would have a small but incremental effect on the regional area of influence. As more lands are converted to industrial use, the character of the area will be reshaped, which could decrease the viability of agricultural uses. However, because Lincoln County is 98 percent public land, ample opportunities would continue to exist for grazing.

4.18.3.3 Recreation and Access

Projected population growth in Las Vegas and Mesquite, growth expected to occur in association with the Riverside Planned Unit Development and Lincoln County Land Act, and recreational pursuits by the project workers could all increase public interest in available open space and recreation areas. Development around the Las Vegas area could push recreation further north into southern Lincoln County. However, the presence of the proposed project, including ancillary facilities and rail line, would not diminish the areas available for recreation. Road development projects in the area and the creation of a new linear route (the rail line) could increase public access in the area. However, most of the routes, trails, and roads in the project area were created for grazing and ranching purposes, and additional access would not be expected to impact the existing transportation network. No cumulative impacts are anticipated to recreation or access.

4.18.3.4 Wilderness and Special Management Areas

Wilderness and special management areas such as ACECs could experience cumulative impacts as population increases and as more people seek solitude and recreational opportunities in the area, increasing pressure on sensitive resources.

The BLM is considering the designation of a Meadow Valley Wash ACEC. It is anticipated that this area would be managed as a ROW avoidance area. Under the Proposed Action Alternative, the rail line would cross the proposed ACEC for approximately 5 miles. Resources within the proposed ACEC have already been impacted by past fire damage and flooding.

4.18.3.5 Visual Resources

The project alternatives would introduce a new industrial facility to the overall landscape, which is primarily undeveloped. However, in combination with other future actions, the additive impact on potential sensitive viewers would be limited due to constrained opportunities for the project to be viewed, the distances from which viewers would be able to see the project, visual interference with the project views by topography, and the presence of existing transmission facilities.

4.18.3.6 Climate and Air Quality

Further residential and commercial development is expected to occur in the general area of the Toquop Energy Project. Emissions due to construction activities are frequently near-ground releases and, therefore, the impacts would occur only over a limited geographic area within the immediate vicinity of the proposed facility. Reid Gardner Station is an existing 590-MW coal-fired power plant in the region. Two proposed power plant projects include the White Pine Project (1,500-MW coal-fired generating plant in White Pine County, Nevada) and Ely Energy Center Project (2,500-MW coal-fired generating plant in White Pine County, Nevada). These development projects would not likely occur at the same time or in the same area as the proposed Toquop Energy Project. Furthermore, since the air quality impacts during construction would occur over a limited geographic area for each project, the cumulative effects during construction would be limited.

In the context of the Prevention of Significant Deterioration (PSD) permitting requirements, a PSD increment evaluation and NAAQS Evaluation were conducted to assess potential cumulative impacts on air quality. The PSD increment evaluation is used to estimate the degradation of air quality caused by construction of manmade sources of air pollution after certain baseline dates. The NAAQS evaluation, which includes background pollutant concentrations, is used to estimate the total impacts of all natural and anthropogenic sources of air pollution on air quality as compared to the pollutant concentrations at which human health or the environment could be impacted.

Table 4-9 is a list of the permitted major sources included by ENSR in the PSD cumulative impact analysis.

Table 4-9
Background Sources Included in the Cumulative Modeling Analysis

Facility Name	Facility Type	Location
Royal Cement Company	Cement plant	Logandale, Nevada
Nevada Power Company Reid Gardner Station	Coal-fired electric generating station	Moapa, Nevada
Western Mining and Materials	Crushing and screening plant	Black Rock, Arizona
Simplot Silica Products	Silica sand production	Overton, Nevada
Casablanca/Oasis Casino	Hotel and casino	Mesquite, Nevada
Rinker Materials Moapa Facility	Cement plant	Moapa, Nevada
Precision Aggregates	Sand and gravel yard	Mesquite, Nevada
Lasco Bathware	Plumbing products manufacturer	Moapa, Nevada
Legacy Rock	Sand and gravel yard	Logandale, Nevada
BLM Moapa Decorative Rock Pit	Sand and gravel yard	Logandale, Nevada
Sunroc Corp Bunkerville Ready Mix	Cement plant	Bunkerville, Nevada
Ready Mix, Inc.	Cement plant	Las Vegas, Nevada
Geneva Pipe of Nevada	Concrete pipe manufacturer	Moapa, Nevada
General Rock Products	Sand and gravel yard	Las Vegas, Nevada

SOURCE: ENSR Corporation 2007a

The PSD Class I modeling results indicate that the proposed project has insignificant impacts. However, since certain pollutants exceeded the SILs within Class II areas, a cumulative PSD Class II increment evaluation and NAAQS evaluation for SO_2 (3-hour), PM_{10} (24-hour and annual), and NO_2 (annual) were performed using project sources with the main boiler at 100 percent load and the appropriate inventory of background sources. Table 4-10 summarizes the PSD Class II increment cumulative modeling analysis for the Virgin River hydrographic basin, which is where the Toquop Energy Project is located. The results of the PSD increment evaluation, presented in Table 4-10, show that the emissions from the proposed project plus those from other PSD-increment-consuming sources would not exceed a PSD Class II increment. The largest percentage of the increment was for annual NO_2 at 50 percent, located 0.6 km (0.4 mile) from the stack.

Table 4-11 presents the results of the NAAQS analysis. For all three pollutants the reasonable, but conservative, impact is shown to be less than the NAAQS. The potential effects on air quality due to emissions from the proposed Toquop Energy Project, in conjunction with nearby source emissions, are expected to result in predicted concentrations in Class II areas that are in compliance with NAAQS limits, as shown in Table 4-11. The largest percentage of the NAAQS was for annual PM_{10} at 61 percent located 0.6 km (0.4 mile) from the stack. The only two reasonably foreseeable actions potentially impacting air quality in the vicinity of the proposed alternative are the White Pine and Ely Energy Center projects. However, both of these projects are to be located near Ely, White Pine County, Nevada, which is located more than 225 km (140 miles) from Toquop Energy Project. The emissions from these two plants would be relatively similar to that of the Toquop Energy Project on a unit-of-power basis. Because the modeled impacts for this analysis occur very near the Toquop Energy Project stack and are well below the PSD Class II increment and NAAQS, it is estimated that the combined impacts would not be expected to exceed the PSD increment and NAAQS.

Table 4-10
PSD Increment Cumulative Modeling Analysis – Main Receptor Grid

Pollutant	Averaging Period	Modeled Impact (μg/m³)	Distance	Bearing (Deg.)	PSD Class II Increment (μg/m³)	Percent of Increment
Sulfur dioxide (SO_2)	3-hour [1]	29.27	16.7 mi (26.9 km)	222	512	6
PM_{10}	24-hour [1]	12.70	0.4 mi (0.6 km)	195	30	42
	Annual [2]	3.89	0.4 mi (0.6 km)	193	17	23
Nitrogen dioxide (NO_2)	Annual [2]	12.39	0.4 mi (0.6 km)	195	25	50

SOURCE: ENSR Corporation 2007a
NOTES: μg/m³ = micrograms per cubic meter
Deg. = degree
PSD = Prevention of Significant Deterioration
PM_{10} = particulate matter less than or equal to 10 microns
mi = mile
km = kilometer
[1] Modeled impact reflects the highest second highest concentration.
[2] Modeled impact reflects the highest first highest concentration.

Table 4-11
Proposed Project NAAQS Cumulative Modeling Analysis – Main Receptor Grid

Pollutant	Averaging Period	Maximum Modeled Conc. (μg/m³)	Ambient Background (μg/m³)	Total Impact (μg/m³)	Distance km (mi)	Bearing (Deg.)	NAAQS (μg/m³)	Percent of Ambient Standard
Sulfur dioxide (SO_2)	3-hour [1]	29.27	28.0	57.27	16.7 mi (26.9 km)	222	1,300	4
PM_{10}	24-hour [1]	12.70	37.1	49.78	0.4 mi (0.6 km)	195	150	33
	Annual [2]	3.89	26.6	30.49	0.4 mi (0.6 km)	193	Revoked	NA
Nitrogen dioxide (NO_2)	Annual [2]	12.39	8.5	20.89	0.4 mi (0.6 km)	195	100	21

SOURCE: ENSR Corporation 2007a
NOTES: : μg/m³ = micrograms per cubic meter
Deg. = degree
NAAQS = National Ambient Air Quality Standards
PM_{10} = particulate matter less than or equal to 10 microns
NA = Not available
[1] Modeled impact reflects the highest second highest concentration.
[2] Modeled impact reflects the highest first highest concentration.

There is one other coal-fired power plant in the region shown on Map 4-1, the Reid Gardner Station in Moapa. This power plant emits about 145 pounds of mercury annually (Clean Air Task Force 2000). The largest source of atmospheric mercury in Nevada is processing gold through precious metal mine operations (NDEP 2007a). In 2006, mining facilities regulated through the Nevada Mercury Control Program reported a total of 4,593 pounds of mercury and 130 pounds of mercury co-product emitted throughout Nevada (NDEP 2007b).

Regulatory changes to reduce mercury emissions have been implemented within the last several years that would be expected to reduce overall emissions to the existing environment. In March 2006, Nevada adopted the Nevada Mercury Air Emissions Control Program, which requires mercury emissions controls at precious metal mining facilities. Voluntary mercury reduction efforts at mining facilities have been occurring since 2002; an 82 percent reduction in mercury emissions was observed through 2004 at the participating mining facilities in this program (NDEP 2007a). In addition, the Clean Air Mercury Rule

(CAMR) applies to coal-fired power plants, as described in Chapter 3. Nevada's CAMR program was initiated in September 2006 and requires new coal-fired units to obtain a mercury operating permit, and encourages reductions at existing facilities. Nevada is responsible for ensuring that the state stays within its mercury emissions "budget" set under CAMR.

Global Air Quality Impacts

As described above, the proposed power plant would emit criteria pollutants, including particulates and gaseous pollutants (SO_2 and NO_x) that form aerosols in the atmosphere. Although measurable concentrations of emissions from the proposed power plant would likely extend no further than 62 miles (100 km) from the facility, due to regional wind patterns, minute quantities of these chemicals could eventually be dispersed across a wider area. In addition, combustion of biomass and all fossil fuels (coal, coke, petroleum, and natural gas) and lime-based flue-gas desulfurization (FGD) processes result in emissions of carbon dioxide (CO_2). CO_2 is widely considered to be a "greenhouse gas." Greenhouse gases, which also include methane, NO_x, chlorofluorocarbons, and other chemicals, play a natural role in maintaining the temperature of the earth's atmosphere by allowing some sunlight to pass through and heat the surface of the earth and then absorbing a portion of the infrared heat reflected or transmitted from the ground. Natural sources of greenhouse gases include volcanic eruptions, plant respiration, and decomposition of organic matter.

Global temperatures have increased in the last 50 years. This phenomenon is referred to as "global warming." Increased emissions of greenhouse gases from anthropogenic (i.e., human) activity over the last 100 years are suspected of playing a role in the observed global warming, although the precise mechanisms and magnitude of their effect remains subject to debate within the scientific community. However, there currently is broad consensus within those members of the scientific community who have researched this issue that greenhouse-gas emissions associated with such anthropogenic activity has contributed to the observed global-warming phenomenon.

The electric power generating industry is participating in extensive research on further defining the extent to which emissions of anthropogenic greenhouse gas contributes to global warming. In addition, technological approaches to reducing greenhouse gas emissions from industrial facilities are the subject of numerous research projects around the world. The Edison Electric Institute has called for increased international cooperation with regard to research and technology development (Edison Electric Institute 2006). One possible means to reduce atmospheric emissions of CO_2 is to compress and inject it deep underground; however, this technology, and the means to concentrate CO_2 in a gasification process, is in the experimental stage.

4.18.3.7 Geology, Soils, and Minerals

Cumulative impacts on soils would include the damage to biological soil crusts in the project area and other areas in the region where construction or surface-disturbing activities, such as those noted in Table 4-8, disturb large acreages of the sensitive desert environment and impact the fragile soil crust. Cumulative impacts on biological soil crusts would be localized and difficult to predict without a survey identifying specific locations. The construction of an improved road may stimulate the development and production of mineral resources, particularly mineral materials, to meet the increasing demands of the southern Nevada markets.

4.18.3.8 Groundwater Resources

Although there have been several other power-generation plants developed in the region in the past 40 years, they draw their groundwater from outside the Tule Desert or Clover Valley fractured-rock or basin-fill aquifers. Basin recharge may have been affected by seven years of drought that may continue for another several years.

There are currently two other power plant projects in development in the region that may be constructed within the next eight years—the Ely Energy Center, White Pine, and Toquop power plants. They would not be drawing groundwater from the Tule Desert or Clover Valley hydrographic basins; therefore, there would be no additive impacts on those groundwater sources from the other proposed power plants. A population boom in several small Lincoln County communities, as well as the availability of up to 103,500 acres of land for sale in Lincoln County, suggests that the demand for groundwater will be increasing over the next 5 to 10 years, which likely will be met (partially or entirely) with water from the Tule Desert and Clover Valley. The Lincoln County Water District (LCWD) has proposed a groundwater development project to pump and transmit water from the Tule Desert and Clover Valley, and this project is being evaluated in the separate EIS. The Kane Springs Valley water development project also is proposed by the LCWD, but this project would draw upon hydrographic basins that are separate flow systems from the Tule Desert or Clover Valley.

Groundwater withdrawals could lead to the cumulative decline in groundwater levels and flows. Currently, there are 17,627 af/yr in permitted water rights in the Clover Valley, with 14,483 af/yr in pending water rights applications. In the Tule Desert, there are currently 4,345 af/yr in permitted water rights and about 42,000 af/yr in pending water rights applications (BLM 2007c). Water amounts to meet the needs of the No-Action or the Proposed Action alternatives are included within these figures. The perennial yield for each of these hydrographic areas is about 1,000 af/yr.

The Lower Meadow Valley Wash hydrographic area (with a perennial yield of about 5000 af/yr) has 92,467 af/yr in permitted water rights, with 20,909 af/yr in pending water rights applications. The Virgin River Valley hydrographic area has 30,260 in permitted water rights and 234,990 af/yr in pending water rights applications. Recharge to the Virgin River Valley is estimated to be about 3,600 af/yr, and the available perennial yield is estimated to be much higher, perhaps 40,000 af/yr, taking into account 12,000 af/yr in local pumping (Dixon and Katzer 2002).

An agreement between LCWD and the National Park Service stipulates that LCWD will monitor, manage, and mitigate unanticipated impacts that result from the development of groundwater resources in the Tule Desert area (BLM 2007c). Groundwater modeling is currently being conducted by the National Park Service to evaluate the regional flow systems and determine whether cumulative pumping in the regional area would influence spring flows in the Virgin River Basin.

4.18.3.9 Surface Water Resources

Floodplains

Floodplains provide floodwater storage during storm events. As the floodplains in the region are altered, their ability to provide floodwater storage capacity for the region will be diminished. All of the potential future developments in the region have the possibility to cumulatively impact floodplains in the region by either direct construction within the floodplains or by creating additional impervious surface areas that could increase the volume of water within the floodplains in the region. This may result in adverse impacts on the natural and beneficial floodplain values if alternate methods for the management of stormwater flows are not developed for each potential future development. However, the project area for all the alternatives is located in an area designated as Zone D on the Federal Emergency Management Agency foodplain maps. Flood hazards in Zone D areas are considered possible, but as of yet are undetermined, as an analysis of floodplains has not been conducted.

Jurisdictional Waters of the United States

Only the projects listed below possibly could have a cumulative impact on the potential jurisdictional waters contained within the project area. All projects described in Table 4-8 that are not listed below are not expected to cumulatively impact the potential jurisdictional waters contained within the project area.

- **Replacement Airport near Mesquite, Nevada**. Halfway Wash passes through the area under consideration for the replacement airport several miles downstream from the project area. Design for the airport has not been completed; however, it is likely that Halfway Wash would be spanned by either a culvert or a bridge. Therefore, the function and value of Halfway Wash will remain intact, and no cumulative impacts on potential jurisdictional waters within the project area are expected to occur as a result of the development of the replacement airport.
- **Exit 109 Interchange**. Cumulative impacts on the potential jurisdictional waters within the project area could occur from the development of the Exit 109 Interchange, dependent on the location and design of the exit. Halfway Wash may be impacted by the proposed interchange. However, because of the type of design required by the Nevada Department of Transportation, the function and values of Halfway Wash would remain intact, and no cumulative impacts on potential jurisdictional waters within the project area are expected to occur as a result of the development of the Exit 109 Interchange.
- **Virgin and Muddy Rivers Surface Water Development Project**. One of the proposed facilities for this project includes the Halfway Wash impoundment dam several miles downstream of the project area. This project is scheduled for completion no earlier than 2013; as such, no specific plans for the Halfway Wash impoundment dam have been completed. Impacts on Halfway Wash from this project will occur, but the degree to which Halfway Wash will be impacted is unknown at this time.

4.18.3.10 Biological Resources

BLM guidance (BLM 1994) recommends evaluating cumulative impacts on a watershed scale for natural resources related to watershed function and stability. Therefore, for purposes of analysis for biological resources, the cumulative impacts analysis area (CIAA) includes all watersheds that intersect the project area (Tule Desert, Virgin River Valley, and Lower Meadow Valley Wash basins) and are within the boundaries of the planning area for the BLM Ely District RMP. The CIAA includes approximately 1.5 million acres of land, which encompasses portions of four watersheds within southwestern Lincoln and northeastern Clark counties (see Map 4-1).

Analysis of existing levels of surface disturbance from available sources of geographic information system data was conducted at a gross scale (i.e., 1:100,000) for the CIAA. The analysis does not include detailed, finer-level data for surface disturbances such as individual homesteads, two track roads, or OHV use, and so provides a minimum estimate of the amount of direct disturbance associated with human activities within the CIAA. Based on this analysis, an estimated 13,178 acres of land within the CIAA (0.88 percent) have been disturbed or eliminated as a result of past and ongoing development activities. Table 4-12 summarizes the amount of existing disturbance by type (e.g., highway, urban development, agriculture, etc.) within each watershed.

Table 4-12
Area and Types of Disturbance by Watershed (Acres)

	Watershed				
Disturbance Type	**Lower Meadow Valley Wash**	**Lower Moapa Valley**	**Tule Desert**	**Virgin River Valley**	**Total Area of Disturbance**
Interstate	13.3	363.4	–	622.9	999.6
State highways	157.9	82.8	–	44.0	284.7
Other roads	621.5	286.1	371.7	1,052.4	2,331.7
Agriculture	822.3	1,910.9	–	1,756.6	4,489.8
Urban development	61.3	1,457.4	–	3,553.4	5,072.1
Subtotal	1,676.3	4,100.6	371.7	7,029.3	13,177.9

SOURCE: Bureau of Land Management 2006-2005; Environmental Systems Research Institute 2004; U.S. Geological Survey 2002

Future levels of potential surface disturbance could not be quantified in the same manner as the past and present disturbance, due to lack of specific area and location data. Where acreages and lengths were available for future projects, the numbers were included in the impact analysis.

Cumulative short- and long-term effects to biological resources within the CIAA are many and stem from a variety of activities, including oil and gas development; mining; livestock grazing; non-native and invasive species; OHV use; camping; agriculture; road, powerline, and pipeline construction; and commercial, residential, and recreational development. The region has several energy-generation plants and is crisscrossed by electric transmission lines and highways, as well as by water and natural gas pipelines, all of which serve urban areas in central and southern Nevada.

Vegetation

The extent of existing disturbance within the CIAA has reduced the total acreage of vegetation cover types by approximately 0.88 percent. Under the No-Action and Proposed Action alternatives, an estimated 963 and 1,661 acres of natural vegetation and habitat, respectively, would be modified or eliminated over the short term and long term. These figures include all temporary disturbance areas that would be reclaimed following construction (see Section 4.12). This represents a 0.06 and 0.1 percent reduction in vegetation cover types within the CIAA. Together with existing disturbances, this raises the cumulative total to 0.95 and 0.98 percent respectively under the No-Action and Proposed Action alternatives.

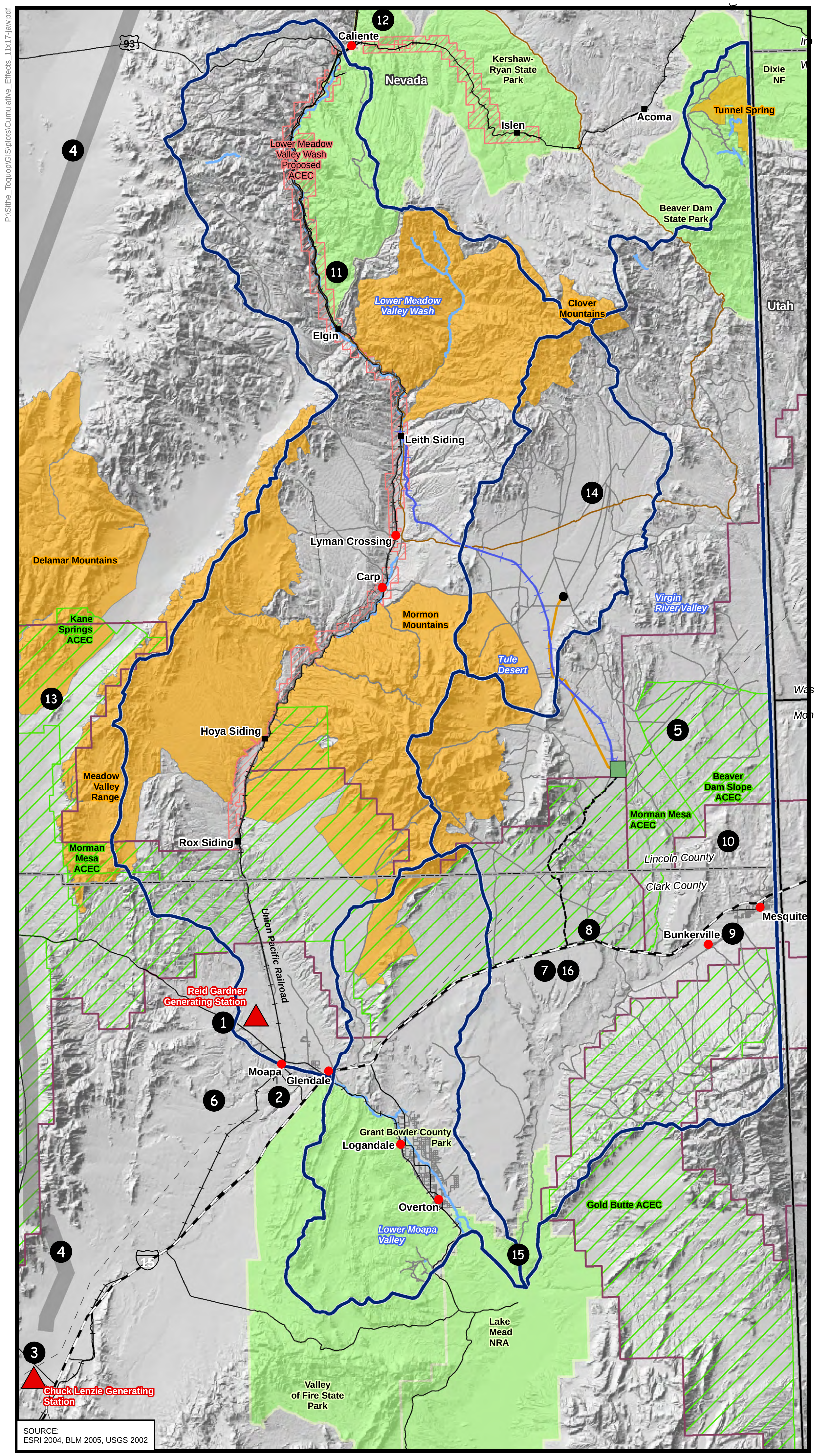
Potential future cumulative impacts include the direct loss of vegetation from development, changes in vegetation community composition due to increased noxious and invasive weed establishment and spread, increased numbers and intensities of wildfire due to increased fuel levels from weeds, as well as increased sources of ignition due to increased human presence in the area.

Future projects (refer to Table 4-8 for a list of future projects) would remove large areas of vegetation. Up to 153,340 acres of vegetation would be disturbed due to those planned or proposed projects shown on Map 4-1 whose areal extent is known. Additional areas of vegetation would be lost from other future projects whose areal extent is not known.

With regard to the Toquop Energy Project, because of the small proportions of vegetation cover types that would be disturbed and the reclamation reduction of post-construction disturbance from 56 to 65 percent, contributions to cumulative impacts on vegetation cover types from the project under all the alternatives would be expected to be minimal.

Noxious and Invasive Weeds

Noxious and invasive weeds are present throughout many portions of the CIAA, including most disturbed areas. The increase in surface disturbance (0.06 to 0.1 percent of the CIAA) and nitrogen deposition associated with the No-Action and Proposed Action alternatives would likely increase noxious and invasive weed establishment at disturbed sites. Ongoing nitrogen deposition from the Reid Gardner Power Plant may contribute to increases in the establishment and spread of noxious and invasive weeds. The establishment of noxious and invasive weeds at areas of disturbance potentially could facilitate their spread into adjacent habitats. Invasive grasses, such as red brome, are present throughout much of the proposed project area and are likely present throughout the CIAA. The spread of invasive grasses would increase fuel levels and the potential for increased intensity and numbers of wildfires within the CIAA. Wildfire within the CIAA potentially could lead to mortality of native plant species and transform the vegetation community from native vegetation to non-native grasslands. Future projects within the CIAA would further increase levels of surface disturbance, increase noxious and invasive weed establishment



Cumulative Impact Analysis Area

Toquop Energy Project EIS
Lincoln County, Nevada

LEGEND

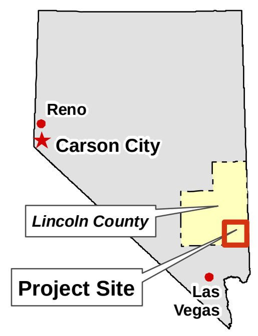
Special Featues and Designations
- Desert Tortoise Critical Habitat
- Wilderness
- Area of Critical Environmental Concern (ACEC)
- Proposed Lower Meadow Valley Wash Area of Critical Environmental Concern
- Recreation Area/State Park/ National Forest
- Backcountry By Way

Watershed Disturbance Features in Nevada
- Watershed Basin
- Perennial Streams
- Roads
- Generating Station

General Features
- Proposed Rail Line
- Proposed Plant Site (640 acres)
- Permitted Well Field
- Permitted Water Pipeline
- Permitted Access Road

1- Reid Gardner Station
2- Reid Gardner Expansion
3- Chuck Lenzie Generating Station
4- Southwest Intertie Project
5- Kern River Expansion Pipeline
6- Ash Grove Cement Plant
7- Mesquite Airport
8- Exit 109 Interchange
9- Wastewater Treatment Plant
10- Lincoln County Land Act
11- Proposed Meadow Valley Wash ACEC
12- Yucca Mountain Rail
13- Kane Springs Valley Water Development Project
14- Tule Desert Water Development Project
15- Virgin and Muddy Rivers Surface Water Development Project
16- Mesquite Contiguity Parcel

Reference Features
- Existing Road
- Interstate
- Existing Railroad
- County Boundary
- State Boundary
- Town
- Point of Interest



0 5 10
Miles

Map 4-1

and spread, and increase the numbers and intensities of wildfires. Mitigation measures, including monitoring for noxious and invasive weeds, control and eradication measures as outlined in an integrated pest management plan, and restoration of disturbed areas would limit the establishment and spread of weeds outside of the project area into the CIAA.

Wildlife

Wildlife habitat within the CIAA has been reduced by approximately 0.88 percent from existing disturbance. Under the No-Action and Proposed Action alternatives, respectively, an estimated 963 acres and 1,661 acres of habitat for general wildlife would be modified or eliminated over the short term to long term. This represents a 0.06 and 0.1 percent reduction in habitat for general wildlife within the CIAA. Together with existing disturbances, this raises the cumulative total to 0.94 and 0.98 percent respectively under the No-Action and Proposed Action alternatives.

Future projects (refer to Table 4-8) would lead to the further loss, degradation, and fragmentation of wildlife habitat within the CIAA. Tracts of habitat would be converted to industrial, residential, and other uses. Approximately 153,340 acres of wildlife habitat would be modified or eliminated (based on the projects on Map 4-1 for which areal extent is known). Acreage for other future projects whose area extent is currently unknown would lead to further modification or elimination of wildlife habitats. As wildlife habitats become further fragmented, some localized wildlife populations may become isolated, which potentially would decrease their ability to respond to environmental and other changes and stressors.

As described in Section 3.10.2.4, a maximum of 15,932 af/yr of groundwater use is currently permitted in the Tule Desert and Clover Valley, and applications to the State Engineer for 36,205 af/yr are pending at the time of this analysis. Future water development in the area may lead to the modification or elimination of some aquatic, riparian, and xeroriparian habitats from groundwater pumping and surface water diversion.

Because of the small proportions of general wildlife habitat that would be disturbed and the reclamation reduction of post-construction disturbance from 56 to 65 percent, contributions to cumulative impacts on general wildlife habitat from the Toquop Energy Project under all the alternatives is expected to be minimal.

Special Status Species

With regard to special status wildlife species, incremental effects from the construction of the proposed power plant and associated facilities would likely be greatest for the desert tortoise. Cumulative short- and long-term effects to desert tortoises within the CIAA are the same as those previously described for biological resources in general. Past, present, and future actions by the private sector, such as urbanization and the take of individual tortoises related to the indirect effects of urbanization, have resulted and will result in large-scale disturbances and degradation of habitat within the CIAA. Many cities and towns, including Moapa, Glendale, Mesquite, Bunkerville, and Carp, among others, are located in historic desert tortoise habitat. Urbanization is not only responsible for the direct reduction and fragmentation of desert tortoise habitat, but also increases the level of human access into adjacent tortoise habitat by virtue of an increase in the number of roads. Desert tortoises are often struck and killed by vehicles on roads and highways, and mortality of desert tortoises due to gunshot and OHV activities is common in many areas within the east Mojave Desert, particularly near cities and towns (USFWS 1994b).

Desert tortoise may be impacted by nitrogen and mercury deposition from existing coal-fired power plants such as the Reid Gardner Station. Impacts on tortoise from mercury deposition are currently unknown; however, the potential exists for adverse impacts if mercury concentrations in tortoises reach levels that decrease overall fitness. Nitrogen deposition may increase the establishment and spread of noxious and invasive weeds, which can lead to direct loss of tortoise and changes in tortoise habitat due to increased fire intensities and frequencies and conversion of desertscrub to non-native grasslands.

Within the CIAA there are portions of three designated critical habitat areas for desert tortoise: Gold Butte-Pakoon (66,279 acres), Mormon Mesa (196,456 acres), and Beaver Dam Slope (87,750 acres). Together these areas comprise nearly 350,485 acres of habitat that is considered essential to the conservation of desert tortoises. Cumulative surface disturbances due to past activities in the CIAA have affected approximately 1,253 acres or 0.36 percent of this habitat. Projected surface disturbance under both the No-Action and Proposed Action alternatives would add approximately 42 acres of permanent disturbance to the total, and bring the cumulative disturbance within designated critical habitat for the desert tortoise within the CIAA to 1,295 acres or 0.37 percent.

Impacts on the desert tortoise associated with future projects include further loss or modification of approximately 134,760 acres and 40 miles along a utility corridor within historic desert tortoise habitat and increased human presence in habitats. Acreage for other future projects whose areal extent is currently unknown would increase the area of habitat modification and elimination. Desert tortoise habitat would be further fragmented by future development, which could lead to isolation of localized populations and potentially decrease the ability of these populations to respond to environmental and other changes and stressors.

Any potential adverse impacts on the desert tortoise under the No-Action Alternative would be mitigated by implementation of the specific terms and conditions issued in the July 23, 2003, Biological Opinion by the USFWS to reduce take of desert tortoises. Adoption of mitigation procedures described in Sections 4.12.1.2 and 4.12.2.2 would ensure that adverse impacts on the desert tortoise and other special status wildlife species under the Proposed Action Alternative are avoided. Thus, cumulative impacts on the desert tortoise resulting from either the No-Action Alternative or the Proposed Action Alternative are expected to be minimal.

4.18.3.11 Archaeology, Historic Preservation, and Indian Trust Assets

Cumulative impacts include the increased opportunity for human activity in the area that may include vandalism, theft, or unauthorized excavation of archaeological and historic sites. Mitigation would consist of continued visitation of members of the BLM Site Stewardship Program. Members of the Nevada Archaeological Site Stewardship Program are actively monitoring archaeological sites in the Mormon Mountains and Tule Desert area.

4.18.3.12 Socioeconomic Conditions

Socioeconomic conditions and the achievement of environmental justice in the local and regional areas of influence are vulnerable to incremental effects on employment, income, governmental revenue, and other social and economic characteristics.

Population

The local area of influence is composed of a very rural setting with small populations, with the exception of St. George, a community with a population of 64,201. Future employment opportunities are expected to add to population figures in the local area of influence. The remainder of the region of influence comprises three counties, two in Nevada and one in Utah. Each county has a minority and low-income population proportionately equal to its respective state. In Lincoln County, Nevada, increases in population are largely dependent on growing opportunities within the region. With housing developments and additional projects, it is anticipated that both the local and regional areas of influence will experience a substantial increase in population. Lincoln County is preparing for a possible population of 200,000 in

20 years. According to the Nevada Small Business Development Center's Web site, Clark County's population is expected to grow by 1,130,334 between 2003 and 2024.

Employment and Economy

The Toquop Energy Project is one of several similar actions in Nevada. The existing Reid Gardner Station and the Chuck Lenzie Generating Station are both owned by Nevada Power, which has a total of 1,772 employees (Nevada Power 2007). Future energy resource development is certain in the region. In addition to the Toquop Energy Project, there are two other large coal-fired generation plants proposed in Nevada—the White Pine Energy Station and the Ely Energy Center. White Pine Energy Station, owned by White Pine Energy Associates, LLC, is currently in the permitting process and is expected to be completed in 2010 in White Pine County. The total cost of the project is expected to be between $600 million and $1 billion, which would generate high revenue for the county from property taxes (Nevada Northern Railway News 2007). The Ely Energy Center would be located north of Ely, Nevada, and would be owned by Nevada Power, a Sierra Pacific Resources company. It has initiated the permitting process consisting of two phases with completion dates of 2011 and 2014. The Nevada State Department of Economic Development will be preparing a study to assess any direct and indirect impacts the project would have on state revenue, property and sales taxes, and other socioeconomic impacts (Sierra Pacific Resources 2007). Given expected increases in demand, it is certain that more employment opportunities will contribute to economic growth in both the local and regional area of influence.

Other projects listed in Table 4-8 would support the addition of more jobs and revenue to the state and affected counties, including the Tule Desert Water Development and Kane Springs Valley Water Development projects. It is unclear how much total revenue would be generated by these projects.

Housing

To accommodate future growth, numerous master-planned communities will be developed in the local area of influence, including the Riverside Planned Unit Development and the Mesquite Contiguity parcel in Mesquite, the Coyote Springs Development, and the Hidden Valley Community project. The Toquop Township also will include housing. Actual home values are unknown at this time.

Public Facilities and Services

Local Utility Service. The large and growing demand for electricity in the southwestern United States makes it certain that a variety of new and existing power generation technologies will meet that demand. Over the next 20 years, Federal energy policies will evolve and states will continue to set energy policy independently as well. It is anticipated that local utility companies, specifically those in Lincoln County, would have to expand their services to accommodate future growth in the region by buying supplemental power from larger energy facilities. Telecommunication companies also would have to accommodate that growth and have plans in place for expansion.

Education and Training. Given expected increases in population in both the Coyote Spring and Toquop areas, the school district is developing policies to accommodate that growth by adding new sites and facilities (Lincoln County 2006). Due to population projections for the remaining counties, there are policies in place to accommodate growth by creating new facilities including the expansion of roads and utilities to serve future development. For example, the city of St. George is working closely with the school district to identify and reserve lands for additional educational facilities (City of St. George 2002).

Health Conditions and Health Care. Currently, medical facilities within the local area of influence are anticipating growth from other projects and are currently developing plans to expand their services.

Public Safety. Given future residential development and increases in employment opportunities, local and state agencies will have to devise strategies to accommodate that growth in terms of infrastructure and public safety. Projected needs for the Toquop area over the next 5 to 10 years include creating 6 patrol positions and 2.5 deputies per thousand individuals (Lincoln County 2006). Lincoln County also will provide fire department startup facilities specifically for the Toquop Township area. These facilities, including equipment and staffing, would be created through the developers' contributions.

4.19 UNAVOIDABLE ADVERSE IMPACTS, AND IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

This section summarizes the unavoidable adverse impacts, and irreversible and irretrievable commitments of resources that would be associated with each of the alternatives. An unavoidable adverse impact is a residual impact that would persist after the implementation of mitigation measures. An irreversible commitment of resources would occur if the resource commitment could not be changed after it is made. An irretrievable commitment of resources would occur if a resource would be used, consumed, destroyed, or degraded during the construction and operation of the project and it would not be able to be reused or recovered for some period of time. Table 4-13 characterizes types of impacts that would be anticipated for each alternative. This analysis is derived from the previous discussion.

4.20 RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF THE ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

The purpose of this section is to highlight how short-term uses of the environment would affect the long-term productivity of resources. In this analysis, "short term" is defined as the period from the onset of construction activities through the initiation of project operation. "Long term" includes the period after decommissioning the power plant, which for all alternatives is expected to occur between 40 and 42 years after the project becomes operational.

The key short-term effects on the natural environment that would result under all alternatives would include the following:

- Soil disturbance would occur within the construction ROWs, which would result in increased erosion potential and increased potential for the spread of invasive species or noxious weeds.
- Disturbance of vegetation (which may provide habitat) would occur within construction ROWs.
- Stormwater runoff from the project facilities would change stormwater flow patterns and affect sediment transport

The surface area that would be temporarily affected (i.e., during construction) would vary among the alternatives. The No-Action Alternative would result in the temporary disturbance of about 963 acres. Under the Proposed Action Alternative, the size of the temporarily disturbed area would increase to 1,661 acres due to the addition of the rail line and the larger plant site footprint. Each of these short-term effects would be mitigated through the measures identified previously in this chapter. Mitigation measures would include minimizing surface disturbance, and reclamation of temporary ROW areas using best management practices identified in Appendix E. Ultimately, soil disturbance, vegetation loss, and stormwater impacts would be limited to permanent ROW areas, which would total about 199 acres under the No-Action Alternative and 930 acres under the Proposed Action Alternative.

The use of groundwater by each alternative would not result in a substantial decline in groundwater levels or a substantial depletion of ground water resources. Therefore, long-term productivity would not be influenced by the use of groundwater in the project under any alternative. However, the Proposed Action Alternative would have a lesser impact on groundwater systems than the No-Action Alternative, because the water requirements would be reduced to 2,500 af/yr from 7,000 af/yr.

Table 4-13
Unavoidable Adverse Impacts and Irreversible and Irretrievable Commitments of Resources

Resource or Resource Use	Unavoidable Adverse Impacts	Irreversible Impacts	Irretrievable Impacts (and Duration)
Land Use			
No-Action Alternative	None	None	None
Proposed Action Alternative	None	None	None
Grazing and Rangeland			
No-Action Alternative	12 acres of rangeland would be displaced.	None	Rangeland would be displaced for the life of the project.
Proposed Action Alternative	368 acres of rangeland would be displaced.	None	Rangeland would be displaced for the life of the project.
Recreation and Access			
No-Action Alternative	None	None	Dispersed recreational use would be displaced for the life of the project.
Proposed Action Alternative	None.	None	Dispersed recreational use would be displaced for the life of the project.
Wilderness and Special Designations			
No-Action Alternative	None	None	The improved access road would cross the Mormon Mesa Area of Critical Environmental Concern for the life of the project.
Proposed Action Alternative	None	None	The improved access road would cross the Mormon Mesa Area of Critical Environmental Concern for the life of the project.
Visual Resources			
No-Action Alternative	Components of the project would be visible to viewers in the Mormon Mountains Wilderness Area.	None	The introduction of project facilities would create a visual contrast with the existing natural environment for the life of the project.
Proposed Action Alternative	Components of the project would be visible to viewers in the Mormon Mountains Wilderness Area, Clover Mountains Wilderness Area, and two existing residences.	None	The introduction of project facilities would create a visual contrast with the existing natural environment for the life of the project.

Resource or Resource Use	Unavoidable Adverse Impacts	Irreversible Impacts	Irretrievable Impacts (and Duration)
Climate and Air Quality			
No-Action Alternative	Criteria pollutants would be emitted.	None	None
Proposed Action Alternative	Criteria pollutants would be emitted.	None	None
Noise			
No-Action Alternative	None	None	Noise levels would exceed ambient conditions occasionally for the life of the project.
Proposed Action Alternative	None	None	Noise levels would exceed ambient conditions occasionally for the life of the project.
Geology, Soils, and Minerals			
No-Action Alternative	Some biological soil crusts could be lost as a result of project construction.	None	Loss of biological soil crust would extend beyond the life of the project because these resources are extremely slow to form and probably cannot be artificially grown or maintained in a cost-effective manner.
Proposed Action Alternative	Some biological soil crusts could be lost as a result of project construction.	None	Loss of biological soil crust would extend beyond the life of the project because these resources are extremely slow to form and probably cannot be artificially grown or maintained in a cost-effective manner.
Groundwater Resources			
No-Action Alternative	Localized groundwater level declines would occur in the Tule Desert hydrographic region (power plant would require 7,000 acre feet per year).	Loss of groundwater would be considered irreversible because of the time required for replenishment of the aquifer.	Use of groundwater would be considered irretrievable because of the time required for replenishment of the aquifer.
Proposed Action Alternative	Localized groundwater level declines would occur in the Tule Desert hydrographic region, although they are fewer than the No-Action Alternative because less water would be required (2,500 acre feet per year).	Loss of groundwater would be considered irreversible because of the time required for replenishment of the aquifer.	Loss of groundwater would be considered irretrievable because of the time required for replenishment of the aquifer.
Surface Water Resources			
No-Action Alternative	None	None	None
Proposed Action Alternative	None	None	None

Resource or Resource Use	Unavoidable Adverse Impacts	Irreversible Impacts	Irretrievable Impacts (and Duration)
Biological Resources			
No-Action Alternative	Construction of the project would remove some vegetation (100 acres within the permanent footprint of the power plant). Long-term removal of vegetation due to access road improvements would total 65 acres.	None	Vegetation would be displaced by project facilities for the life of the project.
Proposed Action Alternative	Construction of the project would remove some vegetation (831 acres within permanent ROWs for the power plant footprint and the rail line). The access road improvements would be the same as for the No-Action Alternative. A small amount of mercury emissions would deposit in the area.	None	Vegetation would be displaced by project facilities for the life of the project.
Archaeology and Historic Preservation			
No-Action Alternative	Possible indirect effects on resources could result from increased public access to the area.	If resources were inadvertently or indirectly destroyed during project construction, the damage would be irreversible. However, the Programmatic Agreement would mitigate impacts.	If resources were inadvertently destroyed during project construction or indirectly, the damage would be irretrievable. However, the Programmatic Agreement would mitigate impacts.
Proposed Action Alternative	Possible indirect effects on resources could result from increased public access to the area.	If resources were inadvertently or indirectly destroyed during project construction, the damage would be irreversible. However, the Programmatic Agreement would mitigate impacts.	If resources were inadvertently or indirectly destroyed during project construction, the damage would be irretrievable. However, the Programmatic Agreement would mitigate impacts.
Paleontological Resources			
No-Action Alternative	None	None	None
Proposed Action Alternative	None	None	None
Public Safety, Hazardous Materials, and Public Safety			
No-Action Alternative	None	None	None
Proposed Action Alternative	None	None	None

Resource or Resource Use	Unavoidable Adverse Impacts	Irreversible Impacts	Irretrievable Impacts (and Duration)
Socioeconomic Resources			
No-Action Alternative	None	None	Regional and local employment and revenues would increase for the life of the project.
Proposed Action Alternative	None	None	Regional and local employment and revenues would increase for the life of the project.

Long-term productivity of most soil and vegetation resources would not be compromised by the project under any alternative, because of the reclamation that would occur after construction and after decommissioning of the power plant. However, any disturbance to biological soil crusts would have a long-term impact, since these resources are slow to regenerate. Impacts on critical habitat for the desert tortoise would be mitigated under the No-Action Alternative and the Proposed Action Alternative.

Under all alternatives, short- and long-term socioeconomic impacts include the generation of tax revenue, employment, and induced employment as a result of wage and other expenditures. The contribution that the project would make to power supply would support long-term economic development in the local area and the region.

4.21 ENERGY REQUIREMENTS AND CONSERVATION POTENTIAL

Energy requirements under all alternatives would include the use of the following resources:

- Petroleum products (diesel, gasoline, oil and grease)
- Chemical products (anhydrous ammonia for the Proposed Action Alternative)
- Natural resources (native aggregate from borrow areas, water from the Tule Desert well field, natural gas from the Kern River Gas pipeline, and coal from Wyoming's Powder River Basin)
- Other building, operations and maintenance materials (steel, aluminum, and wood)

There would be a similar amount of energy and resources required to construct, operate and maintain either the Proposed Action Alternative or the No-Action Alternative.

Conservation potential under the Proposed Action Alternative would be greater with regard to groundwater resources, as this alternative would require less than 2,500 af/yr, whereas the No-Action Alternative would require nearly 7,000 af/yr.

4.22 MONITORING

A groundwater monitoring program plan would be developed as part of the well field design. This plan, which would incorporate the monitoring components of the agreement between Lincoln County, Vidler Water Company, and the National Park Service, would assess changes in water levels downgradient of the production wells. The purpose of the plan is to identify the extent of any cones of depression that could develop as a result from operation of the production wells. The Tule Desert well also would be monitored in order to assess any changes to groundwater levels. Any substantial decline in groundwater level in the Tule Desert downgradient of the production well field would be assessed, particularly with respect to groundwater conditions in the Virgin River Valley.

At least one monitoring well would be installed south of the southernmost production well. The amount of disturbed area associated with this well would be approximately 1 acre. Groundwater monitoring also would occur within the well field, with monitoring wells installed within the appropriate vicinity of the production wells to assess trends in water level change. The areas of disturbance associated with monitoring wells would not add to the total area of disturbed land accounted for in assessing the number and location of the production wells, as these areas are included within production well field area calculations.

Fencing for tortoise protection along the rail line would be monitored to ensure it is not crushed by grazing cattle or other activities.

Monitoring of surface water resources would occur as identified in the stormwater management plan.

Survey and monitoring of desert tortoise habitat would occur during construction activities as identified in Section 4.12.2.2 and any subsequent direction from the USFWS.

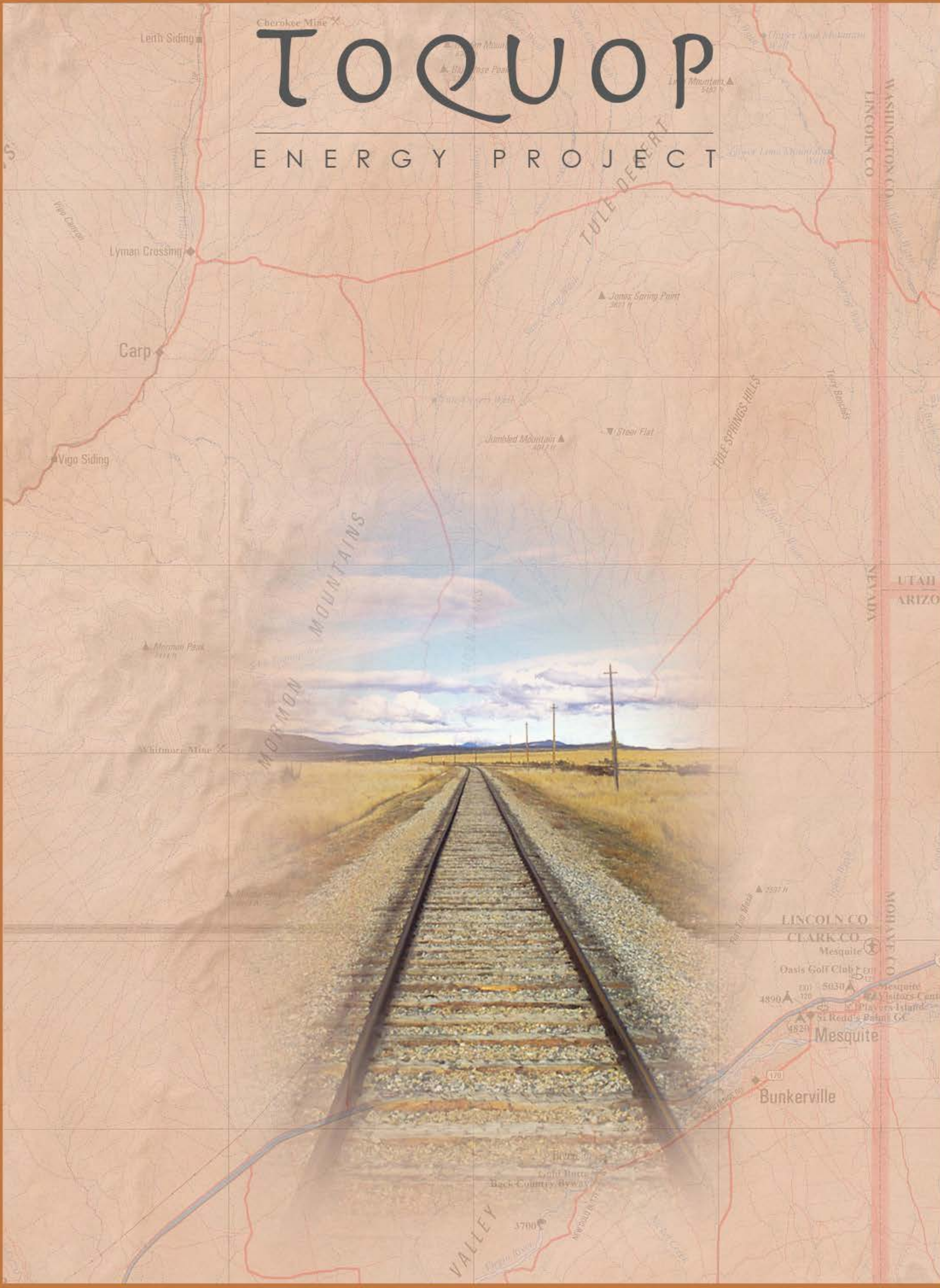
Monitoring of potential impacts on archaeological and historic resources during construction would occur in accordance with the Programmatic Agreement between the BLM and the State Historic Preservation Office.

Monitoring for noxious and invasive weeds would take place around the plant site, rail line, and project features.

Monitoring for bird mortality would occur at the base of the towers and stack.

TOQUOP

ENERGY PROJECT



CHAPTER 5.0 - CONSULTATION AND COORDINATION

5.0 CONSULTATION AND COORDINATION

5.1 INTRODUCTION

Consultation and coordination with Federal and intergovernmental agencies, organizations, American Indian tribes, and interested groups and individuals are important to assure that (1) the most appropriate data have been gathered and employed for analyses and (2) agency and public sentiment and values are considered and incorporated into decision making. Throughout the preparation of this Environmental Impact Statement (EIS), formal and informal efforts were made by Bureau of Land Management (BLM) to involve these groups, primarily through the scoping process, subsequent public involvement activities, formal consultation, and public review of this Draft EIS. This chapter describes the consultation and coordination efforts for this EIS.

5.2 CONSULTATION AND COORDINATION WITH GOVERNMENTS AND AGENCIES

Coordination and collaboration on the EIS were accomplished through written and telephone communication, meetings, and other cooperative efforts between BLM and interested Federal, state, and local government agencies and tribes.

5.2.1 Cooperating Agencies

As part of scoping, Federal, state, and local agencies, and tribes that may have an interest in the Toquop Energy Company, LLC (Toquop Energy) Project EIS were invited to participate in the preparation of the EIS as cooperating agencies. A cooperating agency is any Federal, state, or local government agency or American Indian tribe that has either jurisdiction by law or special expertise regarding environmental impacts of a proposal or a reasonable alternative for a major Federal action affecting the quality of the human environment. The benefits of cooperating agency participation in the analyses for and preparation of this EIS include (1) disclosure of relevant information early in the analytical process; (2) application of available technical expertise and staff support; (3) avoidance of duplication of other Federal, state, local, and tribal procedures; and (4) establishment of a mechanism for addressing intergovernmental issues.

In March 2006, BLM sent letters inviting the cooperation of the following agencies: the Nevada Department of Wildlife, Nevada Division of Environmental Protection, the Nevada State Clearinghouse, the Nevada State Historic Preservation Office (SHPO), the U.S. Fish and Wildlife Service (USFWS), the U.S. Army Corps of Engineers, the National Park Service (Lake Mead National Recreation Area), and Lincoln County. The letter described the proposed project and project facilities and explained the need to prepare a new EIS. In response, the Nevada Department of Wildlife agreed to participate as a cooperating agency during preparation of the EIS.

BLM extended the same invitation to the U.S. Surface Transportation Board in June 2006. In October 2006, the Board agreed to participate as a cooperating agency, since there is a possibility that the Board would be required to license the proposed rail line.

5.2.2 Formal Consultation

BLM is required to prepare EISs in coordination with any studies or analyses required by the Fish and Wildlife Coordination Act (Title 16, United States Code Section 661 et seq. [16 U.S.C. 661]), Endangered Species Act of 1973 (16 U.S.C. 1531), and the National Historic Preservation Act of 1966, as amended (16 U.S.C. 470). In addition, BLM engaged in government-to-government consultation with interested American Indian tribes.

5.2.2.1 Biological Resources

In accordance with the Endangered Species Act, formal consultation is required when the lead Federal agency determines that a proposed action may affect a listed species or designated critical habitat. The consultation process between the lead agency and USFWS results in a determination of whether the proposed action is likely to jeopardize the continued existence of a listed species or destroy or adversely modify critical habitat. The process begins with BLM's written request to initiate consultation. BLM then submits a biological assessment to USFWS, and ultimately the USFWS issues a biological opinion and incidental take statement.

The Toquop Energy Project is considered a major Federal action and, in accordance with Section 7 of the Endangered Species Act, consultation was initiated through a letter sent to the USFWS on April 21, 2006. A list of federally listed species that may occur in the vicinity of the project area also was requested of USFWS in the April letter. Representatives from USFWS and BLM's contractor met informally on June 21, 2006, to discuss potential issues in the project area and survey methods. A biological assessment was submitted to USFWS in September 2007, and further coordination will occur as needed to support the completion of the biological opinion.

5.2.2.2 Archaeological and Historic Resources

Section 106 of the National Historic Preservation Act stipulates that Federal agencies responsible for planning and implementing undertakings consult with the appropriate SHPO and other interested parties to determine if the undertaking would affect historic properties, and consider measures to avoid, reduce, or mitigate any identified adverse effects. Historic properties are districts, sites, buildings, structures, and objects included in or eligible for the National Register of Historic Places. Consultation for the Toquop Energy Project was initiated by the June 2007 submittal of a report to the Nevada SHPO on potential impacts on archaeological and historical resources, and will be conducted in accordance with the Nevada BLM Protocol Agreement with the Nevada SHPO. Coordination with the Nevada SHPO regarding archaeological resources and historic properties will be integrated with tribal consultation as appropriate.

5.2.2.3 Tribal Consultation

Tribes were notified officially of the proposed project through a consultation letter sent to 17 tribes on February 21, 2006. The purpose of the letter and the meeting presentation was to introduce the project to interested tribes and identify potential issues regarding the project. Information on the Toquop Energy Project also was provided to tribal representatives during a regular bimonthly coordination meeting on February 23, 2006, in Ely, Nevada. Members of the Duckwater and Ely Shoshone tribes were in attendance in addition to BLM staff and a Toquop Energy representative. Some tribes have expressed no concerns for the project, others have expressed general concern for preservation of archaeological resources, and some have expressed concern for a property of traditional cultural and religious importance known as the Salt Song Trail. BLM has requested more specific information as to a location of the trail and project-related effects on religious practitioners, but has received no additional data. At least one tribe has expressed to BLM that this trail does not extend into the area of Proposed Action Alternative.

To date, the only response to these outreach efforts has been a request by the Moapa Paiute Tribe for a site visit to address concerns about cultural sites. Representatives of BLM, the tribe, and Toquop Energy met at the site on October 12, 2006, and resolved these concerns. It was determined at that time that other issues did not require additional follow-up.

5.3 PUBLIC PARTICIPATION

Public participation has been ongoing throughout the National Environmental Policy Act (NEPA) process for this EIS and will continue until the Final EIS is completed. Both formal and informal participation by local residents, special interest groups, and interested persons has occurred via telephone calls, electronic mail, and letters.

As required by NEPA, BLM conducted scoping in the early stages of EIS preparation to encourage public participation and solicit public comments on the scope and significance of the proposed action (Council of Environmental Quality regulations, 40 Code of Federal Regulations [CFR] 1501.7). BLM initiated the scoping process in February 2006 by announcing upcoming public scoping meetings and requesting comments to determine the scope of issues and concerns that need to be considered during the analyses conducted for the EIS.

5.3.1 Notice of Intent

The public was notified of the project and upcoming scoping meetings through a notice of intent published in the *Federal Register* on February 21, 2006. The end of the scoping period, required to be a minimum of 30 days, was announced as March 23, 2006. The notice announced the intent to hold scoping meetings in Reno, Caliente, Mesquite, and Las Vegas, Nevada, and advised that specific dates, locations, and times would be announced through mail distribution and the local media. In addition, the notice provided project information including a description of proposed facilities and project location, summary of the 2003 EIS and why a new EIS is being prepared, information on how to submit comments and why they are important, and BLM contact information.

5.3.2 Newspaper and Media Announcements

The public was notified of the scoping meetings through display advertisements published in the papers listed in Table 5-1. The table provides information on the publication, area of coverage, and print dates for the advertisements. Advertisements were timed to meet the 15-day notification requirement outlined in NEPA.

Table 5-1

Display Advertisement Summary

Publication	Area of Coverage	Print Date
Lincoln County Record	Caliente, Nevada	Thursday, March 2
Desert Valley Times	Mesquite, Nevada	Friday, March 3
St. George Spectrum	St. George, Utah, and surrounding area	Friday, March 3
Reno Gazette-Journal	Reno, Nevada, metropolitan area	Friday, March 3
Las Vegas Review Journal	Las Vegas, Nevada, metropolitan area	Friday, March 3

Additionally, press releases were distributed to newspapers and other printed publication outlets, radio stations, and television stations on February 24, March 2, and March 10, 2006. A comprehensive list of media outlets that received the press release is provided in the Final Scoping Summary Report (dated June 2006).

5.3.3 Additional Public Notice

The public and many agencies were notified of the scoping period and comment opportunities through a newsletter distributed to approximately 315 people on February 24, 2006. The mailing list was developed using the BLM Ely Field Office mailing list for the previous Toquop Energy Project and was updated with addresses of current local elected or municipal officials, Federal and state agencies, potentially interested American Indian tribes, and other interested parties. Contact information for the BLM Project Manager was included in the newsletter. The mailing list was supplemented throughout the NEPA process with people who attended the scoping meetings, notified BLM of their interest in the project through the project Web site, sent direct requests for information to BLM, or provided scoping comments. A second newsletter was sent to the recipients on the mailing list in November 2006 to provide an update on the progress of the EIS.

The project Web site (http://www.blm.gov/eis/nv/toquop/) has been maintained since February 2006 to provide updated project information and meeting announcements. The site provides project information including downloadable versions of the notice of intent, project newsletters, scoping meeting materials, and the Final Scoping Summary Report. The Web site provides contact information to reach project managers for BLM and URS Corporation (URS) (the contractor assisting with the EIS) directly.

5.3.4 Public Scoping Meetings

Four public scoping meetings were held for the Toquop Energy Project EIS. At each meeting, the public was informed of the NEPA process by the BLM Project Manager, and a representative from Toquop Energy provided a presentation on the proposed project. Display boards contained information on the project purpose and need, project description, planning process, purpose of the scoping process, and public comment opportunities. Before and after the presentation, an open house atmosphere was maintained during which attendees could browse the information on the boards and speak informally to representatives from the BLM, Toquop Energy, and URS.

Questions and comments were invited and discussed during and after the presentation, both as part of the presentation and in small groups and individually during the open house. These oral comments were recorded on flip charts and by individual note-takers, discussed among the project team after each meeting, and reviewed in conjunction with written comments to ensure that all issues were identified. In addition, comment forms were available at each meeting so that attendees could submit written comments at the meeting, or by mail. The locations, dates, and attendance of each public meeting are shown in Table 5-2.

Table 5-2

Public Scoping Meeting Attendance

Location	Date	Attendance
Caliente, Nevada – Caliente Youth Center	March 20, 2006	12
Mesquite, Nevada – City Council Chambers	March 21, 2006	59
Las Vegas, Nevada – BLM Las Vegas Field Office	March 22, 2006	36
Reno, Nevada – Meadowwood Courtyard	March 23, 2006	6
Total attendance at scoping meetings		113

All comments received during the scoping period were analyzed and documented in the Scoping Summary Report issued in June 2006. By the end of the scoping comment period, BLM had received 31 written or electronically mailed submissions. A copy of the Scoping Summary Report may be obtained from the BLM Ely Field Office or via the project Web site, http://www.blm.gov/eis/nv/toquop/. Table 1-2 in Chapter 1 lists the issues identified through this process, and indicates where they are addressed in this Draft EIS.

5.4 DISTRIBUTION AND REVIEW OF THE DRAFT EIS

Concurrent with the distribution of this Draft EIS, a Notice of Availability was published in the *Federal Register* announcing the availability of the draft document for public review and comment; this notice marks the beginning of the public review and comment period. BLM will hold public hearings during the review period for the purpose of soliciting and understanding public comments on the Draft EIS. Hearings will be held in Caliente, Mesquite, Reno, and Las Vegas, Nevada. Dates and addresses of these meetings are announced in the *Federal Register,* described in a third project newsletter sent to the mailing list, advertised in the local news media, and listed on the project Web site, http://www.blm.gov/eis/nv/toquop/.

Comments on the Draft EIS may be submitted orally or in writing at the scheduled public hearings or in writing by letter or electronic mail to BLM (as instructed in the letter to readers at the beginning of this document). To ensure consideration in the Final EIS, all written comments must be received by the close of the public comment period identified in the Notice of Availability published in the *Federal Register*. All comments received during the public review period will be compiled, analyzed, and summarized. A Final EIS will be prepared that addresses and provides responses to the comments received on the Draft EIS.

The Draft EIS was sent to the agencies and organizations listed in Table 5-3. The list of recipients was developed based on responses to the November 2006 newsletter (which included a reply mailer to request a copy of the Draft EIS) and requests received by BLM through other means. The Draft EIS also will be available on the project Web site (http://www.blm.gov/eis/nv/toquop/) or by request from the BLM Ely Field Office throughout the public review period. The Final EIS will be sent to those who request a copy or provide comments on the Draft EIS.

Table 5-3

List of Recipients of the Draft EIS

FEDERAL AGENCIES

- U.S. Bureau of Indian Affairs
  - Washington, D.C.
  - St. George, Utah
- U.S. Environmental Protection Agency
  - Washington, D.C.
  - Region IX, San Francisco, California
- U.S. Mineral Management Service, Washington, D.C.
- U.S. Office of Public Affairs, Washington, D.C.
- Natural Resources Conservation Service, Reno, Nevada
- U.S. Bureau of Land Management
  - Nevada State Office, Reno, Nevada
  - Las Vegas Field Office
  - National Science and Technology Center, Denver, Colorado
  - Washington, D.C. Office
  - Arizona Strip Field Office, St. George, Utah
  - Battle Mountain Field Office, Battle Mountain, Nevada
  - Caliente Field Station, Caliente, Nevada
  - Carson City Field Office, Carson City, Nevada
  - Cedar City Field Office, Cedar City, Utah
  - Ely Field Office, Ely, Nevada
  - Office of Public Affairs, Washington, D.C.
  - St. George Field Office, St. George, Utah
- U.S. Bureau of Reclamation
  - Boulder City, Nevada
  - Washington, D.C.
  - Denver, Colorado
- U.S. Fish and Wildlife Service
  - Arlington, Virginia
  - Las Vegas, Nevada
- U.S. Forest Service, Sparks, Nevada
- U.S. Geological Survey
  - Reston, Virginia
  - Henderson, Nevada
- U.S. Division of Environmental Compliance, Washington, D.C.
- National Park Service
  - Fort Collins, Colorado
  - Washington, D.C.
  - Air Resource Division, Denver, Colorado

- U.S. Department of Defense
  - U.S. Army Corps of Engineers
    - Reno, Nevada
    - St. George, Utah

STATE AGENCIES

- Nevada Commission for the Preservation of Wild Horses, Carson, City, Nevada
- Nevada Department of Transportation, Carson City, Nevada
- Nevada Department of Water Resources, Carson City, Nevada
- Nevada Division of Agriculture, Las Vegas, Nevada
- Nevada Division of Environmental Protection, Carson City, Nevada
- Nevada Division of Minerals, Carson City, Nevada
- Nevada Division of State Lands, Carson City, Nevada
- Nevada Division of State Parks, Panaca, Nevada
- Nevada Division of Wildlife
  - Pioche, Nevada
  - Las Vegas, Nevada
  - Reno, Nevada
- Nevada Natural Heritage Program, Carson City, Nevada
- Nevada State Historic Preservation Office, Carson City, Nevada
- Nevada State Clearinghouse, Carson City, Nevada
- Nevada Indian Environmental Coalition, Fallon, Nevada
- Nevada Indian Commission, Carson City, Nevada
- Southern Nevada Water Authority, Las Vegas, Nevada

LOCAL GOVERNMENTS

- Alamo Town, Nevada
- Lincoln County, Nevada
- City of Mesquite, Nevada
- City of Sparks, Nevada
- Clark County Commission, Las Vegas, Nevada
- City of Caliente, Nevada
- Sparks Planning Commission, Sparks, Nevada
- Washoe County, Nevada
- City of Los Angeles, Right-of-Way Department, Los Angeles, California
- Enterprise City Advisory Council, Las Vegas, Nevada

CONGRESSIONALS

- Honorable Kenny Guinn, Nevada State Governor
- Representative Shelley Berkley, Washington, D.C.
- Representative Jim Gibbons, Nevada
- Senator John Ensign, Nevada
- Senator Harry Reid, Nevada
- Senator Richard Bryan, Nevada

LIBRARIES

- Caliente Branch Library, Caliente , Nevada
- Mesquite Library, Mesquite, Nevada
- White Pine County Library, Ely, Nevada
- Lincoln County Library, Pioche, Nevada
- North Las Vegas Library, North Las Vegas, Nevada
- Washoe County Library, Reno, Nevada
- Las Vegas Public Library, Las Vegas, Nevada
- James R. Dickinson Library, University of Nevada, Las Vegas, Nevada

ORGANIZATIONS

- The Nature Conservancy
  - Reno, Nevada
- Nevada Mining Association, Reno, Nevada
- The Long Now Foundation, San Francisco, California
- Nevada Woolgrowers Association, Ely, Nevada
- The Trust for Public Land, San Francisco, California
- American Land Conservancy, San Francisco, California
- Animal Protection Institute, Sacramento, California
- Southwest Gas Company, Las Vegas, Nevada
- Truckee Meadows Regional Planning Commission, Reno, Nevada
- Center for Biological Diversity, Tucson, Arizona
- Fraternity of Desert Bighorn, Las Vegas, Nevada
- Friends of Nevada Wilderness, Reno, Nevada
- Grazing Advisory Board, Logandale, Nevada
- Coalition for Nevada's Wildlife, Reno, Nevada
- Keep Truckee Meadows Beautiful, Reno, Nevada
- Truckee Meadows Trails Association, Reno, Nevada
- Environmental Leadership, Reno, Nevada
- Lincoln County Regional Development Authority, Panaca, Nevada
- Western Land Exchange Project, Seattle, Washington

- Kern River Gas Transmission Company, Salt Lake City, Utah
- N-4 Grazing Board, Panaca, Nevada
- Nevada Bell Right-of-Way Department, Reno, Nevada
- Nevada Cattleman's Association, Elko, Nevada
- Wildlife Society, Nevada Chapter, Reno, Nevada
- Nevada Conservation League, Reno, Nevada
- Nevada Environmental Coalition, Las Vegas, Nevada
- Nevada Outdoor Recreation Association, Inc., Carson City, Nevada
- Nevada Power Company, Las Vegas, Nevada
- Western Resource Advocates, Carson City, Nevada
- LS Power Development, St. Louis, Missouri
- Great Basin Mine Watch, Reno, Nevada
- Sierra Club
  - Southern Nevada Group, Las Vegas, Nevada
  - Legal Environmental Law Program, San Francisco, California

INDIAN TRIBES
- Kaibab Paiute Tribe
- Las Vegas Paiute Tribe
- Washoe Tribe of Nevada and California
- Yerington Paiute Tribe
- Moapa Band of Paiutes
- Paiute Indian Tribe of Utah
- Pyramid Lake Paiute Tribe
- Reno-Sparks Indian Colony

NEWSPAPERS
- *Sparks Tribune*, Sparks, Nevada
- *Reno Gazette-Journal*, Reno, Nevada
- *The Desert Valley Times*, St. George, Utah
- *The Spectrum,* St. George, Utah

5.5 PREPARERS AND CONTRIBUTORS

The primary preparers and contributors to this Draft EIS are representatives and staff of the BLM Ely Field Office, URS (BLM's contractor), and the two cooperating agencies (the Nevada Department of Wildlife and U.S. Surface Transportation Board). Individual preparers are listed in Table 5-4.

Table 5-4
List of Preparers

Name	Title	Responsibilities on Environmental Impact Statement
Bureau of Land Management (BLM)		
Bill Morrill (SRK Consulting)	BLM Project Manager	Project management and oversight
Jeff Weeks	Assistant Field Manager-Nonrenewable Resources	Management oversight
Jack Tribble	Deputy Assistant Field Manager - Nonrenewable Resources	Management oversight
Jane Peterson	Energy Project Manager	Management oversight
Doris Metcalf	Realty Specialist	ID team member, lands and realty
Brenda Linnell	Realty Specialist	ID team member, lands and realty
Carolyn Sherve-Bybee	National Environmental Policy Act (NEPA) Coordinator	ID team member, NEPA
Jared Bybee	Wild Horse and Burro Specialist	ID team member, wild horses and burros
Troy Grooms	Range Conservationist	ID team member, range management
Rhonda Karges	NEPA Specialist	ID team member, NEPA
Sarah McCall	NEPA Specialist	ID team member, NEPA
Bruce Winslow	Recreational Specialist	ID team member, visual resources management/wilderness
Dan Netcher	Geologist	ID team member, hydrology
Bill Wilson	Geologist	ID team member, minerals
Melanie Peterson	Environmental Protection Specialist	ID team member, hazmat
Mark Henderson	Archaeologist	ID team member, archaeology and historic preservation
Bonnie Waggoner	Noxious and Invasive Weed Coordinator	ID team member, weeds
Alicia Styles	Wildlife Biologist	ID team member, biological resources
Steve Abele (Eastern Nevada Landscape Coalition)	Wildlife Biologist	ID team member, biological resources
Bob Estes (URS Corporation)	Air Quality Resource Specialist	ID team member, air quality
Richard Butler (URS Corporation)	Environmental Planning Manager	ID Team Member, socioeconomics
URS Corporation		
Cindy Smith	Principal-in-Charge	Project oversight
Jennifer Pyne	Project Manager	Project management and oversight
Lyndy Long	Project Coordinator	Public involvement, project coordination
Sandy Weir	Senior Environmental Planner	Socioeconomic resources
Brad Norling	Senior Biologist	Biological resources
Jeff Johnson	Biologist	Biological resources

Name	Title	Responsibilities on Environmental Impact Statement
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Ryan Rausch	Environmental Planner	Recreation and access, wilderness and special management areas
Anita Richardson Frijia	Geographer and Environmental Planner	Geographic information systems lead, visual resources
Jen Wennerlund	Geographic Information Systems (GIS) Manager	Geographic information systems
Deborah Glogoff	GIS Analyst	Geographic information systems
David Lawrence	Visual Simulation/ Multimedia Specialist	Visual simulations
Richard Knox	Senior Environmental Planner	Visual resources
Brad Sohm	Air Quality Analyst	Air quality
Rob Greene	Noise and Vibration Practice Leader	Noise
David Palmer	Geologist	Geology, soils, and minerals
Mike Kelly	Archaeologist	Archaeology and historic preservation
Michelle Stegner	Archaeologist	Archaeology and historic preservation, paleontological resources
Karen Modesto	Engineer	Groundwater resources
Stephanie Pesek	Environmental Planner	Jurisdictional delineation, surface water resources
Scott Ball	Engineer	Surface water resources, public safety and hazardous materials
Sara White	Senior Environmental Planner	Technical review, groundwater and surface water resources
Maggie Fulton	Editor	Document editing
Mitch Meek	Graphic Design	Graphics
COOPERATING AGENCIES		
Brad Hardenbrook	Supervisory Habitat Biologist, Southern Region, Nevada Department of Wildlife	Cooperating agency representative
Christa Dean	Attorney, Section of Environmental Analysis, Surface Transportation Board	Cooperating agency representative

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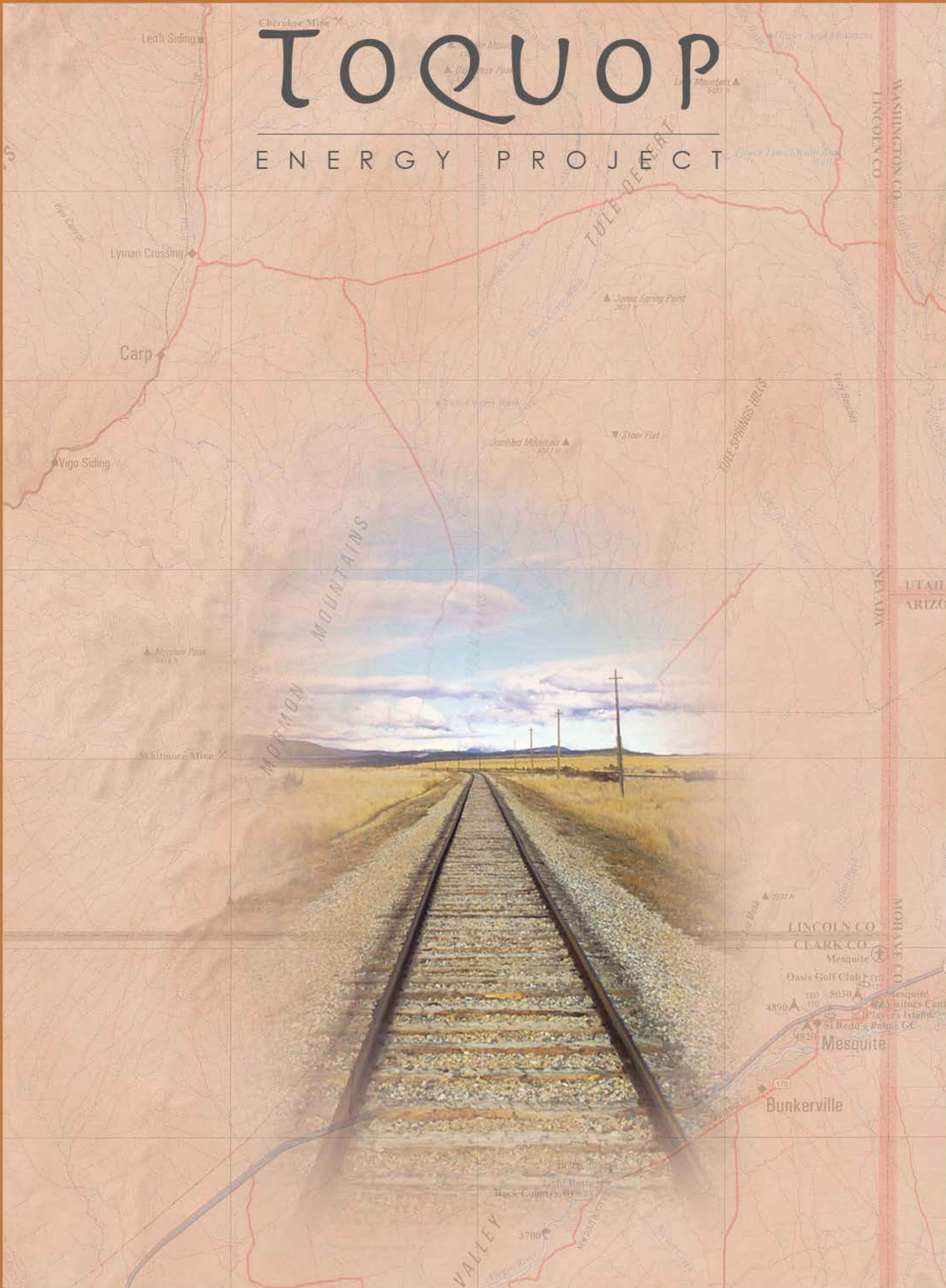

CHAPTER 6.0 - REFERENCES

6.0 REFERENCES

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Federal Transit Administration: see U.S. Department of Transportation, Federal Transit Administration.

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United States Department of the Interior

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Ely, Nevada 89301-9408
http://www.nv.blm.gov/ely

TAKE PRIDE® IN AMERICA

In Reply Refer To:
2850 (NV040)
N-77484

Dear Reader:

Enclosed for your review and comment is the Draft Environmental Impact Statement (EIS) for the Toquop Energy Project in Lincoln County, Nevada. The project would be located on public land managed by the Bureau of Land Management (BLM), about 12 miles northwest of Mesquite, Nevada. This document provides an evaluation of this proposed project in accordance with the National Environmental Policy Act of 1969 and associated regulations.

The purpose of this document is to help the BLM Ely Field Office and the cooperating agencies in their decision-making processes. As the lead federal agency for this EIS, BLM welcomes your comments. Public comments concerning the adequacy and accuracy of this Draft EIS will be accepted through the public comment period, which ends 60 days from the date of publication of the U.S. Environmental Protection Agency Notice of Availability in the *Federal Register*. Where possible, include in your comments references to the specific pages and paragraphs on which you are commenting.

Written comments should be sent to:

Bureau of Land Management
Ely Field Office
Jane Peterson
HC 33, Box 33500
Ely, Nevada 89301-9408

Public meetings to accept verbal and written comments have also been scheduled for the following dates, times, and locations:

Date	Time	Location
November 5, 2007	4:00 to 7:00 p.m.	Caliente Youth Center Highway 93 North Caliente, Nevada
November 6, 2007	4:00 to 7:00 p.m.	Dixie Convention Center 1835 Convention Center Drive St. George, Utah

Date	Time	Location
November 7, 2007	4:00 to 7:00 p.m.	City Hall , 2nd Floor Council Chambers 10 East Mesquite Boulevard Mesquite, Nevada
November 8, 2007	4:00 to 7:00 p.m.	Cora Coleman Senior Center 2100 Bonnie Lane Las Vegas, Nevada
November 13, 2007	4:00 to 7:00 p.m.	Best Western Airport Plaza Hotel 1981 Terminal Way Reno, Nevada

Comments, including names and addresses of respondents, will be available for public review and will be subject to disclosure under the Freedom of Information Act. Before including your address, phone number, e-mail address, or other personal identifying information in your comment, you should be aware that your entire comment – including your personal identifying information – may be made publicly available at any time. While you can ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so.

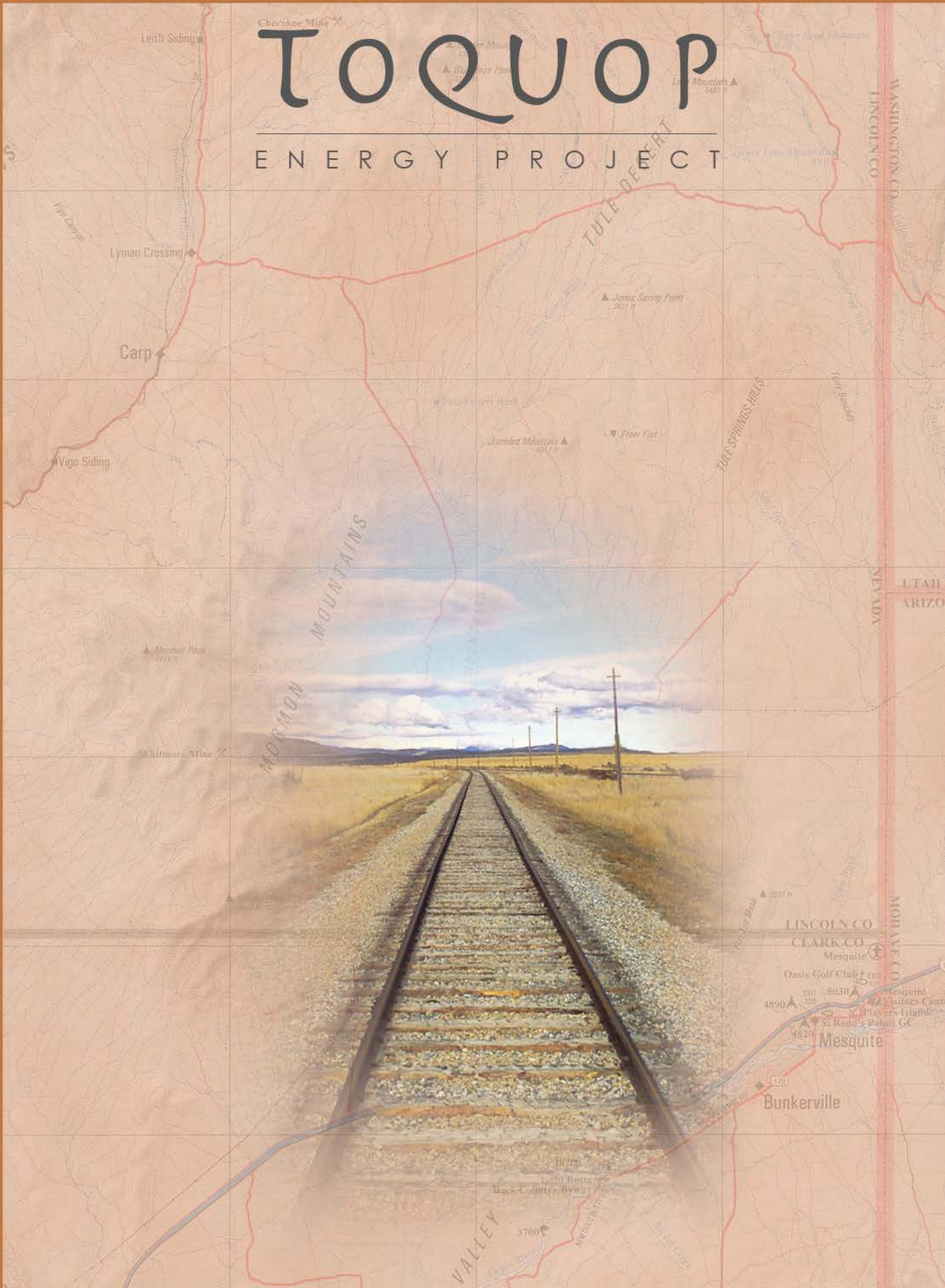
Both written and verbal comments received during the public comment period will be fully considered and evaluated for preparation of the Final EIS. If you would like any additional information, please contact Brenda Linnell, Realty Specialist, at the Ely Field Office at (775) 289-1808.

Sincerely,

John F. Ruhs
Field Manager

TOQUOP

ENERGY PROJECT



EXECUTIVE SUMMARY

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In April 2003, the Bureau of Land Management (BLM) issued a Record of Decision on the Final Environmental Impact Statement (EIS), hereinafter referred to as the 2003 EIS, for the Toquop Energy Project proposed by Toquop Energy, Inc. This project was outlined and analyzed in the 2003 *Proposed Toquop Land Disposal Amendment to the Caliente Management Plan and Final Environmental Impact Statement for the Toquop Energy Project*. The project was to include construction and operation of a 1,100-megawatt (MW) natural-gas-fired electric-power-generation plant and associated facilities in Lincoln County, Nevada. The stated goal for the project was to generate electrical power at competitive prices, as a solution to the near- and long-term power shortages projected for the western United States. The Record of Decision accompanying the Final EIS approved the following rights-of-way (ROWs):

- 100 acres for the power plant site and access road to the power plant from the main access road, plus additional temporary ROW during construction
- 87 acres for improvements to the existing access road from I-15 to the power plant site boundary, plus additional temporary ROW during construction
- 45 acres for a 24-inch buried pipeline and buried electric line between the power plant and the well field, plus additional temporary ROW during construction and 6 acres for storage sites

Since 2003, the price of natural gas has increased substantially and natural-gas prices are projected to remain unstable due to increasing demand coupled with higher exploration and development costs. This, together with the fact that newer technology has improved the efficiency and environmental performance of modern coal-fired plants, has caused the proponent to reconsider the original proposal in favor of a new strategy that would offer greater economic stability by using coal instead of natural gas. In line with the project's original aim to provide power at competitive prices, Toquop Energy Company, LLC. (Toquop Energy) now proposes to construct a 750-MW coal-fired power plant in the same location.

The new coal-fired power plant project has a number of components that differ from the original natural-gas-fired power plant project, and the BLM has determined that preparation of a new EIS is warranted. The new project differs from the original project in the following key respects:

- Plant capacity would decrease from 1,100 to 750 MW.
- The plant site would require use of more surface area to accommodate the storage and handling of coal and the disposal of ash.
- A rail line to transport coal to the site would need to be constructed.

The project would be located on 640 acres of public land currently managed by the BLM Ely Field Office. This site is approximately 12 miles northwest of Mesquite, Nevada, and 50 miles south-southeast of Caliente, Nevada, in southern Lincoln County (Draft EIS Map 1-1). The rail line would depart from the existing Union Pacific Railroad (UPRR) line and would cross about 31 miles of BLM-administered land on its route to the power plant site.

The purpose of the action is to provide public land for the development of energy production by allowing for the construction of power plants on public lands managed by the BLM. The multiple-use mission of the BLM includes managing activities such as mineral development, energy production, recreation, and grazing, while conserving natural, historical, cultural, and other resources on the public lands. BLM's objective is to meet public needs for use authorizations such as rights-of-way, permits, leases, and easements while avoiding or minimizing adverse impacts to other resource values. The proposal to construct, operate and maintain a coal-fired power plant on public lands would be in accordance with this objective.

The need for the action is established by BLM's responsibility under the Federal Land Policy and Management Act of 1976 to respond to applications for ROW Grants and a request for land disposal. The BLM will: (1) respond to the request for a ROW for the rail line that would be required to transport coal to the power plant site, and (2) respond to the request to amend the ROW for the power plant site required for the construction and operation of a coal-fired power plant. The rail line would require a corridor 31 miles long across BLM-managed land, with ROW access to a width of 200 feet temporarily during construction and 100 feet wide for long-term use of the rail line. A 100-acre ROW was originally granted for the gas-fired plant; however, an amendment to the ROW is needed to accommodate the proposed 475-acre coal-fired plant. As part of the Proposed Action Alternative, BLM would dispose (by sale) of the 640-acre parcel that the power plant would occupy.

Some of the ROWs granted in the BLM's 2003 Record of Decision would not be changed under the current proposed project. Specifically, the proponent has not requested any action by BLM related to the existing ROW grants for the water pipeline, access road, and disposal of the 640-acre site. Accordingly, this EIS will be tiered to the 2003 EIS to incorporate by reference the relevant aspects of the earlier analysis. The current EIS is focused on the issues and impacts that were not addressed in the previous EIS, or builds upon the 2003 analysis to adequately consider the impacts that could result from the grant of additional ROW or a ROW amendment.

PROPOSED ACTION AND NO-ACTION ALTERNATIVES

Two alternatives are evaluated in this Draft EIS:

- The No-Action Alternative—to revert to a 1,100-MW natural-gas-fired plant and associated facilities, (i.e., the Proposed Action described in the 2003 EIS)
- The Proposed Action Alternative—to construct and operate a 750-MW coal-fired plant and associated facilities

A number of alternative locations, technologies, and alternative rail alignments were evaluated and eliminated from the detailed analysis. These alternatives and the reasons why they were eliminated are described.

No Action Alternative

Under the No-Action Alternative, a 1,100-MW natural-gas-fired power plant would be constructed and operated on a site in southern Lincoln County, Nevada, as permitted in the 2003 EIS. Ancillary facilities would include a 14.4-mile-long access road and a water-supply system, including a well field and 12.50-mile-long water pipeline (Draft EIS Map 1-1).

Power Plant and Associated Facilities

The plant would use a combined-cycle technology to generate electricity, which would be transmitted to the existing Navajo-McCullough electric transmission line that passes through the southeastern corner of the site. The power plant, switchyard, equalization and evaporation ponds, and other associated facilities would cover about 100 acres on the site, and would be enclosed within an 8-foot-high chain-link fence, incorporating tortoise fencing to exclude the desert tortoise from the plant site. The project area included in the No-Action Alternative is the same 640-acre site included in the Proposed Action of the 2003 EIS. Rights-of-way would be issued by BLM for the construction and operation of the power plant and all related facilities. Several primary elements of the No-Acton Alternative also include the construction and operation of a natural-gas-fired, water-cooled electric-power-generation plant with a maximum combined cycle of 1,100 MW, connected to a natural gas pipeline and electric transmission lines. The No-Action Alternative for the power plant employs combined-cycle technology, which would use four combustion-turbine generators in series with four heat-recovery steam generators and four steam-turbine engines. Exhaust gas would pass through a series of emissions-control systems and would be vented through an elevated exhaust stack that is 180 feet high. A 5-acre uncovered equalization pond would be constructed on site to keep the water chemistry balanced for use in the cooling system, and a 20-acre evaporation pond also would be constructed to handle the wastewater disposal.

The power generation operations would be fueled by natural gas arriving to the site via the 36-inch-diameter Kern River Gas Transmission Company pipeline, which currently passes through the southeastern corner of the site. A tap, meter station, and connective pipeline would be constructed and connected to the existing gas line to provide natural gas to the site.

Water-Supply System

A new well field and new water pipeline would be developed in the Tule Desert hydrologic basin to supply groundwater for use in an evaporative wet-cooling tower system. Facilities would include 15 deep wells, each approximately 1,000 to 1,500 feet deep; a manifold system to connect the output from these wells to a single, 24-inch-diameter buried pipeline; the extension of this buried pipeline and buried electrical distribution lines to the plant site; and a storage tank with a capacity of approximately 500,000 gallons. Although the exact location of each well is not yet known, they would be dispersed spatially in the southern third of the Tule Desert and would be located as close as possible to one of the several existing dirt roads in the area. It is estimated that under the No-Action Alternative, the natural-gas-fired power plant could require up to 7,000 acre feet per year (af/yr) of water. More than 90 percent of this water (approximately 6,300 acre-feet) would be used by an evaporative cooling tower system. The length of the 24-inch-diameter water pipeline would be 12.5 miles, partially located along an existing road, requiring a permanent ROW with a width of 30 feet. The pipeline would be buried deep, well below potential streambed scour, erosion, and exposure, and away from potential lateral bank migration. New access roads would be constructed to the wells and storage tank as necessary for use during construction and maintenance activities.

Construction Activities

Under the No-Action Alternative, construction activities would occur over approximately 26 months. The average construction crew would total about 500 people. Construction activities related to the power plant facilities would be completed within the 640-acre power plant site in four phases, including (1) site clearing and preparation, (2) foundation construction, (3) building and equipment installation, and (4) site cleanup and project startup.

About 14.4 miles of an existing dirt-and-gravel road would be upgraded by paving to a width of 24 feet, and some sections would be straightened to facilitate truck access between Interstate 15 (I-15) and the plant site (see Draft EIS Map 1-1). The permanent ROW for the access road would encompass 138 acres (50 acres in Clark County and 88 acres in Lincoln County.

The access road that would serve the power plant is currently used to maintain a microwave station, communications equipment fiber-optic lines, natural-gas pipelines, and electric transmission lines located on the southern end of the East Mormon Mountains. Construction activities would increase the traffic along this road. Multiple diesel-powered construction equipment such as bulldozers and dump trucks would be used for approximately 120 days each.

Temporary ROW for construction access and staging areas would be required along the access road, water pipeline, and in the well field. The construction ROW for the 14.4-mile access road to the power plant site would vary in width because of terrain, and would occupy a total of 246 acres. The current access road in this location occupies about 30 acres, and the net increase in disturbance due to construction activities would be about 216 acres. Staging areas for road construction would require an additional 20 acres in Lincoln County. The staging areas and temporary road construction ROWs would be reclaimed after construction in accordance with restoration plan requirements of the appropriate BLM field office.

The ROW requirements for each of the proposed wells would be a maximum of 1 acre per well. This would include approximately one-third acre for a new 300-foot-long access road and pipeline (with a construction ROW of about 60 feet) to link the well area and the pipe to existing roads, and about two-thirds of an acre for construction activities at each well site. A 500,000-gallon water-storage tank would be required to maintain flow and pressure to the plant. The maximum disturbed area for the water-storage tank also would be 1 acre. The water pipelines would require a temporary construction ROW of 60 feet to allow for soil disturbance during pipeline trenching, laying, and backfilling operations, and the laying of electrical lines to the well field. Staging areas would include 3 acres near the northern end of the pipeline, 3 acres midway along the pipeline east of Toquop Gap, and 3 acres at the plant site. All areas temporarily disturbed by construction in the ROW and staging areas would be reclaimed.

Operation and Maintenance

Under the No-Action Alternative, permanent water rights to supply up to 7,000 acre feet of water annually would be required. These water rights were included in a joint application by Vidler Water Company Inc. and Lincoln County, which was submitted to the Nevada State Engineer. In Ruling 5181, the State Engineer granted the right to use 2,100 acre feet annually to Vidler Water Company and Lincoln County. A request for the required additional 4,900 acre-feet of water rights was included in a second application by the same proponents. That request is being held for action pending results of additional hydrologic studies requested by the Nevada State Engineer. Most of the water for the power plant would be used in the evaporative wet-cooling system (90 percent, or 3,800 gallons per minute under annual average design operating conditions). The remainder would be filtered, as necessary, to provide service water, potable water, and water for the demineralized water-treatment system. That system would supply the high-purity water needs of the heat-recovery steam generators.

Permanent employees at the plant site would total 25. These employees would travel to the site along the improved access road from I-15.

Occasional maintenance and monitoring of production wells would occur, requiring travel over the access roads to reach the wells. Maintenance of the water pipeline would require periodic inspection of the entire route and routine exercising of all valves in the system. It is anticipated that this activity could be supported using low-impact all-terrain vehicles.

For analysis purposes, the effects of taking no action serve as the baseline of environmental information against which impacts from the proposed project would be predicted to occur if the necessary agency actions are taken.

Proposed Action Alternative

Under the Proposed Action Alternative, facilities and activities include the (1) coal-fired power plant and associated infrastructure, (2) associated construction activities, (3) operation and maintenance activities, (4) construction and operation of the 31-mile-long railroad line, and (5) decommissioning activities.

The proposed facilities would include a 750-MW generation unit and a plant-cooling system, a 31-mile-long railroad line, coal-handling and -processing facilities, power transmission lines and interconnection facilities, a water-supply system, an access road to the plant site, waste-management operation facilities, and other ancillary facilities. Because ROWs have already been granted for the original project (i.e., Proposed Action in the 2003 EIS) and, therefore, the Proposed Action Alternative in this EIS, BLM would need only to approve an additional ROW for the rail line and to amend the power plant site's ROW. A 100-acre ROW was granted originally for the gas-fired plant; however, an amendment to the ROW is needed to accommodate the proposed 475-acre coal-fired plant.

As part of the Proposed Action Alternative, BLM would dispose of the 640-acre land area to Toquop Energy through a sale purchase of the 640-acre parcel of land the plant site would occupy. Table ES-1 summarizes the acreage requirements for construction of each major facility under the action alternatives.

Table ES-1
Acreages of Proposed and Permitted Project Features

	Acres	Permitted	Proposed
Power plant site	640		x
Gas-fired power plant footprint	100	x	
Coal-fired power plant footprint	475		x
Water pipeline permanent ROW (30 feet wide)*	45	x	
Water pipeline construction ROW (60 feet wide)*	90	x	
Access road permanent ROW (50 feet wide)*	138	x	
Rail line permanent ROW (100 feet wide)*	356		x
Rail line construction ROW (200 feet wide)*	698		x

SOURCE: Bureau of Land Management 2003a
NOTE: ROW = right-of-way

Power Plant and Related Facilities

Project facilities would include a single 750-MW generation unit and plant-cooling system, a rail line to supply coal to the plant, coal-storage facilities, a water-supply system including a well field and a 12.5-mile-long water pipeline, waste-management operation facilities, and a power transmission interconnection with an existing power transmission line that passes through the southeast portion of the project area. Related facilities also include an administration building, turbine hall, supercritical boiler, maintenance shops, diesel-generator building, coal-unloading station and conveyer, coal-crusher building, dry-cooling towers, solid-waste disposal, oil storage, and an electrical switchyard. The water-supply system, power-interconnection facilities, and improvements to the access road from I-15 to the site would be the same as those proposed in the original project evaluated in the 2003 EIS. All materials used in roadway improvements and other associated project construction, such as gravel, sand, and ballast would be transported to the site from existing sources. No new excavations or pits would result from the project.

Within the same 640-acre site as described in the No-Action Alternative, the power-plant block would occupy 261 acres, the ash disposal would occupy 150 acres, and the topsoil storage areas would occupy 64 acres, while the remaining 165 acres would remain undisturbed.

Water-Supply System

Water would be delivered to the site from the Tule Desert or Clover Valley well field via pipeline and would be stored in the raw water tank. Water would be drawn from this tank and treated by reverse osmosis units and demineralizer systems in the water-treatment building and used in the boiler-feed water and the cooling-water systems. Water consumption would be minimized by using a Heller system dry, natural-draft cooling tower.

The annual water requirements for power generation under the proposed alternative would total 2,500 acre feet. Previously, 2,100 acre feet of water was approved by the Nevada State Engineer for the power plant proposal on this site. This water supply still would be granted under the proposed action, with an additional 400 acre-feet required to reach the 2,500-acre-foot annual water requirements for the Proposed Action Alternative. The approval for the additional 400 acre-feet is pending.

Lincoln County Water District has proposed the Lincoln County Land Act (LCLA) Groundwater Development Project. If this project is completed, it would develop additional groundwater resources in the Tule Desert and the Clover Valley and water pipelines that would deliver water to the LCLA development area and the Toquop Energy Project. This project's proposed water pipeline, if constructed, would eliminate the need for a separate water pipeline for the Toquop Energy Project and would allow for water from either the Clover Valley or Tule Desert hydrographic basins to serve the needs of the power plant.

Construction Activities

Site preparation activities would be undertaken in accordance with a grading design developed by the construction contractor. Specific plans and/or measures proposed for fugitive-dust control, erosion and sedimentation control, site reclamation, stormwater-runoff control, and the protection of natural and cultural resources would be implemented as identified through National Environmental Policy Act (NEPA) or other permitting processes.

Laydown and storage areas and temporary construction facilities would be located on the 640-acre power plant site. Site laydown areas would be modified based on specific contours of the site, terrain, entry points and exit points, and preventative maintenance and material storage requirements. A 200-foot-wide temporary ROW would be required for construction activities along the rail line. Areas requiring excavation and fill materials could be wider.

The ROWs for the construction staging areas associated with the well field, water pipeline, and the access road would be the same as those evaluated in the 2003 EIS.

Access to the construction ROW would be from either end of the rail line and would use existing roads. Bridges would be needed to cross the Meadow Valley Wash and the Toquop Gap. Additional cut and fill and culverts would be used to span the washes going up from the Meadow Valley Wash Bridge. All construction personnel, equipment and materials would be confined within the 200-foot-wide construction ROW and at either end of the rail line. At this time, it is anticipated that the rail construction period would be 24 months.

Operation and Maintenance

The project life would be 54 years—4 years of power plant construction followed by 50 years of plant operation. Water rights would be exercised at the beginning of plant construction. Operation of the power plant would require up to 3.1 million tons of coal per year. The plant would use natural gas supplied by the Kern River Gas Transmission Company line for the initial startup and for restarts during regular maintenance. Fuel oil would provide a backup source of startup fuel. The power plant would produce its own operating power and would not require nor use external sources of power supply. Low-sulfur coal, derived from northeast Wyoming's Powder River Basin, would be delivered by the UPRR to Leith Siding and then to the power plant site via the new rail line. The coal would be blended, crushed, and pulverized to a powder for optimized burning in the boilers. The power plant would use a supercritical pulverized-coal boiler. Use of a once-through supercritical steam cycle and other design features would enable this plant to operate with a higher net efficiency than other coal-fired power plants.

A hybrid cooling tower was selected to minimize water consumption. When the ambient temperature is below 80 degrees Fahrenheit, the cooling tower operates as a dry, natural-draft cooling tower. When the temperature exceeds 80 degrees Fahrenheit, the facility has the option of applying water overspray on the heating surfaces inside the cooling tower to provide additional cooling through evaporation. This type of cooling tower has no particulate emissions. Due to the very limited amount of water used in the cooling process, there would be no visible plume emitted from the cooling tower.

As mentioned, from Leith Siding, a 31-mile-long rail line would be constructed, connecting the existing UPRR rail line to the proposed power plant. The permanent ROW for this rail line would be 100 feet wide. To reduce dust, the coal-transfer systems would have filtered-air-collection systems and water fogging for the receipt and transport of coal.

Other materials that would be stored on site include limestone, quicklime, and ammonia. Quicklime would be purchased from local suppliers and delivered to the site by trucks to a pneumatic conveyer that would transport the quicklime to a storage silo. The silo would be equipped with a baghouse to control particulate matter less than or equal to 10 microns (PM_{10}) emissions. Anhydrous ammonia would be purchased from local suppliers and delivered to the site by truck for storage in a pressurized tank. No air pollutants are emitted from pressurized storage tanks.

Improvements to the access road would be the same as those evaluated in the 2003 EIS, including upgrading to paved surface, widening the ROW, and grading/straightening of the existing roadway.

Byproducts from power generation would include fly ash and synthetic gypsum. The fly ash would be collected by the main fabric filter. The pulverized-coal-fired boiler also would generate bottom ash. Fly ash and bottom ash would be stored in separate ash silos. Emissions from the ash silos would be controlled by a fabric filter.

The power plant would employ approximately 110 permanent employees, who would travel to the site along the improved access road. Traffic along the access road also would include deliveries of quicklime, ammonia, and other materials that would be transported in compliance with applicable Federal, state, and local requirements.

Daily rail traffic along the new rail line is expected to be one train with 80 to 100 cars, loaded with coal coming from the UPRR line, and empty heading back toward the UPRR line. Within the rail line ROW, there would be a maintenance road for periodic inspections of the rail and any fencing that might be within the ROW. Access to the rail line ROW would be restricted by installing barriers at existing road crossings.

Alternative Rail Line Alignments

Several alternative rail line alignments were considered but eliminated from detailed analysis, primarily because of grade and slope considerations or potential impacts on specially designated areas (Draft EIS Map 2-3). One route that was considered but eliminated would originate south of Glendale in Moapa Valley (green route on Draft EIS Map 2-3) and would head north across the Muddy River from the UPRR to intersect with the subalternative rail line alignment, then would travel through Mormon Mountains pass to the project site along the same route as the subalternative rail line alignment. This would result in a total track length of 42 miles, including 3 miles on either trestles or bridges. This alternative was eliminated due to the excessive earthwork that would be required to move the line from a 2.3 percent grade to a 1.5 percent grade and because of potential impacts on wilderness areas.

Another route that was considered but eliminated would originate at UPRR's Hoya Siding with less than 1.3 percent maximum grade, would circumvent the Mormon Mountains by traveling to the south and east, and would cross Mormon Mesa (red route on Draft EIS Map 2-3). This route would approach the project site across Halfway Wash and south of Davidson Peak. Multiple wash crossings would require box culverts. Although this route would require additional track length (a total of 39 miles), the maximum grade would be 1.3 percent. The grade could be reduced with additional minor earthwork. This route was eliminated because it crosses the Mormon Mountain Wilderness and Mormon Mesa Area of Critical Environmental Concern (ACEC) southeast of Davidson Peak.

A third route that was considered and eliminated would begin at UPRR's Hoya Siding with less than a 1.5 percent maximum grade heading south, would turn east through the Mormon Mountains pass (Jacks Pockets) to Mormon Mesa, then would proceed northeast through the East Mormon Mountains pass to the project site (brown route on Draft EIS Map 2-3). The total track length is 35 miles. This route was dismissed as a viable alternative due to the designated Mormon Mountain Wilderness being crossed for approximately 5 miles and Mormon Mesa ACEC.

AFFECTED ENVIRONMENT

Chapter 3 describes the existing conditions of the human and natural environments that potentially could be affected by the No-Action or Proposed Action alternatives. The descriptions of existing conditions are based on the most recent data available in published and unpublished reports, as well as agency databases. Field reconnaissance and interviews were conducted as necessary to verify specific information (such as biological resources, land use, and traditional and cultural resources). The environmental resources described include land use; livestock grazing and rangelands; recreation and access; wilderness and special management areas; visual resources; climate and air quality; noise; geology, soils, and minerals; groundwater resources; surface water resources; biological resources; wild horses and burros; archaeology and historical preservation; Indian trust assets; paleontological resources; public safety, hazardous materials, and solid waste; socioeconomics; and environmental justice.

ENVIRONMENTAL CONSEQUENCES

The potential environmental consequences of each alternative were determined using the description of the existing conditions of the environment provided in Chapter 3 of this Draft EIS as a baseline to identify and measure potential impacts. Best management practices, conservation measures, and the effectiveness of recommended mitigation measures were considered in assessing the impacts on each resource. The full discussion of the impact assessment is provided in Chapter 4 of this Draft EIS. Table ES-3, at the end of this Executive Summary, is a summary of major impacts anticipated under the Proposed Action Alternative and each action alternative by resource area.

The cumulative effects of the project were considered as part of the analysis (Draft EIS Section 4.17). Cumulative effects result from the Proposed Action Alternative's incremental impacts when those impacts are added to the impacts of other past, present, and reasonably foreseeable future actions, regardless of the agency or person who undertakes them (Federal or non-Federal).

The impacts of greatest consequence under the No-Action Alternative stem from the use of large volumes (up to 7,000 af/yr) of water required for the operation of the natural-gas-fired power plant, the disturbance of rangeland, the deleterious effects of the access road crossing designated ACEC, the socioeconomic factors, and the effects of particulate emissions as a result of plant operation. Impacts on recreation and access; visual and biological resources; noise; geology, soils, and minerals; archaeology and historic preservation; public safety; hazardous materials, and solid waste are considered to be minimal under the No-Action Alternative.

The environmental consequences under the Proposed Action Alternative would include similar effects as the No-Action Alternative with some differences. Chief among these differences is the addition of a 31-mile-long rail line that would enable a coal-delivery route to the project site under the Proposed Action Alternative. The rail line would travel north across the Tule Desert from the project site and would connect to an existing UPRR line at Leith Siding. The rail line would cross several existing dirt roads and pastures that are used mainly for grazing activities and off-highway driving.

Another difference between the No-Action Alternative and the Proposed Action Alternative would be the changes resulting from using and burning coal (Proposed Action Alternative) for power generation instead of natural gas (No-Action Alternative).

The socioeconomic impacts under both alternatives would be related primarily to the economic benefits associated with each project. It is estimated that much of the workforce would originate from the local area, and local municipalities would benefit from the increased population and impacts on local economies. The No-Action Alternative would provide 25 permanent jobs and the Proposed Action Alternative would provide 110 permanent jobs.

Wilderness areas would not be affected, but special management areas would be affected by both alternatives. No aspects of the project would occur within a designated wilderness area under either alternative. However, under the three alternative rail line alignments originally considered, the rail line would cross the Mormon Mountains Wilderness and Mormon Mesa ACEC, thereby eliminating these alternative rail alignments from further analysis. Under both the No-Action Alternative and Proposed Action Alternative, the access road to the project site would cross the Mormon Mesa ACEC. Mitigation measures for protection of the ACEC are included in Chapter 4 of this Draft EIS.

Air quality would be affected by the following under both alternatives: power plant emissions; vehicle emissions; and emission of pollutants from earthmoving activity during construction. Coal-handling operations also would generate fugitive dust. However, mitigation measures are recommended to reduce fugitive dust, particularly during construction, and the Federal National Ambient Air Quality Standards (NAAQS) would not be exceeded under either alternative. See Table ES-2 for a comparison of Maximum Annual Criteria Pollutant Emissions for the No-Action Alternative and the Proposed Action Alternative.

Table ES-2
Comparison of No-Action and Proposed Action Alternatives Summaries of Maximum Annual Criteria Pollutant Emissions

	NO_x	CO	SO_2	VOC	PM_{10}
	Tons/Year				
No Action	355.91	967.48	202.23	79.04	434.97
Proposed Action	1,614.00	2,656.00	1,352.00	82.00	875.00

SOURCE: Bureau of Land Management 2003a; ENSR Corporation 2007a

NOTES: NO_x = nitrogen oxides
CO = carbon monoxide
SO_2 = sulfur dioxide
VOC = volatile organic compound
PM_{10} = particulate matter equal to or less than 10 microns in diameter

The risks to human health under both alternatives were analyzed, primarily as related to air emissions. The health-protective NAAQS criteria would not be exceeded under either alternative, and risks associated with residential exposure to air emissions would be below the target for health standards.

The primary impacts on biological resources under both alternatives would be associated with surface disturbance—vegetation removal and associated habitat loss or fragmentation and changes to wildlife movement corridors. The amount of surface disturbance would be greater under the Proposed Action Alternative due to the additional area of disturbance at the power plant site and from the rail line. Surface disturbance also could cause soil erosion and affect biological productivity, but mitigation measures and best management practices would be employed to reduce effects on soils. Under both alternatives, impacts on federally listed or sensitive species would be localized. The species would not be jeopardized; however, there may be adverse effects, therefore, a biological opinion is being sought from the U.S. Fish and Wildlife Service. Mitigation measures, including biological monitoring, have been identified and proscribed to protect both the desert tortoise within the Mormon Mesa ACEC and the other species that may inhabit the area.

The project would impact visual resources in the project area under both alternatives, and the addition of the rail line under the Proposed Action Alternative would increase the affected viewshed. Users of the surrounding public land who would be able to view the facilities would be most affected by these changes.

Cultural resources in the project area potentially would be affected under both alternatives. The residual effects (post-mitigation) would be the same under both alternatives. Mitigation would include appropriate placement of facilities to avoid cultural sites as well as application and adherence to the measures outlined in the project-specific programmatic agreement regarding the treatment of cultural properties.

CONSULTATION AND COORDINATION

The analyses for this Draft EIS were completed in consultation with BLM, other agencies, and the public. In March 2006, the BLM sent letters inviting the cooperation of the following agencies: Nevada Department of Wildlife; Nevada Division of Environmental Protections; Nevada State Clearinghouse; the Nevada State Historic Preservation Office; U.S. Fish and Wildlife Service; U.S. Army Corps of Engineers; National Park Service (Lake Mead National Recreation Area); and Lincoln County. The BLM also extended the invitation to the Surface Transportation Board in June 2006.

The BLM hosted a total of four public scoping meetings in March 2006, which were attended by 113 people. A detailed report of comments and issues heard from the public was developed and placed on the proponent's Toquop Energy Project Web site at http://www.blm.gov/eis/nv/toquop/. An informational newsletter (also on the Web site) detailing the results of the scoping period and the remaining milestones for the EIS were distributed in February 2006.

AGENCY PREFERRED ALTERNATIVE

BLM is awaiting public input before making a decision on a preferred alternative.

Table ES-3
Summary of Impact Assessment

Resource	No-Action Alternative 1,100-Megawatt Gas-Fired Facility	Proposed Action Alternative 750-Megawatt Coal-Fired Facility
Lands	Public land transferred to private ownership would result in a net loss of public land acres. Grazing would be displaced from some locations and range improvements (e.g., fences) would be crossed where facilities are developed. The No-Action Alternative would require a variance or special use permit from Lincoln County to allow construction of this type of facility within an agriculturally zoned area.	Impacts would be the same as for the No-Action Alternative. The proposed rail line would pass through undeveloped areas.
Grazing and Rangelands	The location of the proposed gas-fired plant lies within the Gourd Spring grazing allotment. Livestock grazing was excluded from the power plant site as a result of the construction of the boundary fence meant to protect the Mormon Mesa Area of Critical Environmental Concern (ACEC). No animal unit months (AUMs) would be lost by the construction of the power plant. Construction activities along the water pipeline could disturb up to 90 acres of rangeland that is currently managed for livestock use, with the effect of displacing forage temporarily. Vegetation within the temporary right-of-way (ROW) would be reclaimed after construction. The 2003 Environmental Impact Statement (EIS) includes standard procedures to implement protection of rangelands surrounding the project area.	Impacts on grazing on the power plant site and water-supply system from the Proposed Action Alternative would be similar to those of the No-Action Alternative. The construction of the rail line would displace existing fences in about four locations and directly would impact 356 acres of rangelands.
Recreation and Access	As noted in the 2003 EIS, the effect of the project would not be substantive because recreational use does not require direct use of land proposed for the power plant site. Implementation of the action would provide improved access for individuals who wish to pursue recreation opportunities nearby, as noted by BLM. As the power plant is constructed, a temporary increase in average daily traffic would occur on Interstate 15 (I-15) near the East Mesa interchange.	Effects of the Proposed Action Alternative on recreation and access related to the power plant site would be the same as those of the No-Action Alternative. In approximately 10 locations, the rail line would cross primitive/unimproved roads still associated with grazing and ranching and now also used by off-highway vehicles (OHVs). During the construction phase, the railroad construction activity would disrupt recreational access temporarily and intermittently in these locations. This increase would result from approximately 20 daily vehicle trips (10 trips accessing the project area and 10 trips leaving the project area) needed for delivering and removing construction equipment (BLM 2003a).
Wilderness and Special Management Areas	None of the project facilities would be located within designated wilderness areas or ACECs; therefore, as noted in the 2003 EIS, no direct impacts on wilderness or other special management areas would result. The exception is the permitted access road between I-15 and the power plant site, which would cross the Mormon Mesa ACEC.	Effects of the Proposed Action Alternative on wilderness and special management areas from activities on the power plant site would be nearly the same as that of the No-Action Alternative.

Resource	No-Action Alternative 1,100-Megawatt Gas-Fired Facility	Proposed Action Alternative 750-Megawatt Coal-Fired Facility
Visual Resources	The plant would be visible in the background from I-15, 10 miles south of the site. The power plant may be visible from the ridges in the Mormon Mountains Wilderness, about 5.5 miles away. Nighttime lighting for operational safety and security would create a new source of light in an area of very little night lighting. During construction, temporary impacts on visual resources would result from (1) fugitive-dust generation, (2) presence of construction equipment, and (3) increased light during possible nighttime construction.	Construction of the proposed 750-megawatt coal-fired power plant would result in similar impacts as the No-Action Alternative.
Climate and Air Quality	Construction of the proposed natural gas-fired power plant and associated facilities under the No-Action Alternative would result in direct and indirect impacts on air quality within the project area. Direct effects on air quality would occur from construction activities at the power plant site, along access roads, at the water pipeline, and at the well field. During construction, temporary and localized increases in ambient concentrations of nitrogen oxides (NOx), carbon monoxide (CO), sulfur dioxide (SO_2), particulate matter with aerodynamic diameter less than 10 microns (PM_{10}), particulate matter with aerodynamic diameter less than 2.5 microns ($PM_{2.5}$) and volatile organic compounds (VOCs) would result from exhaust emissions of worker vehicles, heavy construction equipment, diesel generators, and other machinery and tools. In addition, fugitive-dust emissions would result from vehicular travel on unpaved ground surfaces and from excavation and earthmoving activity. Operation of the 1,100-MW power plant under the No-Action Alternative would result in direct and indirect impacts on air quality within the project area. Air pollutant emissions would result from the operation of the following natural gas-fired equipment associated with the power plant. The natural gas and diesel-fired equipment would cause air emissions of the criteria pollutants NO_x, CO, SO_2, PM_{10}, and VOCs. Minor quantities of hazardous air pollutants, such as formaldehyde and benzene, also would be emitted. The cooling towers would cause emissions of PM_{10}. Air quality impacts resulting from plant operations under the No-Action Alternative would be the least of all alternatives considered for NO_x, SO_2, PM_{10}, CO, and lead (Pb).	Impacts on air quality and climate would be similar to the No-Action Alternative. Air pollutant emissions would result from earthmoving activity during construction (fugitive dust, PM_{10} and $PM_{2.5}$), tailpipe emissions from vehicles (PM, NO_x, SO_2, CO, and VOC), and coal combustion by the power plant (CO, NO_x, SO_2, and others). The Proposed Action Alternative would comply with Federal air quality standards. Particulate emissions during construction would be temporary and mitigated through adherence to the recommended mitigation measures. The project proponents have committed to voluntary mitigation measures to invest in third-party capital improvements projects to reduce SO_2 in the region.

Resource	No-Action Alternative 1,100-Megawatt Gas-Fired Facility	Proposed Action Alternative 750-Megawatt Coal-Fired Facility
Noise	This alternative was analyzed in the 2003 EIS for which the BLM Ely Field Office issued a Final EIS and Record of Decision. No noise impacts were identified because no noise-sensitive receptors would be close enough to the plant to be adversely affected.	The proposed coal-fired power plant would have a different and larger site plan than the previously analyzed gas-fired plant to accommodate the coal and coal-handling facilities, which would result in additional noise sources. The overall acoustic emission from the 750-MW plant including the coal-processing facilities is estimated to be approximately equal to or lower than the previously approved, higher-power output (1,100-MW) plant. Thus, the Proposed Action Alternative power generation facilities would create an equal or smaller acoustical footprint than the No-Action Alternative. The rail line would traverse areas not previously evaluated for noise or vibration issues. This rail line is proposed to operate one full and one empty train per day (a total of two train passes per day). The trains typically would consist of two to three locomotives and 80 to 100 railcars. The throttle setting of the locomotive was assumed to be in notch 8. The train speed would average 30 miles per hour with a maximum speed of 45 miles per hour. Because there are no public highway and one at-grade railroad crossing along the project route, the sounding of the locomotive warning horn would be rare and would not contribute to the ordinary noise emission of the trains.
Geology, Soils, and Minerals	There are no unique geologic features or geologic resources within the project area that would be impacted by construction of the power plant under the No-Action Alternative (BLM 2003a). The No-Action Alternative would result in soil disturbance on approximately 971 acres at the power plant site and on all construction ROWs. Because the project is designed to minimize disturbance to soils and because temporary ROWs would be reclaimed, 280.7 acres would experience long-term impacts from the construction of project facilities. There would be no impacts on mineral resources or resource uses within the project area under the No-Action Alternative.	Impacts would be the same as the No-Action Alternative, except after reclamation efforts following construction of the plant and rail line, approximately 831 acres would be disturbed over the long term to accommodate the power plant footprint and the permanent right-of-way for the rail line.
Groundwater Resources	Through analysis in the 2003 EIS, it was determined that pumping water from the fractured-rock aquifer in the Tule Desert in the amount and at rates necessary to serve the permitted gas-fired generating plant would not result in a substantial decline of groundwater levels or a significant reduction in groundwater resources.	Under this alternative, the demand for water would be 2,500 acre-feet per year, which is substantially less than that required for the No-Action Alternative. Based on the results of the 2002 analysis by CH2M Hill, the effects from use of 7,000 af/yr of groundwater from the Tule Desert were reviewed in the 2003 EIS and determined to be minimal.

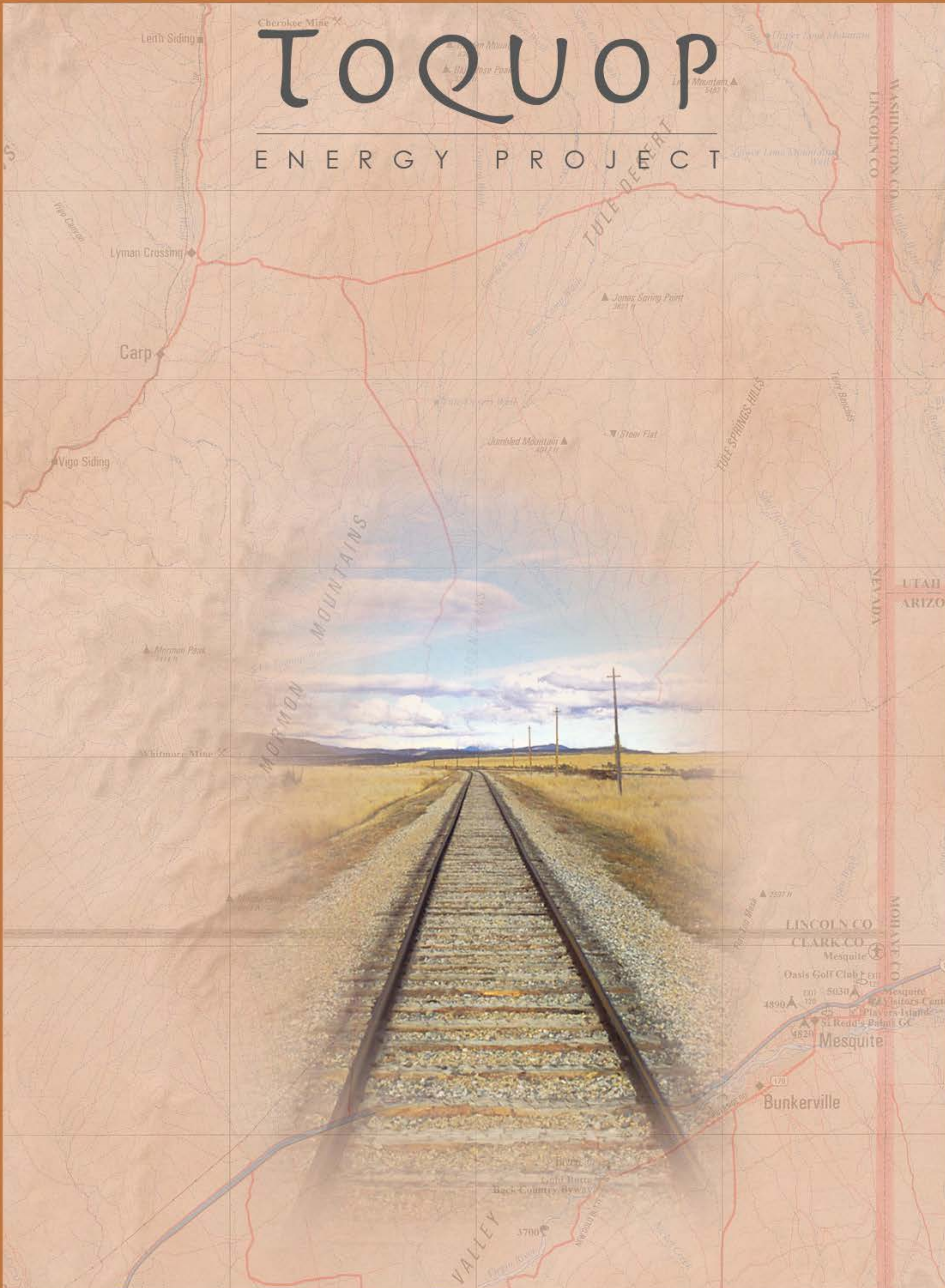
Resource	No-Action Alternative 1,100-Megawatt Gas-Fired Facility	Proposed Action Alternative 750-Megawatt Coal-Fired Facility
Surface-water Resources	Six small, unnamed washes cross the power plant site. The specific disturbed area where the plant structures would be constructed straddles one of these ephemeral washes. That particular wash, therefore, would be filled and its watercourse diverted to one or more adjacent washes. As a result, the amount and rate of flow in the washes that receive the diverted flow would increase when local rainfall amounts are great enough to generate runoff. Construction of a power plant under any of the alternatives would create areas (e.g., rooftops, roads, parking areas) that are impervious to rainfall, which would increase the amount and rate of flow of runoff from local storms. The total power plant area that would be rendered impervious would be approximately 15 acres. Both construction and operation of the power plant potentially would provide the opportunity to affect the surface-water quality of the local washes and, in turn, the Virgin River. Water quality in the washes could be degraded by the addition of both suspended solids (sediment) and dissolved constituents (substances commonly found in stormwater runoff from parking lots and industrial areas).	Impacts on the power plant site would be similar to those described in the No-Action Alternative. Approximately 9,000 gallons of surfactant would be added to coal storage piles per year in order to reduce dust from the piles. The coal storage pile area would be bermed and all stormwater would be directed to a lined evaporation pond designed to 100-year flood event standards.
Biological Resources	Effects on vegetation would occur from disturbance or removal of vegetation at the power plant site, along access roads, at the water pipeline, and at the well field. Surface disturbances resulting from construction under the No-Action Alternative would be the least of all alternatives considered. The principal impacts on terrestrial wildlife likely to be associated with the No-Action Alternative include (1) the disturbance of certain wildlife habitats due to construction activities such as earthmoving at the plant site and access roads, (2) habitat fragmentation, (3) direct mortality and/or displacement of some wildlife species, and (4) an increase in the potential for illegal killing and harassment of wildlife. Construction and operational impacts of the No-Action Alternative on special status plant and wildlife species and their habitats would be similar to those for vegetation communities and wildlife.	Impacts on vegetation under this alternative would be similar in nature to those described for the No-Action Alternative; however, the scope of effects would be increased under the Proposed Action Alternative primarily due to the addition of the rail line. In addition, indirect impacts from nitrogen and mercury deposition from the power plant air emissions may occur.

Resource	No-Action Alternative 1,100-Megawatt Gas-Fired Facility	Proposed Action Alternative 750-Megawatt Coal-Fired Facility
Archaeology and Historic Preservation	Of the 19 cultural resources identified within the No-Action Alternative power plant site, effects on the seven prehistoric rock alignments recommended as eligible for the National Register of Historic Places would be addressed and mitigated through the development and implementation of a historic properties treatment plan that would delineate measures to avoid, reduce, or mitigate those impacts. Mitigation or avoidance would not be required for the 12 ineligible sites or isolated artifacts.	Of the 31 cultural resources identified within the Proposed Action Alternative power plant site and rail line corridor, effects to nine cultural resources recommended as eligible for the National Register of Historic Places would be addressed and mitigated through the development and implementation of a historic properties treatment plan that would delineate measures to avoid, reduce, or mitigate those impacts. Mitigation or avoidance would not be required for the 22 ineligible sites or isolated artifacts.
Public Safety, Hazardous Materials, and Solid Waste	With the implementation of environmental controls outlined in the standard operating procedures for the No-Action Alternative, no environmental impacts related to hazardous and waste materials are anticipated.	Potential wastes that could be generated at the site include domestic non-hazardous solid waste, hazardous wastes or materials, and used wastes that can be recycled. These types of substances, materials, and wastes most likely would be present during stages of construction, development, and operation of the facility. During all stages of plant construction and operation, strict compliance with all Federal, state, and local regulations governing the management of hazardous materials is required by law.
Socioeconomic Resources	The No-Action Alternative would generate revenue by property and sales taxes that would be paid to the State of Nevada, which in turn would redistribute it to all counties. It is anticipated that Lincoln County would collect $14 million during the construction period, along with a portion generated from a certain percentage of the cumulative tax rate (BLM 2003a). Construction of the facility would last 26 months, and approximately 500 skilled workers would be hired. During peak construction of the first phase, it is anticipated that there would be 1,200 to 1,500 temporary positions open for skilled workers. Employment at the power plant would have a local multiplier effect, generating 25 more jobs. Of those 25 jobs, 10 would be tied indirectly to the power plant, resulting from employment at local establishments that would support the power plant, and the remaining 15 would be from induced employment. For all projects in the region, temporary housing facilities would be needed and the added population during construction could place a burden on local social and public services. During the shutdown phase, there would be a loss of jobs.	Impacts of the Proposed Action Alternative would be similar to those of the No-Action Alternative, although economic impacts would be greater due to a larger workforce. It is anticipated that Lincoln County would collect tax revenues exceeding $10 million per year at current tax rates. Construction of the facility would last 50 months with an average workforce of 800 jobs. During operation of the power plant, 110 permanent jobs would be added.

Resource	No-Action Alternative 1,100-Megawatt Gas-Fired Facility	Proposed Action Alternative 750-Megawatt Coal-Fired Facility
Environmental Justice	There is no expectation that the No-Action Alternative would have a disproportionate impact on the environmental justice populations in Mesquite, Caliente, and/or St. George. There are no special issues, such as housing, transportation access, or resource use in the project area that would affect the environmental justice population disproportionately.	Impacts would be similar to those listed under the No-Action Alternative.

TOQUOP

ENERGY PROJECT



GLOSSARY

GLOSSARY

Acre-foot: The volume (as of irrigation water) that would cover 1 acre to a depth of 1 foot (43,560 cubic feet).

Action: In the context of the National Environmental Policy Act (NEPA), describes actions proposed to meet a specific purpose and need and that may have effects on the environment, which are potentially subject to Federal control and responsibility. Federal actions generally fall into the categories of adoption of official policy, formal plans, and programs; or approval of specific projects. For this document, the term action applies to a specific project.

Air quality: A measure of the health-related and visual characteristics of the air, often derived from quantitative measurements of the concentrations of specific injurious or contaminating substances.

Alluvium: A general term for clay, silt, sand, gravel, or similar consolidated material deposited during comparatively recent geologic time by a stream or other body of running water in the bed of the stream, river, or floodplain, or as a cone or fan at the base of a mountain slope.

Alternative: Any one of a number of options for a project.

Ambient: Of the environment surrounding a body, encompassing on all sides. Most commonly applied to air quality and noise.

American Indian tribe (or tribe): Any American Indian group in the conterminous United States that the Secretary of the Interior recognizes as possessing tribal status (listed periodically in the Federal Register).

Animal unit month: The amount of forage necessary to sustain one cow and one calf (e.g., a 1,000-pound cow and calf) for a period of one month.

Annual (ecology): A plant that completes its development in one year or one season and then dies.

Aquatic: Growing or living in or near the water.

Aquifer: A water-bearing rock unit (unconsolidated or bedrock) that will yield water in a usable quantity to a well or spring.

Archaeological site: A discrete location that provides physical evidence of past human use.

Archaeology: The scientific study of the life and culture of past, especially ancient, peoples, as by excavation of ancient cities, relics, artifacts, etc.

Area of Critical Environmental Concern: A Bureau of Land Management (BLM) designation pertaining to areas where specific management attention is needed to protect and prevent irreparable damage to important historical, cultural, and scenic values, fish or wildlife resources, or other natural systems or processes, or to protect human life and safety from natural hazards.

Arroyo: A dry gully, or a stream in a dry region.

Artifact: Any object showing human workmanship or modification, especially from a prehistoric or historic culture.

Ash: The residue that remains when something is burned. Also, one component of coal; generally, high ash-content coal is considered to be low-grade.

Assessment: The act of evaluating and interpreting data and information for a defined purpose.

Backfill: The fill, often mine waste or rock, that replaces the void left from where a rock or ore has been removed. Also, the material used to fill in a trench in the groundbed (i.e., pipeline trench). The composition of the backfill varies based on the soil type being used and the component being covered.

Background (visual): That portion of the visual landscape lying from the outer limit of the middleground to infinity. Color and texture are subdued in this area, and visual sensitivity analysis here is primarily concerned with the two-dimensional shape of landforms against the sky.

Baghouse: An air pollution control device containing a large fabric bag, usually made of glass fibers, used to eliminate intermediate and large (greater than 20 PM [particulate matter] in diameter) particles. This device operates like the bag of an electric vacuum cleaner, passing the air and smaller particles while entrapping the larger ones.

Baseline: The existing conditions against which impacts of the proposed action and its alternatives can be compared.

Basin: A depressed area having no surface outlet (topographic basin); a physiographic feature or subsurface structure that is capable of collecting, storing, or discharging water by reason of its shape and the characteristics of its confining material (water); a depression in the earth's surface, the lowest part often filled by a lake or pond (lake basin); a part of a river or canal widened (drainage, river, stream basin).

Best management practices: A suite of techniques that guide, or may be applied to, management actions to aid in achieving desired outcomes and help to protect the environmental resources by avoiding or minimizing impacts of an action.

Big game: Large species of wildlife that are hunted (such as elk, deer, pronghorn antelope).

Biological assessment: Information prepared by, or under the direction of, a Federal agency to determine whether a proposed action is likely to (1) adversely affect listed species or designated critical habitat; (2) jeopardize the continued existence of species that are proposed for listing; or (3) adversely modify proposed critical habitat.

Biological opinion: A document that is the product of formal consultation, stating the opinion of the U.S. Fish and Wildlife Service on whether or not a Federal action is likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of critical habitat.

Boiler: Any device used to burn coal fuel to heat water for generating steam.

Butte: A steep hill standing alone in a plain.

Candidate species: A plant or animal species not yet officially listed as threatened or endangered, but which is undergoing status review by the U.S. Fish and Wildlife Service.

Clean Air Act of 1990: Federal legislation governing air pollution. The Clean Air Act established National Ambient Air Quality Standards for carbon monoxide, nitrogen oxide, ozone, particulate matter, sulfur dioxide, and lead. Prevention of Significant Deterioration classifications define the allowable increased levels of air quality deterioration above legally established levels and include the following:

> **Class I** – minimal additional deterioration in air quality (certain national parks and wilderness areas)
>
> **Class II** – moderate additional deterioration in air quality (most lands)
>
> **Class III** – greater deterioration for planned maximum growth (industrial areas)

Clean Water Act of 1987: National environmental law enforced by the U.S. Environmental Protection Agency that regulates water pollution.

Coal: A fossil fuel extracted from the ground by deep mining. It is a readily combustible black or brownish-black sedimentary rock composed primarily of carbon and hydrocarbons along with other elements including sulfur. Coal is formed from plant remains that have been compacted, hardened, chemically altered, and metamorphosed by heat and pressure over geologic time. It is primarily used as a solid fuel to produce heat through combustion and is the most common source of electricity generation worldwide.

Coal washing: The process of separating undesirable materials from coal based on differences in densities. For example, pyritic sulfur, or sulfur combined with iron, is heavier and sinks in water; coal is lighter and floats.

Compaction: Process by which the volume or thickness of rock is reduced due to pressure from overlying layers of sediment.

Conduit: A pipe, usually made of metal, ceramic, or plastic, that protects buried cables or wires.

Cooperating agency: Assists the lead Federal agency in developing an environmental assessment or environmental impact statement. The Council on Environmental Quality regulations implementing NEPA define a cooperating agency as any agency that has jurisdiction by law or special expertise for proposals covered by NEPA (40 CFR 1501.6). Any Federal, state, or local government jurisdiction with such qualification may become a cooperating agency by agreement with the lead agency.

Corridor: As discussed in this document, a wide strip of land within which a proposed linear facility (e.g., pipeline, transmission line) could be located.

Council on Environmental Quality (CEQ): An advisory council to the President established by the National Environmental Policy Act of 1969. It reviews Federal programs for their effort on environmental studies, and advises the President on environmental matters.

Criteria: Standards on which a judgment or decision can be based.

Cultural resources: Remains of human activity, occupation, or endeavor as reflected in districts, sites, buildings, objects, artifacts, ruins, works of art, architecture, and natural features important in human events.

Cumulative effect (or impact): The impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable actions. Cumulative impacts are evaluated as part of the environmental impact statement (EIS), and may include consideration of additive or interactive effects regardless of what agency or person undertakes the other actions.

Decibel: A unit for expressing the relative intensity of sounds on a logarithmic scale from zero for the average least perceptible sound to about 130 for the average level at which sound causes pain to humans. For traffic and industrial noise measurements, the A-weighted decibel, a frequency-weighted noise unit, is widely used. The A-weighted decibel scale corresponds approximately to the frequency response of the human ear and thus correlates well with loudness.

Degradation: The wearing down or away, and general lowering or reducing, of the earth's surface by the processes of weathering and erosion.

Discharge: Outflow of surface water in a stream or canal (water). Discharge from an industrial facility that may contain pollutants harmful to fish or animals if it is released into nearby water bodies usually requires a permit issued by the U.S. Environmental Protection Agency and is monitored.

Distance zone: A visibility threshold distance where visual perception changes. They usually are defined as foreground, middleground, and background.

Diversion: A channel, embankment, or other manmade structure constructed to divert water from one area to another; the process of using these structures to move water.

Drainage: The natural or artificial removal of surface water and groundwater from a given area. Many agricultural soils need drainage to improve production or to manage water supplies.

Drawdown: The decrease in elevation of the water surface in a well, the local water table or the pressure head on an artesian well due to extraction of groundwater or decrease in recharge to the aquifer.

Easement: A right afforded a person, agency, or organization to make limited use of another's real property for access or other purposes.

Ecology: The relationship between living organisms and their environment.

Effect (or impact): A modification of the existing environment as it presently exists, caused by an action (such as construction or operation of facilities). An effect may be direct, indirect, or cumulative. The terms effect and impact are synonymous under the NEPA. A direct effect is caused by an action and occurs at the same time and same place (40 CFR 1508.8(a)). An indirect effect is caused by the action later in time or farther removed in distance, but still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.

Emission: Effluent discharged into the atmosphere, usually specified by mass per unit time, and considered when analyzing air quality.

Endangered species: A plant or animal that is in danger of extinction throughout all or a significant portion of its range. Endangered species are rarely identified by the Secretary of the Interior in accordance with the Endangered Species Act (ESA) of 1973.

Endangered Species Act of 1973: Provides a means whereby the ecosystems upon which threatened and endangered species depend may be conserved and to provide a program for the conservation of such threatened and endangered species. The ESA requires all Federal agencies to seek to conserve threatened and endangered species, use applicable authorities in furtherance of the purposes of the ESA, and avoid jeopardizing the continued existence of any species that is listed or proposed for listing as threatened and endangered or destroying or adversely modifying its designated or proposed critical habitat. The U.S. Fish and Wildlife Service is responsible for administration of this act.

Energy conservation: A means of saving energy.

Environment: The surrounding conditions, influences, or forces that affect or modify an organism or an ecological community and ultimately determine its form and survival.

Environmental impact statement (EIS): A document prepared to analyze the impacts on the environment of a proposed action and released to the public for review and comment. An EIS must meet the requirements of NEPA, CEQ, and the directives of the agency responsible for the proposed action.

Environmental justice: The fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no group of people including racial, ethnic, or socioeconomic group should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of Federal, state, local, and tribal programs and policies (see Executive Order 12898).

Ephemeral wash or stream: A stream that flows only in direct response to precipitation in the immediate watershed or in response to the melting of a cover of snow and ice and has a channel bottom that is always above the local water table.

Erosion: The wearing away of the land surface by running water, wind, ice, or other geologic agents and by such processes as "gravitation creep."

Federal Register: Published by the Office of the Federal Register, National Archives and Records Administration, the *Federal Register* is the official daily publication for rules, proposed rules, and notices of Federal agencies and organizations, as well as executive orders and other presidential documents.

Floodplain: That portion of a river or stream valley, adjacent to a river channel, that is built of sediments and is inundated with water when the stream overflows its banks.

Foreground: The visible area from a viewpoint or use area out to a distance of 0.5 mile. The ability to perceive detail in a landscape is greatest in this zone.

Fossil: Any remains, trace, or imprint of a plant or animal that has been preserved by natural process in the earth's crust since some past geologic time.

Geographic information system: A system of computer hardware, software, data, people and applications that capture, store, edit, analyze, and graphically display a potentially wide array of geospatial information.

Geology: The science that relates to the earth, the rocks of which it is composed, and the changes that the earth has undergone or is undergoing.

Geothermal resource: Heat found in rocks and fluids at various depths that can be extracted by drilling or pumping for use as an energy source. This heat may be residual heat, friction heat, or a result of radioactive decay.

Global warming: An increase in the average temperature of the earth's atmosphere and oceans. The term also is used to describe the theory that increasing temperatures are the result of a strengthening greenhouse effect caused primarily by manmade increases in carbon dioxide and other greenhouse gases.

Groundwater: Subsurface water that fills available openings in rock or soil materials to the extent that they are considered water saturated.

Gypsum: A soft white mineral, the most common sulfate mineral.

Habitat: A specific set of physical conditions in a geographic area(s) that surrounds a single species, group of species, or large community. In wildlife management, the major components of habitat are food, water, cover, and living space.

Hydrology: The study of the movement, distribution, and quality of water throughout the earth, addresses both the hydrologic cycle and water resources.

Impact (or effect): A modification of the existing environment as it presently exists, caused by an action (such as construction or operation of facilities). An impact may be direct, indirect, or cumulative. The terms effect and impact are synonymous under NEPA.

Impoundment: A closed basin, naturally formed or artificially built, which is dammed or excavated for the retention of water, sediment, or waste.

Indirect effect (or impact): Secondary effects that occur in locations other than the initial action or later in time, but that are caused by the proposed action.

Industrial area: A land use zoning term used to describe or designate areas in which heavy industry is concentrated or allowed.

Infrastructure: The facilities, services, and equipment needed for a community or facility to function, such as and including roads, sewers, water lines, and electric lines.

Intermittent: A river or stream that flows for a period of time, usually seasonally during rainy periods, and stops during dry periods. In arid regions, dry periods may be interrupted by occasional flash floods from brief but intense rain storms.

Invasive species: Describes a large number of nonnative plant species whose introduction causes or is likely to cause economic or environmental harm or harm to human health.

Issue: Describes the relationship between actions (proposed, connected, cumulative, similar) and environmental (natural, cultural, and socioeconomic) resources. Issues may be questions, concerns, problems, or other relationships, including beneficial ones. Issues do not predict the degree or intensity of harm the action might cause, but simply alert the reader as to what the environmental problems might be. The NEPA document should address issues identified through interaction with agencies and/or the public, and/or through resource studies.

Labor force: All persons 16 years of age or over who are either employed or unemployed and actively looking for a job.

Land use plan: A plan or document developed by a government entity, which outlines specific functions, uses, or management-related activities of an area, and may be identified in combination when joint or seasonal uses occur and may include land used for support facilities that are an integral part of the use.

Landform: A term used to describe the many land surfaces that exist as a result of geologic activity and weathering (e.g., plateaus, mountains, plains, and valleys).

Landscape: An area composed of interacting ecosystems that are repeated because of geology, landform, soils, climate, biota, and human influences throughout the area. Landscapes are generally of a size, shape, and pattern, which are determined by interacting ecosystems.

Lease: An authorization or contract by which one party (lessor) conveys the use of property to another (lessee) in return for rental payments. In cases of resource production, lessees pay royalties to the lessor in addition to rental payments.

Locomotive: A railway vehicle that provides the motive power for a train and has no payload capacity of its own; its sole purpose is to move the train along the tracks.

Megawatt: A unit for measuring power equal to one million watts. The productive capacity of electrical generators is measured in megawatts.

Mesa: An isolated, nearly level land mass, formed on nearly horizontal rocks, standing above the surrounding country and bounded with steep sides.

Mineral resources: Any inorganic or organic substance occurring naturally in the earth that has a consistent and distinctive set of physical properties. Examples of mineral resources include coal, nickel, gold, silver, and copper.

Minimal (impact): Unless otherwise specified, “minimal” shall mean non-deleterious impacts that are measurable on the short term, but not significant (see definition herein).

Mitigation: The abatement or reduction of an impact on the environment by (1) avoiding a certain action or parts of an action, (2) employing certain construction measures to limit the degree of impact, (3) restoring an area to preconstruction conditions, (4) preserving or maintaining an area throughout the life of a project, (5) replacing or providing substitute resources to the environment, or (6) gathering data (e.g., archaeological or paleontological) prior to disturbance.

National Ambient Air Quality Standards: The allowable concentrations of air pollutants in the air specified by the Federal government. The air quality standards are divided into primary standards (based on the air quality criteria and allowing an adequate margin of safety and requisite to protect the public health) and secondary standards (based on the air quality criteria and allowing an adequate margin of safety and requisite to protect the public welfare) from any unknown or expected adverse effects of air pollutants.

National Environmental Policy Act of 1969: Our nation’s basic charter for protection of the environment. It establishes policy, sets goals, and provides means for carrying out the policy. In accordance with NEPA, all Federal agencies must prepare a written statement on the environmental impacts of a proposed action. The provisions to ensure that Federal agencies act according to the letter and spirit of NEPA are in the CEQ regulations for implementing NEPA (43 CFR 1500-1508).

National Register of Historic Places. A listing, maintained by the Secretary of the Interior, of districts, sites, buildings, structures, and objects worthy of preservation. To be eligible a property must normally be at least 50 years old, unless it has exceptional significance, and have national, State, or local significance in American history, architecture, archaeology, engineering, or culture; and possess integrity of location, design, setting, material, workmanship, feeling, and association; and (a) be associated with events that have made a significant contribution to the broad patterns of history, (b) be associated with the lives of persons significant in our past, or (c) embody the distinctive characteristics of a type, period, or method of construction; represent the work of a master; possess high artistic values; or represent a significant and distinguishable entity whose components may lack individual distinction; or (d) have yielded, or may be likely to yield, information important to prehistory or history.

Negligible (impact): Unless otherwise specified, "negligible" shall mean impacts of such a small scale such as to be non-measurable.

Noise: Loud, unpleasant, unexpected, or undesired sound that disrupts or interferes with normal human activities.

Noxious weed: Nonnative plant species that negatively impact crops, native plant communities, and/or management of natural or agricultural systems. Noxious weeds are officially designated by a number of states (including Arizona and Nevada) and Federal agencies.

Perennial stream: A stream or that part of a stream that flows continuously during all of the calendar year as a result of groundwater discharge or surface runoff.

Perennial yield: The amount of usable water from a groundwater aquifer that can be withdrawn economically and consumed each year for an indefinite period of time. It cannot exceed the natural recharge to that aquifer and ultimately is limited to maximum amount of discharge that can be used for beneficial use.

Pipeline: A continuous pipe conduit for transporting fluids such as natural gas and/or supplemental gaseous fuels, oil, or water from one point to another, usually from a point in or beyond the producing field or processing plant to another pipeline or to points of use. Pipelines require associated equipment as valves, compressor stations or booster pumps, communications systems, and meters.

Prime farmland: A special category of highly productive cropland that is recognized and described by the U.S. Department of Agriculture's Soil Conservation Service and receives special protection under the Surface Mining Law of 1977.

Public land: Land or interest in land owned by the United States and administered through the Secretary of the Interior through the BLM without regard to how the United States acquired ownership, except lands on the Outer Continental Shelf, and land held in trust for the benefit of American Indians, Aleuts, and Eskimos.

Range: A large, open area of land over which livestock can wander and graze.

Raptor: A bird of prey.

Rare: A plant or animal restricted in distribution. May be locally abundant in a limited area or few in number over a wide area.

Recharge: Replenishment of a groundwater reservoir (aquifer) by the addition of water, through either natural or artificial means.

Reclamation: Restoration of land disturbed by natural or human activity (e.g., mining, pipeline construction) to original contour, use, or condition. Also describes the return of land to alternative uses that may, under certain circumstances, be different from those prior to disturbance.

Recontouring: Return a surface to or near to its original form through some type of action such as grading.

Record of Decision: A document separate from, but associated with, an EIS that publicly and officially discloses the responsible official's decision on a proposed action.

Reservation: Land set aside to achieve a particular land use or conservation objective. For the purposes of this document, reservation refers to those lands managed by an American Indian tribe under the U.S. Department of the Interior's Bureau of Indian Affairs. The reservation land is Federal territory held in trust for tribes. The American Indian tribes have limited national sovereignty.

Revegetation: The reestablishment and development of self-sustaining plant cover. On disturbed sites, this normally requires human assistance such as reseeding.

Reverse osmosis: A separation process that uses pressure to force a solvent through a membrane that retains the solute on one side and allows the pure solvent to pass to the other side. More formally, it is the process of forcing a solvent from a region of high solute concentration through a membrane to a region of low solute concentration by applying a pressure in excess of the osmotic pressure.

Right-of-way: Land authorized to be used or occupied for the construction, operation, maintenance, and termination of a project, such as a road or utility.

Riparian: Referring or relating to areas adjacent to water or influenced by free water associated with streams or rivers on geologic surfaces occupying the lowest position of a watershed. Pertaining to, living or situated on banks of rivers, streams, or other body or water. Normally used to refer to the plants of all types that grow along, around, or in wet areas.

Rural: Sparsely settled places away from the influence of large cities and towns. Such areas are distinct from more intensively settled urban and suburban areas, and also from unsettled lands such as outback or wilderness. People tend to live in villages, on farms, and in other isolated houses on large plots of land.

Scoping: The process open to the public early in the preparation of an EIS for determining the scope of issues related to a proposed action and identifying significant issues to be addressed in an EIS.

Screen: An initial assessment performed with few data and many assumptions to identify alternatives that should be evaluated more carefully.

Sediment: Solid fragmental material, either mineral or organic, that is transported or deposited by air, water, gravity, or ice.

Sedimentation: The result when soil or mineral is transported by moving water, wind, gravity, or glaciers and deposited in streams or other bodies of water, or on land. Also, letting solids settle out of wastewater by gravity during treatment.

Sensitive receptor: In terms of noise, people or animals that may hear a noise or be sensitive to increased noise levels within their range of hearing.

Sensitivity: The state of being readily affected by the actions of external influence.

Significant (impact): Unless otherwise specified, "significant" has been used in this document to describe any impact that would cause an impact that is irreversible and/or irretrievable without human intervention (i.e., mitigation/restoration)

Slurry: In the case of this project, the slurry is a mixture of 50 percent water and 50 percent finely ground coal. The coal from the Black Mesa Mine is transported in this slurry mixture via pipeline to the Mohave Generating Station.

Special status species: Wildlife and plant species either federally listed or proposed for listing as endangered or threatened; state-listed; or priority species of concern to Federal agencies or tribes.

Standard operating procedures (SOPs): A set of written instructions to achieve uniformity of the performance of a specific function.

Surface water: All bodies of water on the surface of the earth and open to the atmosphere such as rivers, lakes, reservoirs, ponds, seas, and estuaries.

Surfactant: Any substance that when dissolved in water or an aqueous solution reduces its surface tension or the interfacial tension between it and another liquid.

Terrain: Used to describe the geophysiographic characteristics of land in terms of elevation, slope, and orientation.

Threatened or Endangered Species: Animal or plant species that are listed under the Federal Endangered Species Act of 1973, as amended (federally listed), or under similar state laws (state-listed).

Total dissolved solids: A term that describes the quantity of dissolved material in a sample of water.

Traditional cultural lifeway/resources: Resources that are significant for retention and transmission of traditional cultures. Biological resources that could have traditional cultural significance include plants collected for food, medicine, ceremonies, and other traditional uses, as well as raptors (e.g., eagles and hawks) collected for ceremonial uses. Other natural resources that could have traditional cultural significance include minerals or clay deposits and sources of surface water or shallow groundwater pumped for traditional purposes.

Traditional cultural places: These named places (landscape features) comprise the cultural landscape that provides the context for evaluating specific traditional cultural properties.

Transition zone: The area between two discrete environmental areas, and thus containing elements of each. For example, the transition zone between an upland piñon forest and a lowland desert scrub environment.

Transmissivity: The rate at which water is transmitted through a unit width of the aquifer under a unit hydraulic gradient.

Tribe: Any Indian tribe, band, group, or community having a governing body recognized by the Secretary of Interior.

Tutsqwa: The Hopi heartland, encompasses much of northeastern Arizona.

Undertaking: A project, activity, or program funded in whole or in part under the direct or indirect jurisdiction of a Federal agency, including those carried out by or on behalf of a Federal agency; those carried out with Federal financial assistance; those requiring a Federal permit, license, or approval; and those subject to State or local regulation administered pursuant to a delegation or approval of a Federal agency.

Urban: An area where there is an increased density of human-created structures in comparison to the areas surrounding it. Urban areas are frequently referred to as cities or towns. The U.S. Census Bureau defines an urbanized area as: "Core census block groups or blocks that have a population density of at least 1,000 people per square mile and (386 per square kilometer) and surrounding census blocks that have an overall density of at least 500 people per square mile (193 per square kilometer)."

Vegetation communities: Species of plants that commonly live together in the same region or ecotone.

Visibility: The distance to which an observer can distinguish objects from their background. The determinants of visibility include the characteristics of the target object (shape, size, color, pattern), the angle and intensity of sunlight, the observer's eyesight, and any screening present between the viewer and the object (i.e., vegetation, landform, even pollution such as regional haze).

Visual resource management classes: Categories assigned to public lands based on scenic quality, sensitivity level, and distance zones. There are four classes, each of which has an objective that prescribes the amount of change allowed in the characteristic landscape.

Waters of the United States: All waters that are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce including adjacent wetlands and tributaries to water of the United States; and all waters by which the use, degradation, or destruction of which would affect or could affect interstate or foreign commerce.

Watershed: All land and water within the confines of a drainage divide.

Well field: Area containing one or more wells that produce usable amounts of water or oil.

Wetlands: Areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Examples of wetlands include marshes, shallow swamps, lakeshores, bogs, muskegs, wet meadows, estuaries, and riparian areas.

Wilderness: An area formally designated by Congress as part of the National Wilderness Preservation System.

Xeroriparian: Riparian refers or relates to areas adjacent to water or influenced by free water associated with streams or rivers on geologic surfaces occupying the lowest position of a watershed. Pertaining to, living, or situated on, the banks of rivers and streams. “Xeroriparian” refers to being situated on dry washes (ephemeral streams).

BLM MISSION STATEMENT

The Bureau of Land Management is responsible for the stewardship of our public lands. It is committed to manage, protect, and improve these lands in a manner to serve the needs of the American people for all times.

Management is based upon the principles of multiple use and sustained yield of our nation's resources within a framework of environmental responsibility and scientific technology. These resources include recreation, rangelands, timber, minerals, watershed, fish and wildlife, wilderness, air and scenic, scientific and cultural values.

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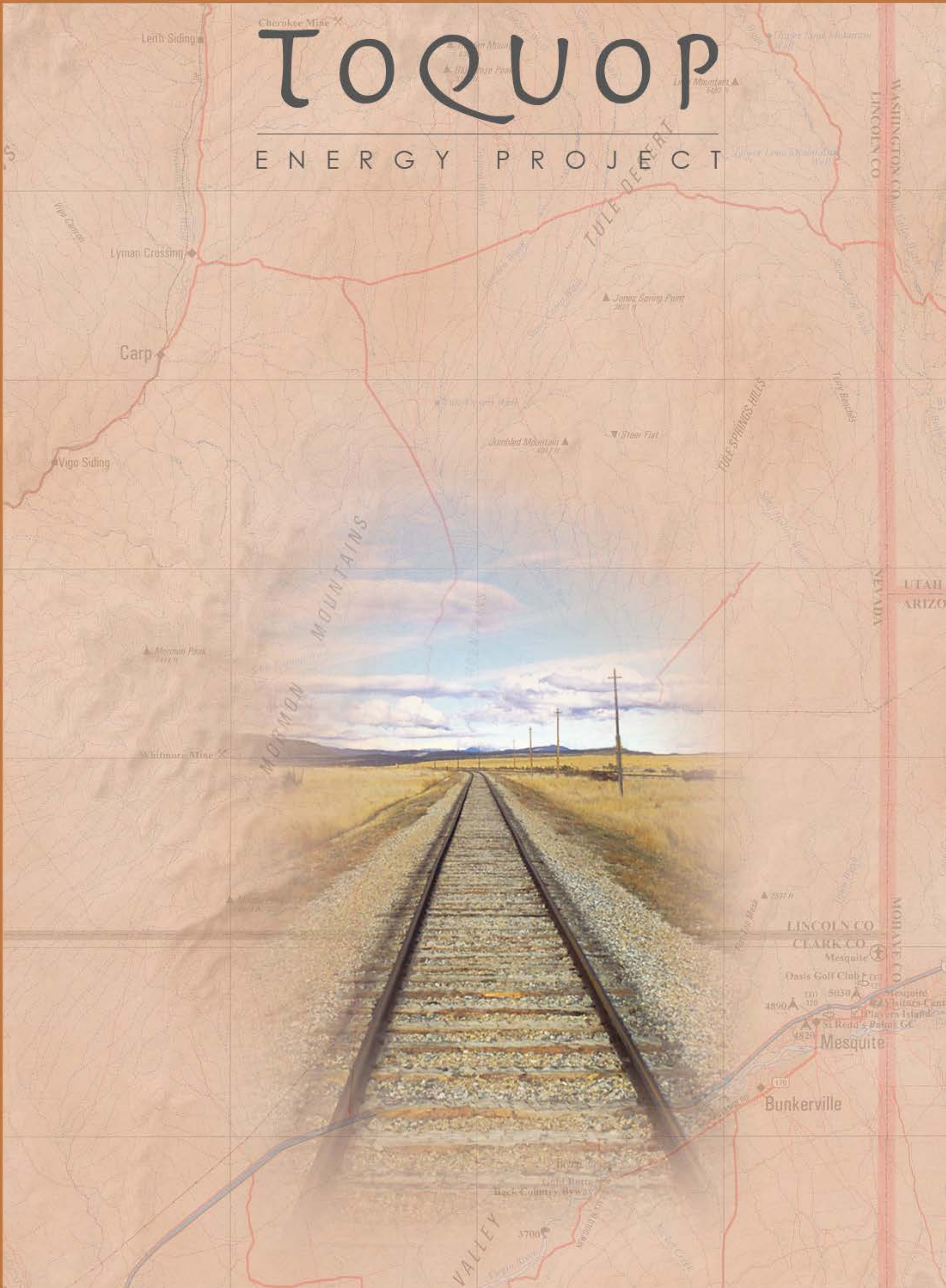
TOQUOP

ENERGY PROJECT



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$\mu g/m^3$	micrograms per cubic meter
AAC	Arizona Administrative Code
ACEC	Area of Critical Environmental Concern
ADEQ	Arizona Department of Environmental Quality
AERMOD	American Meteorological Society/U.S. Environmental Protection Agency Regulatory Model
af/yr	acre feet per year
APE	area of potential effect
ATSDR	Agency for Toxic Substance and Disease Registry
AUM	animal unit month
BACT	Best Available Control Technology
BEA REIS	Bureau of Economic Analysis Regional Economic Information System
bgs	below ground surface
BLM	Bureau of Land Management
Btu	British thermal unit
CAA	Clean Air Act
CAIR	Clean Air Interstate Rule
CALPUFF	California Puff Model
CAMR	Clean Air Mercury Rule
CARB	California Air Resources Board
CCDAQEM	Clark County Department of Air Quality and Environmental Management
CCP	coal combustible product
CEMS	continuous emissions monitoring systems
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CEQ	Council of Environmental Quality
CFB	Circulating Fluidized Bed
CFR	Code of Federal Regulations
cfs	cubic feet per second
CIAA	cumulative impacts analysis area
CO	carbon monoxide
CO_2	carbon dioxide
CTSCREEN	Complex Terrain Screening
CWA	Clean Water Act
DAT	deposition analysis threshold
dBA	A-weighted decibels
DRMC	Dixie Regional Medical Center
dscfm	dry standard cubic foot per minute
EF	emission factor
EIS	environmental impact statement
ENSR	ENSR Corporation
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
ESRI	Environmental Systems Research Institute

°F	degrees Fahrenheit
FGD	flue gas desulfurization
FLPMA	Federal Land Policy and Management Act
Forest Service	U.S. Forest Service
g/bhp-hr	gram per brake horsepower hour
GHG	greenhouse gas
GIS	geographic information system
$g/m^2/yr$	grams per square meter per year
gpd/ft	gallons per day per foot
gpm	gallons per minute
GPS	Global Positioning System
GVW	gross vehicle weight
gr/dscf	grain per dry standard cubic foot
H_2SO_4	sulfuric acid
HC	hydrocarbon
Hg	mercury
HAP	hazardous air pollutant
HMA	herd management area
hp	horsepower
hr	hour
I-15	Interstate 15
ID	interdisciplinary
IGCC	integrated gasification combined cycle
IMPROVE	Interagency Monitoring of Protected Visual Environments
ISCST3	Industrial Source Complex Short Term 3
Kern River Gas	Kern River Gas Transmission Company
kg	kilogram
kg/ha/yr	kilograms per hectare year
km	kilometer
kV	kilovolt
lb	pound(s)
lb/bhp-hr	pounds per brake horsepower hour
lb/hr	pounds per hour
lb/MMBtu	pounds per million British thermal units
lb/yr	pounds per year
LCLA	Lincoln County Land Act
LCWD	Lincoln County Water District
L_{dn}	Day-Night Average Sound Level
m	meter(s)
mg/L	milligrams per liter
mi	mile, miles
mph	miles per hour
MMBtu	million British thermal units
MW	megawatt

MRL	minimal risk level
m/s	meters per second
NAAQS	National Ambient Air Quality Standards
NAC	Nevada Administrative Code
NDEP	Nevada Division of Environmental Planning
NDOW	Nevada Division of Wildlife
NEPA	National Environmental Policy Act
NH_3	ammonia
NHPA	National Historic Preservation Act
NO_2	nitrogen dioxide
NO_x	nitrogen oxide(s0
NP	National Park
NPS	National Park Service
NRA	National Recreation Area
NRHP	National Register of Historic Places
NRS	Nevada Revised Statutes
NSPS	New Source Performance Standards
NSR	New Source Review
OHV	off-highway vehicle
OHWM	ordinary high-water mark
O_2	oxygen
O_3	ozone
PAC	powdered activated coal
Pb	lead
PC	pulverized coal
PILT	Payments in Lieu of Taxes
PM	particulate matter
$PM_{2.5}$	particulate matter equal to or less than 2.5 microns in diameter
PM_{10}	particulate matter equal to or less than 10 microns in diameter
ppm	parts per million
ppmvd	parts per million, volumetric dry
PRG	preliminary remediation goal
PSD	Prevention of Significant Deterioration
PTE	potential to emit
RAWS	remote automatic weather station
RCRA	Resource Conservation and Recovery Act
RMP	resource management plan
ROW	right-of-way, rights of way
RV	recreational vehicle
SCC	Source Classification Code
SCR	selective catalytic reduction
sf	square foot (square feet)
SHPO	State Historic Preservation Office
SIL	Significant Impact Level
SNWA	Southern Nevada Water Authority

SO_2	sulfur dioxide
SPCCP	Spill Prevention Control and Countermeasures Plan
SWPPP	Storm Water Pollution Prevention Plan
SWReGAP	Southwest Regional Gap Analysis Project
TDS	total dissolved solids
Toquop Energy	Toquop Energy Company, LLC
tpy	tons per year
TRI	Toxic Release Inventory
UDEQ	Utah Department of Environmental Quality
UPRR	Union Pacific Railroad
USACE	U.S. Army Corps of Engineers
U.S.C.	United States Code
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VRM	Visual Resource Management
VMT	vehicle miles traveled
VOC	volatile organic compound
W	Wilderness
WECC	Western Electricity Coordinating Council
WRAP	Western Regional Air Partnership

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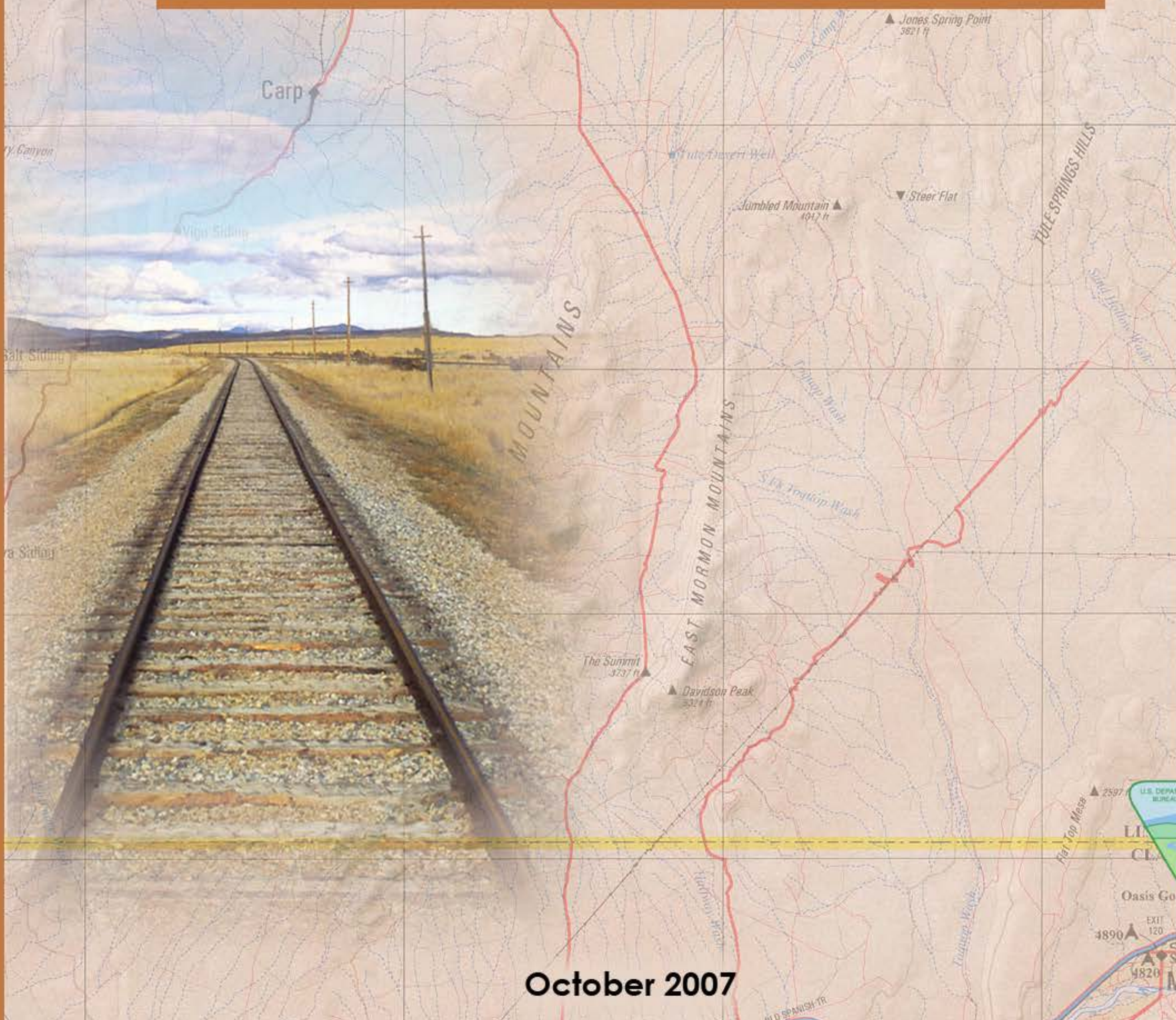
DRAFT ENVIRONMENTAL IMPACT STATEMENT



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