

**U.S. Department of the Interior  
Bureau of Land Management**

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**Environmental Assessment  
DOI-BLM-NV-S010-2012-0146-EA**

**September 2012**

**Techren Boulder City Solar Project 69kV Gen-Tie Transmission Line Project  
NVN-90395**

**PREPARING OFFICE**

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# **Environmental Assessment**

## **DOI-BLM-NV-S010-2012-0146-EA**

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# Glossary

**Table 1. Acronyms and Abbreviations**

BA	Biological Assessment
BO	Biological Opinion
BCCE	Boulder City Conservation Easement
BLM	Bureau of Land Management
BMP	Best Management Practices
CAA	Clean Air Act
CFR	Code of Federal Register
CO	Carbon monoxide
DAQ	Department of Air Quality
EA	Environmental Assessment
ESA	Endangered species act
EZ	Energy Zone designated by the City of Boulder City
GHG	Greenhouse gas emissions
MSL	Mean sea level
MW	Megawatt
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NO <sub>2</sub>	Nitrogen dioxide
O <sub>3</sub>	Ozone
OHV	Off-road Vehicles
Pb	Lead
PM <sub>2.5</sub>	Particulate matter equal to or less than 2.5 microns in diameter
PM <sub>10</sub>	Particulate matter equal to or less than 10 microns in diameter
ROW	Rights-of-way
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USC	United States Code
VOC	Volatile organic compounds

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# **Chapter 1. Introduction**

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## **1.1. Identifying Information:**

### **1.1.1. Title, EA number, and type of project:**

Techren Boulder City Solar Project

DOI-BLM-NV-S010-2012-0146-EA

### **1.1.2. Location of Proposed Action:**

This project is located in the Apex area just south of the intersection of S.R. 93 and interstate 15

### **1.1.3. Name and Location of Preparing Office:**

Lead Office - Las Vegas Field Office

LLNVS01000

### **1.1.4. Identify the subject function code, lease, serial, or case file number:**

Case file number NVN-090395

### **1.1.5. Applicant Name:**

Techren Solar LLC

## **1.2. Purpose and Need**

In accordance with the Federal Land Policy and Management Act (FLPMA) (Section 103(c)), public lands are to be managed for multiple use that takes into account the long-term needs of future generations for renewable and non-renewable resources. The Secretary of the Interior is authorized to grant right-of-ways (ROWs) on public lands for systems of generation, transmission, and distribution of electric energy (Section 501(a)(4)). Taking into account the BLM's multiple use mandate, the purpose and need for the proposed actions is to respond to a FLPMA ROW application submitted by Techren Solar, LLC to construct, operate and maintain, and decommission a transmission line on public lands administered by the BLM. Consideration of the ROW application would be in compliance with FLPMA, BLM right-of-way regulations, and other applicable Federal laws and policies. These actions would, if approved, assist the BLM in addressing the management objectives in the Energy Policy Act of 2005 (Title II, Section 211) which establish a goal for the Secretary of the Interior to approve 10,000 MWs of electricity from non-hydropower renewable energy projects located on public lands. This proposed action, if approved, would also further the purpose of Secretarial Order 3285A1 (March 11, 2009) that

establishes the development of environmentally responsible renewable energy as a priority for the Department of the Interior.

### **1.2.1. Background**

Techren Solar LLC has submitted a rights-of-way (ROW) application to and is seeking a ROW grant from the Bureau of Land Management (BLM) to construct a transmission line to connect the Techren Boulder City Solar Project to the Marketplace Substation or the McCullough Switching Station and Eldorado Substation. The transmission line would utilize a designated federal utility corridor. The proposed project sites is in Clark County, NV, approximately 7 miles southwest of the City of Boulder City Figure 1.1, “Project Vicinity” (p. 8)

### **1.2.2. Purpose and Need for the Action**

In accordance with the Federal Land Policy and Management Act (FLPMA) (Section 103(c)), public lands are to be managed for multiple use that takes into account the long-term needs of future generations for renewable and non-renewable resources. The Secretary of the Interior is authorized to grant right-of-ways (ROWs) on public lands for systems of generation, transmission, and distribution of electric energy (Section 501(a)(4)). Taking into account the BLM’s multiple use mandate, the purpose and need for the proposed actions is to respond to a FLPMA ROW application submitted by Techren Solar, LLC to construct, operate and maintain, and decommission a transmission line on public lands administered by the BLM. Consideration of the ROW application would be in compliance with FLPMA, BLM right-of-way regulations, and other applicable Federal laws and policies. These actions would, if approved, assist the BLM in addressing the management objectives in the Energy Policy Act of 2005 (Title II, Section 211) which establish a goal for the Secretary of the Interior to approve 10,000 MWs of electricity from non-hydropower renewable energy projects located on public lands. This proposed action, if approved, would also further the purpose of Secretarial Order 3285A1 (March 11, 2009) that establishes the development of environmentally responsible renewable energy as a priority for the Department of the Interior.

### **1.2.3. Scope of Analysis and Decisions to be Made**

This Environmental Assessment (EA) presents two alternative transmission line routes for analysis, which are discussed in detail in Chapter 2, *Proposed Action and Alternatives* (p. ).

Both alternatives consist of a transmission line that would connect the Techren Boulder City Solar Project to the Southern California Edison’s (SCE) Eldorado Substation and the McCullough Switching Station or the Los Angeles Department of Water and Power’s (LADWP) Marketplace Substation

The BLM will decide whether to deny the proposed ROW, grant the ROW, or grant the ROW with modifications. Modifications may include modifying the proposed use or changing the route or location of the proposed facilities (43 Code of Federal Regulations (CFR) 2805.20[a][1]).

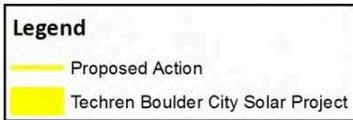
Techren Solar LLC is also proposing to construct a solar energy-generating facility on private land owned by the City of Boulder City, which would be considered a connected action Section 2.1.1, “Non-federal Connected Action” (p. 15). Construction of the solar facility is dependent upon the BLM’s approval of the transmission lines because electricity generated at the solar facility would

not reach the power grid without utilizing the BLM utility corridors for nearly all of the possible transmission line routes. Because the connected action can be prevented by the BLM decision, the effects of the connected action are properly considered indirect effects of the Proposed Action, and as such are analyzed as effects of the Proposed Action (40 CFR 1508.7 and 1508.25[c]).



Z:\00 Techren Boulder City\GIS Data\Map\BA\Project Area 032612\_LUEPA.APP

Techren Solar LLC Regional Area



**Figure 1.1. Project Vicinity**  
*Chapter 1 Introduction*  
*Scope of Analysis and Decisions to be Made*

## 1.2.4. Relationship to Laws, Regulations, Policies, and Other Plans

This EA has been prepared in accordance with the following statutes, regulations, policies, and procedures:

- National Environmental Policy Act (NEPA) of 1969, as amended (Public Law 91-190, 42 United States Code [USC] 4321 et seq.);
- 40 CFR 1500 et seq.: Regulations for Implementing the Procedural Provisions of NEPA;
- BLM NEPA Handbook (H-1790-1) (BLM 2008a);
- FLPMA, as amended, Sections 103(c) and 501(a)(4);
- Boulder City Master Plan (Boulder City 2003);
- Clark County Multiple Species Habitat Conservation Plan (Clark County 2000); and
- Las Vegas Resource Management Plan (RMP) and Final Environmental Impact Statement (BLM 1998).

The BLM lands in southern Nevada are managed under the Las Vegas Resource Management Plan (RMP) and Final Environmental Impact Statement (BLM 1998). This RMP provides management objectives and directions for lands within the Las Vegas District of the BLM. The BLM manages approximately 2.5 million acres of public land in Clark County. The Techren Boulder City Solar Project is in conformance with the RMP, specifically objective RW-1 (providing legal access to major utility transmission lines and related facilities) and management action RW-1-h (public land is available for ROW at agency discretion under the FLPMA).

## 1.2.5. Supplemental Authorities

To comply with NEPA, the BLM requires that compliance with other authorities is addressed in the NEPA document. Supplemental authorities may be executive orders or other federal and state laws that provide procedural or substantive responsibilities relevant to the NEPA process and may “help identify issues for analysis.” Table 1.1, “Supplemental Authorities” (p. 9) presents a list of elements dictated by Supplemental Authorities and specifies if these elements are present in the proposed project area, and if they are present if they potentially would be affected by the proposed project or not affected by the proposed project and the rationale for that conclusion.

**Table 1.1. Supplemental Authorities**

Supplemental Authority*	Not Present**	Present/Not Affected	Present/ may be Affected***	Rationale
<b>Air Quality</b> Clean Air Act			X	Addressed in Section 3.1
<b>Cultural Resources</b> National Historic Preservation Act			X	Addressed in Section 3.9
<b>Fish Habitat</b> Magnuson-Stevens Act Provision: Essential Fish Habitat	X			Not present

<b>Forests and Rangeland</b> Health Forests Restoration Act of 2003	X			Not present.
<b>Migratory Birds</b> Migratory Bird Treaty Act of 1918 EO 131186			X	Addressed in Section 3.8
<b>Native American Religious Concerns</b> American Religious Freedom Act of 1978			X	Not present.
<b>Threatened or Endangered Species</b> Endangered Species Act of 1983			X	Addressed in Section 3.8
<b>Wastes, Hazardous or Solid</b> Resources Conservation and Recovery Act of 1976 Comprehensive Environmental Repose Compensation and Liability Act of 1980			X	Addressed in Section 3.12
<b>Water Quality(Drinking/Ground)</b> Safe Drinking Water Act Clean Water Act			X	Addressed in Section 3.4
Wild and Scenic Rivers Wild and Scenic Rivers Act	X			Not present
Wilderness Federal Land Policy and Management Act	X			Not present
Environmental Justice Executive Order (EO) 12898, Environmental Justice	X			Not present
Floodplains EO 11988, Floodplain Management			X	Addressed in Section 3.4
<b>Wetlands-Riparian Zones</b> EO 11990, Protection of Wetlands	X			Not present
* See H-1790 Appendix 1: Supplemental Authorities to be Considered (BLM 2008)				
** Supplemental Authorities determined to be “Not Present” were not analyzed in this document				
*** Supplemental Authorities determined to by “Present/May be Affected” are required to be carried forward for analysis in this document				

### 1.3. Scoping, Public Involvement and Issues:

The BLM sent out letters to adjacent ROW holders notifying them of the pending project and requesting information on any conflicts that the proposed project might have on their existing

ROWs. The project was internally reviewed with BLM resources staff to identify what resources are present and affected by the proposed action, and documented in the Affected Resources Form, which is incorporated by reference. The affected resources were identified in Chapter 3, *Affected Environment, Environmental Consequences, and Mitigation Measures* (p. 23).

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# **Chapter 2. Proposed Action and Alternatives**

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## **2.1. Description of the Proposed Action:**

The “Proposed Action” refers to the transmission line for which Techren Solar, LLC has submitted a ROW application to the BLM.

### **2.1.1. Non-federal Connected Action**

Techren Solar, LLC also proposed construct, operate, and maintain a solar energy-generating facility of up to 300 megawatts (MW) on 2,200 acres of land owned by the City of Boulder City and leased by Techren Solar, LLC. At this time, Techren is considering of either fixed tilt or tracking solar photovoltaic (PV) solar arrays. All feasible transmission line routes from this facility would require utilizing BLM-managed utility easements. As such, construction and operation of this facility cannot proceed without BLM approval of the transmission line route to transport the electricity generated at the solar facility to the power grid. Because the non-federal connected action and its effects of the non-federal connected action are considered indirect effects of the Proposed Action and, as such, are analyzed as effects of the Proposed Action (40 CFR 1508.7 and 1508.25[c]).

## **2.2. Overview of Alternative 1 and Alternative 2**

Techren Solar, LLC has developed two transmission line alternatives, which would connect the solar energy-generating facility to the Eldorado Substation and McCullough Switching Station, or would connect the project facility to the Marketplace Substation Figure 2.1, “Transmission Line Alternatives” (p. 16). Both Alternatives generally parallel existing transmission lines to the extent feasible and are located within the BLM Utility Corridor. Under either alternative, a 200-foot-wide permanent ROW is requested. Table 2.1, “Comparison of Alternatives” (p. 17) and Figure 2.1, “Transmission Line Alternatives” (p. 16) illustrate the differences between the transmission line routes. Master title plats with the transmission line and solar-energy facility are contained in Appendix A, *Master Title Plats* (p. 75)



**Figure 2.1. Transmission Line Alternatives**

**Table 2.1. Comparison of Alternatives**

	<b>Alternative 1</b> <b>Connecting to Eldorado Substation and McCullough Switching Station</b> <b>230 kV</b>	<b>Alternative 2</b> <b>Connecting to Marketplace Substation</b> <b>500 kV</b>
<b>Total Length of the transmission line</b>	<b>4.6 miles</b>	<b>3 miles</b>
Within BLM Easement		
Transmission Line Length	4.3 miles	2.7 miles
Transmission Line ROW Width	200 feet	200 feet
Total ROW Acres Requested for the Transmission Line	104 acres	65.5 acres
Total ROW Acres Requested	104 acres	65.5 acres
Temporary Disturbance within BLM Easement		
Wire Pulling Sites (2)	4 acres (2 acres each)	4 acres (2 acres each)
Transmission Line Poles  (7 poles per mile, 400 square feet of disturbance per pole)	0.28 acre  (12,400 square feet)	0.17 acre  (7,600 square feet)
<b>Total</b>	<b>4.3 acres</b>	<b>4.2 acres</b>
Permanent Disturbance within the BLM Easement		
Transmission Line Poles  (7 poles per miles, 27 square feet per pole)	0.019 acre  (810 square feet)	0.012 acre  (513 square feet)
<b>Total</b>	<b>0.019 acre</b>	<b>0.012 acre</b>
Within Land Owned by the City of Boulder City		
Transmission Line Length	0.3 mile	0.3 mile

### 2.2.1. Alternative 1

Alternative 1 would consist of a 230kV transmission line that would originate at the southwest corner of that solar facility and extend approximately 3.3 miles south to a split point. At this point, the transmission line would split into two lines, one 0.8-mile-line would terminate at the Eldorado Substation and one 0.5-mile-line would terminate at the McCullough Switching Station. The total length of the line would be 4.6 miles long Figure 2.1, “Transmission Line Alternatives” (p. 16). For clarity, ??? provides a comparison of the alternatives. Approximately 4.3 miles of the transmission line would be within the BLM easement. The 0.3 miles of transmission line outside the BLM easement would be on land owned by the City of Boulder City. Project activities within the BLM easement would require a right-of-way (ROW) grant from BLM.

The 230 kV overhead transmission line would be designed for a double circuit from the solar site, to the split point, where a single circuit would connect to the McCullough Switching Station and the Eldorado Substation. It would be comprised of single, wood-pole (or tubular steel) structures. The span length between structures would range from between 500 feet and 1,200 feet except in areas where the proposed transmission line would cross under existing greater capacity transmission lines such as within BLM ROWs.

## 2.2.2. Alternative 2

Alternative 2 would consist of a 3-mile-long 500kV transmission line that would originate at the southwest corner of that solar facility and terminate at the Marketplace Substation. It would be comprised of single, wood–pole (or tubular steel) structures. The span length between structures would range from between 500 feet and 1,200 feet except in areas where the proposed transmission line would cross under existing greater capacity transmission lines such as within existing BLM ROWs.

The 500kV overhead transmission line would be comprised of single, wood–pole (or tubular steel) structures. The span length between structures would range from between 500 feet and 1,200 feet except in areas where the proposed transmission line would cross existing greater capacity transmission lines such as within BLM ROWs.

## 2.2.3. No Action Alternative

The No Action Alternatives means that ROW grant would not be approved, and the proposed transmission line would not be constructed. Without the transmission line, the Techren Boulder City Solar Project would not be able to deliver energy generated from the solar facility to the grid; therefore, the solar facility would not be constructed.

## 2.2.4. Alternatives Considered but not Analyzed in Detail

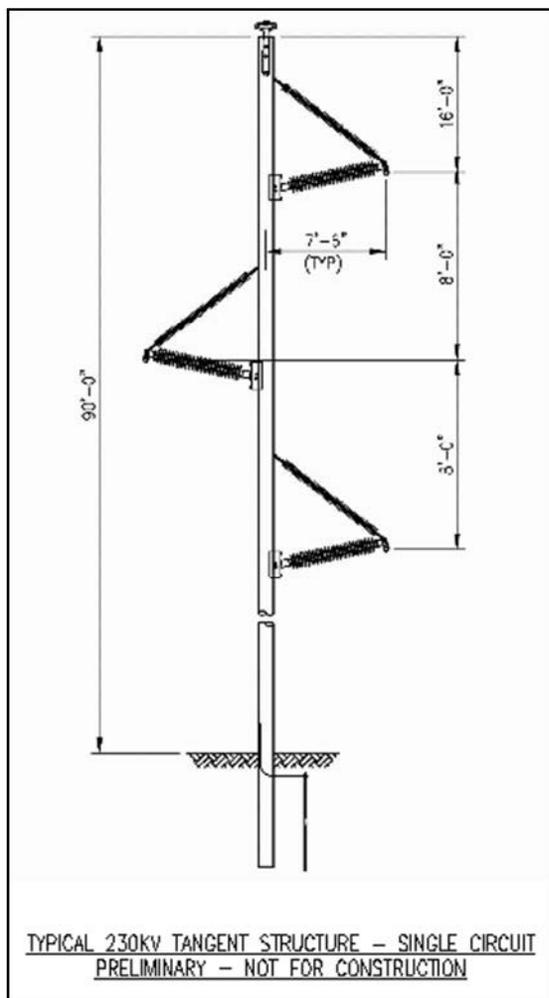
No other alternatives routes were identified. The proposed routes were identified because they represented the shortest routes with the least environmental impacts because there were located within the BLM-managed easement, followed existing transmission lines, and crossed the least number of existing ROWs (such as existing gas and power lines).

## 2.3. Proposed Project Facilities

Typical design characteristics are listed in Table 2.2, “Typical Design Characteristics” (p. 18). Refer to Figure 2.2, “Typical Transmission Structure” (p. 19) below for a diagram with dimensions.

**Table 2.2. Typical Design Characteristics**

Feature	Characteristics
Type of structure	Single-pole wood or tubular steel structures
Structure height	Approximately 90 - 100 feet
Span length	Approximately 500 feet to 1,200 feet, except in areas where crossing other transmission lines, then the poles may be more closely spaced.
Number of structures per mile	7
Base of structure	27 square feet
Right-of-Way width	200 feet
Access roads	No new roads needed
Voltage	230 or 500 kV
Circuit configuration	Delta
Conductor size	795 nominal amp rating
Ground clearance of conductor	27 feet
Pole foundation depth	10% of pole height + 4 feet



**Figure 2.2. Typical Transmission Structure**

Design characteristics would be the same for Alternative 1 and Alternative 2. Assembly and erection of each transmission line pole would require approximately 400 square feet of disturbance around the base of each pole; 27 square feet of which would be permanent disturbance Table 2.2, “Typical Design Characteristics” (p. 18). Additionally, two 2-acre wire pulling sites would be needed to install the transmission line wire upon each pole. The disturbance in these areas would be temporary during construction.

Access to the transmission line during construction (temporary) and operation (permanent) would be via existing roads, including U.S. Highway 95 and existing paved and dirt roads. No equipment storage areas would be located within the transmission line ROW. No other transmission line components are anticipated.

### 2.3.1. Site Preparation and Mobilization Activities

For the transmission line, site preparation consists of clearing a small area (approximately 27 square feet) so that a hole for the transmission line pole can be excavated most likely using an auger. Transmission line pole assembly would occur at each pole structure location. Vegetation may be temporarily crushed so that installation equipment can get from the main road to the pole

locations. Specific structure locations would be determined during final design and construction. Structure assembly and mounting of associated line hardware would take place within the 27 square foot permanent disturbance area at each structure location. An additional temporary disturbance area of approximately 400 square feet may be utilized during assembly, but would be reclaimed post-construction. The assembled structure would be raised and placed in the pre-dug holes.

No turn-around pads would be constructed.

Additionally, two 2-acre wire pulling sites would be required to install the transmission lines. Tensioning and pulling sites would be specifically located on a map and provided to the BLM prior to construction. The tensioning site is an area approximately 150 feet by 60 feet. The tensioner, line truck, and wire trailer that are needed for stringing and anchoring the conductors would be located at this site. The tensioner, along with the puller, maintains tension on the conductor. Maintaining tension ensures adequate ground clearance and is necessary to avoid damage to the conductor or any objects below them during the stringing operation. The pulling site requires two-thirds the area of the tension site. A puller and trucks are needed for the pulling and temporary anchoring of the ground wire and conductor.

### **2.3.2. Waste and Hazardous Materials Management**

No hazardous materials are associated with the operation of the transmission line. However, during maintenance of the transmission line the potential for a vehicle petroleum spill exists. Spill cleanup kits would be available on equipment so that spills or leaks of vehicle fluids could be quickly cleaned up for proper disposal.

Construction sites, material storage yards, and access roads would be kept in an orderly condition throughout the construction period. Refuse and trash, including stakes and flags, would be removed from the sites and disposed of in an approved manner. No construction equipment oil or fuel would be drained on the ground. Oils or chemicals would be hauled to an approved site for disposal. No open burning of construction trash would occur on BLM-administered lands.

The contractor would be required to have a continuous cleanup program throughout construction. Construction sites (located at the solar facility) and access roads would be kept in an orderly condition and free of trash and rubbish throughout the construction period. Trash and rubbish would be stored in predator-proof storage containers on-site. Waste materials and debris from construction areas, would be collected, hauled away, or disposed of at approved landfill sites.

An operational Environmental Health and Safety Plan would be prepared for the proposed project and solar facility (connected action). The Safety Plan would outline all project activities, identify all hazardous substances and chemicals used at the site, and ensure compliance with Occupational Safety and Health Administration (OSHA) Standards, the Nevada Division of Industrial Relations requirements, and all other local, state, and federal regulatory requirements. The Safety Plan would identify site-specific safety control measures, site health and safety roles and responsibilities, speed limits, and site safety hazards and controls.

### **2.3.3. Surface Reclamation**

Following construction and cleanup, reclamation of temporarily disturbed areas within the ROW would be completed. Temporarily disturbed areas include additional construction

staging/laydown area as required. The disturbed surfaces would be restored to the appropriated contour of the land surface.

The Techren Boulder City Solar Project and Transmission Line Project are designed to function for a minimum of 40 years. When the project is decommissioned, the transmission line and poles would be removed. Stabilization and re-vegetation strategies would be developed in the reclamation plan six months prior to the decommissioning of the transmission line.

### 2.3.4. Best Management Practices

To minimize effects to biological resources, the Applicant would adhere to the Best Management Practices (BMPs) presented in Appendix B. These BMPs were adapted from a nearby solar transmission line project and approved by the BLM (BLM 2011).

## 2.4. Project Construction Schedule

Techren Solar LLC anticipates that transmission line construction would begin in the first quarter of 2013 and last approximately 15 weeks. Construction of the solar facility would begin also in the first quarter of 2013 and continue for approximately 18 months. Typical construction work schedules are expected to be from 7:00 A.M. to 5:00 P.M., Monday through Friday, which complies with the local noise ordinance restrictions for construction activity of 7:00 AM to 7:00 PM, except Sundays and federal holidays. Anticipated workforce and equipment needed for construction of the transmission line is described in Table 2.3, “Transmission Line Construction Estimated Personnel and Equipment Required” (p. 21)

**Table 2.3. Transmission Line Construction Estimated Personnel and Equipment Required**

Activity	Number of Workers	Type of Equipment
Survey	3	2 pickup trucks
Hole digging	2	1 auger 1 pickup truck
Pole haul	2	1 flatbed
Structure erection	4	1 line truck 1 crane
Conductoring (Wire pulling)	12	1 drum puller 1 splicing truck 1 double-wheeled tensioner 1 wire reel trailer 1 line truck 1 sagging equipment 2 pickup trucks
Clean-up	4	2 pickup trucks
Rehabilitation	2	1 pickup truck
TOTAL	31*	

\* More personnel may be used in order to meet schedule

## 2.5. Conformance

The EA is in conformance with the Las Vegas Resource Management Plan and Final Environmental Impact Statement, signed October 5, 1998..

### **Right of Way Management**

#### Objective

RW-1. Meet public demand and reduce impacts to sensitive resources by providing an orderly system of development for transportation, including legal access to private in holdings, communications, flood control, major utility transmission lines, and related facilities.

#### Management Direction

RW-1-h. All public lands within the planning area, except as stated in RW-1-c through RW-1-g, are available at the discretion of the agency for right-of-way under the authority of the Federal Lands Policy Management Act.

# **Chapter 3. Affected Environment, Environmental Consequences, and Mitigation Measures**

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## **3.1. Proposed Project General Setting**

The proposed project site is located in the Boulder City Solar Energy Zone in the Eldorado Valley, Clark County, Nevada. This area is approximately 15 miles southeast of Las Vegas and 7 miles southwest of the city of Boulder City.

The Eldorado Valley is within the southern portion of the Basin and Range province characterized by north-south trending valleys. Specifically this portion of the Eldorado Valley is flanked by the McCullough Mountain Range directly west and the Eldorado Range directly to the east.

Resources analyzed in this EA include the following:

Section 3.2, “Air Quality and Climate” (p. 25)

Section 3.3, “Geology, Minerals, and Soils” (p. 31)

Section 3.4, “Water Resources” (p. 33)

Section 3.5, “Vegetation” (p. 36)

Section 3.6, “Special Status Vegetation” (p. 37)

Section 3.7, “Wildlife” (p. 38)

Section 3.8, “Special Status Wildlife Species” (p. 40)

Section 3.9, “Cultural Resources” (p. 49)

Section 3.10, “Land Use” (p. 50)

Section 3.11, “Visual Resources” (p. 51)

Section 3.12, “Recreation” (p. 53)

Section 3.13, “Noise” (p. 54)

Section 3.14, “Socioeconomics” (p. 56)

Section 3.15, “Waste Management and Hazardous Materials” (p. 57)

## **3.2. Air Quality and Climate**

### **3.2.1. Affected Environment**

For the analysis, air quality is characterized by the existing concentrations of various pollutants and those conditions that influence the quality of the ambient air surrounding the proposed project. The primary factors that determine the air quality of the region are the locations of air pollution sources, the type and magnitude of pollutant emissions, and the local meteorological conditions. This analysis takes into account these factors and provides a reliable and conservative prediction of the air impacts that would occur during construction and operation of the proposed project. The Federal Clean Air Act (CAA) and subsequent amendments have provided the authority and framework for United States Environmental Protection Agency (USEPA) regulation of air

emission sources. The USEPA regulations serve to establish requirements for the monitoring, control, and documentation of activities that affect ambient concentrations of certain pollutants that may endanger public health and the environment.

As an enforcement tool, the CAA established National Ambient Air Quality Standards (NAAQS), which have historically applied to six criteria pollutants—sulfur dioxide (SO<sub>2</sub>), carbon monoxide (CO), nitrogen dioxide (NO<sub>2</sub>), particulate matter equal to or less than 10 microns in diameter (PM<sub>10</sub>), ozone (O<sub>3</sub>), and lead (Pb) Table 3.1, “National Ambient Air Quality Standards” (p. 26). These standards are defined in terms of threshold concentration (e.g., micrograms per cubic meter [g/m<sup>3</sup>]) measured as an average for specified periods of time (averaging times). Short-term standards (i.e., 1-hour, 8-hour, or 24-hour averaging times) were established for pollutants with acute health effects, while long-term standards (i.e., annual averaging times) were established for pollutants with chronic health effects. More recently, additional standards for 8-hour average O<sub>3</sub> concentrations and particulate matter equal to or less than 2.5 microns in diameter (PM<sub>2.5</sub>) were added.

**Table 3.1. National Ambient Air Quality Standards**

Pollutant	Averaging Periods	NAAQS	
		Primary	Secondary
Sulfur dioxide (SO <sub>2</sub> )	3-hour	--	0.5 ppm
	24-hour	0.14 ppm*	--
	Annual	0.03 ppm	--
Particulate matter equal to or less than 10 microns in diameter (PM <sub>10</sub> )	24-hour	150 g/m <sup>3</sup> *	150 g/m <sup>3</sup>
	Annual	50 g/m <sup>3</sup>	50 g/m <sup>3</sup>
Particulate matter equal to or less than 2.5 microns in diameter (PM <sub>2.5</sub> )	24-hour	65 g/m <sup>3</sup>	65 g/m <sup>3</sup>
	Annual	15 g/m <sup>3</sup>	15 g/m <sup>3</sup>
Carbon monoxide (CO)	1-hour	35 ppm	--
	8-hour	9 ppm	--
Nitrogen dioxide (NO <sub>2</sub> )	Annual	0.053 ppm	0.053 ppm
Lead (Pb)	Quarterly	1.5 g/m <sup>3</sup>	1.5 g/m <sup>3</sup>
Ozone (O <sub>3</sub> )	1-hour	0.12 ppm	0.12 ppm
	8-hour	0.08 ppm	0.08 ppm

**Sources:** U.S. Environmental Protection Agency 2005b, 2005c, 2005d, 2005e, 2005f, 2005g, 2005h, and 2005i

\*ppm - parts per million

\*\*g/m<sup>3</sup> - micrograms per cubic meter

Geographic areas 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 and air quality is shown to meet the NAAQS, the USEPA may designate an area as an attainment area. Areas in which air pollutant concentrations exceed the NAAQS are designated as non-attainment for specific pollutants and averaging times. Typically, non-attainment areas are urban regions and/or areas with higher-density development. As a result, an area’s status is designated separately for each criteria pollutant; one geographic area may have more than one classification.

Clark County was redesignated to attainment for carbon monoxide in 2010 (Federal Register Vol. 75, No. 145, July 29, 2010). Clark County was also redesignated to attainment for PM<sub>10</sub> in 2010 (Federal Register Vol. 75, No. 148, August 3, 2010), and was redesignated to attainment for ozone in 2011 (Federal Register Vol. 76, No. 60, March 29, 2011).

The United States Department of the Interior (Department), Secretary of Interior Order Number 3289, made effective September 14, 2009, establishes a “Climate change Response Council” that will execute a coordinated Department-wide approach for applying scientific tools in an effort to increase understanding of climate change. The Council will establish an effective response to impacts on tribes as well as on the land, water, ocean, fish and wildlife and cultural heritage resources that the Department manages.

Currently there are no emission limits for so-called greenhouse gases (GHG), and no technically defensible methodology for predicting potential climate changes from GHG emissions. However, there are, and will continue to be, several efforts to address GHG emissions from federal activities, including BLM authorized uses.

Ongoing scientific research has identified the potential impacts on the global climate of anthropogenic (manmade) GHG emissions and changes in biological carbon sequestration due to development and land management activities. Through complex interactions on a regional and global scale, these GHG emissions and net losses of biological carbon sinks cause a net warming effect on the atmosphere, primarily by decreasing the amount of heat energy radiated by the earth back to space. Although GHG levels have varied for millennia, recent industrialization and burning of fossil carbon sources have caused carbon dioxide concentrations to increase dramatically, and have the potential to contribute to overall global climatic changes

## 3.2.2. Environmental Consequences

### 3.2.2.1. No Action Alternative

Under the No Action Alternative, the project would not be built; therefore, no project related effects on air quality would occur.

### 3.2.2.2. Alternative 1

For the construction of the 4.6-mile 230 kV transmission line from the solar facility (i.e. connected action) to the Eldorado Substation and McCullough Switching Station, Criteria pollutant emissions would result from employee and construction vehicles, and heavy equipment moving across the site and along the ROW during construction of the high-voltage transmission line. Those emissions from worker travel to and from the project site have been included in this analysis. Exhaust from construction vehicles and heavy equipment would also result in localized, short-term increases in CO and NO<sub>x</sub> emissions. Construction of the entire transmission line facility is expected to take approximately 15 weeks. This analysis is based on an assumed transmission line constructed on steel poles. The potential emissions from transmission line construction are included in Table 3.2, “Total Emissions for Construction of the Transmission Line” (p. 27).

**Table 3.2. Total Emissions for Construction of the Transmission Line**

Source Category		TSP	CO	NO <sub>x</sub>	VOC	SO <sub>2</sub>	PM	PM <sub>10</sub>	PM <sub>2.5</sub>
Transmission Line Construction (Unpaved Roads)	Unpaved roads	27.8	0.63	0.06	0.06	0.00	0.00	8.2	0.82
Transmission Line Construction (U.S. Highway 95)	Paved roads	1.14	4.05	0.36	0.23	0.00	0.00	0.20	0.06

Transmission Line Construction (Eldorado Valley Dr.)	Paved roads	0.83	0.58	0.05	0.06	0.00	0.00	0.00	0.04
Transmission Line Construction - Nonroad Vehicles	Exhaust	0.55	1.5	11.6	0.54	1.48		0.55	0.55
Total Emissions for Transmission Line Construction	Tons/4 months	30.3	6.76	12.1	0.9	1.5	0.00	9.0	1.5

### 3.2.2.3. Alternative 2

The impacts to air quality for Alternative 2, which is a 3-mile 500 kV transmission line from the solar facility (i.e. connected action) to the Marketplace Substation, would be the similar to those as described for Alternative 1. Due to slightly less disturbance, emission would be slightly less, but would not significantly change the figures presented in Table 3.2, “Total Emissions for Construction of the Transmission Line” (p. 27).

### 3.2.2.4. Connected Action

This section analyzes the air quality impacts of the solar facility as described in Section 2.1.1, “Non-federal Connected Action” (p. 15). An air quality impact is caused by changes in the concentrations of ambient air pollutants as a result of specific actions. Construction of the solar facility is projected to take approximately 18 months. Construction traffic is estimated at 350 trips per day and 400 workers during peak construction. Truck traffic during construction is expected to average approximately 30 truck trips per day. The emissions for the paved road components were based upon maximum trucks per month and number of workers at peak construction.

Emissions of criteria pollutants for the proposed project were calculated for three distinct project elements. Those elements considered were:

- The initial land disturbance that includes clearing, grading, grubbing, etc.
- Construction of the solar array.
- Operation and maintenance of the facility following construction.

The solar facility would be constructed in phases. Four phases are anticipated. The first phase would include the substation and transmission line. The first phase would also deliver 200 MW to the Eldorado substation or the McCullough switching station. Power delivery would commence with the completion of the first phase. Phases 2 through 4 would be developed in 100 MW increments and would deliver power to either the Eldorado substation or McCullough Switching Station.

During site development, the project would include grading the approximately 2,200 acre, for all phases, resulting in localized, short-term increases in fugitive dust (PM10 emissions). The increase in PM10 would be primarily from soils disturbed during clearing and grubbing of vegetation and grading the site as well as vehicle and road travel. The other criteria pollutants associated with this phase would result in negligible quantities of emissions associated with the combustion of fuel from the various construction equipment.

Criteria pollutant emissions during construction activities would result from employee and construction vehicles, and heavy equipment moving across the site during construction of the solar array. Emissions from worker travel to and from the project site have been included in this analysis. Exhaust from construction vehicles and heavy equipment would result in localized, short-term increases in CO and NO<sub>x</sub> emissions.

During operations and maintenance of the solar facility, vehicle traffic would produce criteria pollutant emissions. These emissions can be characterized as *de minimis* and would result in no long-term impact on the existing ambient air quality.

The methodologies and calculated criteria pollutant emissions data associated with the aforementioned phases are further discussed below. Each element of site development and its associated mass emissions were calculated as worst-case scenarios using USEPA and/or Clark County DAQ-approved pollutant emission factors and methodologies.

Emission estimates were compiled for construction of the facility and routine ongoing operations and maintenance. Primary sources of criteria pollutant emissions for construction activities are related either to fuel use in internal combustion engines or to dust emitted into the air from various activities. Criteria pollutant emissions from both of these source types are described in detail below and are summarized in Table 3.3, “Total Emissions for Construction and Operation of the Solar Facility” (p. 29).

**Table 3.3. Total Emissions for Construction and Operation of the Solar Facility**

Source Category		TSP	CO	NO <sub>x</sub>	VOC	SO <sub>2</sub>	PM	PM <sub>10</sub>	PM <sub>2.5</sub>
Construction Emissions (initial)	Construction	682						242	24.2
Solar Panel Construction (Exterior Road)	Unpaved roads	159	5.0	1.9	0.57	0.00	0.05	41	4.1
Solar Panel Construction (Interior Roads)	Unpaved roads	129	2.5	0.96	0.29	0.00	0.02	38	3.8
Solar Panel Construction	Wind erosion	314						157	23.5
Solar Panel Construction (U.S. highway 95)	Paved roads	40	198	19.5	11.3	0.06	0.41	7	2.3
Solar Panel Construction (Non-road Vehicles)	Exhaust	13	224	175	14.9	24.02		12.9	12.9
Operation and Maintenance (Exterior Road)	Unpaved roads	3.4	0.18	0.01	0.02	0.00	0.00	0.9	0.09
Operation and Maintenance (Interior Roads)	Unpaved roads	2.8	0.09	0.01	0.01	0.00	0.00	0.8	0.08
Operation and Maintenance	Wind erosion	13.3						6.7	1.0

Operation and Maintenance (U.S. Highway 95)	Paved roads	0.12	1.3	0.08	0.07	0.00	0.00	0.02	0.01
Total Emissions - Construction	Tons /18 months	1337	429	197	27	24.1	0.5	498	70.9
Total Emissions - O&M	Tons/year	19.62	1.6	0.1	0.1	0.0	0.0	8.4	1.2

The PM10 emission factor for construction (0.11 tons/acre-month) was obtained from the March 2001 Clark County PM10 State Implementation Plan (SIP). Based on the emissions factors for unpaved roads (Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Areas Sources [AP-42], EPA 2008, Section 13.2.2), the PM2.5 emission factor is 10% of the PM10 factor. For the purpose of this inventory, it was assumed that 2,200 acres would be disturbed by construction activities.

Emissions associated with constructing the solar panels and the transmission line are from heavy trucks delivering materials and employee vehicles. Emission sources include fugitive dust emissions for vehicle travel on paved and unpaved roads, motor vehicle exhaust, and wind erosion. Fugitive dust emissions from paved and unpaved roads were calculated using AP-42 emission factors, the estimated number of vehicles, vehicle parameters, paved and unpaved road travel distances, and an estimated 55 percent control factor for watering the unpaved roads during construction (AP-42 EPA 2008 Section 13.2.1 and Section 13.2.2). Wind erosion emissions for the disturbed area were calculated, based on an AP-42 emission factor (Section 11.9), and an AP-42 particle size distribution for PM10 and PM2.5 (AP-42 EPA 2008 Section 13.2.5).

Emissions associated with operating the facility are from employee vehicles and wind erosion. Emission sources include fugitive dust emissions for vehicle travel on paved and unpaved roads, motor vehicle exhaust, and wind erosion. Fugitive dust emissions from paved and unpaved roads were calculated using AP-42 emission factors, the estimated number of vehicles, vehicle parameters, paved and unpaved road travel distances, and an estimated 55 percent control factor for dust suppressants planned for the facility (private property) roads (AP-42 Section 13.2.1 and Section 13.2.2). Wind erosion emissions for the area were calculated, based on an AP-42 emission factor (Section 11.9), an AP-42 particle size distribution for PM10 and PM2.5 (AP-42 EPA 2008 Section 13.2.5), and an estimated 90 percent control factor for the planned mitigation measures.

Vehicle exhaust emissions (NO<sub>x</sub>, SO<sub>2</sub>, CO, PM10, PM2.5, and VOC,) can come from on-road and non-road motor vehicles. On-road vehicles would include heavy trucks and employee vehicles. It was assumed that both the trucks and employee vehicles would travel 30 miles each way. On-road motor vehicle emissions were calculated using the DAQ mobile source (MOBILE5b) emission factors (DAQ, 2001). Non-road vehicles include backhoes, augers, forklifts, cranes, line trucks, bucket trucks, tensioner and puller vehicles, and other support equipment. Emissions from these vehicles were estimated using estimated number of vehicles and non-road emission factors from the state SIP for Clark County, Nevada (2001).

The estimated cumulative PM10 potential to emit exceeds the major source threshold of 70 tons per year for a major source under Clark County DAQ rules. Prior to site construction it will be necessary for the developer to meet with DAQ and obtain the necessary air emission permits.

### 3.2.3. Mitigation

Since the major source threshold emission rate is 70 tons per year, the project will be considered a major stationary emission source and would be subject to Prevention of Significant Deterioration (PSD) or New Source Review (NSR) permitting requirements under the CAA. Emission sources used to construct and operate the proposed Project will exceed major source thresholds. Prior to site construction it will be necessary for the developer to meet with DAQ and obtain the necessary air emission permits.

Construction activities that disturb soils and emit or have the potential to emit particulate matter must obtain a Dust Control Permit from the DAQ. As part of the Dust Control Permit, the applicant must also submit a Dust Mitigation Plan. This Enhanced Dust Mitigation Plan will specify the control measures that would be implemented during construction to reduce fugitive dust and minimize impacts to ambient air quality. Dust control measures would include; watering the disturbed soil areas and unpaved roads during construction, applying dust suppressants (on private property) during routine operations, applying soil stabilizers or crushed aggregate for wind erosion control, installing a construction entrance with track-out control devices, and stabilizing disturbed land surfaces with pavement, re-vegetation, or suppressants (on private property) directly after construction is completed in each area.

## 3.3. Geology, Minerals, and Soils

### 3.3.1. Affected Environment

The Eldorado Valley is within the southern portion of the Basin and Range Province characterized by north-south trending valleys, bounded by normal faults, with alluvial fill underlain by older bedrock units. The proposed facility will be located on alluvial soils in the Eldorado Valley. The Valley is situated on an alluvial fan and consists of alluvial, aeolian, and playa deposits which are surrounded by steeply sloping alluvial aprons of gravel and sand deposits (US Department of Agriculture, Natural Resources Conservation Service 2006). The thickness of the alluvium below the site is approximately 1,000 feet, where it is underlain by bedrock of the Bridge Spring formation, a Miocene-age rhyolitic ash-flow tuff.

Eldorado Valley is a closed drainage basin bounded to the west by the McCullough Range, to the north by the River Mountains, and the east by the Eldorado Mountains and the Opal Mountains. In the McCullough, River, and Eldorado Mountains mid-Tertiary volcanic and plutonic rocks occur. The southern part of the McCullough Range and the Opal Mountains are formed primarily of Pre-Cambrian foliated metamorphic rock. The Eldorado Mountains were uplifted during the Miocene Basin and Range Uplift.

The soil textures in the project area are very gravelly, loamy sand, and very gravelly, fine sandy loam. There is a potential for soils in the Eldorado valley to be corrosive and reactive to concrete. The soil slopes range from 0 to 8 percent. The soil erosion potential for the entire project area is low. The project area has a moderate wind erosion potential, soils with rapid permeability, and very deep soil depths.

Biological soil crusts are formed by living organisms and their by-products, creating a crust of soil particles bound together by organic material. They are commonly found in semiarid and arid environments. Crusts are well adapted to severe growing conditions, but poorly adapted

to disturbance. Recovery of biological soil crusts may require hundreds of years. Preventing degradation by minimizing disturbance is an important consideration. The presence of biological soil crusts in the proposed project area has not been documented. Locations that may be disturbed would be examined for the presence of biological soil crusts prior to site development.

Desert pavement is a unique formation of a shallow surface layer of rock overlying fine soil that is commonly found in arid environments. Desert pavement may be created as a lag deposit of larger stones left behind by the wind which blows away the fine-grained material (Cooke and Warren, 1973). Desert pavements may also be developed by detachment and uplifting of clasts from bedrock surfaces as eolian fines accumulate in fractures (McFadden and Wells, et al, 1987). Studies of development of desert pavement on volcanic bedrock (Valentine and Harrington, 2005) has shown that desert pavement has developed by eolian processes of infiltration of fine material down into the larger rock fragments and accretion of fine sediments that lift and protect the pavement-forming clasts. The presence of desert pavement has not been documented in the project area. Disturbance of desert pavement may result in exposure of fine-grained material that would be subject to wind and water erosion. Locations that may be disturbed would be examined for the presence of desert pavement prior to site development.

According to the Supplemental Environmental Impact Statement for the Clark County Regional Flood Control District (BLM 2004), the Quaternary alluvial deposits that cover most of the valley floors (Las Vegas Valley and Boulder City), including the Project site, have little or no paleontological potential.

### **3.3.2. Environmental Consequences**

#### **3.3.2.1. No Action Alternative**

Under the No Action Alternative, the project would not be constructed; therefore, no project related effects to geologic resources would occur.

#### **3.3.2.2. Alternative 1**

The erosion susceptibility of the soils in Eldorado Valley ranges from low to moderate) under Alternative 1 (BLM, 1992). Most of the erosion conditions range from slight to moderate, but two areas of critical erosion condition have been identified within the basin. Soils disturbed by grading and excavation will have a higher potential for erosion by wind and water. The presence of biological soil crusts in the Alternative 1 area has not been documented. Locations that may be disturbed would be examined for the presence of biological soil crusts prior to site development. Locations that may be disturbed in the Alternative 1 area would be examined for the presence of desert pavement prior to site development.

#### **3.3.2.3. Alternative 2**

The impacts to geologic resources for Alternative 2 would be the same as those described for Alternative

### **3.3.2.4. Connected Action**

The types of impacts associated with the connected action would be similar to those described under Alternative 1, but would occur over a larger area. In addition to the BMPs described in Appendix A, all required permits would be obtained and an Enhanced Fugitive Dust Plan with mitigation measures would be developed to minimize impacts. The presence of biological soil crusts associated with the connected action has not been documented. Locations that may be disturbed would be examined for the presence of biological soil crusts prior to site development. Locations that may be disturbed by the connected action would be examined for the presence of desert pavement prior to site development.

### **3.3.3. Mitigation**

Before the start of construction, the construction contractor will obtain a dust control permit from the Clark County Department of Air Quality as required (Clark County DAQ 2003). Techren would also develop an Enhanced Fugitive Dust Plan with mitigation measures to reduce the potential for fugitive dust. In addition to the BMPs listed in Appendix B, potential mitigation measures may include, but are not limited to, the following: watering the site, applying soil stabilizers, installing a construction entrance with track-out control devices, and the stabilization of disturbed surfaces, after construction is completed.

Should biological soil crusts be detected during pre-construction surveys, appropriate measures would be taken to minimize disturbance of soil crusts. Suggested measures include: (1)-maintain the optimum amount of live vegetation, litter and biological crust relative to the site in order to maintain the content of organic matter, (2)-defer disturbance during periods when biological crusts are more susceptible to physical disturbance when soil is very wet, (3)-control the establishment and spread of invasive plants that can increase the risk of wildfire which may impact biological soil crusts. Should desert pavement be detected during pre-construction surveys, appropriate measures would be taken to minimize disturbance of desert pavement. Suggested measures might include limiting surface disturbance in desert pavement areas, replacement of desert pavement with similar gravel-sized layer over exposed underlying fine-grained soils or other BMPs.

## **3.4. Water Resources**

Water resources include groundwater, surface water, and wetlands. Under the authority granted in Nevada Revised Statutes 533 and 534, the State Engineer oversees groundwater quality and issues permits for the use of both surface and groundwater. The US Army Corps of Engineers has authority and responsibility for wetlands.

### **3.4.1. Affected Environment**

#### **3.4.1.1. Groundwater**

Eldorado Valley is a designated groundwater basin. The depth to water in Eldorado Valley is believed to be highly variable. Nevada Division of Water Resources (<http://water.nv.gov>) on-line records list a borehole, Well Driller's Report Number 58575, approximately 1 mile southwest of the site. The depth to static groundwater in the borehole was measured at 315 feet below land surface in March, 1994. In 2009, Ninyo & Moore advanced a soil boring to 15 feet below

land surface on land located approximately 1.5 miles south of the proposed site. No perched groundwater was encountered. No registered groundwater wells are located on the proposed transmission alignment.

Groundwater in Eldorado Valley is predominantly a sodium-bicarbonate type with high concentrations of total dissolved solids and a medium to high salinity hazard (Rush and Huxel, 1966). Historic analyses of the groundwater in some areas of Eldorado Valley indicate that concentrations of total dissolved solids, sulfate, and chloride exceed drinking water standards. The presence of historic mining districts suggests that soluble metals and other trace constituents may be present in portions of the aquifer, most probably originating in the mountains to the southwest of the site. According to information on file with the Clark County Department of Health Services, iron, lead, manganese, mercury, and nitrate have been detected in groundwater at levels exceeding their respective maximum contaminant levels in the Searchlight area (Buqo and Giampaoli, 1988).

### **3.4.1.2. Surface Water**

The surface water resources of Eldorado Valley are very limited. Although not known, the annual runoff within the basin has been estimated at less than 100 acre-feet/year (Scott et al., 1971). Surface runoff is very infrequent, occurring as ephemeral flow in the streambeds and, even less often, as ponded water on the playa lake bed adjacent to the site. Surface water runs from the Boulder City Sewage Treatment Plant to the Eldorado Dry Lake. Flooding characteristics are probably similar to those in adjacent basins; i.e., shallow flash flooding over large areas.

Eldorado Valley is a closed basin; surface water runoff from the surrounding mountains is directed to the Eldorado Dry Lake. There are no permanent surface water sources or wetlands in the project area. Several narrow and shallow ephemeral drainage swales or washes cross the site, predominantly in a west to east direction toward the Eldorado Dry Lake. The flow of water in these small drainage systems occurs only during infrequent storm events and has no nexus to the Colorado River system, and therefore would not be regulated by the U.S. Army Corps of Engineers under Section 404 of the Clean Water Act. A request for a jurisdictional determination has been submitted to the U.S. Army Corps of Engineers for this project.

## **3.4.2. Environmental Consequences**

### **3.4.2.1. No Action Alternative**

Under the No Action Alternative, the project would not be constructed; therefore, no project related effects to surface and groundwater would occur.

### **3.4.2.2. Alternative 1**

#### **Groundwater**

The Project will obtain water from the existing Boulder City Public Works Department main, which runs north to south along the western boundary of the Solar One PV facility to the west of the site. Boulder City Public Works Department obtains its public water supply from intakes at Lake Mead, not from underground sources. During the 15 week transmission line construction period, water would be primarily utilized for dust suppression along the access road. Total anticipated water usage for the entire transmission line construction period would be less than

one acre foot. Excavations during construction are not expected to be deep enough to intercept groundwater.

### **Surface Water**

The proposed project would not divert flows from areas of perennial flow or ephemeral washes, nor would the project divert water from downstream habitat dependent on that water. During construction, increased surface disturbance could result in an increased level of erosion. With BMPs in place, impacts from increased erosion and sedimentation due to ground-disturbance activity would be reduced to a level of non-significance Appendix B, *Best Management Practices* (p. 77).

#### **3.4.2.3. Alternative 2**

The impacts described under Alternative 1 would be the same under Alternative 2.

#### **3.4.2.4. Connected Action**

The types of impacts associated with the connected action would be similar to those described under Alternative 1, but would occur over a larger area. Excavations during construction are not expected to be deep enough to intercept groundwater. The potential adverse impacts to surface water from increased erosion and sedimentation will be less than for the solar facility and would be short term. Water for construction would be provided by connection to the Boulder City Public Works department water main located west of the site or the Boulder City Wastewater Treatment Plant which is located approximately 1.5 miles north of the site. Water from one of these sources would be trucked or piped to tanks or a temporary lined pond. During construction activities, water would be used mainly for grading and dust control. As most of the grading is expected in the first 6-9 month of construction, approximately 70-80 acre feet of water would be used. For the remaining construction period, water would be used dust control. It is anticipated that 30-40 acre feet would be utilized for the remaining 6-9 months of construction.

Water for operations and maintenance of the solar facility would be provided by a connection to the Boulder City Public Works department water main. Approximately 15 acre feet of water per year would be used during operations primarily for dust control and panel maintenance.

### **3.4.3. Mitigation**

#### **3.4.3.1. Groundwater**

No excavations greater than 30 feet in depth are planned during construction. Because the depth to static groundwater in the Project area is approximately 315 feet, no mitigation measures are necessary.

During construction, a sanitary service will be contracted to provide and maintain portable toilets on the solar facility site. With BMPs in place both during construction and operation, potential impacts from the sanitary discharges would be non-significant Appendix B, *Best Management Practices* (p. 77).

### **3.4.3.2. Surface Water**

A general permit for stormwater discharge associated with construction will be required. The general permit requires the preparation and implementation of a SWPP. With BMPs in place for control of on-site surface flows, impacts from increased erosion, and sedimentation due to ground disturbance activities would be reduced to non-significance Appendix B, *Best Management Practices* (p. 77).

## **3.5. Vegetation**

### **3.5.1. Affected Environment**

Mojave creosote bush scrub is the main vegetation community in the transmission line area. This vegetation community forms the matrix throughout Eldorado Valley. This community typically is dominated by creosote bush (*Larrea tridentata*) and white bursage (*Ambrosia dumosa*) with some other species such as four-winged salt brush (*Atriplex canescens*), cheesebush (*Hymenoclea salsola*), and broom snakeweed (*Gutierrezia sarothrae*). Also, Sahara mustard (*Brassica tournefortii*), a plant species designated by the Nevada Department of Agriculture as a Category B weed species, was found within the area. Category B species are defined as “weeds established in scattered populations in some counties of the state; actively excluded where possible, and 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.”

Vegetation within proposed project area previously has been disturbed by various activities including Off-Highway Vehicle recreation, construction of the nearby Nevada Solar-One power plant, construction of existing power lines, and the construction of the historic Highway 5. These disturbed areas possess urban and construction related trash and display high rates of erosion.

### **3.5.2. Environmental Consequences**

#### **3.5.2.1. No Action Alternative**

Under the No Action Alternative the project would not be constructed; therefore, no project related impacts to vegetation would occur.

#### **3.5.2.2. Alternative 1**

Vegetation may be crushed temporarily during construction activities at the two 2-acre wire pulling sites and around each transmission line pole (approximately 400 square feet per pole), which is approximately 4.3 acres in total. Approximately 0.019 acres of vegetation would be permanently removed and replaced with transmission tower structures.

Additionally, construction activities could facilitate the introduction or spread of noxious or invasive weed that species can displace native vegetation, increase fire frequency, and reduce the quality of wildlife habitat.

### 3.5.2.3. Alternative 2

Vegetation may be crushed temporarily during construction activities at the two 2-acre wire pulling sites and around each transmission line pole (approximately 400 square feet per pole), which is approximately 4.2 acres in total. Approximately 0.012 acres of vegetation would be permanently removed and replaced with transmission tower structures.

### 3.5.2.4. Connected Action

The entire 2,200 acre solar facility would be graded causing direct removal of vegetation and wildlife habitat.

## 3.5.3. Mitigation

BMPs will reduce construction impacts on vegetation and wildlife habitat Appendix B, *Best Management Practices* (p. 77). No additional mitigation is proposed.

## 3.6. Special Status Vegetation

Cactus and Yucca are protected under NRS 527.060-527.120, Nevada State Protection of Christmas Trees, Cacti, and Yucca and addressed in this section.

Additionally, the USFWS requested that a list of At-Risk Plant and Animal Species be obtained from the State of Nevada Natural Heritage Program (NNHP). Newfields submitted the request and on July 7, 2011, the NNHP replied to the request. The NNHP identified three additional sensitive species that could be in the proposed project area including the chuckwalla (*Sauromalus ater*), a BLM sensitive species; Las Vegas bear poppy (*Arctomecon californica*), a BLM sensitive species and Nevada state protected under Nevada Revised Statute (NRS) 527.260-300, and Littlefield milkvetch (*Astragalus preussii* var. *laxiflorus*), a taxon determined to be Critically Imperiled by the NNHP. These species are addressed in this section.

### 3.6.1. Existing Condition

#### Cactus and Yucca

During field surveys, only a few cactus plants were observed in the proposed project area including silver cholla (*Cylindropuntia echinocarpa*) and pencil cholla (*Cylindropuntis ramossissima*). No yucca was observed within the proposed project area.

#### Las Vegas Bearpoppy

Las Vegas bearpoppy is fully protected under Nevada State Law (NRS 527.260 - .300), and is listed as a BLM Special Status Species. Habitat requirements include open “badland” or hummocked soils with high gypsum content (NNHP 2001). Although potential habitat may be found in the proposed project area, no Las Vegas bearpoppy plants were observed in the proposed project area. Therefore, Las Vegas bearpoppy will not be addressed further in this EA.

### **Littlefield Milkvetch**

Littlefield milkvetch is a taxon determined to be Critically Imperiled by the NNHP. It is not federally or state protected. Little research has been completed on this milkvetch so its distribution and requirements are not fully understood (NatureServe 2010). This species requires sandy or gravelly washes near badlands and can grow in selenium rich soils (NatureServe 2010). Although potential habitat may be found in the proposed project area, no Littlefield milkvetch plants were observed during field surveys. Therefore, Littlefield milkvetch will not be addressed further in this EA.

## **3.6.2. Environmental Consequences**

### **3.6.2.1. No Action Alternative**

Under the No Action Alternative, the project would not be constructed and no project related effects to special status vegetation species would occur.

### **3.6.2.2. Alternative 1**

Very few cacti were observed in the proposed project area; however, it is possible that a cactus could be crushed or removed during construction activities.

### **3.6.2.3. Alternative 2**

Under Alternative 2, impacts to cacti would be the same as those discussed under Alternative 1.

### **3.6.2.4. Connected Action**

The entire 2,200 acre solar facility would be graded causing direct removal of a few cactus plants below the threshold of requiring notification under NRS.570.070.

## **3.6.3. Mitigation**

As some flexibility exists in the placement of transmission line poles, cactus will be avoided to the extent possible. To further reduce impacts to cacti, cacti will be salvaged as described in the BMPs Appendix B, *Best Management Practices* (p. 77).

## **3.7. Wildlife**

### **3.7.1. Affected Environment**

The proposed project area supports wildlife characteristic of the north-eastern Mojave Desert. Common wildlife observed during surveys are described below.

Several reptile species were observed during the 2011 desert tortoise field surveys including the Great Basin whiptail (*Cnemidophorus tigris*), and desert horned lizard (*Phrynosoma platyrhinos*). Migratory birds observed were recorded during desert tortoise surveys and it is assumed that the

action area contains potential nesting and foraging habitat for a wide range of migratory birds including the burrowing owl. Bird species observed included the common nighthawk (*Chordeiles minor*), and the common raven (*Corvus corax*). The only mammal species observed was the black-tailed jack rabbit (*Lepus californicus*), but evidence of kit fox (*Vulpes macrotis*) and coyote (*Canis latrans*) and various rodents were observed. Other evidence suggested the presence of common Mojave Desert rodent inhabitants such as cactus mice (*Peromyscus* spp.), and kangaroo rats (*Dipodomys* spp.).

## **3.7.2. Environmental Consequences**

### **3.7.2.1. No Action Alternative**

Under the No Action Alternative, the project would not be constructed; therefore, no project related impacts to wildlife would occur.

### **3.7.2.2. Alternative 1**

During transmission line construction, ground-disturbing activities could directly result in mortality to various wildlife species. Some species that are particularly mobile might be able to avoid injury or mortality by leaving the area. However, some wildlife, such as nocturnal species or species that use burrows, might be more susceptible to injury or mortality.

Although temporary in nature, noise and activity associated with construction could cause animals to avoid the area, thus altering their normal behavior patterns.

Increased traffic on established roads could result in more vehicle/wildlife collisions, thereby resulting in injury or death to wildlife. This might be of particular concern for reptiles and species that utilize roads for heat sources or for other small wildlife.

### **3.7.2.3. Alternative 2**

Under Alternative 2 impacts to wildlife would be the same as discussed under Alternative 1.

### **3.7.2.4. Connected Action**

The types of impacts associated with the connected action would be similar to those described under Alternative 1, but would occur over a larger area, approximately 2,200 acres of private land. This entire solar facility site would be graded and fenced to exclude wildlife.

## **3.7.3. Mitigation**

BMPs will reduce construction impacts on vegetation and wildlife habitat Appendix B, *Best Management Practices* (p. 77).

## **3.8. Special Status Wildlife Species**

### **3.8.1. Affected Environment**

#### **3.8.1.1. Desert Tortoise**

During April 2012 (and May 2012 for the connected action), regionally experienced biologists conducted pre-project tortoise surveys within the entire action area in accordance with 2010 USFWS protocols (USFWS 2010). The survey area was located using topographical maps, aerial photographs, and global positioning system (GPS) coordinates. Physical landmarks such as roads, surveyor markers, existing transmission lines, solar power plants and substations were also used for orientation.

According to the USFWS, the objective of the field surveys is to determine presence or absence of desert tortoise, estimate the number of tortoises (abundance), and assess the distribution of tortoises within the action area (USFWS 2010). Within the Proposed Action area a minimum of 40-meters (132feet) were surveyed on each side of the proposed centerline with 100 percent coverage. Additionally, the perimeter of both the Eldorado and Marketplace substations were surveyed.

No live tortoises were found within the Proposed Action area; therefore, relative tortoise abundance could not be estimated using the USFWS model. One tortoise carcass and three burrows were found within the survey area. Two burrows were in good condition and possibly utilized by desert tortoise (i.e. Condition Class 4). One Condition Class 3 burrow was found, meaning it was definitely a tortoise burrow but in deteriorated condition.

In addition, Zone-of-Influence (ZOI) surveys were completed because linear facilities may overlap only part of a tortoise's annual home range. ZOI surveys account for the possibility that a resident tortoise was outside the project area at the time surveys are conducted. This included completion of three additional 10-m (~30-ft) belt transects spaced at 200-m (~655-ft) intervals parallel to the alignment (200-m, 400-m, and 600-m). Tortoises and/or tortoise sign encountered during these surveys were recorded however, these transects were only used for the presence/absence determination and are not included in the estimation of tortoise abundance within the project area. ZOI surveys were completed on BLM managed lands only.

Although no tortoise and limited tortoise sign were found in the Proposed Action area, the entire action area is within desert tortoise habitat; therefore, a tortoise could potentially be affected by the proposed project.

#### **3.8.1.2. Migratory Birds**

Executive Order (January 11, 2001) defines the responsibilities of the Federal Agencies to protect migratory birds; under the MBTA of 1918 and subsequent amendments (16 U.S.C. 703–711) state that it is unlawful to take, kill, or possess migratory birds. Numerous bird species travel through Nevada during spring and fall migrations. A complete list is published at the USFWS web site (USFWS 2006). A list of those that are protected birds is in 50 CFR 10.13. The list of birds protected under this regulation is extensive and the project area has potential to support many of these species. Typically, the breeding season is when these species are most sensitive to disturbance, which generally occurs from March 15 through July 30.

Migratory birds were recorded during desert tortoise surveys and it is assumed that the action area contains potential nesting and foraging habitat for a wide range of migratory birds including the burrowing owl.

The burrowing owl, a USFWS species of concern, is known to occur in the project area and is protected by the MBTA and the State of Nevada (NRS 503.620). This species is a day-active bird of prey specialized for grassland and shrub-steppe habitats in western North America. The owls are widely distributed throughout the Americas and are found from central Alberta, Canada to Tierra del Fuego in South America.

Burrowing owl habitat typically consists of open, dry, treeless areas on plains, prairies, and desert floors (Haug et al. 1993). Burrowing owls most frequently use mammal burrows created by other animals such as kit fox, coyotes or desert tortoises. Burrow presence is the limiting factor to burrowing owl distribution and abundance (Coulumbe 1971; Martin 1973; Green and Anthony 1989; Haug et al. 1993). The burrows are used for nesting, roosting, cover, and caching prey (Coulumbe 1971; Martin 1973; Green and Anthony 1989; Haug et al. 1993).

In recent decades, the range and species count have been declining primarily due to agricultural, industrial, and urban development that reduce burrow availability. The owls also face increased mortality rates from pesticides and edge-effect predation (Haug et al. 1993).

Although burrowing owls were not observed during the May 2011 field surveys, the proposed project contains burrowing owl habitat. Therefore, burrowing owls potentially could be affected by the proposed project.

### **3.8.1.3. Gila Monster**

The Gila monster is classified as a State sensitive reptile (NAC 503.080) and is protected under Nevada state law (NAC 503.090 and NAC 503.093). The geographic range and habitat of the Gila monster overlaps with that of the desert tortoise. This venomous lizard is found below 5,000 feet elevation on rocky slopes and landscapes of upland desert scrub interspersed with desert washes (NDOW 2007). No Gila monsters were observed during the biological surveys; however, this species could be encountered during construction activities in the action area.

## **3.8.2. Environmental Consequences**

### **3.8.2.1. Desert Tortoise**

#### **No Action Alternative**

Under the No Action Alternative, the project would not be built; therefore, no project related effects on desert tortoise would occur.

#### **Alternative 1**

Tortoises may be injured or killed during construction activities. Biological monitors would be present at all active construction locations to locate tortoises and, if necessary, direct the contractor to cease construction activities until the tortoise moves out of harm's way. Only 400 square feet of disturbance is associated with each transmission pole installation site. This small area is readily surveyed for the presents of tortoises and burrows. If a tortoise in a burrow is

encountered, the transmission line poles may be able to be shifted to avoid tortoises in burrows. This will limit the handling of tortoises. If avoidance is not possible, an authorized biologist would relocate tortoises. Capturing, handling and relocating desert tortoises from transmission line installation locations may result in harassment and possibly injury or death (Blythe et al. 2003). Additionally, if capture and relocation methods are performed improperly, the tortoise could void its bladder, which would lower its chances of survival (Averill-Murray 2001). Another risk is that if multiple tortoises are improperly handled by the same biologist, pathogens for upper respiratory disease could be spread amongst the tortoise.

Increase human activity and construction vehicle traffic may also result in tortoise/vehicle collisions that result in tortoise injury or death. Tortoise may take shelter under parked vehicles and be killed, injured, or harassed. Minimization measures such as the WEAP and speed limits on roads would reduce or eliminate these effects.

Indirect effects could be caused by access roads and transmission lines include increased predation. Predators such as ravens, coyotes, or other raptors may be attracted to the construction site due to an increase in food opportunities including construction site litter and voluntary feeding from construction staff; an increased number of perching opportunities due to new transmission lines, fences, or other opportunities; or increased water sources due to dust control protocols. An increased presence of predators could lead to a predation increase on smaller, more vulnerable tortoises. Minimization measures such as a litter control program and Raven Management Plan will reduce these effects.

Ground disturbing activities during construction may result in an increase of noxious and invasive plant species in the area. Construction machinery may facilitate the spread of existing noxious or invasive species throughout the site, or may facilitate the introduction of new noxious weeds or invasive species. Noxious and invasive plants may displace native species that provide forage for tortoises. A Noxious Weed Control Plan would reduce or eliminate these effects.

## **Alternative 2**

Effects to desert tortoise under Alternative 2 would be the same as those described under Alternative 1.

## **Connected Action**

The types of impacts to desert tortoise associated with the connected action would be similar to those described under Alternative 1, but would occur over a larger area, approximately 2,200 acres of private land. However, during surveys conducted in May 2011, no tortoise or tortoise sign was found in the solar facility site. Much of the habitat in the solar facility is dry lakebed; therefore, not suitable for desert tortoise. Development of the solar facility is on private lands (i.e. those owned by the City of Boulder City) and therefore would utilize the existing Clark County MSHCP Section 10 permit for potential take of desert tortoise and limit disturbance to desert tortoise habitat to the minimum extent possible.

### **3.8.2.2. Migratory Birds**

#### **No Action Alternative**

Under the No Action Alternative, the project would not be built; therefore, no project related effects on migratory birds would occur.

### **Alternative 1**

Migratory birds could be injured or killed during vegetation removal and grading activities. Adult birds may be able to flee the area; however, during migratory bird nesting season, eggs and juvenile birds that are confined to nests may be killed. During operation of the facility birds may be injured, electrocuted, or killed from collisions with power lines or construction vehicles.

Only a small amount (< 0.02 acre) of native plant communities that provide habitat to nesting migratory birds would be eliminated as a result of the proposed project.

### **Alternative 2**

Effects to migratory birds under Alternative 2 would be the same as those described under Alternative 1.

### **Connected Action**

The types of impacts associated with the connected action would be similar to those described under Alternative 1, but would occur over a larger area, approximately 2,200 acres of private land.

## **3.8.2.3. Gila Monster**

### **No Action Alternative**

Under the No Action Alternative, the project would not be built; therefore, no project related effects on Gila monsters would occur.

### **Alternative 1**

Gila monsters could be injured or killed during construction activities. Indirect effects may include habitat fragmentation and disruption of normal activity patterns. Gila monsters also may be disturbed by noise from construction.

### **Alternative 2**

Effects to Gila monsters under Alternative 2 would be the same as those described under Alternative 1.

### **Connected Action**

The types of impacts associated with the connected action would be similar to those described under Alternative 1, but would occur over a larger area, approximately 2,200 acres of private land.

## **3.8.3. Mitigation**

### **3.8.3.1. Desert Tortoise**

The BLM has submitted a Biological Assessment to the USFWS as part of consultation under Section 7 of the ESA. The BLM has proposed the following mitigation measures in the Biological Assessment. Final desert tortoise mitigation measures would be determined by the USFWS in the Biological Opinion (BO). A ROW grant will not be issued until consultation with the USFWS is complete (i.e. the USFWS issues a BO for the proposed project). Mitigation measures will be

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implemented as part of the project to avoid, or reduce environmental impacts associated with the proposed action to federal or state protected species. Mitigation measures and actions are to comply with the USFWS guidelines, the Clark County Multi-Species Habitat Conservation, and Nevada Department of Wildlife (NDOW) standards.

Associated development on private lands (i.e. those owned by the City of Boulder City) would utilize the existing Clark County MSHCP Section 10 permit for potential take of desert tortoise and limit disturbance to desert tortoise habitat to the minimum extent possible.

- **Construction Minimization Measures**

Techren Solar would be required to adhere to all mitigation measures issue in the BO. These measures may include but are not limited to the following:

- **Field Contact Representative:** Techren will designate a field contact representative (FCR) who would be responsible for overseeing compliance of the tortoise protective measures. The FCR would be on-site during all activities that could result in the “take” of a desert tortoise. The FCR would have the authority to halt activities that are in violation of the desert tortoise protective measures.
- **Biological Monitors:** A biological monitor(s) would be present at all active construction locations within the BLM-managed easement. Desert tortoise monitors would provide oversight to ensure proper implementation of protective measures, record and report desert tortoise and tortoise sign observations in accordance with approved protocol, report incidents of noncompliance in accordance with the biological opinion and other relevant permits. The biological monitor(s) would survey the construction area to insure that no tortoises are in harm’s way. If a tortoise is observed entering the construction zone, work in the immediate vicinity would cease until the tortoise moves out of the area. No tortoises found above ground would be handled or moved during transmission line construction activities.

All burrows with the potential to be occupied by tortoises within the construction area would be searched for presence. In some cases, a fiber optic scope would be used to determine presence or absence within a deep burrow. If burrows inhabited by tortoises are found in the construction area where a pole is to be placed, the transmission line pole location would be shifted to avoid the burrow. Only if it is not possible to shift the transmission line pole, the tortoise would be excavated using hand tools by authorized biologists. Techren Solar LLC would have an authorized biologist relocate tortoises following the USFWS-approved protocol (USFWS 2009). If the Desert Tortoise Council releases a revised protocol for handling desert tortoises before initiation of project activities, the revised protocol would be implemented for the Proposed Action. The relocation/translocation effort would adhere to the following procedures as well as those stipulated in the Terms and Conditions of the Biological Opinion.

- Tortoises excavated from burrows would be relocated to unoccupied natural or artificially constructed burrows immediately following excavation. The artificial or unoccupied natural burrows must occur 150 to 300 feet from the original burrow.
- Relocated tortoises would not be placed in existing occupied burrows.
- If an existing burrow that is similar in size, shape, and orientation to the original burrow is unavailable, the authorized biologist would construct one.

- Desert tortoises moved during less active periods would be monitored for at least 2 days after placement in the new burrows to ensure their safety. The authorized biologist would be allowed some judgment and discretion to ensure that survival of the desert tortoise is likely.
- Relocation/translocation would be authorized by the USFWS biological opinion.
- If a tortoise voids its bladder while being handled it will be given the opportunity to rehydrate before release.
- **Construction Area Flagging:** The boundaries of all areas to be disturbed would be flagged before beginning any construction activities, and all disturbances would be confined to the flagged areas. All survey crews on site prior to construction would be escorted by a biological monitor. All project vehicles and equipment would be confined to the flagged areas. Survey crew vehicles would remain on existing roads. In cases where construction vehicles are required to go off existing roads, the vehicles would be preceded by a biological monitor on foot. Disturbance beyond the construction zone would be prohibited except to complete a specific task within designated areas or emergency situations. In these situations a biological monitor would accompany the construction crew assure that no tortoise are in the area.
- **Worker Environmental Awareness Program (WEAP):** A worker environmental awareness education program will be presented to all personnel onsite during construction. This program would contain information concerning the biology and distribution of the desert tortoise, desert tortoise activity patterns, and its legal status and occurrence in the proposed project area. The program will also discuss the definition of "take" and its associated penalties, measures designed to minimize the effects of construction activities, the means by which employees limit impacts, and reporting requirements to be implemented when tortoises are encountered. Personnel will be instructed to check under vehicles before moving them as tortoises often seek shelter under parked vehicles. Personnel will also be instructed on the required procedures if a desert tortoise is encountered or observed within the proposed project area.
- **Access Roads:** Construction access would be limited to established access roads.
- **Speed Limits and Signage:** A speed limit of 15 miles per hour will be maintained while on the construction site, access roads, and storage areas during the periods of highest tortoise activity (March 1 through November 1) and not to exceed 25 miles per hour during periods of low tortoise activity. This will reduce dust and allow for observation of tortoises in the road. Speed-limit and caution signs would be installed along access roads and service roads.
- **Trash and Litter Control:** Trash and food items will be disposed properly in predator proof containers with resealing lids. Trash will be emptied and removed from the project site on a period basis. Trash removal reduces the attractiveness of the area to opportunistic predators such as ravens, coyotes and fox.
- **Habitat Compensation:** Prior to surface disturbance activities within desert tortoise habitat on BLM, the project proponent would pay one-time remuneration fee (per acre of proposed disturbance) into the Desert Tortoise Public Lands Conservation Fund Number 730-9999-2315. The compensation for habitat loss under the ESA Section 7 of the ESA is an annually adjusted rate, currently \$810/acre, for development of public (i.e. BLM-managed lands).

- **Noxious Weed Control Plan:** Before construction begins, a Noxious Weed Control Plan will be prepared and submitted to the BLM for review and approval. This plan will follow the Las Vegas Field Office's Resource Management Plan (BLM 1998), Noxious Weed Plan (BLM 2006), and the interagency guidance Partners Against Weeds (BLM 2007) for an active integrated weed management program using weed control BMPs.
- **Interim Site Rehabilitation Plan:** Techren Solar LLC would develop a Site Rehabilitation Plan to revegetate and reclaim temporarily disturbed areas such as wire pulling sites.
- **Overnight Hazards:** No overnight hazards to desert tortoises (e.g., auger holes, trenches, pits, or other steep-sided depressions) would be left unfenced or uncovered; such hazards would be eliminated each day prior to the work crew and monitoring biologist leaving the site. All excavations will be inspected for trapped desert tortoises at the beginning, middle, and end of the work day, at a minimum, but will also be continuously monitored by. Should a tortoise become entrapped, the authorized biologist will remove it immediately.

### Operation and Maintenance Minimization Measures

The following minimization measures have been proposed by the BLM. The USFWS will determine which mitigation measures will be implemented as part of the BO.

- **Speed Limits and Signage:** While conducting maintenance activities such as inspections and repairs during periods of high desert tortoise activity (March 1 through November 1), a speed limit of 15 miles per hour will be maintained and not to exceed 25 miles per hour during periods of low tortoise activity. This will reduce dust and allow for observation of tortoises in the road. Speed-limit and caution signs would be installed along access roads.
- **WEAP Training:** WEAP training would be required for all maintenance and operation staff for the duration of the project. In addition to an overview of minimization measures and BMP to reduce effects on the desert tortoise.
- **Raven Management Plan:** There is a potential for predation increase on the desert tortoise and other sensitive species by common ravens exploiting transmission towers for perching, roosting, and nesting. Techren Solar, LLC will implement a Raven Management Plan to minimize avian predation on desert tortoise for the project. The purpose of the Raven Management Plan is to utilize methods to deter raven depredation of juvenile desert tortoises, and other wildlife species. The Raven Management Plan is not intended to eliminate or control raven populations, rather to target offending ravens that have been found to prey upon desert tortoise. The Raven Management Plan will incorporate an adaptive management strategy for immediate implementation following project construction. The Raven Management Plan will be evaluated after three years of monitoring or as needed, depending on the survey findings and field conditions, or if avian predation becomes apparent. The following activities will be implemented as part of the Raven Management Plan: (a) *Perch and Nest Prevention Devices*, and (b) *Common Raven Nest/Power Line Monitoring*. Mutual and timely cooperation between Techren Solar, LLC and the BLM, USFWS, and the Nevada Division of Wildlife (NDOW) is central to effective implementation of the Raven Management Plan.

(a) *Perch and Nest Prevention Devices.* Techren Solar, LLC will install perch and nest prevention devices on the gen-tie lattice structures. These could include triangles, plastic owls, and/or small spikes. Devices will comply with guidelines provided by the Avian Power Line Interaction Committee (APLIC 2006).

(b) Common Raven Nest/Power Line Monitoring. The name and qualifications of a Qualified Biologist(s) will be submitted to the BLM, USFWS, and NDOW for approval 30 days prior to commencement of monitoring each year. A Qualified Biologist(s) or USFWS/State approved Techren Solar, LLC designee with expertise identifying common raven nests and desert tortoise sign will conduct:

- Nest surveys will be performed once per month, between the 15th and last day of each month, during the primary common raven nest building period (February to May) and will begin the first common raven nesting season following the completion of construction. In the event that a common raven is documented initiating a new nesting attempt during the May surveys, follow up visits to that nest will be made in the subsequent months to establish whether or not the pair is bringing desert tortoise back to the nest. Surveying once per month is expected to identify potential nests prior to hatching of chicks, considering an incubation time of approximately 4 to 5 weeks. Nest removal by Techren Solar, LLC would occur at the time of offending raven removal, depending upon impacts on personnel safety or system reliability. If eggs or chicks are found in a removed nest, the eggs or chicks would be humanely disposed of.
- Surveys for the presence of common raven nests on Techren Solar, LLC tower structures and for the presence of desert tortoise remains within a 15-meter radius of each tower.
- Nest survey methods may include vehicular windshield surveys or pedestrian surveys as appropriate.

If desert tortoise remains are found below an active nest, Techren Solar, LLC will document the remains and verify the nesting status of the common ravens (e.g., incubating, feeding nestlings) and notify the BLM, USFWS, and NDOW verbally (via phone call) and in writing (via email or fax) within 24 hours of documenting the remains. Techren Solar, LLC will mark or collect the desert tortoise remains after verification with the USFWS. In addition, Techren Solar, LLC will establish a Cooperative Service agreement with US Department of Agriculture, Animal and Plant Health Inspection Service facilitating USFWS' performance of removal efforts of offending common raven(s) and nests on project structures. Techren Solar, LLC will be responsible for expenses attributed to removal of common ravens and nests on project structures. The Cooperative Agreement would allow the removal of offending ravens and their nests through a depredation permit held by Animal and Plant Health Inspection Service (APHIS) and USFWS. Nest removal of offending ravens will occur at the time of raven removal to the greatest extent possible depending upon impacts on personnel safety or system reliability. Also, at least once per year and outside of the avian breeding season and the desert tortoise's most active season, where personnel safety or system reliability does not pose a threat, Techren Solar, LLC will remove all other raven nests (e.g., inactive or non-offending ravens) identified during the monthly surveys. Techren Solar, LLC will dispose of nesting material so that it is no longer available for nest building (e.g., removal to a landfill, or disposal at a Techren Solar, LLC facility). APHIS-USFWS intends to respond to nest removal within 2 to 3 days following notification of nest(s) identified on project tower structures belonging to offending raven(s). However, Agency response time may be limited by available personnel or other unavoidable factors out of the scope of this Raven Management Plan. The joint Cooperative Agreement when prepared between Techren Solar, LLC, APHIS, and USFWS will establish working timeframes to manage ravens documented to negatively impact the desert tortoise. Techren Solar, LLC will annually submit progress reports to the USFWS, BLM, and NDOW within 90 days of the years' last survey effort. The annual report would contain nest survey monitoring and raven removal results including geographic information system layer(s) of all the nests recorded/destroyed and ravens removed during the

year. After three years of compiling nest survey and raven removal activities, an effectiveness evaluation of this conservation measure will be performed by Techren Solar, LLC inclusive of identification of appropriate adaptive measures for Techren Solar, LLC's implementation in the next breeding season. Based on the effectiveness of initial conservation measures, Techren Solar, LLC will implement adaptive management measures after timely consultation with the BLM, USFWS, and NDOW. The frequency and type of surveys implemented may increase or decrease depending on survey results and the effectiveness of monitoring and removal efforts. If avian predation concerns become apparent interim to the third-year Raven Management Plan evaluation, adaptive measure addressing the situation would be identified and implemented with the agencies concurrence. Nest monitoring, common raven removal, and searches for desert tortoise remains will be conducted for the life of the Proposed Action or until Techren Solar, LLC demonstrates, and the agencies agree, that any or all of these actions are no longer necessary based on the results of nest monitoring surveys and raven removals. An evaluation of the effectiveness of this minimization measure will be reviewed by Techren Solar, LLC, BLM, USFWS, and NDOW on an annual basis in order to develop appropriate adaptive measures for the project for the next breeding season. The frequency and type of surveys implemented may increase or decrease depending on survey results and the effectiveness of the monitoring and removal. Techren Solar, LLC will implement adaptive management measures after consultation with the USFWS based on the effectiveness of conservation measures.

### **3.8.3.2. Migratory Birds**

In compliance with the Migratory Bird Act of 1918, habitat-altering projects or portions of projects should be scheduled outside bird breeding season (between March 1st and July 31st) whenever possible. For work occurring during the nesting period, a qualified biologist would survey the area for nests within 15 days prior to initial grading and vegetation removal. This shall include burrowing and ground-nesting species in addition to those nesting in vegetation. If any active nests (containing eggs or young) are found, a 200-foot buffer area would be avoided until the young birds fledge.

To reduce impacts to burrowing owls, Techren Solar LLC would implement the protocols in the USFWS's pamphlet *Protecting Burrowing Owls at Construction Sites in Nevada's Mojave Desert Region Appendix C, USFWS Burrowing Owl Mitigation at Construction Sites* (p. 81). Additionally, preconstruction nest surveys will be conducted to identify occupied burrows and reduce potential impacts on western burrowing owl. Preconstruction surveys will be in accordance with the USFWS 2007 burrowing owl guidance.

To reduce the risk of electrocution, all transmission poles would be designed in accordance with the Suggested Practices for Avian Protection on Power Lines; the State of the Art in 2006 (Avian Power Line Interaction Committee 2006). Perch management attempts to control where birds land or nest on transmission structures.

Several devices are designed to discourage birds from landing at dangerous structure locations. It is important to note that perch guards do not always keep raptors off structures. Placing perch guards on the top of vertical construction may contribute to inadvertent electrocutions as the birds may choose to roost lower on the pole, near energized conductors. Perch guards can also shift problems onto other line segments. It is more desirable to allow raptors to safely use the structures rather than shifting them off preferred perches to other structures that may be more lethal.

Post-construction bird monitoring will be conducted along transmission lines in conjunction with the Raven Management Plan Section 3.8.3.1, “Desert Tortoise” (p. 43), followed by reporting to the appropriate agencies. Bird collisions, electrocutions, and nesting avoidance measures will be recorded using a one-page reporting form that identified date, time, location, and disposition of the activity. Raptor electrocutions and power line collisions will be reported to BLM and USFWS within 24 hours of discovery or notification of a carcass.

### **3.8.3.3. Gila Monster**

Gila monsters, if observed, will be removed in accordance with Nevada Department of Wildlife (NDOT) protocols issued November 2007 Appendix C, *USFWS Burrowing Owl Mitigation at Construction Sites* (p. ). Additionally, Gila monster identification and notification protocols will be included in the WEAP.

## **3.9. Cultural Resources**

### **3.9.1. Affected Environment**

#### **Regulatory Framework**

Section 106 of the National Historic Preservation Act, as amended (16 USC 40 *et seq.*), requires federal agencies to take into account the effects of their actions on properties listed or eligible for listing on the National Register of Historic Places (NRHP). The National Park Service defines archaeological and historic resources as “the physical evidences of past human activity, including evidences of the effects of that activity on the environment. What makes a cultural resource significant are its identity, age, location, and context in conjunction with its capacity to reveal information through the investigatory research designs, methods, and techniques used by archeologists.” Ethnographic resources are defined as any “site, structure, object, landscape, or natural resource feature assigned traditional legendary, religious, subsistence, or other significance in the cultural system of a group traditionally associated with it” (National Park Service 1998).

The BLM’s Proposed Action is subject to compliance with Section 106 of the NHPA as it is considered a federal undertaking. Section 106 requires federal agencies to consider the effects of their actions on historic properties and to consult with the State Historic Preservation Office.

#### **Area of Potential Effects**

The area of potential effects (APE) is defined in 36 CFR 800.16(d) as the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The APE is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking. The APE for the project includes 3-4.6 miles of transmission line from the two alternatives. The proposed transmission line is located within a BLM designated right-of-way and has been surveyed numerous times from 1975 to 2008. Only one of these surveys located a site within the proposed right-of-way, and the site was collected during survey. It is therefore considered to no longer exist.

## **3.9.2. Environmental Consequences**

### **3.9.2.1. No Action Alternative**

Under the no action alternative, the transmission lines would not be constructed, and there would be no project induced changes in the cultural resources in the project area.

### **3.9.2.2. Alternative 1**

Because no sites eligible for listing on the NRHP were found during survey of this alternative, no effects to cultural resources are anticipated.

### **3.9.2.3. Alternative 2**

Because no sites eligible for listing on the NRHP were found during survey of this alternative, no effects to cultural resources are anticipated.

### **3.9.2.4. Connected Action**

Sites recommended eligible for listing on the NRHP were recorded during survey for the adjacent solar array field. If the solar field is constructed impacts to NRHP eligible sites would occur over the larger area associated with the dry lake bed. A Cultural Resources Treatment Plan outlining mitigation measures would be developed to reduce potential effects upon these resources to an acceptable level.

### **3.9.2.5. Mitigation**

No mitigation measures would be necessary for either of the proposed transmission line alternatives. Mitigation measures would be developed for the Connected Action to construct the solar array. These could include excavation of features, extraction of phytoliths and pollen from grinding tools, radiocarbon dating, and collection of artifacts to prevent their destruction. BMPs for cultural resources are listed in Appendix B, *Best Management Practices* (p. 77).

## **3.10. Land Use**

### **3.10.1. Affected Environment**

The proposed facility is located in a sparsely populated area of Clark County, Nevada, approximately 7 miles southwest of Boulder City. Surrounding land is characterized primarily by power generation facilities, energy transmission infrastructure, transportation infrastructure, and open space. The BLM-managed utility corridors where the transmission lines would be mostly located contain several ROWs for transmission lines, pipelines, and related facilities, which is consistent with the Management Objective RW-1 in the Las Vegas RMP (BLM 1998). Within the last 12 months, several private parties have applied to construct new transmission lines within the corridors.

The solar field site is located within Boulder City's Solar Enterprise Zone. The transmission line routes would follow existing roads and transmission line routes where possible, traversing a flat desert landscape typical of the area. The route would originate at the proposed solar field in the northern part of the project area and terminate at the existing Marketplace and Eldorado Substations. The transmission line routes would be contained within BLM-administered utility corridors.

## **3.10.2. Environmental Consequences**

### **3.10.2.1. No Action Alternative**

Under the no action alternative, the transmission lines would not be constructed; therefore, no project-related impacts to land use would occur.

### **3.10.2.2. Alternative 1**

Development under Alternative 1 would not prevent other authorized land uses and would not impact future land use authorizations or ROWs in the project area, including any new transmission lines constructed by other private parties within the BLM-managed utility corridors.

### **3.10.2.3. Alternative 2**

The impacts under Alternative 2 would be the same as described under Alternative 1.

### **3.10.2.4. Connected Action**

All development on Boulder City property would occur on lands zoned ER – Energy Zone, which is the appropriate zoning classification for the proposed solar energy generation use (Boulder City 2011).

## **3.10.3. Mitigation**

Because the proposed transmission lines would not impact other land uses within the BLM-managed utility corridor no mitigation measures are necessary.

## **3.11. Visual Resources**

### **3.11.1. Affected Environment**

The landscape character of Eldorado Valley is typical of the Great Basin. Regional topography consists of mountain ranges arranged in a north-south orientation, separated by broad valleys. The Eldorado Valley extends south of Henderson and the River Mountains between the McCullough Mountain Range and the Eldorado Mountain Range. These mountain ranges are dominant visual features. Another interesting feature near the proposed project area is the Dry Lake Bed, which is an area clear of vegetation, flat, and has a contrasting white color from the rest of the Valley.

Visible man-made features in the area include U.S. Highway 95, two existing solar facilities, over 10 transmission lines, gravel quarries, and 3 electrical substations Figure 3.1, “Representative View in the Project Area” (p. 52). Because of the amount of man-made cultural modifications, the scenic quality has been altered. An existing solar array adjacent to the proposed project area is clearly visible from US 95 from the junction of US 93 and south toward Laughlin. Unimproved and dirt roads cross the area, and recreational vehicle use in the dry lake bed has modified the natural environment in some locations.



**Figure 3.1. Representative View in the Project Area**

## **3.11.2. Environmental Consequences**

### **3.11.2.1. No Action Alternative**

Under the no action alternative, the transmission lines would not be constructed; therefore, no project-related impacts to visual resources would occur.

### **3.11.2.2. Alternative 1**

No visual resources inventory has been completed for the project area. BLM has not developed Visual Resource Management Classification for the area.

The proposed transmission line would parallel existing transmission lines within the BLM-managed easement. Therefore, no substantive change in visual characteristics would occur as a result of the proposed project.

### **3.11.2.3. Alternative 2**

The impacts from Alternative 2 would be the same as those described under Alternative 1.

### **3.11.2.4. Connected Action**

The proposed project would alter the appearance of the area from vacant land to developed land; however, the solar facility would be located near existing solar facilities and substations. No private residences, schools, or other community facilities are near the proposed project area so the visual impacts from the solar facility would be minimal.

### **3.11.3. Mitigation**

Because no impacts are anticipated, no mitigation is warranted.

## **3.12. Recreation**

### **3.12.1. Affected Environment**

Recreation in the area mostly consists of off-highway vehicle (OHV) usage throughout the area, especially near the Eldorado Dry Lake bed. OHV disturbance also is apparent along the utility corridors. Adjacent Boulder City lands are utilized primarily for energy development, though the Boulder City Conservation Easement (BCCE) allows casual recreational uses, including hiking, sightseeing, and driving for pleasure at speeds below 25 miles per hour. The BCCE overlaps portions of the gen-tie routes under both alternatives.

The project area is located within NDOW Hunt Unit 263 (NDOW 2010b). Big game hunting in this Hunt Unit consists of desert bighorn sheep (*Ovis canadensis nelsoni*), which are predominantly found at higher elevations such as between McCullough Pass and Black Mountain.

### **3.12.2. Environmental Consequences**

#### **3.12.2.1. Alternative 1**

Because bighorn sheep are found at higher elevations, construction and operation of the transmission line would not affect hunting in the area.

Construction of the transmission line would not affect OHV recreation in the area because only small areas would be utilized for construction activities. These areas would be limited to 400 square feet for installation of each transmission line pole and two 2-acre wire-pulling sites. Each of the areas would be flagged and marked to alert recreationist to possible dangers.

#### **3.12.2.2. Alternative 2**

Under Alternative 2, impacts would be the same as those described under Alternative 1

### 3.12.2.3. Connected Action

The solar facility would be partially located on the dry lakebed. Though the solar field site would be fenced, OHV users could continue to access most of the dry lakebed and other OHV routes throughout the area; therefore, the solar facility would not inhibit access or recreational opportunities.

### 3.12.3. Mitigation

As no impacts are anticipated; no mitigation measures are proposed.

## 3.13. Noise

### 3.13.1. Affected Environment

Noise sources in the project area include wind, weather, and wildlife; the existing power generating stations; traffic on US Highway 95; and occasionally off-road vehicles. Ambient sound levels typical of rural areas range between 30 and 40 dBA (dBA represents A-weighted decibels, which measure sound in a manner that emphasizes the response of the human ear) (USEPA 1978).

No sensitive noise receptors are located within one mile of the project site. Sensitive noise receptors are generally considered to be homes, hospitals, schools, libraries, parks, and recreational areas.

The Noise Control Act of 1972, as amended by the Quiet Communities Act of 1978 (42 USC §§ 4901-4918), delegates to the states the authority to regulate environmental noise. It also directs government agencies to comply with local community noise statutes and regulations, and to conduct their programs to promote an environment free of any noise that could jeopardize public health or welfare.

The Boulder City Municipal Code governs construction-related noise in the Energy Zone.

### 3.13.2. Environmental Consequences

#### 3.13.2.1. Alternative 1

##### Construction

As previously mentioned, no sensitive receptors are within one mile of the project; therefore, impacts to sensitive receptors would occur.

The primary effect on the existing environment would be attributed to noise generated during construction activities. Typical construction equipment noise levels are presented in Table 3.4, “Noise Levels at Various Distances from Typical Construction Equipment” (p. 54).

**Table 3.4. Noise Levels at Various Distances from Typical Construction Equipment**

Construction Equipment	Noise Level Leq(1-h)a at Distances (dBA)					
	50 ftb	250 ft	500 ft	1,000 ft	2,500 ft	5,000 ft
Bulldozer/scrapper	85	71	65	59	51	45

Concrete mixer	85	71	65	59	51	45
Concrete pump	82	68	62	56	48	42
Crane, derrick	88	74	68	62	54	48
Crane, mobile	83	69	63	57	49	43
Front-end loader	85	71	65	59	51	45
Generator	81	67	61	55	47	41
Grader	85	71	65	59	51	45
Shovel	82	68	62	56	48	42
Truck	88	74	68	62	54	48

Source: Final Programmatic EIS on Wind Energy Development on BLM-Administered Lands in Western U.S., Table 4.5-5.5.2-1 (BLM 2005b).

Note: An assumed propagation rate is 6 dBA per doubling of distance.

a Leq(1-h) is the equivalent steady-state sound level that contains the same varying sound level during a 1-hour period.

b To convert feet to meters, multiply by 0.3048.

Construction noise may affect recreationalist or other visitors that may be in the area; however, this would be short term and noise impacts are expected to be below Clark County and Boulder City noise thresholds.

### Operation

The potential sources of long-term operational noise would stem from the operation of electrical equipment primarily corona noise from the 230-kV transmission lines.

Transmission line corona noise is the noise generated from the strong electric field at the surface of a high-voltage power line conductor ionizing the nearby air, resulting in an audible, continuous, low-level noise or “buzz” during operation of transmission lines and substation equipment. The amount of corona produced by a transmission line is a function of the voltage of the line, the diameter of the conductor, the elevation of the line above sea level, the condition of the conductor and hardware, and the local weather conditions. Noise produced from the transmission line would not be audible at the closest sensitive receptor, which is greater than 1 mile from the proposed project.

### 3.13.2.2. Alternative 2

Under Alternative 2, impacts resulting from noise would be the same as those described under Alternative 1

### 3.13.2.3. Connected Action

Construction-related noise impacts at the solar field site would be similar to those experienced during construction of the transmission lines but in a more concentrated area.

Noise from operation of the solar facility would be limited to vehicle use and occasional equipment use during maintenance activities. These maintenance activities would be intermittent and would have little to no noise effects on visitors or recreationists.

### 3.13.3. Mitigation

Noise generated from construction and operation of the transmission line would not be audible at the nearest sensitive receptor; therefore, no mitigation is required.

## 3.14. Socioeconomics

### 3.14.1. Affected Environment

The region of influence (ROI) for the proposed action is Clark County, Nevada. Selected socioeconomic indicators for the ROI and comparative data for the state are presented in Table 3.5, “Selected Socioeconomic Indicators for the Region of Influence and State of Nevada” (p. 56).

**Table 3.5. Selected Socioeconomic Indicators for the Region of Influence and State of Nevada**

Geographic Area	Population (2010)	Population (2000)	Labor Force	Housing Units	Owner-Occupied Housing Units (percent)	Housing Vacancy Rate (percent)	Median Home Price
Clark County	1,951,269	1,375,765	957,102	775,520	59.0	13.5	\$278,500
Nevada	2,700,551	1,998,260	1,329,085	1,089,982	60.7	13.4	\$275,300

Source: US Census Bureau 2000, 2009

### 3.14.2. Environmental Consequences

#### 3.14.2.1. No Action Alternative

Under the no action alternative, the gen-tie lines would not be constructed, and there would be no change in socioeconomic conditions. Temporary socioeconomic benefits from construction would not be realized.

#### 3.14.2.2. Alternative 1

The proposed project would have a direct beneficial impact on the local and regional economy during the construction period. On average, 10 to 20 construction and supervisory personnel would be required on site to construct the transmission lines. The worker pool is expected to draw from Clark County. Operation of the transmission lines would be managed, remotely monitored, and controlled by the staff of the Techren Solar Generation facility.

#### 3.14.2.3. Alternative 2

The impacts under Alternative 2 would be the same as those described in Alternative 1.

#### **3.14.2.4. Connected Action**

The connected action would have a direct beneficial impact on the local and regional economy during the construction period. On average, 80 to 120 personnel would be needed to construct the solar field.

Operation of the solar field would be managed, remotely monitored, and controlled by the staff of the Techren Solar Generation facility. When fully operational, approximately five additional employees would be hired for on-site maintenance of the proposed facility. Occasionally, there would be up to ten workers on site that are employed by contractors engaged by Techren Generation to conduct periodic maintenance or repair activities. The addition of five permanent jobs associated with the operation of the Techren Boulder City project would not represent a significant population increase. Because the potential long-term employment is relatively limited, the proposed action is not expected to directly or indirectly impact local housing market, schools, social services, or overall income and employment levels.

#### **3.14.3. Mitigation**

Only beneficial impacts are anticipated to result from construction of the proposed transmission line; therefore, no mitigation measures are warranted.

### **3.15. Waste Management and Hazardous Materials**

#### **3.15.1. Existing Environment**

A Phase I Environmental Site Assessment was conducted of the project site in general accordance with ASTM E-1527-05 (Ninyo & Moore, 2011). That study included a review of the site history, historical aerial photographs, and interviews with representatives of the City of Boulder City, and review of environmental databases. The site is described as vacant desert land and transmission line corridors. No hazardous substances were observed on the property during the site reconnaissance and no hazardous substances were historically used or stored on the property. No on-site recognized environmental conditions (RECs) or off-site RECs were identified during that study. Ninyo & Moore (2011) concluded that no further investigation is warranted at this site.

The City of Boulder City operates a Class I Municipal Landfill for municipal solid waste. Municipal solid waste is collected under contract from residences and businesses and disposed of at the landfill located at the end of Utah Street at the southeast portion of the city. In addition, Republic Services operates the Apex Class I Landfill that operates under contract to handle commercial and municipal wastes from incorporated and un-incorporated areas of the Las Vegas Valley.

#### **3.15.2. Environmental Consequences**

##### **3.15.2.1. Alternative 1**

The construction of the proposed transmission line will generate solid waste in the form of soil and brush from limited clearing and grubbing, building materials from installation of the

transmission line support structures, and the operation and maintenance of transmission lines. Solid waste generated during construction will be transported for disposal at a licensed waste management facility.

### **3.15.2.2. Alternative 2**

The impacts under Alternative 2 would be the same as those described in Alternative 1.

### **3.15.2.3. Connected Action**

Construction of the solar facility would generate solid waste in the form of soil and brush from clearing and grubbing (of the 2,200 acre site), building materials from installation of the solar generating facilities, transmission lines, the operation and maintenance facilities, and interior access road. Solid waste generated during construction will be transported for disposal at a licensed waste management facility.

The construction and operation of the proposed facility is not expected to require the transportation, use, or generation of hazardous materials or hazardous wastes that could create a significant hazard to the public or environment. The types of materials that would potentially be present during construction would be minimal volumes of vehicle fuels, lubricating oils, paints, adhesives, and sealants. Under ordinary use, none of these materials would result in the generation of hazardous wastes. As the construction contractors would be required to comply with environmental and work-place safety laws and procedures, no significant risks to public health and safety would be expected from the proposed action.

### **3.15.3. Mitigation Measures**

A solid and hazardous waste management plan will be prepared and implemented for both construction and operation of the proposed project and connected action. Included in the solid and hazardous waste management plans will be stipulations and procedures regarding compliance with federal, state, and local regulations for waste minimization, storage, and disposal. The construction contractor shall prepare BMPs that describe the methods for working with hazardous materials during construction. Construction contractor will prepare a Spill Prevention, Control, and Countermeasure (SPCC) Plan that describes methods for working with hazardous materials during construction, measures for avoiding spills, and mitigation measures if a spill were to occur.

# **Chapter 4. Cumulative Impacts**

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In 40 CFR 1508.7, the Council on Environmental Quality defines cumulative impacts in as “impacts on the environment which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions.” Plainly stated, NEPA requires the consideration of cumulative impacts, which are the incremental impacts of an action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal).

This cumulative impacts analysis addresses the cumulative effects on air quality and climate, water resources, soils, vegetation (including special status plant species), wildlife (including migratory birds and special status species), vegetation and invasive species/noxious weeds, visual resources land use, and socioeconomics that the proposed action would have in conjunction with other past, present, and reasonably foreseeable actions in the project area. The proposed action would not impact the remainder of the resources evaluated in Chapter 3, and these resources are therefore not included in the cumulative analysis.

## 4.1. Past and Present Actions

Current land use activities in the project vicinity include energy production, energy transmission, and dispersed recreation. In the past, mining claims were active in the vicinity, but there are currently no active mining claims. Most of the land in the Eldorado Valley is owned by Boulder City and deemed the “Energy Zone” which is zoned for energy production. There are three solar energy generation facilities south of the project site: The 10 MW Eldorado facility, the 48 MW Copper Mountain Solar I facility, the 150 MW Copper Mountain II (under construction) (all operated by Sempra Generation), and Nevada Solar One, a 64 MW facility, operated by Acciona North America. Several electrical substations (including the Marketplace, McCullough, and Eldorado substations) exist in the area to facilitate energy transmission.

## 4.2. Reasonably Foreseeable Projects

Reasonably foreseeable future actions are considered those actions that are known or could reasonably be anticipated to occur within the analysis area for each resource, within a time frame appropriate to the expected impacts from the Proposed Action. Reasonably foreseeable future actions include the following:

1. **Techren Boulder City Solar Project** - As described in Chapter 2, Techren also is proposing a 2,200 acre solar facility that will generate up to 300 MW of energy, under BLM policy this is considered a “connected action.” This connected action is included in the subsequent cumulative analysis section.
2. **Copper Mountain Solar North Project** - Sempra Generation is proposing to develop 1,400 acres for a solar facility that generates up to 220 MW. Additionally, Sempra is proposing to build a transmission line that would connect the solar facility to the McCullough and Marketplace Substations.
3. **Dry Lake Bed South** – This area has been leased to Korean Midland Power Company for solar facility development. It can be reasonable anticipated that the entire 1,500-acre site will be developed. No further details are available at this time.

4. **Town Site** – This area has been leased by the City of Boulder City to Korean Western Power Company for solar facility development. It can be reasonably anticipated that the entire 880-acre site will be developed. No further details are available at this time.

### **4.3. Air Quality and Climate**

Construction of numerous solar facilities in the Boulder City Energy zone could have both short term and long term cumulative adverse effects on air quality. Removal of the vegetation that keeps soil in place would increase airborne particulate matter in the Eldorado Valley.

Operation of the proposed solar facilities and any future solar facilities in the Boulder City Energy Zone would have a cumulative beneficial impact on air quality because operation of solar generation facilities results in a reduction in emissions compared to other kinds of electricity generation facilities as well as less long-term emission than recreational OHV use.

### **4.4. Geology, Minerals, and Soils**

Some potential for soil erosion exists from the proposed solar field site any other future solar facilities due to soil disturbance, biological soil crust, desert pavement, and removal of vegetation. The proposed solar field site would utilize BMPs for soil, biological soil crust and desert pavement protection thereby minimizing the contribution to cumulative impacts. In addition, a fugitive dust plan would be developed with mitigation measures to reduce the potential for fugitive dust.

### **4.5. Water Resources**

Preparation of sites for solar energy facilities would typically include site grading and construction of channels, berms, or retention basins, resulting in potential impacts to area hydrology. The potential for erosion of disturbed soils would be minimized by incorporating erosion control BMPs into the grading activities and design of the project grading plan. Maintenance of historic drainage paths, as well as drywells to increase the rate of percolation of water from retention basins would minimize the contribution to cumulative impacts from the proposed solar field project.

### **4.6. Vegetation**

Past, present and future solar development in the valley would contribute incrementally to vegetation disturbance and removal. In total, approximately 6,000 acres of predominately dry lake and Mojave creosote bush scrub vegetation would be removed for solar energy development and associated transmission lines.

Construction of these projects may introduce weed species and/or would contribute to the spread of weed species in the Eldorado Valley. If projects in the region were not successfully re-vegetated after decommissioning, native vegetation communities would be lost, or native vegetation communities might be converted term to communities that are dominated by invasive, nonnative species. Increased presence of invasive annual grass species could also promote unwanted wildland fires, which is very destructive to habitat and native vegetation. Infrastructure may become more at risk to wildland fire occurring on adjacent lands over time.

## 4.7. Wildlife

Past, present and future solar development in the valley could continue to displace wildlife, and as described under cumulative effects under vegetation, wildlife habitat. Most like all the solar facilities would be fenced, and therefore, wildlife would be excluded from approximately 6,000 acres of land. This may disrupt normal migratory patterns and fragment habitat. In addition, some of these projects and actions could increase traffic, conflicts with humans, and competition for available habitat. Some of these actions could also decrease forage quality and quantity as described under Section 4.6 Vegetation.

## 4.8. Cultural Resources

Recreational use of the project area currently has moderate adverse impacts on archeological sites, mainly through soil erosion and unauthorized collection, and these are expected to continue in the future. Reasonably foreseeable future actions proposed in the region, such as development of additional solar facilities, are likely to have additional adverse cumulative impacts on cultural resources. While such impacts can be partially mitigated through excavation or other means, archaeology is a destructive process. Once sites have been excavated, any data that is not captured would be lost.

## 4.9. Land Use

Because the proposed action and reasonably foreseeable future projects, including any additional transmission lines in the Eldorado Valley currently proposed by other parties, would be required to comply with adopted land use plans and zoning requirements, these projects would be consistent with the overall land use policies of the city of Boulder City and would not result in any cumulative effects that would be incompatible with existing or long-term land use patterns.

## 4.10. Visual Resources

Development of the Techren Boulder City project and reasonably foreseeable solar facilities in Boulder City's Energy Zone would result in a change to the existing visual landscape through the introduction of additional solar generating equipment and associated transmission infrastructure. While the proposed and connected action would alter the visual character of the project area (including the viewshed from portions of the Sloan Canyon National Conservation Area), the cumulative projects described in this analysis have already changed the visual character of the area from rural, open space to a more industrial feel both at the generating facilities and along transmission line routes.

## 4.11. Socioeconomics

The proposed action would have a short-term beneficial cumulative effect from the creation of construction jobs during the construction periods. Operation of the proposed facilities and any future solar energy generating facilities in the Boulder City Energy Zone would have a minor beneficial cumulative effect through the number of jobs created. The project would also have a moderate beneficial cumulative effect through the revenue accrued by the City for lease of the land.

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## **Chapter 5. Tribes, Individuals, Organizations, or Agencies Consulted:**

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**Table 5.1. List of Persons, Agencies and Organizations Consulted**

Name	Purpose & Authorities for Consultation or Coordination	Findings & Conclusions
Enter Name		
Enter Name		

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# **Chapter 6. List of Preparers**

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**Table 6.1. List of Preparers**

Name	Title	Responsible for the Following Section(s) of this Document
BLM		
Mark Chandler	Realty Specialist	All
Jill Pickren	Realty Specialist	All
Mark Slaughter	Biologist	Wildlife and Biologist
Lisa Christianson	Biologist	Air Quality
Borris Poff	Biologist	Hydrology and Soils
John Evans	Environmental Planner	All
Kathleen Sprowl	Archeologist	Cultural
NewFields		
Stephanie Locke	Project Manager	All
Ken MacDonald	Vice President	Socioeconomics, Cumulative
Anne Dubarton	Project Manager	Cultural
Sean Milne	Environmental Scientist	Biology
Ninyo and Moore		
Albert Ridley	Principal Geologist	Geology, Minerals, Soils, Water, Hazardous Materials
Randy Keys	Environmental Scientist	Air Quality, Water
Courtney Brooks	Senior Environmental Scientist	Water

## Figure 6.1. References 1

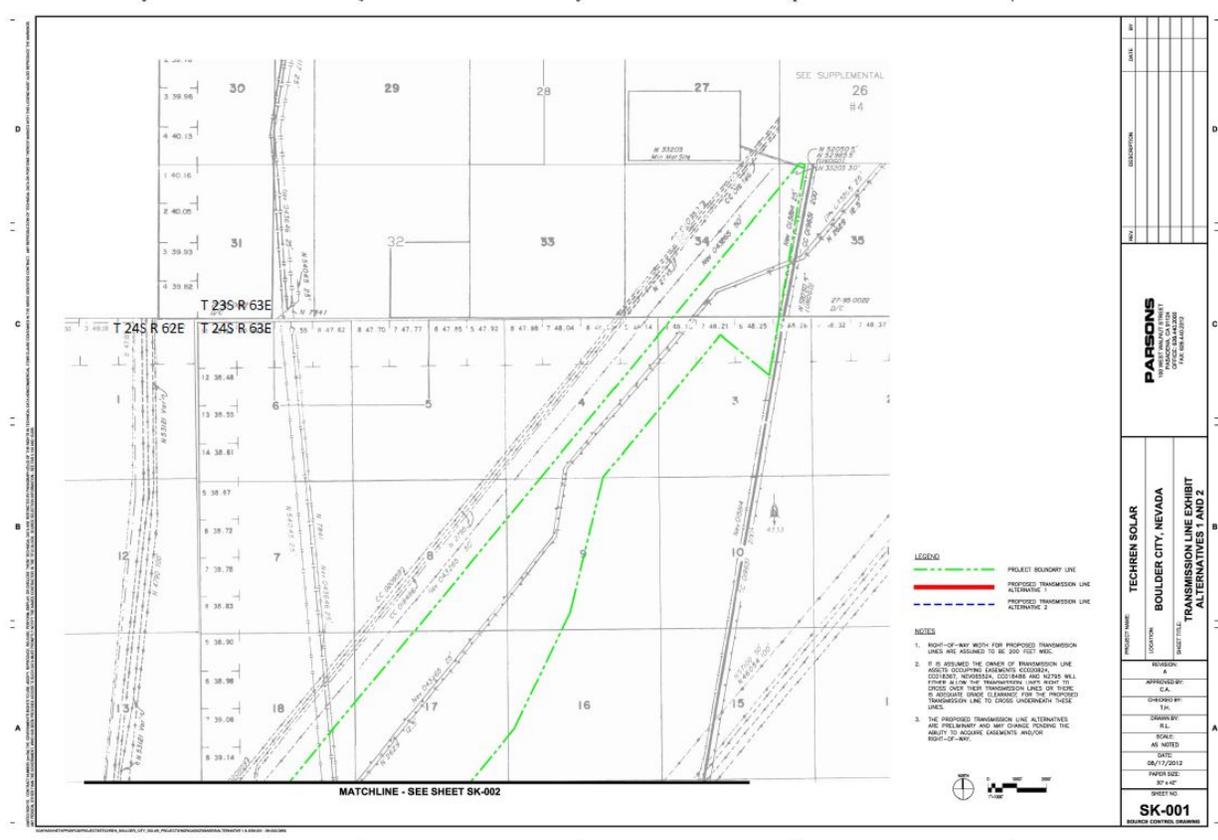
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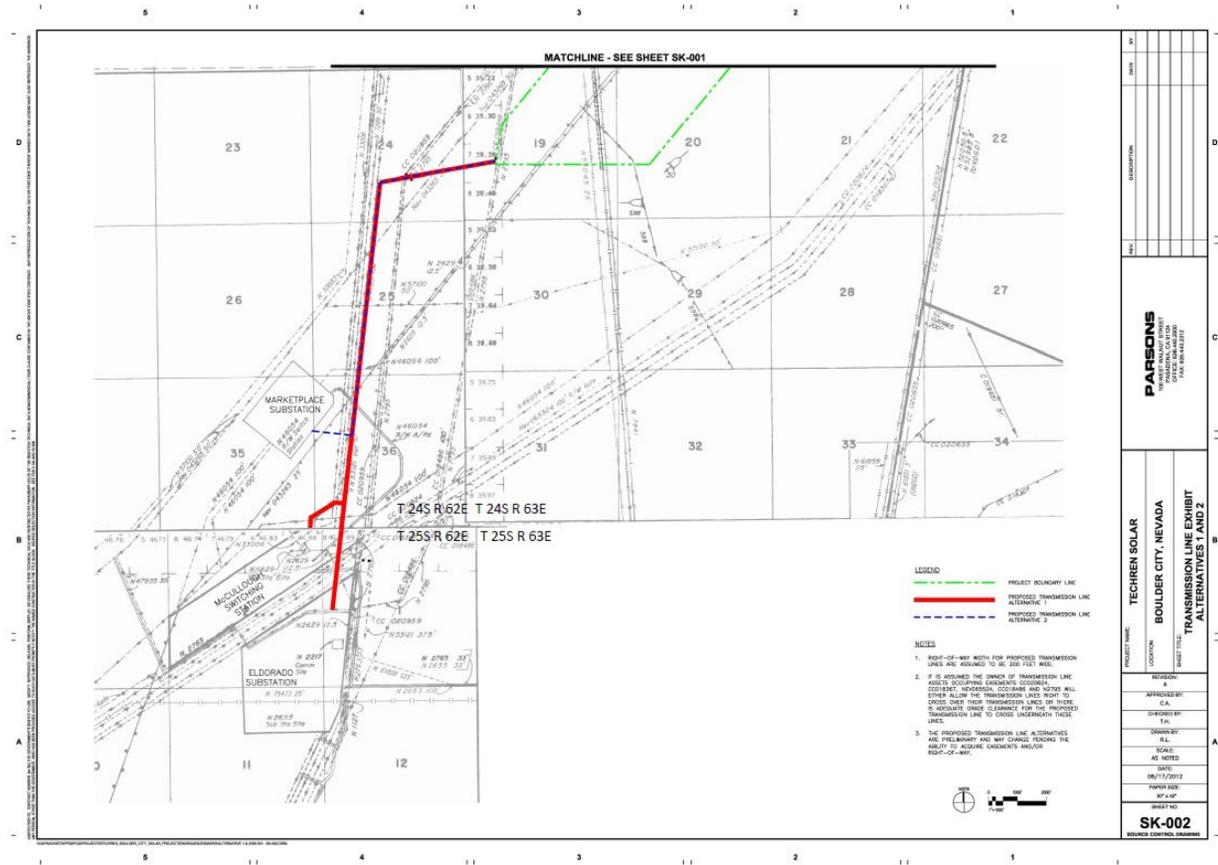
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# Appendix A. Master Title Plats



Techren Solar Field marked in green, located on private lands

DATE:	
BY:	
REVISION:	
NO.	
<b>PARSONS</b> THE CONSULTING ENGINEERS 1000 EAST FLORISSANT AVENUE SALT LAKE CITY, UT 84103 PHONE: (801) 438-7000 FAX: (801) 438-7001 WWW.PARSONS.COM	
PROJECT NAME:	TECHREN SOLAR
LOCATION:	BOULDER CITY, NEVADA
SHEET TITLE:	TRANSMISSION LINE EXHIBIT ALTERNATIVES 1 AND 2
REVISION:	
APPROVED BY:	ICA
DESIGNED BY:	TR
CHECKED BY:	AS NOTED
DATE:	04/17/2012
PROJECT NO.:	SK-001
SHEET NO.:	



The transmission line marked in red, which is the BLM connected action.

# Appendix B. Best Management Practices

## Best Management Practices

In addition to the requirements and mitigation measures proposed in this document and in the project permits, the applicant has committed to implementing the environmental protection measures discussed below. These measures have been divided into the following categories: General Measures, Soil Disturbance, Noxious Weeds, Vegetation, Water Features, Wildlife and Sensitive Species, Cultural and Paleontological Resources, Hazardous Materials and Waste, and Air Quality.

### General Measures

1. All construction vehicle movement will be restricted to the ROW, predesignated access roads, and public roads.
2. Fences and gates, if damaged by construction activities, will be repaired or replaced to their original preconstruction condition as required by the landowner or land management agency.
3. Temporary gates will be installed only with prior permission of the landowner or land management agency.
4. All existing roads will be left in a condition equal to or better than their preconstruction condition.

### Soil Disturbance

1. Site inspections will be conducted during the construction period to ensure that erosion-control measures were properly installed and are functioning effectively.
2. Construction will be prohibited when the soil is too wet to adequately support construction equipment.
3. Construction activities will be limited to the ROW to reduce soil compaction, erosion, and vegetation loss.
4. The Applicant will prepare and implement a SWPPP in accordance with the Clark County Department of Air Quality and the Nevada Division of Environmental Protection.
5. Implement BMPs such as locating waste and excess excavated materials outside drainages to avoid sedimentation.
6. Install silt fences, temporary earthen berms, temporary water bars, sediment traps, stone check dams, or other equivalent measures (including installing erosion-control measures around the perimeter of stockpiled fill material) as necessary.
7. Conduct regular site inspections during the construction period to see that erosion-control measures were properly installed and are functioning effectively.

### Noxious and Invasive Weeds

1. All gravel and/or fill material will be certified weed-free.

2. The proponent shall use weed free seed for reclamation and for other organic products for erosion control, stabilization, or revegetation (e.g. straw bales, organic mulch) must be certified weed free.
3. The project proponent shall coordinate weed management with the BLM Weed Specialist regarding any proposed herbicide treatment. The project proponent shall prepare, submit, obtain and maintain a pesticide use proposal (PUP) for the proposed action and Pesticide Application Records will be submitted to the BLM Weed Specialist within one week after application.
4. The project proponent shall limit the size of any vegetation and/or ground disturbance to the absolute minimum necessary to perform the activity safely and as designed. The project proponent will avoid creating soil conditions that promote weed germination and establishment.
5. The project proponent shall begin project operations in weed free areas whenever feasible before operating in weed-infested areas.
6. The project proponent shall locate equipment storage, machine and vehicle parking or any other area needed for the temporary placement of people, machinery and supplies in areas that are relatively weed-free. The project proponent shall avoid or minimize all types of travel through weed-infested areas.
7. BLM or the project proponent shall determine equipment-cleaning sites. Project related equipment and machinery (this especially includes the nooks and crannies of undercarriages) will be cleaned using compressed air or water to remove mud, dirt and plant parts before entering the project site. Seeds and plant disposal methods will be determined in coordination with the BLM Weed Specialist based on species present.
8. Fire prevention measures must be established where problematic annual grass infestations (such as red brome and cheat grass) are present. Compliance with fire restrictions is mandatory while fire restrictions are in place. Fire restrictions are generally enacted between May 15 and October 1. Specific noncompliant activities may be waived on a case by case basis by the District Manager after review and approval by the Fire Management Officer and Field Manager.
9. Reduce or remove flammable invasive species to the extent where infrastructure is protected from the direct impact of a wildland fire where needed.

### **Vegetation**

1. Wherever possible, vegetation will be left in place. Where vegetation must be removed, the root structure will be preserved as feasible to allow for potential resprouting.
2. All temporary construction areas, including stringing sites and transmission structure work areas, that have been disturbed will be recontoured and restored as required by the landowner or land-management agency. The method of restoration typically will consist of seeding or revegetating with native plants (if required), installing cross drains for erosion control, and placing water bars in the road or centerline travel route. Seed used for revegetation will be certified as weed-free.

3. All temporarily impacted areas will be restored per Southern Nevada District Office restoration guidance.

### **Wildlife Sensitive Species**

1. Prior to construction (including ROW clearing and access road construction), biological surveys of the project area will be conducted by a competent biologist. The biologist will conduct surveys for sensitive plant and animal species in the appropriate season.
2. Excavations left open overnight will be covered or fenced securely to prevent wildlife from falling into open excavations.
3. The number of areas where wildlife could hide or be trapped (e.g., open sheds, pits, uncovered basins, and laydown areas) shall be minimized. Detention basins located in tortoise habitat would be designed to minimize risk to tortoise or fenced to avoid risk of entrapment.
4. Transmission Line Towers will be constructed to conform to those practices described in the Suggested Practices for Raptor Protection on Power Lines Manual developed by the Edison Electric Institute.

### **Cultural and Paleontological Resources**

1. A cultural resource inventory survey will be conducted prior to construction as determined necessary after consultation with BLM biologists. Unevaluated cultural sites will be tested to determine their eligibility status.
2. The applicant will avoid cultural sites identified as eligible for inclusion on the National Register of Historic Places.
3. Prior to construction, the applicant and/or its contractors will advise workers and individuals as necessary regarding the potential to encounter historic or prehistoric sites and objects, proper procedures in the event that cultural items or human remains are encountered, prohibitions on artifact collection, and respect for Native American religious concerns.
4. If potential resources are found, work will be halted immediately within a minimum distance of 300 feet from the discovery, and a professional archaeologist (holding a valid Cultural Resources Permit from the state BLM) will be mobilized to the site to evaluate the find and determine appropriate further step and mitigation measures as necessary. Any cultural and/or paleontological resource discovered during construction on public or land will be reported immediately to the BLM. Work will not commence until the BLM issues a notice to proceed. The BLM will notify and consult with SHPO and appropriate Tribes on eligibility and suitable treatment options. If significant resources are discovered, they will be recovered, transported, and stored at an approved curation facility that meets the standards specified in Title 36 of the Code of Federal Regulations (CFR) Part 79.
5. If human remains are encountered during project construction, all work within 300 feet of the remains will cease, and the remains will be protected. If the remains are on land managed by the BLM, BLM representatives will be immediately notified. If the remains are Native American, the BLM will follow the procedures set forth in 43 CFR Part 10, Native American Graves Protection and Repatriation Regulations. If the remains are located on state or private lands, the SHPO and the BLM will be notified immediately.

**Hazardous Materials and Waste**

1. All construction vehicles will be maintained in accordance with the manufacturers' recommendations. All vehicles will be inspected for leaks prior to entering the jobsite.
2. All discovered leaks will be contained with a bucket or absorbent materials until repairs can be made.
3. All hazardous waste materials will be properly labeled in accordance with Title 40 of the CFR Part 262.
4. Spilled material of any type will be cleaned up immediately. A shovel and spill kit will be maintained on site at all times to respond to spills.
5. All sanitary wastes will be collected in portable, self-contained toilets at all construction staging areas and other construction operation areas and managed in accordance with local requirements.

**Air Quality**

1. The applicant and/or its contractor will implement will prepare and implement an Enhanced Fugitive Dust Plan to minimize fugitive dust emissions generated from project construction activities. The Enhanced Fugitive Dust Plan will be submitted to the Clark County Planning Department and will be prepared in accordance with the county or state. At a minimum, the Enhanced Fugitive Dust Plan will discuss enforcement of dust control requirements; environmental training; and dust control measures to be implemented during construction.

# Appendix C. USFWS Burrowing Owl Mitigation at Construction Sites

U. S. Fish and Wildlife Service

Nevada Fish and Wildlife Office  
*Conserving the Biological Diversity of Great Basin, Eastern Sierra & Mojave Desert*

PROTECTING BURROWING OWLS  
AT CONSTRUCTION SITES  
IN NEVADA'S MOJAVE DESERT REGION



Burrowing owl numbers are declining despite protection under the Migratory Bird Treaty Act. Killing or possessing these birds or destruction of their eggs or nest is prohibited.

Be part of the solution: help these owls!





U.S. Fish and Wildlife Service  
Nevada Fish and Wildlife Office  
4701 N. Torrey Pines Drive  
Las Vegas, NV 89130  
Phone: 702-515-5230  
Fax: 702-515-5231

<http://www.fws.gov/nevada>

U.S.F.W.S. Brochure on Protecting Burrowing Owls at Construction Sites (Cover Panel and Back Panel).

Though burrowing owls are capable of digging their own burrows, they often will use burrows of other animals for shelter and nesting. They will even adopt pipes or culverts 6" to 8" in diameter.

**Tips for Protecting Burrowing Owls, Their Eggs and Young at Construction Sites:**

Even though burrowing owls are often active during the day, always check burrows, cracks, and crevices for owls before beginning construction. Use of a fiber-optic scope or remote mini-camera to look into a burrow can help determine the presence of owls or nests. Ensure owls and eggs are not present in burrows when grading begins, to avoid burying them.

In southern Nevada, owls breed from about mid-March through August. If a burrow has an active nest, the site must be avoided until the chicks have fledged. To ensure that birds will not abandon the nest, a buffer of at least a 250-foot radius should be placed around the burrow, within which no construction should occur. It takes a minimum of 74 days from when eggs are laid until chicks are able to fly (fledge). After the young have fledged, check the nest burrow for any owlets before resuming construction.

The following owl behaviors may help determine breeding or the presence of an active nest:

- A pair of owls is initially observed at a site, then only one owl is observed. This may indicate that the pair has chosen a nest burrow, and the female has gone down into the burrow to lay and incubate eggs. Once incubation begins the female rarely leaves the burrow.
- An owl is frequently observed carrying food to the burrow. The male provides food for the female while she is incubating eggs. The best time of day to observe owls is dawn and dusk, but they may be active throughout the day. The male will most likely leave the food in front of the burrow and the female will come to the entrance to take

the food. This is probably the best indication that the owls have an active nest.

- Only one owl has been seen for a period of time; then, two owls are observed. This may indicate that either the nest has failed, or the eggs have hatched, and the female has emerged from the burrow to assist the male in hunting for food to feed the chicks. The chicks will appear at the burrow entrance when they are about 10 days old.

If you are unsure of breeding status, seek the assistance of a professional biologist or other knowledgeable person. Should breeding behavior be observed, presence of an active nest should be assumed and the area avoided until the chicks have fledged or the nest is no longer occupied.

**IMPORTANT!** In the Mojave Desert portions of Clark, southern Lincoln and Nye counties, owls may use desert tortoise burrows for nesting and shelter. Desert tortoises are protected under the Endangered Species Act. Killing, harming, or harassing desert tortoises, including destruction of their nests with eggs, without prior authorization is prohibited by Federal law.\*

**\* IF YOUR PROJECT IS IN CLARK COUNTY, PLEASE READ ON:**

Clark County holds a permit from the U.S. Fish & Wildlife Service authorizing "take" of desert tortoises during the course of otherwise legal activities on non-federal lands. In Clark County only, discouraging burrowing owls from breeding in the construction site on private property is allowed by collapsing tortoise burrows during the owl's non-breeding season (September through February). This may help avoid construction delays. Prior to collapsing a burrow, always check for owls or other protected wildlife occupying the burrow for the winter. Call the Nevada Department of Wildlife at 702-486-5127 if a Gila monster is found as this is a State protected species.

Thank you for your assistance in protecting migratory birds and Nevada's endangered and threatened species!

**U.S.F.W.S. Brochure on Protecting Burrowing Owls at Construction Sites (inside panels).**

# Appendix D. NDOW Gila Monster Mitigation



NEVADA DEPARTMENT OF WILDLIFE  
Southern Region  
4747 W. Vegas Drive, Las Vegas, Nevada 89108  
Phone: 702-486-5127, Fax: 702-486-5133



1 November 2007

## GILA MONSTER STATUS, IDENTIFICATION AND REPORTING PROTOCOL FOR OBSERVATIONS

### Gila Monster Status

- Per Nevada Administrative Code 503.080, the Gila monster (*Heloderma suspectum*) is classified as a Protected reptile.
- Per Nevada Administrative Codes 503.090, and 503.093, no person shall capture, kill, or possess any part thereof of Protected wildlife without the prior written permission by the Nevada Department of Wildlife (NDOW).

This species is rarely observed relative to other species which is the primary reason for its Protected classification by the State of Nevada. The USDI Bureau of Land Management has recognized this lizard as a sensitive species since 1978. Most recently, the Gila monster was designated as an *Evaluation* species under Clark County's Multiple Species Habitat Conservation Plan (MSHCP). The evaluation designation was warranted because inadequate information exists to determine if mitigation facilitated by the MSHCP would demonstrably cover conservation actions necessary to insure the species' persistence without protective intervention as provided under the federal Endangered Species Act.

The banded Gila monster (*H.s. cinctum*) is the subspecies that occurs in Clark, Lincoln, and Nye counties of Nevada. Found mainly below 5,000 feet elevation, its geographic range approximates that of the desert tortoise (*Gopherus agassizii*) and is coincident to the Colorado River drainage. Gila monster habitat requirements center on desert wash, spring and riparian habitats that inter-digitate primarily with complex rocky landscapes of upland desert scrub. They will use and are occasionally encountered out in gentler terrain of alluvial fans (bajadas). Hence, Gila monster habitat bridges and overlaps that of both the desert tortoise and chuckwalla (*Sauromalus ater*). Gila monsters are secretive and difficult to locate, spending >95% of their lives underground.

The Gila monster is the only venomous lizard endemic to the United States. Its behavioral disposition is somewhat docile and avoids confrontation. But it will readily defend itself if threatened. Most bites are considered illegitimate and consequential to harassment or careless handling. These lizards are not dangerous unless molested or handled and should not be killed.

Scant information exists on detailed distribution and relative abundance in Nevada. The Nevada Department of Wildlife (NDOW) has ongoing management investigations addressing the Gila monster's status and distribution, hence additional distribution, habitat, and biological

Page 1 of 3

information is of utmost interest. In assistance to gathering additional information about Gila monsters in Nevada, NDOW will be notified whenever a Gila monster is encountered or observed, and under what circumstances (see Reporting Protocol below).

### Identification



The Gila monster is recognizable by its striking black and orange-pink coloration and bumpy, or beaded, skin. In keeping with its namesake, the banded Gila monster retains a black chain-link, banded appearance into adulthood. Other lizard species are often mistaken for the Gila monster. Of these, the non-venomous western banded gecko (*Coleonyx variegatus*) and non-venomous chuckwalla are most frequently confused with the Gila monster. All three species share the same habitats.

The western banded gecko is often mistakenly identified as a baby or juvenile Gila monster. Western banded geckos do have a finely granular skin and pattern that can be suggestive of the Gila monster to the untrained eye. However, western banded gecko heads are somewhat pointed at the snout and the relatively large eyes have vertical pupils. Snouts of Gila monsters are bluntly rounded and the smallish eyes have round pupils. Newly hatched Gila monsters are about 5-6 inches long with a vivid orange and black, banded pattern. Adult western banded geckos are at best cream to yellow and brown in pattern and do not exceed 5 inches.



Both juvenile and adult chuckwallas are commonly confused with the Gila monster. Juvenile chuckwallas have an orange and black, banded tail. Although banding of the tail fades as chuckwallas mature, their large adult size (up to 17 inches) rivals that of the Gila monster. Adult chuckwallas have a body shape somewhat suggestive of the Gila monster, but they lack the coarsely beaded skin and black and orange body pattern of the Gila monster.

### Reporting Protocol for Gila Monster Observations

Field workers and personnel in southern Nevada should at least know how to: (1) identify Gila monsters and be able to distinguish it from other lizards such as chuckwallas and western banded geckos (see Identification section above); (2) report any observations of Gila monsters to the Nevada Department of Wildlife (NDOW); (3) be alerted to the consequences of a Gila monster bite resulting from carelessness or unnecessary harassment; and (4) be aware of protective measures provided under state law.

- 1) Live Gila monsters found in harms way on the construction site will be captured and then

detained in a cool, shaded environment ( $\leq 85^{\circ}\text{F}$ ) by the project biologist or equivalent personnel until a NDOW biologist can arrive for documentation, marking and obtaining biological measurements and samples prior to releasing. Despite that a Gila monster is venomous and can deliver a serious bite, its relatively slow gait allows for it to be easily coaxed or lifted into an open bucket or box carefully using a long handled instrument such as a shovel or snake hook (*Note: it is not the intent of NDOW to request unreasonable action to facilitate captures; additional coordination with NDOW will clarify logistical points*). A clean 5-gallon plastic bucket w/ a secure, vented lid; an 18"x 18"x 4" plastic sweater box w/ a secure, vented lid; or, a tape-sealed cardboard box of similar dimension may be used for safe containment. Additionally, written information identifying the mapped capture location, Global Positioning System (GPS) coordinates in Universal Transverse Mercator (UTM) using the North American Datum (NAD) 83 zone 11. Date, time, and circumstances (e.g. biological survey or construction) and habitat description (vegetation, slope, aspect, substrate) will also be provided to NDOW.

- 2) Injuries to Gila monsters may occur during excavation, blasting, road grading, or other construction activities. In the event a Gila monster is injured, it should be transferred to a veterinarian proficient in reptile medicine for evaluation of appropriate treatment. Rehabilitation or euthanasia expenses will not be covered by NDOW. However, NDOW will be immediately notified of any injury to a Gila monster and which veterinarian is providing care for the animal. If an animal is killed or found dead, the carcass will be immediately frozen and transferred to NDOW with a complete written description of the discovery and circumstances, date, time, habitat, and mapped location (GPS coordinates in UTM using NAD 83 Z 11).
- 3) Should NDOW's assistance be delayed, biological or equivalent acting personnel on site should detain the Gila monster out of harms way until NDOW personnel can respond. **The Gila monster should be detained until NDOW biologists have responded.** Should NDOW not be immediately available to respond for photo-documentation, a digital (5 megapixel or higher) or 35mm camera will be used to take good quality images of the Gila monster *in situ* at the location of live encounter or dead salvage. The pictures will be provided to NDOW at the address above or the email address below along with specific location information including GPS coordinates in UTM using NAD 83 Z 11, date, time and habitat description. Pictures will show 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 (Gila monster should fill camera's field of view and be in sharp focus); (3) a clear, overhead close-up of the head (head should fill camera's field of view and be in sharp focus).

Please contact NDOW Biologist Polly Conrad at (702) 486-5127 x3718 or by e-mail at [pconrad@ndow.org](mailto:pconrad@ndow.org) for additional information regarding these protocols.