CHAPTER 4 – ENVIRONMENTAL CONSEQUENCES

4.1 INTRODUCTION

This chapter provides a description of the effects on the environment that could occur from the construction, operation, and ultimate decommissioning of the Applicant's Proposed Project and amending the YFO RMP. The Applicant's Proposed Project and alternatives are described in Chapter 2 and the proposed YFO RMP amendment and alternatives are presented in Appendix A. Information about the existing condition of the environment provided in Chapter 3 was used as a baseline from which to measure and identify potential impacts resulting from the Project and the proposed YFO RMP amendment. As explained in Section 3.1, the direct, indirect, and cumulative effects of the Applicant's Proposed Project and plan amendment area the same.

This chapter begins with a summary of the terms and methods used for the impact assessment and general mitigation. Subsequent sections for each resource describe the impacts that could result from each alternative.

The **No Action Alternative** is used as a benchmark of existing conditions by which the public and decision makers can compare the environmental effects of the Applicant's Proposed Project and the alternatives. Under the No Action Alternative, Western would deny the interconnection request and the BLM would not grant a right-of-way or amend the YFO RMP. The impacts of the Project would not occur.

The **Applicant's Proposed Project** would consist of the construction and operation of the Project, as proposed. The proposed Project would have a 30-year lifespan at which point the Project would be decommissioned, unless the Project remains economically viable. The Applicant's Proposed Project would use dry-cooling for power plant cooling.

Alternative 1 – Hybrid Cooled. Under Alternative 1, the Project would be constructed and operated using a hybrid-cooled technology, rather than the dry-cooling technology considered under the Applicant's Proposed Project.

If Western chooses to interconnect QSE's proposed solar facility, under either the dry- or hybrid cooled alternative, Western would construct and operate a new 161/230-kV switchyard to interconnect the solar facility to Western's existing Bouse-Kofa 161-kV transmission line. In addition, Western would upgrade their communication system to provide dual and redundant communications to deliver signals to operate the switchyard equipment from control centers and other remote locations and to report metering. Impacts associated with construction and operation of Western's proposed switchyard and telecommunication system were analyzed as part of the Applicant's Proposed Project and alternatives. The issuance of a ROW grant for either, the Applicant's Proposed Project or Alternative 1, requires the concurrent amendment of the YFO RMP as outlined in Appendix A.

4.1.1 Types of Impacts to be Addressed

Impacts are defined as modifications to the existing environment brought about by implementing an alternative. Impacts can be beneficial or adverse, result from the action directly or indirectly, and can be long-term, short-term, temporary, or cumulative in nature. The analysis in this chapter provides a quantitative or qualitative comparison (dependent on available data and nature of the impact) between alternative impacts and establishes the severity of those impacts in the context of the existing environment. The discussion of each resource includes sections for specifically required disclosures under NEPA, including the disclosure of residual impacts, irreversible and irretrievable commitment of resources, and the impact of the Project's short-term resource use on the long-term productivity of the Project area. These required disclosures are explained in the section below.

Direct impacts are attributable to implementation of an alternative that affects a specific resource, and generally occur at the same time and place.

Indirect impacts can result from one resource affecting another (e.g., soil erosion and sedimentation affecting water quality) or can occur later in time or removed in location, but can be reasonably expected to occur.

Long-term impacts are those that would remain for the life of the Project. For the analysis contained in this EIS, long-term impacts are those lasting beyond 5 years after the implementation of the alternative.

Short-term impacts result in changes to the environment that are stabilized or mitigated rapidly and without long-term effects. For the analysis contained in this EIS, short-term impacts are those occurring within the first 5 years of alternative implementation.

Cumulative impacts are those 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" (40 CFR 1508.7).

NEPA regulations, 40 CFR 1502.16, require a discussion of ***irreversible or irretrievable commitments of resources*** which would be involved with the Project. A resource commitment is considered irreversible when impacts from its use would limit future use options and the change cannot be reversed, reclaimed, or repaired. A resource commitment is considered irretrievable when the use or consumption of the resource is neither renewable nor recoverable for use by future generations until reclamation is successfully applied.

4.1.2 Mitigation and Residual Impacts

The mitigation measures identified in Chapter 4 consist of potential additional mitigation not included as applicant-committed measures under any of the alternatives (including measures outside the jurisdiction of the lead or cooperating agency) that could be implemented to address impacts that would result from Project implementation. The residual impacts section addresses impacts that cannot be avoided by the application of mitigation measures. This section, therefore,

discloses the effectiveness of proposed mitigation measures for each resource, and helps the decision maker identify those mitigation measures to be included in the ROD.

4.1.3 Cumulative Impacts

The CEQ (40 CFR § 1508.7) defines "cumulative impact" as: "...the impact on the environment that results 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."

Cumulative impacts result when the effects of an action are added to, or interact with, other effects in a particular place and within a particular time. It is the combination of these effects, and any resulting environmental degradation, that is the focus of the cumulative impact analysis. While impacts can be differentiated as direct, indirect, and cumulative, the concept of cumulative impacts takes into account all disturbances since cumulative impacts result in the compounding of the effects of all actions over time. Thus, the cumulative impacts of an action can be viewed as the total effects on a resource, ecosystem, or human community of that action and all other activities affecting that resource no matter what entity (Federal, non-Federal, or private) is taking the actions.

4.1.3.1 Cumulative Impacts Analysis Methodology

The cumulative impacts on the resources, ecosystem, and human community were considered by first identifying the geographic scope of the cumulative analysis area. The cumulative analysis area varies depending on the resource. For example, the analysis area for geology may be restricted to a geological unit, while the analysis area for the socioeconomic analysis may encompass multiple counties, cities, and jurisdictions. After determining the analysis area, a comprehensive list of past, present, and reasonably foreseeable actions within the analysis area was compiled and utilized to determine the cumulative impacts of the Project and the additional projects identified. Figure 4-1 and Table 4-1 lists existing (past and present), and reasonably foreseeable projects within the cumulative effects ROI.

Information about past, present, and reasonably foreseeable future activities in the cumulative effects ROI were gathered from the BLM, La Paz County, and other agencies; adopted plans; environmental documents; and personal communications with public agencies.

The approach to cumulative impacts of the proposed Project considers "past" or "existing" projects to be those that currently exist or have completed construction and are in operation. As explained in Chapter 3 and above, the impacts of past or existing actions are already reflected in the baseline conditions identified in Chapter 3. "Present" projects include those that are currently under construction or have been fully permitted such that they are likely to be part of the existing environment when the proposed Project would begin construction. "Reasonably foreseeable" future projects are those for which a formal permit application has been filed. For Western, if an interconnection request has been submitted, then it is considered a "reasonable foreseeable" action. For the BLM, a reasonably foreseeable action is one for which a ROW application has been submitted. However, the identification of reasonably foreseeable project does not end there, it also considers the status of such projects, the availability of data for such projects, and whether

or not the impacts of such projects are too speculative to be considered "reasonably foreseeable" based on the available information. As explained, in Table 4-1 below, for some of the projects where applications have been submitted, the impacts of those projects have been determined to not be reasonably foreseeable, because inactivity on those applications, or lack of data, makes the status of such projects speculative.

4.1.4 Relationship of Short-Term Uses to Long-Term Productivity

This section describes how the short-term Project use would affect the long-term productivity of a given resource.

4.1.5 Irreversible and Irretrievable Commitments of Resources

Irreversible and irretrievable commitments of resources (in other words, irreversible and irretrievable impacts) are disclosed in this chapter for each resource. Irreversible impacts are those that would result in changes to the environment that cannot be reversed, reclaimed, or repaired. An example of an irreversible impact would be the removal of groundwater from a poorly recharged aquifer. Once groundwater reserves are removed, they cannot be replaced or reclaimed. Irretrievable impacts are those that result in the temporary loss or degradation of the resource value until reclamation is successfully completed.

It is important to note, if approved, the ROW authorization for the proposed Project would include a required Performance and Reclamation bond to ensure compliance with the terms and conditions of the BLM ROW authorization, consistent with the requirements of 43 CFR 2805.12(g). The "Performance and Reclamation" bond would consist of three components. The first component would be hazardous materials; the second component would be the decommissioning and removal of improvements and facilities; and the third component would address reclamation, revegetation, restoration, and soil stabilization.

Prior to issuance of the BLM ROW authorization, the Applicant must submit a Decommissioning and Site Reclamation Plan that defines the reclamation, revegetation, restoration, and soil stabilization requirements for the Project area as a component of their Plan of Development (43 CFR 2804.25(b)). The Decommissioning and Site Reclamation Plan requires expeditious reclamation of construction areas and the revegetation of disturbed areas to reduce invasive weed infestation and erosion and must be approved by the BLM authorized officer prior to the issuance of the ROW grant. The approved Decommissioning and Site Reclamation Plan will be used as the basis for determining the standard for reclamation, revegetation, restoration, and soil stabilization of the Project area.

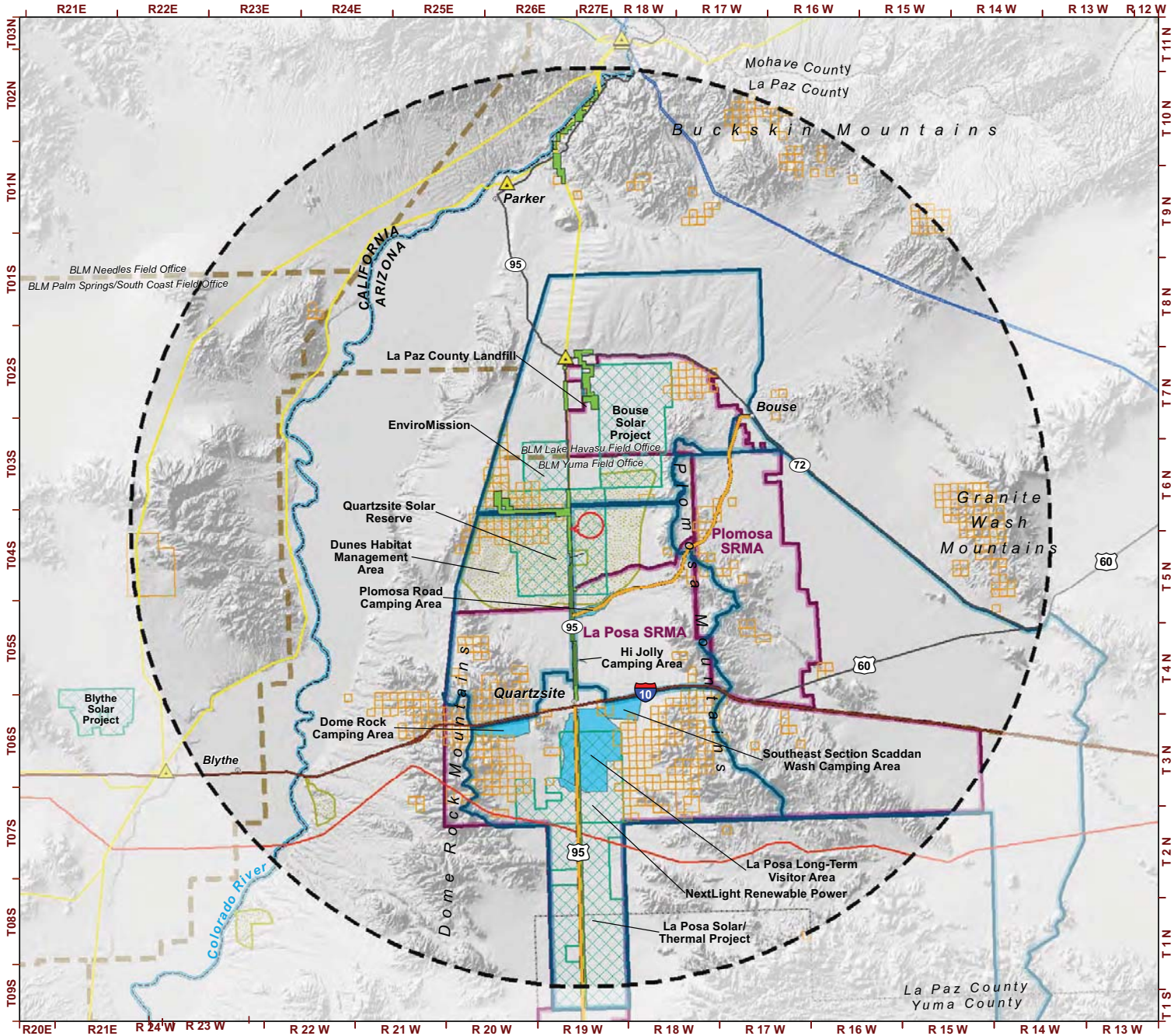
Table 4-1 List of Past, Present, and Reasonably Foreseeable Projects and Actions				
Project Name	**Project Description**	**Project Type**	**Project Status**	**Affected Resources**
Multiple Grazing Allotments on BLM-managed Lands	Nine Mile Allotment (109,239 acres BLM land; 640 other; 468 AUMs); Weisser Ephemeral Allotment (64,674 acres BLM land; 0 AUMs); Martinez Allotment (64,044 acres BLM land; 0 AUMs)	Land Use	Past and Present	Land Use, Livestock Grazing
Grazing Allotments on Arizona State Trust Lands	Byers Allotment (005-094375). Located on Arizona State Land, totaling approximately 24,000 acres. Land lease expires in April 2012. *Not shown on Figure 4-1.	Land Use	Past and Present	Land Use, Livestock Grazing
Dunes WHA	The Project area is located in the Dunes WHA.	Land Use	Past and Present	Biological Resources, Land Use, Recreation
Plomosa 14-Day Camping Area	BLM campground located 4.5 miles south of Project area on east side of SR 95.	Land Use	Past and Present	Recreation, Socioeconomic Resources
Hi Jolly 14-Day Camping Area	BLM campground located 7.5 miles south of Project area on east side of SR 95.	Land Use	Past and Present	Recreation, Socioeconomic Resources
La Posa LTVA	BLM camping area located south of I-10 east and west of US 95. This area accommodates an estimated 250,000 visitors a year.	Land Use	Past and Present	Recreation, Socioeconomic Resources
Road Runner 14-Day Area Site	BLM campground located southwest of La Posa LTVA west of US 95.	Land Use	Past and Present	Recreation, Socioeconomic Resources
Scadden Wash 14-Day Area Site	BLM campground located southeast of I-10 and US 95 just north of La Posa LTVA.	Land Use	Past and Present	Recreation, Socioeconomic Resources
Plomosa SRMA	BLM recreation area on 102,053 acres of BLM land and located 3 miles northeast of the Project area.	Land Use	Past and Present	Recreation, Socioeconomic Resources
La Posa SRMA	Recreation area located 2 miles south of the Project area.	Land Use	Past and Present	Recreation, Socioeconomic Resources
Arizona Public Service (BLM ROW AZA 010121 and AZA 032504, and Arizona State Land Department ROW 18-47038)	Arizona Public Service ROW for maintenance and operation of 69-kV transmission line along SR 95 between I-10 and SR 72. Located on BLM and Arizona State Land, totaling approximately 116 acres.	Electric Utility Line	Past and Present	Visual Resources

Table 4-1 List of Past, Present, and Reasonably Foreseeable Projects and Actions				
Project Name	**Project Description**	**Project Type**	**Project Status**	**Affected Resources**
Western Area Power Administration (AZ-PHX 0080583)	Western ROW for maintenance and operation of 161-kV transmission line along the west side of the Little Harquahala Mountains. Located on BLM land, totaling 245 acres.	Electric Utility Line	Past and Present	Visual Resources
Western Area Power Administration (Bureau of Reclamation Parker-Gila Project; AZ PHX 072-0086406)	Western (formerly Bureau of Reclamation) ROW for 161-kV transmission line located on BLM-managed land on the east side of SR 95 running north to Parker (totals 993 acres). Western, formerly Bureau of Reclamation, ROW located on Arizona State Land Department managed land, totaling 164 acres.	Electric Utility Line	Past and Present	Visual Resources
Southwestern Telephone Company (BLM ROW AZA 34991; Arizona State Land Department ROW 18-104576)	Southwestern Telephone Company ROW for telephone line along the east side of SR 95. Located on BLM and Arizona State Land, totaling approximately 16 acres.	Telephone Line	Past and Present	Visual Resources
ADOT (Arizona State Land Department ROW 072-083964)	ADOT ROW for State Route 95.	Highway	Past and Present	Transportation
La Paz County Board of Supervisors (BLM ROW AZA 028920)	First stage of Project ROW would be used as a truck haul road. Long-range plan is to construct 4.9 miles of roadway for a railroad drill track.	Road	Past and Present	Transportation
Patch Living Trust (BLM ROW [road] AZA 032505; AZA 032506 [water])	AZA 32505 issued to Cyprus Copperstone. Right-of-way width/length – 27,984 feet by 75 feet wide. AZA 32506 includes a water line and three well pump stations.	Road and Water	Past and Present	None
Oldham Family Trust (BLM ROW AZA 032825; Arizona State Land Department 016-108178 [road])	Development of a dirt road to access private property located east of SR 95. Right-of-way is 66 feet wide by 590 feet long.	Road	Past and Present	None
Arizona State Highway (AZAR 0009717)	Right-of-way for a material site. BLM land, totaling approximately 57 acres.	Material Site	Past and Present	None
Town of Quartzsite – BLM Recreation and Public Purpose Lease (AZA 032171)	Town of Quartzsite Recreation and Public Purpose Lease for the Town's park. Park is approximately 80 acres in size.	Recreation Lease	Past and Present	Recreation, Socioeconomic Resources

Table 4-1 List of Past, Present, and Reasonably Foreseeable Projects and Actions				
Project Name	**Project Description**	**Project Type**	**Project Status**	**Affected Resources**
Arizona Western College – BLM Recreation and Public Purpose Lease (AZA 03264401)	Public Purpose Lease for Arizona Western College Quartzsite Learning Facility. Disturbed ground (including building) is approximately 6 acres. Lease is for 60 acres.	Public Purpose Lease	Past and Present	Socioeconomic Resources
Quartzsite Fire Department – BLM Recreation and Public Purpose Lease (AZA 03344501)	Quartzsite Fire Station. Located on Tyson Street just west of SR 95 on 5 acres of BLM Land.	Public Purpose Lease	Past and Present	Public Safety
Multiple mining claims and leases on BLM and Arizona State Land Department lands	More than 100 active mining claims within the La Posa Plain. Most claims consist of lode and placer claims. Larger authorized leases include Cyprus Bagdad (AZA 023307 – 900 acres; gold lode), American Bonanza Gold Mining Corporation (AZA 033604 – 3,790 acres, gold lode; AZA 032676 – 4,900 acres; 008-113911 and 08-113912 Arizona State Land Department Mineral Exploration Permits, varying acreage), Copperstone claims (multiple leases, varying acreage).	Mining	Past and Present	Mineral Resources
EnviroMission (USA) Inc. (003-11362899)	Request for 5,700 acres of Arizona State Land to construct and operate two solar collecting towers, each 2,400 feet high, to generate up to 400-MW of solar energy. Applicant issued a press release on November 10, 2010, stating they have filed an application for a Certificate of Environmental Compatibility with the Arizona Power Plant and Transmission Line Siting Committee (Line Siting Committee of the Arizona Corporation Commission) to begin the State permitting process. According to the press release, EnviroMission plans to sell electricity from the first of two planned 200-MW Solar Tower power stations to the Southern California Public Power Authority under the terms of a Power Purchase Agreement approved by the Southern California Public Power Authority on October 26, 2010.	Solar Energy Project	Future/Pending (see Project Description regarding status)	Land Use, Recreation, Special Management Areas, Biological Resources, Water Resources, Socioeconomic Resources, Visual Resources, Public Health and Safety, Air Quality

Table 4-1 List of Past, Present, and Reasonably Foreseeable Projects and Actions				
Project Name	**Project Description**	**Project Type**	**Project Status**	**Affected Resources**
SolarReserve (03-113630-99)	Request for 5,120 acres of Arizona State Trust Land to construct and operate a 100 to 200-MW CSP Project. ROW application filed on January 15, 2009. Parcel was part of SolarReserve initial siting investigation, but was eliminated from further consideration (see Section 2.2.1)	Solar Energy Project	Not Active	None
Bouse Solar Project, Boulevard Associated LLC (AZA 034335)	BLM ROW request for 24,220 acres to construct and operate two 250-MW CSP projects. Right-of-way application filed with the BLM YFO on June 8, 2007.	Solar Energy Project	Future/Pending No activity since 2007	Given the inactivity since the submission of the ROW application in 2007, there is no data to assess the potential impacts that would result from this project's construction, operation, maintenance, and decommissioning, as a result the status of this project is speculative, and therefore those impacts are not reasonably foreseeable for purposes of this analysis.
NextLight Renewable Power, LLC (AZA 034554)	BLM ROW request for 20,700 acres to construct and operate a 500-MW CSP project. Right-of-way application filed with the BLM YFO on March 26, 2008.	Solar Energy Project	Future/Pending No activity since 2008	Given the inactivity since the submission of the ROW application in 2008, there is no data to assess the potential impacts that would result from this project's construction, operation, maintenance, and decommissioning, as a result the status of this project is speculative, and therefore those impacts are not reasonably foreseeable for purposes of this analysis.

Table 4-1 List of Past, Present, and Reasonably Foreseeable Projects and Actions				
Project Name	**Project Description**	**Project Type**	**Project Status**	**Affected Resources**
La Posa Solar Thermal Project, Pacific Solar Investment Company (AZA 034427)	Right-of-way request for 38,211 acres of BLM land to construct and operate a 2,000-MW CSP project. Right-of-way application filed on September 6, 2007.	Solar Energy Project	Future/Pending No activity since 2008	Given the inactivity since the submission of the ROW application in 2008, there is no data to assess the potential impacts that would result from this project's construction, operation, maintenance, and decommissioning, as a result the status of this project is speculative, and therefore those impacts are not reasonably foreseeable for purposes of this analysis.
Blythe Solar Project (CACA 48811) (Solar Millennium, LLC)	Request for 9,400 acres of BLM land to construct and operate 1,000-MW commercial dry-cooling solar thermal parabolic trough generating station. The site is 8 miles west of Blythe, 3 miles north of I-10 (approximately 30 miles west of the Project area).	Solar Energy Project	Under construction	Socioeconomic Resources (Construction began in June 2011. Project to be constructed in multiple phases over a 60-month timeframe))
ADOT	Installation of a new traffic signal at the interchange of SR 95 and SR 72.	Roadwork	Future/Pending	Transportation
Quartzsite Golf Course (AZA 03446701)	Proposed golf course on 321 acres of BLM managed land.	Recreation	Future/Pending	Recreation
American Bonanza Gold Mining Corporation (AZA 035202)	The BLM YFO issued a Finding of No Significant Impact on October 20, 2010 to allow the mine to reopen as an underground gold mining and flotation mill operation. The project proposes to mine and mill approximately 450 tons of ore per day and produce between 35,000 to 55,000 ounces of gold per year for 7 to 10 years. Waste rock from underground operations will be disposed of within the open pit left by previous mining.	Mining	Present/future (use of an existing open pit mine)	Land Use, Transportation, Air Quality, Geology and Mineral Resources, Water Resources, Social and Economic Resources, Noise, Hazardous Materials



Quartzsite Solar Energy Project

Cumulative Impacts

Figure 4-1

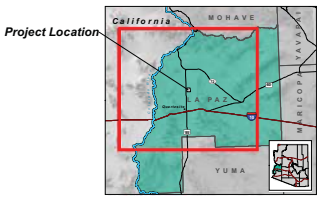
LEGEND

Project Features
- Project Footprint
- 30-Mile Buffer

Regional Features
- BLM Grazing Allotment
- Special Recreation Management Area
- Solar Project
- Dunes Habitat Management Area
- Active Mining Claim
- Recreation Area
- Transmission Line/Transportation Right-of-Way
- Scenic Byway

Existing Utilities
- WAPA Substation
- 500kV Transmission Line
- 230kV Transmission Line
- <230kV Transmission Line

Reference Features
- BLM Field Office Boundary
- State Boundary
- County Boundary
- City/Town
- Interstate
- Highway
- Major River



July 2011

Sources: USGS, 2010; BLM, 2010; ALRIS, 2009; Worley-Parsons, 2010; Geocommunicator, 2010; Platts, 2009; EPG, 2009;

Western Area Power Administration

4.2 LAND USE

This section discusses the effects on land use that may occur from amending the YFO RMP with implementation of the Applicant's Proposed Project or alternatives.

4.2.1 Methodology for Analysis

The BLM Legacy Rehost and National Integrated Land System GeoCommunicator were reviewed to obtain information related to pending and authorized land uses and grazing allotments on BLM land potentially affected by the Project.

The impact assessment is based on known impacts relative to construction, operation, maintenance, and decommissioning of rights-of-way and land use permits of all types on BLM-administered land. The land use impact analysis is based on review of the existing conditions (Section 3.2) and focuses on the indicators listed below in Section 4.2.2.

4.2.2 Indicators

An impact on land use and/or livestock grazing may result if any of the following were to occur from construction or operation of the Project:

- Conflict with applicable land use plans, policies, goals or regulations
- Unresolved conflict with existing utility rights-of-way
- Nuisance impacts attributable to incompatible land uses
- Loss of forage such that it would adversely affect livestock operations and reduce the number of AUMs available
- Disrupt livestock movement between use areas
- Increase human disturbance/harassment to livestock
- Conflict with the use of existing livestock grazing areas

4.2.3 Direct and Indirect Effects by Alternatives

4.2.3.1 **No Action Alternative**

Under this alternative, the BLM would not approve the Applicant's ROW application and would not amend the YFO RMP; and Western would not approve the interconnection request. The BLM would continue to manage the land encompassing the Project area consistent with the existing VRM objective as described in the YFO RMP, and Western would continue to operate the Bouse-Kofa 161-kV transmission line under current conditions.

Because there would be no amendment to the YFO RMP and no solar project approved for the site under this alternative, it is expected that the site would continue to be managed within the BLM's framework of a program of multiple use and sustained yield, and the maintenance of environmental quality in conformance with applicable statutes, regulations, policies, and land use plans. As a result, none of the impacts to land use, including livestock grazing, mining, or other uses would occur. In the absence of this Project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

4.2.3.2 Applicant's Proposed Project Alternative – Dry-Cooled

Construction of the QSE's solar facility and associated Project components (e.g. access road, Western's switchyard, etc.) would remove approximately 1,675 acres of land from potential public use or disposal for the duration of the lease. The proposed land use is compatible with the BLM YFO RMP and the BLM mission of multiple uses of public land.

The Applicant's Proposed Project has no direct effects to the authorized and pending rights-of-way identified in Chapter 3, does not conflict with applicable land use plans, policies, goals or regulations, and does not result in unresolved conflict with existing utility rights-of-way.

The Project footprint is located within the 64,674-acre Weisser Ephemeral Allotment (see Figure 3-1), which currently is not active for grazing. Implementation of the Applicant's Proposed Project would result in an approximate 2.6 percent reduction in available rangeland within the Weisser Ephemeral Allotment and an approximate 0.04 percent reduction in available rangeland within the entire YFO (approximate reduction from 428,300 to 426,625 acres).

Given the small size of the Project footprint relative to the Weisser Ephemeral Allotment, if the Allotment were to become active, implementation of the Applicant's Proposed Project would not result in a loss of forage. Therefore, the Applicant's Proposed Project is not anticipated to adversely affect livestock operations or reduce the number of AUMs available, would not disrupt livestock movement, would not increase human disturbance/harassment to livestock, and would not conflict with the use of existing livestock grazing areas.

Closure and Decommissioning

Permanent closure would presumably occur 30 years after the start of operation unless the Project remains economically viable. The industrial use currently proposed would then be considered an existing use in an area that would probably continue to be bounded by public recreation and natural resource lands. Given the limited infrastructure and distance from any major urban area, significant residential or commercial development over the next 30 years is unlikely.

Prior to issuance of the BLM ROW authorization, the Applicant must submit a Decommissioning and Site Reclamation Plan that defines the reclamation, revegetation, restoration, and soil stabilization requirements for the Project area as a component of their Plan of Development (43 CFR 2804.25(b)). The Decommissioning and Site Reclamation Plan requires expeditious reclamation of construction areas and the revegetation of disturbed areas to reduce invasive weed infestation and erosion and must be approved by the BLM authorized

officer prior to the issuance of the ROW grant. The approved Decommissioning and Site Reclamation Plan will be used as the basis for determining the standard for reclamation, revegetation, restoration, and soil stabilization of the project area.

Construction of the proposed Project would disrupt the existing ecosystem and habitat within the facility footprint, conditions that would have been maintained for the life of the Project. Appropriate rehabilitation of the site would need to be revisited to determine consistency with land uses existing at the time of closure. A return to the drainages and topography that existed at the time of construction may not be appropriate and could, in fact, result in unacceptable impacts to surrounding properties. Land disturbance over the life of the Project would preclude rapid revegetation and grazing potential on the land following closure. However, the Applicant's Decommissioning Plan would include a provision for rehabilitation of the site to be consistent with land uses existing at the time of closure. This would reduce any land use consistency issues to a minimum and would not disrupt land uses in the surrounding area.

4.2.3.3 Alternative 1 – Hybrid-Cooled

The hybrid alternative would result in effects to land use and livestock grazing similar to those described under the Applicant's Proposed Project.

4.2.3.4 Western's Switchyard and Telecommunication System

Western's Switchyard

Western's switchyard would be located on approximately 4.6 acres of BLM-administered land adjacent to the existing right-of-way for the Bouse-Kofa 161-kV transmission line. The switchyard facilities would be constructed, owned, and operated by Western through a land use agreement with the BLM. Land use impacts associated with construction and operation of Western's switchyard are described in section 4.2.3.2.

Telecommunication Options

Either telecommunications alternative could be implemented under the Applicant's Proposed Project or Alternative 1.

Fiber-Optic Cable Alternative

No impacts to existing or planned residential, commercial, or industrial uses would be expected to occur. Because stringing of cable would occur within the existing Bouse-Kofa 161-kV transmission line corridor, there would be no long-term impacts to land use. Direct impacts to land use as a result of construction activity along roadway ROW would be temporary and minimal. Creation of new access road, if required, and the use of existing roads are not expected to change the use of the access roads or increase accessibility of areas for other users. The use and management of existing roads would remain unchanged. No indirect or permanent impacts to land use are expected as a result of fiber-optic cable installation.

Microwave Alternative

The area that may be affected by the installation of a new microwave dish at the Bouse Substation, or communication sites at Metal Mountain or Cunningham Peak, would be limited to the fenced area within the existing facility. Under this option, the microwave dish would be installed on an existing structure or new monopole within the facility ROW.

4.2.4 Mitigation Measures

No additional mitigation measures, outside those included in the applicant committed measures identified in Chapter 2, are suggested.

4.2.5 Residual Effects

The Project is not expected to have any residual effects to land use and livestock grazing, based on the criteria outlined in this section.

4.2.6 Cumulative Impacts

Impacts resulting from amending the YFO RMP and construction, operation, maintenance, and decommissioning of the Applicant's Proposed Project could result in a cumulative effect on land use with other past, present, or reasonably foreseeable future actions. Due to the rural, undeveloped setting of the Project area, and to better illustrate potential effects associated with other pending projects, the cumulative effects land-use ROI considers a 5-mile buffered area centered along SR 95 between the Town of Quartzsite and the intersection of SR 95 and SR 72, a distance of approximately 20 miles.

There are three pending projects within the land use ROI. They include the EnviroMission Solar Energy Project, the expansion/reopening of the American Bonanza Copperstone Gold Mine, and the Bouse Solar Project. The proposed EnviroMission project is the only project that is anticipated to result in a cumulative impact to land use. The proposed expansion/reopening of the Copperstone Gold Mine would occur on previously disturbed lands. The potential impacts that would result from the construction, operation, maintenance, and decommissioning of the Bouse Solar Project are too speculative based on the inactivity on that ROW application since it was filed. Therefore those impacts are not reasonably foreseeable for purposes of this analysis.

EnviroMission is proposing to build a 200-MW solar project on 5,700 acres of land managed by the Arizona State Land Department. The proposed project, which is approximately 2 miles northwest of the Applicant's Proposed Project, would use two 2,400 foot "solar towers" and hot air to power the plant. According to their company website (www.enviromission.com.au), the project would use no water, and they are expecting to begin construction in 2014, following completion of additional engineering and environmental studies. In October 2010, EnviroMission announced they had secured a Power Purchase Agreement with the Southern California Public Power Authority to purchase power from the EnviroMission project (EnviroMission 2011). Details about their proposed transmission interconnection options are

unknown. EnviroMission would be required to obtain appropriate Federal, State, and local permits and approvals prior to construction.

The construction and operation of the Applicant's Proposed Project, when combined with the construction and operation of the proposed EnviroMission solar project, would modify the land use setting in the northern portion of the BLM Yuma District along SR 95. The amount of land to be ultimately disturbed by the EnviroMission project is unknown. For this analysis, it is assumed that up to 5,700 acres would be disturbed by construction and operation of that project. Since the proposed EnviroMission project would be located on land managed by the Arizona State Land Department, it would not be subject to BLM land use guidelines. If EnviroMission plans to interconnect to a Western transmission line, they would be required to submit an interconnection request and Western would analyze and disclose impacts of the EnviroMission interconnection to Western's system through the Bouse-Kofa 161-kV transmission line in a separate EIS.

The Applicant's Proposed Project is located within the 64,674-acre Weisser Ephemeral Allotment, which currently is not active for grazing. The EnviroMission project is located on lands managed by the Arizona State Land Department, but surrounded by lands managed by the BLM YFO and Lake Havasu Field Office within the Nine Mile Allotment. Considering the BLM Yuma District contains 428,300 acres of rangeland, the additive effect of construction and operation of the Applicant's Proposed Project and the EnviroMission solar project, would not result in a significant loss of available forage; would not disrupt livestock movement; would not increase human disturbance or harassment to livestock; and would not conflict with the use of existing livestock grazing areas.

4.2.7 Short-Term Uses versus Long-Term Productivity

Under the action alternatives, lands within the Project area would be converted from their existing land uses to renewable energy production. The land within the Project area would be unavailable for other land uses as long as the Project is in operation. Although the land within the Project area would be unavailable for other land uses, the new industrial land use would produce renewable energy.

Land within the Project area is not currently used for grazing. However, construction and operation of the Project as a result of implementation of the action alternatives (the short-term use) would affect the long-term vegetation productivity of the Project area via vegetation removal. During construction of the Project, some vegetation removal would occur to facilitate placement of Project facilities on the landscape. At Project decommissioning, the Project area could be reclaimed. The loss of the vegetation communities and forage productivity that occurred during Project operations would persist for a time until vegetation is reestablished and again available for forage.

4.2.8 Irreversible and Irretrievable Commitments of Resources

There would be an irretrievable loss of availability for other land uses as a result of the action alternatives because the Project area would be graded and fenced and other uses would be

precluded, but only for the life of the Project and for a time following Project decommissioning. Long-term surface-disturbing activities and removal of forage associated with construction and operation of the Project would result in irretrievable commitments of potential livestock grazing resources, as they would persist only for the life of the Project and for a time following Project decommissioning. There would be no irreversible commitments of resources because the area could be reclaimed after termination of the Project and other uses could then be established.

4.3 SPECIAL MANAGEMENT AREAS

This section discusses the effects on SMAs that may occur from amending the YFO RMP with implementation of the Applicant's Proposed Project or alternatives. As described in Section 3.3, the SMA ROI includes lands within a 30 miles radius of the Project area. Although the Project would not directly impact SMAs in the ROI, the larger geographic area was selected based on potential visual effects to SMAs from the solar towers associated with the Applicant's Proposed Project.Methodology for Analysis

The impact assessment is based on impacts to known SMAs relative to construction, operation, maintenance, and decommissioning of the Project. The SMA impact analysis is based on review of the existing conditions (Section 3.3) and focuses on the indicators listed below.

4.3.1 Indicators

An impact to SMAs may result if any of the following were to occur from construction or operation of the Project:

- Conflict with State or federally established, designated, or reasonably foreseeable planned special use areas (e.g., recreation, wildlife management area, game management areas, waterfowl production areas, scientific and natural areas, Wilderness Areas, etc.)
- Results in nuisance impacts attributable to incompatible land uses.

4.3.2 Direct and Indirect Effects by Alternatives

4.3.2.1 **No Action Alternative**

Under this alternative, the BLM would not approve the Applicant's ROW application and would not amend the YFO RMP; and Western would not approve the interconnection request. The BLM would continue to manage the land encompassing the Project area consistent with the existing VRM objective as described in the YFO RMP, and Western would continue to operate the Bouse-Kofa 161-kV transmission line under current conditions.

Because there would be no amendment to the YFO RMP and no solar project approved for the site under this alternative, it is expected that the site would continue to be managed within the BLM's framework of a program of multiple use and sustained yield, and the maintenance of environmental quality in conformance with applicable statutes, regulations, policies, and land use

plans. As a result, impacts to SMAs would not occur. Although the proposed Project would not be constructed, the lands on which it is proposed would still be available for future development, including uses similar to the proposed Project.

4.3.2.2 Applicant's Proposed Project Alternative – Dry-Cooled

There would be no change to the recreational setting in any of the SMAs; however, as described in more detail in Section 4.4.3, the views of the Project would impact the desired, primitive experience that visitors seek when visiting the Wilderness Areas, WSA, Back Country Byway, and Scenic Byway in the vicinity of the Project. These views would be most apparent from locations closer to the Project and from peaks with expansive vistas. According to the visual analysis (Section 4.16), Project facilities would be visible from portions of the Gibraltar Mountain Wilderness, East Cactus Plain Wilderness, Riverside Mountain Wilderness, Big Maria Mountains Wilderness, the Cactus Plain WSA, the Plomosa Back Country Byway, and the Highway 95 Scenic Byway. Topography and distance would diminish or eliminate (block) these effects in portions of the nearby Wilderness Areas, WSA, and Scenic Byway. Visitors to the Plomosa Back Country Byway would have unobstructed views of the solar collecting tower, but topography would screen views of the remaining Project facilities.

Closure and Decommissioning

Permanent closure would presumably occur 30 years after the start of operation, unless the Project remains economically viable. The industrial use currently proposed would then be considered an existing use in an area that will probably continue to be bounded by public recreation and natural resource lands, including SMAs.

4.3.2.3 Alternative 1 – Hybrid-Cooled

The hybrid alternative would result in effects to SMAs similar to those described under the Applicant's Proposed Project.

4.3.2.4 Western's Switchyard and Telecommunication System

Western's Switchyard

Western's switchyard would be located on approximately 4.6 acres of BLM-administered land adjacent to the existing right-of-way for the Bouse-Kofa 161-kV transmission line. The proposed switchyard site is not located within or near a SMA. Therefore, construction and operation of the proposed switchyard would not impact any SMAs.

Telecommunication Options

Either telecommunications alternative could be implemented under the Applicant's Proposed Project or Alternative 1.

Fiber-Optic Cable Alternative

The existing Bouse-Kofa 161-kV transmission line does not cross any SMAs. Because stringing of cable would occur within an existing transmission line corridor, there would be no impacts to SMAs.

Microwave Alternative

The Bouse Substation and communication sites at Metal Mountain and Cunningham Peak are located outside of existing SMAs. As such, the installation of a microwave dish on an existing structure or monopole at these facilities would not impact SMAs. All construction activities would occur within the facility ROW, in previously disturbed areas.

4.3.3 Mitigation Measures

No additional mitigation measures, outside those included in the applicant committed measures identified in Chapter 2, are suggested.

4.3.4 Residual Effects

The Project is not expected to have any residual effects on SMAs based on the criteria outlined in this section.

4.3.5 Cumulative Impacts

Impacts resulting from amending the YFO RMP and construction, operation, maintenance, and decommissioning of the Applicant's Proposed Project could result in a cumulative impact on SMAs with other past, present, or reasonably foreseeable future actions. The geographic scope of the cumulative effects analysis for SMAs includes lands within a 30 miles radius of the Project area. The ROI was selected based on potential visual effects to SMAs from the solar towers associated with the Applicant's Proposed Project and the proposed EnviroMission solar project.

As described in Sections 4.3 (Special Management Areas) and 4.4 (Recreation), there would be no change to the recreation setting in any of the SMAs; however, views of the Applicant's Proposed Project would impact the desired, primitive experience that visitors seek when visiting the adjacent Wilderness Areas, WSA, and Back Country and Scenic Byways. These views would be most apparent from locations closer to the Project and from peaks with expansive views.

The EnviroMission project, as currently proposed, would include two 2,400 foot solar towers, both of which would be 1,747 feet higher than the QSEP solar tower. According to the visual analysis conducted for this Draft EIS (see Section 4.16), the QSEP solar tower would be visible from portions of the Gibraltar Mountains Wilderness, East Cactus Plain Wilderness, Riverside Mountain Wilderness, Big Maria Wilderness, the Cactus Plain WSA, the Plomosa Back Country Byway, and the Highway 95 Scenic Byway (south of Quartzsite). Topography and distance would diminish or block the visual effects of the QSEP solar tower in portions of the nearby Wilderness Areas, WSAs, and Scenic Byway. At a height of 2,400 feet, there would be a higher

probability that the EnviroMission solar towers could be seen, not only from the aforementioned areas, but in other areas beyond the cumulative effects ROI. Visitors to the Plomosa Back Country Byway would have unobstructed views of both the QSEP solar collecting tower and two 2,400 foot EnviroMission towers, and it is anticipated that the EnviroMission towers would be the more dominant feature given their height relative to the QSEP tower.

4.3.6 Short-Term Uses versus Long-Term Productivity

Implementation of the Project would create short-term and long-term changes to the landscape. This could have an indirect impact on the human uses in SMAs because views of the solar facilities could alter the recreational setting and experience in SMA's with expansive views of the Project area.

4.3.7 Irreversible and Irretrievable Commitments of Resources

If the Project area were to be reclaimed at the termination of the Project, there would be no irreversible impacts on SMAs associated with the Applicant's Proposed Project or other alternatives. However, the Project footprint could visibly persist from SMAs for some period of time beyond the Project completion. Even after reclamation efforts are complete, the composition of vegetation species and surface geomorphology in the recovery area could be different than the pre-Project setting, and additional time would then be needed for the native surface composition to reestablish. Ultimately, the native surface composition would be reestablished and would once again provide habitat and forage for wildlife. Thus, the operation of the Project would have an irretrievable impact on SMAs within the Project vicinity.

4.4 RECREATION

This section discusses the effects on recreation that may occur from amending the YFO RMP with implementation of the Applicant's Proposed Project or alternatives. As described in Section 3.4, the recreation ROI includes lands within a 30 miles radius of the Project area. The larger geographic area was selected based on potential visual effects to recreational users within the ROI from the solar towers associated with the Applicant's Proposed Project.

4.4.1 Methodology for Analysis

The impact assessment is based on impacts to known recreational uses relative to construction, operation, maintenance, and decommissioning of the Project. The recreation impact analysis is based on review of the existing conditions (Section 0) and focuses on the indicators listed below in Section 4.4.2.

4.4.2 Indicators

An impact on recreation may result if any of the following were to occur from construction or operation of the Project:

- Conflict with existing Federal, State, and local recreation management plans and policies.
- Prevention of access to existing recreation areas or sites.
- Change in levels of use for existing recreation areas or sites.
- Creation of overcrowding to other recreation areas caused by "spill over."

4.4.3 Direct and Indirect Effects by Alternatives

4.4.3.1 No Action Alternative

Under this alternative, the BLM would not approve the Applicant's ROW application and would not amend the YFO RMP; and Western would not approve the interconnection request. The BLM would continue to manage the land encompassing the Project area consistent with the existing VRM objective as described in the YFO RMP, and Western would continue to operate the Bouse-Kofa 161-kV transmission line under current conditions.

Because there would be no amendment to the YFO RMP and no solar project approved for the site under this alternative, it is expected that the site would continue to be managed within the BLM's framework of a program of multiple use, including recreation, and the maintenance of environmental quality in conformance with applicable statutes, regulations, policies, and land use plans. Although the proposed Project would not be constructed, the lands on which it is proposed would still be available for future development, including uses similar to the proposed Project.

4.4.3.2 Applicant's Proposed Project Alternative – Dry-Cooled

The Project area is within an Extensive Recreation Management Area not managed specifically to maintain recreational values, meaning that BLM management actions within this area are limited to custodial actions and do not require any implementation level planning. The Applicant's Proposed Project would not be in conflict with the Extensive Recreation Management Area management, or any other existing Federal, State, or local recreation management plans or policies.

The Applicant's Proposed Project would not directly impact an area with high recreational resource values, elevated public concern, or significant amounts of recreational activity. As discussed in Section 3.4.3, there are no commonly-used rockhounding sites within the Project area. No OHV routes are present within the Project area. The Applicant's Proposed Project would not impact use of existing routes within the ROI, and would not prevent access to existing designated recreation areas or sites.

Indirect effects of the Applicant's Proposed Project include the potential for visitors in the Quartzsite area to congregate near the Project area for recreational viewing of the solar facilities. As is described in Section 4.16, depending on one's location, the Project facilities could be a dominant feature within the immediate landscape of the area, and could therefore become a draw for those interested in observing the Project structures. This potential increase in visitorship to the Project area could cause an increased recreational use of the areas immediately surrounding the Project area, thereby changing the level of recreational use.

An existing recreational feature that may be indirectly affected by implementation of the Applicant's Proposed Project is the Plomosa Back Country Byway. Located approximately 4 miles south of the Project area, the byway is the most immediate paved, public roadway to the south, and is likely to receive an increase in travelers wishing to obtain an elevated view of the Project. The byway is managed by the BLM to "expose visitors to local recreation opportunities and various multiple-use management programs, and interpret natural, cultural, geological, and scenic features" (BLM 2010a). Increased use of the Plomosa Back Country Byway as an indirect result of the Project could further expose visitors to these opportunities and features, thereby potentially broadening visitors' understanding of the area and its resources.

Potential visual impacts to recreational users within the Wilderness Areas, WSA, Back Country Byway, and Scenic Byway in the vicinity of the Project are described in more detail in sections 4.16.3 (Visual Resources) and 4.3.2 (Special Management Areas).

Closure and Decommissioning

Once constructed and in operation, the proposed Project has an estimated life of at least 30 years. The industrial use currently proposed would then be considered an existing use in an area that will probably continue to be bounded by public recreation and natural resource lands. Construction of the proposed Project would disrupt the existing ecosystem and habitat within the facility footprint; conditions that would have been maintained for the life of the Project. Appropriate rehabilitation of the site would need to be revisited to determine consistency with land uses existing at the time of closure. A return to the drainages and topography that existed at the time of construction may not be appropriate and could, in fact, result in unacceptable impacts to surrounding properties. Land disturbance over the life of the Project would preclude rapid revegetation and grazing potential on the land following closure. However, the Applicant's Decommissioning Plan would include a provision for rehabilitation of the site to be consistent with land uses existing at the time of closure. This would reduce any land use consistency issues to a minimum and would not disrupt recreational uses in the surrounding area.

Impacts associated with closure and decommissioning would likely benefit recreational values, since additional acres would be reclaimed; thereby, made available for active or passive recreational use.

4.4.3.3 Alternative 1 – Hybrid-Cooled

Implementation of the hybrid alternative would result in effects to recreation similar to those described under the Applicant's Proposed Project.

4.4.3.4 Western's Switchyard and Telecommunication System

Western's Switchyard

Western's switchyard would be located on approximately 4.6 acres of BLM-administered land adjacent to the existing right-of-way for the Bouse-Kofa 161-kV transmission line. The proposed switchyard site is not located within an area that experiences significant amounts of recreational activity. As such, construction and operation of the switchyard would not affect existing or future recreational uses of lands on or near the proposed switchyard.

Telecommunication Options

Either telecommunications alternative could be implemented under the Applicant's Proposed Project or Alternative 1.

Fiber-Optic Cable Alternative

No impacts to existing recreational uses would be expected to occur. Because stringing of cable would occur within the existing Bouse-Kofa 161-kV transmission line corridor, there would be no long-term impacts to recreation. The temporary nature of construction would limit impacts to recreation. Creation of new access road, if required, and the use of existing roads are not expected to change the use of the access roads or increase accessibility of areas for other users. The use and management of existing roads would remain unchanged. Affected BLM land would remain available for dispersed recreation activities. No indirect or permanent impacts to recreation are expected as a result of fiber-optic cable installation. Access to adjacent recreation areas from users is not expected to change because the condition of the roads is expected to remain relatively unchanged.

Microwave Alternative

The area that may be affected by the installation of a new microwave dish at the Bouse Substation, or communication sites at Metal Mountain or Cunningham Peak, would be limited to the fenced area within the existing facility. Under this option, the microwave dish would be installed on an existing structure or new monopole within the facility ROW. As such, there would be no impacts to recreation.

4.4.4 Mitigation Measures

No additional mitigation measures, outside those included in the applicant committed measures identified in Chapter 2, are suggested.

4.4.5 Residual Effects

The Project is not expected to have any residual effects to recreation, based on the criteria outlined in this section.

4.4.6 Cumulative Impacts

The geographic scope of the cumulative effects analysis for recreation includes lands within a 30 mile radius of the Project area, with an emphasis on specially-designated recreation areas (including LTVAs and other camping areas).

As described in Section 3.4.3, during winter months, lands within the recreation ROI experiences a tremendous influx of temporary residents. Estimated at more than 100,000 people, many visitors camp throughout the region (La Paz County 2005). During the peak period of winter, visitation recreational resources receive a high level of use. Within the Project vicinity, visitors utilize the five BLM-designated 14-day camping areas for shorter stays, and the La Posa LTVA for longer-term stays. If construction of the Project occurs during peak winter visitation, the presence of the expected 400- to 500-person peak workforce coupled with the high number of winter visitors has the potential to lead to an overcrowding of LTVA facilities in the region. Because of the estimated duration of construction, some workers are likely to temporarily reside within the La Posa LTVA. Depending on the number of workers utilizing the LTVA, use could impact the social setting or the physical infrastructure. However, this potential construction-associated impact would be limited to the projected 30-month construction period, and only during times of peak winter visitation.

As of July 2011, the only project under construction in the recreation cumulative effects ROI is the Blythe Solar Energy Project, approximately 30 miles west of the Project area. It is unlikely the proposed Project would be constructed during the same period as the Blythe Solar Energy Project or other pending projects listed in Table 4.1, and therefore the Applicant's Proposed Project and the Blythe Solar Energy Project, are unlikely to have a cumulative impact on recreation resources. Workforce numbers for the proposed EnviroMission project are not available, based on the current status of that project. Therefore, it is too speculative to forecast the potential impact the Applicant's Proposed Project would have when combined with the EnviroMission would have on the visitation or use of the regional LTVA and other camping areas within the ROI.

4.4.7 Short-Term Uses versus Long-Term Productivity

Implementation of the Project would restrict recreational access and activities within the 1,675 acre Project footprint for the life of the Project (up to 30 years). However, it would not restrict access to existing recreation areas or sites, nor would it restrict recreational activities such as OHV use on adjacent lands. Implementation of the Project would create long-term disruptions of the visual quality of the recreational experience because of soil and vegetation disturbances and changes to land use to an industrial setting.

4.4.8 Irreversible and Irretrievable Commitments of Resources

After termination of the Project, the Project area could be reclaimed; therefore, there would be no irreversible loss of recreation opportunities associated with the Applicant's Proposed Project or other alternatives. However, the Project footprint could visibly persist for some period of time

beyond the Project completion. Even after reclamation efforts are complete, the composition of vegetation species and surface geomorphology in the recovery area could be different than the pre-Project setting, and additional time would then be needed for the native surface composition to be reestablished. This would not be an irreversible change to the recreation setting, but could result in displacement of recreation users or alteration of their experiences or activities.

Construction and operation of the Project would alter the adjacent scenery to a more industrial setting, as viewed from within nearby recreation areas; but, as described above, the existing landscape setting would be restored upon reclamation.

4.5 TRANSPORTATION AND TRAFFIC

This section discusses the effects on traffic and transportation that may occur from amending the YFO RMP with implementation of the Applicant's Proposed Project or alternatives.

4.5.1 Methodology for Analysis

The area of analysis for transportation and traffic consists of the Project area and the access routes that would be used for Project construction and operation, as discussed in Chapter 3, Section 3.5.

The impacts analysis for transportation and traffic in the Project area and the adjacent traffic interchanges discusses changes to the LOS that would result from the Applicant's Proposed Project and alternatives. LOS is a qualitative measure of the traffic operations at an intersection or on a roadway segment. At signalized intersections, LOS is calculated for each movement. At unsignalized intersections, LOS is calculated for those movements that must either stop for or yield to oncoming traffic.

LOS is ranked from LOS A, which signifies little or no congestion and is the highest rank, to LOS F, which signifies congestion and jam conditions. LOS C or better is typically considered adequate operation at signalized and un-signalized intersections in rural areas. The impacts analysis also discusses (1) changes that would occur to the total miles of routes in the existing transportation system and the resulting impacts to transportation and traffic, and (2) changes in access to the existing transportation and traffic network.

Due to high seasonal fluctuations in traffic in the area during the winter months, the traffic counts are based on potential January peak traffic volume levels in this area, using established ADOT factors to account for seasonal variations.

4.5.2 Indicators

Based on ADOT guidelines, future peak hour factors (PHF) for the Project were used, as found in the ADOT Traffic Engineering Policies Guidelines and Procedures Section 240 Traffic Impact Analyses (ADOT 2000). Future peak hour represents how many vehicles per hour (vph) are predicted to travel through a given area. The PHF utilized are as follows:

- PHF = 0.80 for < 75 vph per lane
- PHF = 0.85 for 73–300 vph per lane
- PHF = 0.90 for > 300 vph per lane

To assess the impacts of the Project on future traffic operations, traffic predictions were made for 2012 and 2014 (SWTE 2010). Construction would most likely take place between 2012 and 2014. A construction peak year of 2012 was assumed.

Due to a lack of detailed historic traffic data in the Project area, a growth rate could not be calculated. In light of this, a 5 percent growth rate was used to estimate traffic growth in the Project area.

4.5.3 Direct and Indirect Effects by Alternatives

4.5.3.1 No Action Alternative

Under this alternative, the BLM would not approve the Applicant's ROW application and would not amend the YFO RMP; and Western would not approve the interconnection request. The BLM would continue to manage the land encompassing the Project area consistent with the existing VRM objective as described in the YFO RMP, and Western would continue to operate the Bouse-Kofa 161-kV transmission line under current conditions.

Because there would be no amendment to the YFO RMP and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, impacts from increased construction and operation traffic would not occur. In the absence of this Project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

It should be noted that ADOT has indicated that a traffic signal will be constructed and activated at the intersection of SR 95 and SR 72 in 2011 (SWTE 2010).

Under the No Action alternative, the following ongoing transportation and traffic actions and activities are assumed to continue:

- Limited dispersed recreation across the Project area would continue. Motorized vehicle use would be limited to existing routes in the area.
- The existing routes in the Project area (SR 95) would remain open to motorized travel.
- All intersections would continue with the existing vehicular traffic volumes as reported in Chapter 3.

Level of Service

LOS was calculated for each intersection in the area of analysis for 2012 and 2014 under the No Action alternative. The predicted LOS for eight intersections were analyzed by comparing the

predicted LOS with the existing LOS, as outlined in Table 4-2 and Table 4-3, and displayed the predicted LOS for the following intersections:

- SR 95/Main Street
- SR 72/SR 95
- I-10 Westbound Ramps/Quartzsite Boulevard
- I-10 Eastbound Ramps/Quartzsite Boulevard
- I-10 Westbound Ramps/Riggles Avenue
- I-10 Eastbound Ramps/Riggles Avenue
- Quartzsite Boulevard/Main Street
- Riggles Avenue/Main Street
- SR 95/Access Road

Table 4-2 Peak Hour Levels of Service During Construction (2012)

Intersection	No Action Alternative				Proposed Alternative[1]			
	Morning Peak		Afternoon Peak		Morning Peak		Afternoon Peak	
	LOS	Delay[2]	LOS	Delay[2]	LOS	Delay[2]	LOS	Delay[2]
Signalized Intersections								
SR 95/Main Street								
Eastbound Approach	C	25.9	B	19.0	C	26.9	B	19.0
Westbound Approach	C	26.6	B	19.7	C	27.2	B	19.7
Northbound Approach	B	16.1	B	18.7	B	16.9	C	19.3
Southbound Approach	B	17.1	B	19.9	B	17.6	C	22.7
SR 72/SR 95								
Eastbound Approach	B	13.0	B	13.3	B	15.2	B	16.4
Westbound Approach	B	11.7	B	11.5	B	11.7	B	14.2
Northbound Approach	C	23.5	C	23.5	C	23.5	C	27.0
Southbound Approach	B	16.8	B	16.9	B	16.8	B	14.0
Un-signalized Intersections								
I-10 Westbound Ramps/Quartzsite Boulevard								
Northbound Left/Through	A	8.0	A	8.6	A	8.0	A	8.9
Westbound Left/Through/Right	B	11.8	B	14.5	B	12.8	C	15.0
I-10 Eastbound Ramps/Quartzsite Boulevard								
Southbound Left/Through	A	8.0	A	8.3	A	8.0	A	8.3
Eastbound Left/Through	B	12.4	C	17.5	B	13.8	C	17.5
Eastbound Right	A	9.2	A	9.9	A	9.2	A	9.9
I-10 Westbound Ramps/Riggles Avenue								
Northbound Left	A	7.9	A	8.3	A	7.9	A	8.4
Westbound Left	B	10.3	B	10.9	B	10.3	B	11.0

Table 4-2 Peak Hour Levels of Service During Construction (2012)								
Intersection	**No Action Alternative**				**Proposed Alternative[1]**			
	Morning Peak		**Afternoon Peak**		**Morning Peak**		**Afternoon Peak**	
	LOS	**Delay[2]**	**LOS**	**Delay[2]**	**LOS**	**Delay[2]**	**LOS**	**Delay[2]**
Westbound Through	B	11.6	B	12.9	B	11.6	B	13.2
Westbound Right	A	9.2	A	9.6	A	9.4	A	9.6
I-10 Eastbound Ramps/Riggles Avenue								
Southbound Left	A	7.9	A	8.1	A	7.9	A	8.1
Eastbound Left	B	12.3	B	15.0	B	12.3	C	16.1
Eastbound Through	B	13.3	C	16.1	B	13.3	C	17.3
Eastbound Right	A	8.7	A	8.8	A	8.7	A	8.8
Quartzsite Boulevard/Main Street								
Eastbound Left/Through/Right	A	9.0	A	9.6	A	9.2	A	9.9
Westbound Left	B	11.3	C	18.3	B	11.8	D	25.2
Westbound Through/Right	A	8.5	A	9.2	A	8.7	A	9.2
Northbound Left/Through	A	9.2	A	9.8	A	9.3	B	10.0
Northbound Right	A	9.9	B	12.7	B	11.3	B	13.4
Southbound Left/Through/Right	A	9.0	A	9.7	A	9.1	B	10.0
Riggles Avenue/Main Street								
Eastbound Left	B	12.0	C	15.0	B	12.8	C	15.0
Eastbound Right	A	9.5	B	10.3	A	9.5	B	10.5
Northbound Left	A	7.8	A	8.0	A	7.8	A	8.0
SR 95/Access Road								
Southbound Left	N/A	N/A	N/A	N/A	A	9.7	A	7.9
Westbound Left/Right	N/A	N/A	N/A	N/A	A	0.0	D	32.8

[1]Data for the Applicant's Proposed Project is identical to Alternative 1.
[2]Delay is reported in seconds.
Source: SWTE 2010

Table 4-3 Peak Hour Levels of Service During Operation (2014)								
Intersection	**No Action Alternative**				**Proposed Alternative[1]**			
	Morning Peak		**Afternoon Peak**		**Morning Peak**		**Afternoon Peak**	
	LOS	**Delay[2]**	**LOS**	**Delay[2]**	**LOS**	**Delay[2]**	**LOS**	**Delay[2]**
Signalized Intersections								
SR 95/Main Street								
Eastbound Approach	C	26.4	B	16.4	C	26.5	B	16.5

Table 4-3 Peak Hour Levels of Service During Operation (2014)								
Intersection	**No Action Alternative**				**Proposed Alternative[1]**			
	Morning Peak		**Afternoon Peak**		**Morning Peak**		**Afternoon Peak**	
	LOS	**Delay[2]**	**LOS**	**Delay[2]**	**LOS**	**Delay[2]**	**LOS**	**Delay[2]**
Westbound Approach	C	27.2	B	17.0	C	27.3	B	17.0
Northbound Approach	B	16.7	C	22.4	B	16.8	C	22.5
Southbound Approach	B	18.3	C	24.4	B	18.4	C	24.6
SR 72/SR 95								
Eastbound Approach	B	13.3	B	13.5	B	13.4	B	13.6
Westbound Approach	B	11.7	B	11.5	B	11.7	B	11.5
Northbound Approach	C	24.6	C	24.6	C	25.3	C	25.3
Southbound Approach	B	16.8	B	16.9	B	16.8	B	16.9
Un-signalized Intersections								
I-10 Westbound Ramps/Quartzsite Boulevard								
Northbound Left/Through	A	8.1	A	8.8	A	8.1	A	8.8
Westbound Left/Through/Right	B	12.5	C	16.3	B	12.6	C	16.2
I-10 Eastbound Ramps/Quartzsite Boulevard								
Southbound Left/Through	A	8.1	A	8.5	A	8.1	A	8.5
Eastbound Left/Through	B	13.2	C	20.1	B	13.3	C	20.5
Eastbound Right	A	9.2	B	10.1	A	9.2	B	10.1
I-10 Westbound Ramps/Riggles Avenue								
Northbound Left	A	8.0	A	8.4	A	8.0	A	8.4
Westbound Left	B	10.5	B	11.1	B	10.5	B	11.2
Westbound Through	B	12.0	B	13.5	B	12.0	B	13.5
Westbound Right	A	9.3	A	9.8	A	9.3	A	9.8
I-10 Eastbound Ramps/Riggles Avenue								
Southbound Left	A	8.0	A	8.1	A	8.0	A	8.1
Eastbound Left	B	12.9	C	16.1	B	12.9	C	16.2
Eastbound Through	B	13.8	C	17.2	B	13.9	C	17.3
Eastbound Right	A	8.7	A	8.8	A	8.7	A	8.8
Quartzsite Boulevard/Main Street								
Eastbound Left/Through/Right	A	9.2	A	10.1	A	9.2	A	10.1
Westbound Left	B	11.9	C	21.8	B	12.1	C	22.8
Westbound Through/Right	A	8.6	A	9.4	A	8.7	A	9.5
Northbound Left/Through	A	9.4	A	10.0	A	9.4	B	10.1
Northbound Right	B	10.5	B	14.2	B	10.6	B	14.5

Table 4-3 Peak Hour Levels of Service During Operation (2014)								
Intersection	**No Action Alternative**				**Proposed Alternative[1]**			
	Morning Peak		**Afternoon Peak**		**Morning Peak**		**Afternoon Peak**	
	LOS	**Delay[2]**	**LOS**	**Delay[2]**	**LOS**	**Delay[2]**	**LOS**	**Delay[2]**
Southbound Left/Through/Right	A	9.1	A	10.0	A	9.2	B	10.1
Riggles Avenue/Main Street								
Eastbound Left	B	12.6	C	16.5	B	12.6	C	16.6
Eastbound Right	A	9.6	B	10.6	A	9.6	B	10.6
Northbound Left	A	7.8	A	8.1	A	7.8	A	8.1
SR 95/Access Road								
Southbound Left	N/A	N/A	N/A	N/A	A	8.0	A	8.0
Westbound Left/Right	N/A	N/A	N/A	N/A	B	12.1	B	12.2

[1]Data for the Applicant's Proposed Project is identical to Alternative 1.
[2]Delay is reported in seconds.
Source: SWTE 2010

Under the No Action alternative, the Project area intersections would continue to operate at a LOS C or better in 2012 and 2014.

A traffic signal would be installed at the intersection of SR 72/SR 95 regardless of the alternative selected. Existing LOS at this intersection are LOS A and B. Following installation of the traffic signal, LOS will decrease to LOS B and C. For all other intersections, when compared to the existing conditions, the predicted LOS ratings would be similar in the mornings, with slight decreases in LOS in the evenings as a result of predicted growth in the area.

The No Action Alternative would have no impact to the LOS for transportation and traffic.

Transportation Routes

Transportation routes would not be impacted under the No Action Alternative, as there would be no Project-related increases in traffic or vehicle use.

Changes in Access and Infrastructure

Access and transportation infrastructure would not be impacted under the No Action Alternative, as there would be no new roads, upgrades to existing roads, or closures of existing roads.

4.5.3.2 Applicant's Proposed Project Alternative – Dry-Cooled

Levels of Service

The Applicant's Proposed Project would change the existing traffic conditions due to the increase in heavy truck traffic and frequent daily trips, resulting in slightly lower LOS during construction (Year 2012).

At the expected construction peak, 450 workers would be needed. In order to analyze the worst case scenario, i.e. peak construction, it was determined that 450 vehicles carrying construction workers would be driving to and from the Project area each day during the typical morning and afternoon peak hours. With construction complete, the operation of the Project would require 45 permanent employees (Table 4-4).

Table 4-4 Weekday Project Generated Trips

Time Period	Construction Peak (2012)	Operation (2014)
Morning Peak Hour, Inbound (vph)	450	35
Morning Peak Hour, Outbound (vph)	0	10
Total Morning Peak	**450**	**45**
Afternoon Peak Hour, Inbound (vph)	0	10
Afternoon Peak Hour, Outbound (vph)	450	35
Total Afternoon Peak	**450**	**45**
Source: SWTE 2010		

As shown in Table 4-4, the intersection of SR 95/Access Road is predicted to operate at a LOS D in the afternoon peak hour for the westbound left/right turn movement. This is due to the high number of vehicles turning left out of the Project area, delaying vehicles making a right turn (SWTE 2010).

Westbound left-turning traffic at the Quartzsite Boulevard/Main Street intersection is also predicted to operate at a LOS D in the weekday afternoon peak hour during Project construction in 2012 (SWTE 2010). This is due to the overall high number of westbound left-turning vehicles and the limited capacity of an all-way stop controlled intersection.

Per ADOT guidelines, a LOS C or better is typically considered adequate operation at signalized and un-signalized intersections in rural areas. In the case of the intersection at Quartzsite Boulevard/Main Street, for approximately 4 months out of the year when the Town of Quartzsite hosts numerous gem and mineral shows, swap meets, and winter visitors, the Town reflects an urban character with much higher traffic volumes. The LOS D would occur during this time and is considered adequate for such conditions. As a temporary condition caused by both the construction of the Project and high winter traffic volumes, further mitigation measures are not recommended at this intersection.

The predicted construction traffic at the SR 95/Access Road intersection would greatly increase (approximately 450 Project-generated vph during the morning and afternoon peaks) under the Applicant's Proposed Project when compared to the No Action Alternative. As part of the Project design described in Chapter 2, a left turn lane would be added to southbound SR 95 to prevent a decrease in LOS for through-traffic. Under current ADOT regulations (ADOT Policies, Guides, and Procedures 245), a northbound right turn lane is not warranted as fewer than 200 vph are projected as through-traffic at this intersection during peak 2012 construction (SWTE 2010).

The additional operations traffic that would be generated by the Project following peak construction and full build-out (2014) has a limited effect on the LOS at the existing Project intersections when compared to the No Action alternative. The limited effect can be characterized as such due to the expected delay increases not being substantial enough to warrant a change in the LOS. Project area intersections are predicted to continue operating at LOS C or better during the weekday peak hours with full Project build-out in 2014 (SWTE 2010).

With construction complete, travel times would return to their existing level after full build-out is complete (2014). During Project operation, delays resulting from the increased left-turning during construction would return to near pre-construction levels. Therefore, there would not be any long-term impacts to LOS at any of the Project area intersections under the Applicant's Proposed Project.

Transportation Routes

The Applicant's Proposed Project would result in new paved and gravel roads within the Project area. Most of these routes would occur within the perimeter fencing and would be closed to unauthorized use. These routes would serve as internal roads used to access the solar field, power block, staff buildings, and other facilities within the Project's footprint and would only be authorized for Project staff and authorized guests.

A paved access road would be constructed from SR 95 to the Project area, a distance of approximately 0.5 mile. Other paved and unpaved roads would be developed within the Project area to provide access to the power block and other ancillary facilities. Deceleration and/or acceleration lanes would be constructed, as required, to meet the ADOT and La Paz County requirements where the Project access road would connect to SR 95. The Project access road would be a two-lane road, constructed for two directions of travel, with a minimum width of 24 feet and 2-foot-wide shoulders on each side of the road. Additionally, paved roads meeting this same general description may be constructed from the power block to the east and south edges of the solar field. Alternate surfacing for these road segments would be rock. A perimeter road would be constructed around the perimeter of the solar field and would be surfaced with rock. Permanent access roads as discussed above are anticipated to occupy approximately 2.3 acres.

Changes in Access

Under the Applicant's Proposed Project, approximately 1,675 acres would be occupied by Project components and would be fenced for safety and security purposes. There are no authorized OHV routes or other roads present within the Project area; therefore, there would be no changes in access within the Project area.

Closure and Decommissioning

Permanent closure would presumably occur 30 years after the start of operation, unless the Project remains economically viable. It is assumed that the number and type of workers required for closure and decommissioning activities would be similar to that described for construction of the Project. Also, it is assumed decommissioning activities would utilize the same regional and local roadways that currently serve the Project site. It is speculative to assume what the capacity or LOS of these roadways would be at the time of decommissioning activities because future

conditions are unknown. However, as closure and decommissioning activities would be temporary in duration, resulting in similar or fewer vehicle trips to that presented for Project construction, no significant traffic or transportation impacts to area roadways or transportation-related facilities are expected to result from closure and decommissioning activities. Therefore, closure and decommissioning of the Project would not result in any direct permanent effects to local and regional roadway capacities serving the site, or alternative transportation facilities.

4.5.3.3 Alternative 1 – Hybrid Cooled

Under Alternative 1, the Project would be constructed using hybrid-cooling technology rather than dry-cooling, as under the Applicant's Proposed Project. Impacts to transportation and traffic as a result of the implementation of Alternative 1 would be the same as under the Applicant's Proposed Project.

4.5.3.4 Western's Switchyard and Telecommunication System

Western's Switchyard

Since construction of Western's switchyard would occur at the same time as the solar facility, impacts on transportation from construction and operation of Western's switchyard are analyzed in section 4.5.3.2.

Telecommunication Options

Either telecommunications alternative could be implemented under the Applicant's Proposed Project or Alternative 1.

Fiber-Optic Cable Alternative

Cable installation would occur within the existing Bouse-Kofa 161-kV transmission line ROW and would not affect local roadways. Existing roadways would be used during installation. Some short-term impacts to traffic and transportation could occur along SR 95, due to construction equipment using SR 95 to access the dirt road that parallels the transmission line. Western would be required to coordinate this activity with La Paz County and ADOT, if needed. Construction vehicles would comply with all local, State, and Federal laws and regulations.

Microwave Alternative

Transportation impacts are not expected from the installation of a new microwave dish at the Bouse Substation, or communication sites at Metal Mountain or Cunningham Peak. Under this option, the microwave dish would be installed on an existing structure or new monopole within the facility ROW. Existing roadways would be used to access Bouse Substation, Metal Mountain, or Cunningham Peak.

4.5.4 Mitigation Measures

No additional mitigation measures, outside those included in the applicant committed measures identified in Chapter 2, are suggested.

4.5.5 Residual Effects

Under the Applicant's Proposed Project and Alternative 1, there would be short-term and long-term increases in traffic volume that could not be eliminated completely through mitigation. Short-term increases would be large and would affect the LOS of roads in the vicinity, particularly during peak traffic times and especially within the Town of Quartzsite. Long-term increases would be very small and would not be likely to affect the LOS at any intersection in the area.

4.5.6 Cumulative Impacts

The ROI for transportation is limited to the La Posa Plain area within 15 miles of the Project area. The primary transportation corridors consist of I-10, SR 95, and SR 72. Additional roadways that are used as primary connectors are Main Street, Quartzsite Boulevard, and Riggles Road. Other improved and unimproved roadways exist throughout the ROI, including Plomosa Road, which accesses several campgrounds and the Town of Bouse.

Seasonal congestion exists on local roads as a result of thousands of tourists inhabiting the area during the winter months. However, the LOS is still ranked at LOS C or better, which are acceptable levels of service.

There are four large-scale construction projects being proposed within the ROI; however, only the EnviroMission project is anticipated to result in a cumulative impact to transportation. The Bouse, NextLight, and La Posa projects are not actively advancing their applications; therefore their potential impacts are too speculative to be considered here. The EnviroMission project is scheduled to initiate construction in 2014, possibly at a similar time as the Applicant's Proposed Project, although Western has not initiated an EIS for the interconnection. The EnviroMission project is located approximately 2 miles northwest of the Applicant's Proposed Project, on SR 95. Exact impacts to transportation as a result of this project are unknown given where the EnviroMission project is in the approval process. It is assumed that EnviroMission would have impacts comparable to other large scale renewable energy development, but that it would incorporate traffic control measures into their design to minimize impacts to vehicles traveling along SR 95.

Construction and operation of the Project under the Applicant's Proposed Project and Alternative 1 would contribute to the increase in traffic volume and alter the LOS. Under the Applicant's Proposed Project and Alternative 1, there would be an increase of 450 vehicle trips to and from the construction site twice per day (morning and afternoon). The LOS at most Project area intersections would remain at LOS C or better. At Quartzsite Boulevard/Main Street and at SR 95/Access Road, westbound left-turning traffic would experience LOS D during the evenings. This decrease in LOS and short-term impacts to traffic and transportation would improve as the peak construction of 2012 is completed and as the Project moves toward operation. The additional operations traffic that would be generated by the Project after peak construction would have limited effect on the LOS of the existing Project area intersections. Construction and operation of the Project under these alternatives would contribute to the

increases in traffic and decreases in levels of service during the construction in the ROI, but would return to existing levels during operations.

4.5.7 Short-Term Uses versus Long-Term Productivity

The short-term use of the Project area (the 30-year lifespan of the Project) would not have a long-term effect on the traffic and transportation system in the surrounding area.

4.5.8 Irreversible and Irretrievable Commitments of Resources

There would be no irreversible impacts associated with the Applicant's Proposed Project or Alternative 1.

4.6 AIR QUALITY AND CLIMATE

This section describes the analysis conducted to assess Project air quality effects and evaluate whether the Project complies with applicable Clean Air Act requirements and State air quality regulations. Emission estimates of both criteria pollutants and GHG are presented in Appendix D for Project construction, commissioning, and operation. Project GHG emission estimates are presented for information purposes. As there are no established significance criteria, this analysis makes no conclusions regarding GHG emissions.

4.6.1 Methodology for Analysis

For this Project, the air quality impact analysis area comprises the vicinity of the Project area, including the solar field and the adjacent transmission corridor to Western's switchyard.

The locale of the Project area in La Paz County is under the jurisdiction of the ADEQ with respect to air quality permitting and compliance. Certain State regulations would apply to the installation and temporary operation of construction and commissioning facilities. For the commissioning and operation of the Project, a Class II (minor source) Air Quality Permit would be obtained from the ADEQ prior to commencing construction.

The particulate emission contributions from earthmoving and vehicle travel within the Project area were determined using emission factors from the URBEMIS Version 9.2.4 program (an urban emissions software program). Similarly, the on-road emissions from daily worker commute were estimated using the URBEMIS program, with the default vehicle population profile, and travel mileages and ambient temperatures adjusted to reflect conditions for the Project locale. A summary of construction phase criteria pollutant emissions is provided in Appendix D.

Operation of diesel- and gasoline-fueled construction-related vehicles and temporary stationary equipment generates emissions of gaseous pollutants including NO_X, CO, and VOCs. South Coast Air Quality Management District factors were used as a tool for off-road vehicle and diesel-engine powered construction emissions analyses in this EIS. These South Coast Air

Quality Management District factors are based on the anticipated penetration of Tier II and more stringent engine performance standards into the population of construction vehicles and engine-driven equipment, and are acceptable for air quality analysis in Arizona. Emissions due to off-site vehicle travel related to construction (e.g., deliveries and commuter travel) were estimated using emission factors from the South Coast Air Quality Management District 2007 emission factor model for on-road delivery trucks and passenger vehicles. For this analysis, the factors associated with 2012-year vehicle and equipment population were used to assemble the inventory of emission rates for equipment exhausts. The estimates likewise assume the use of ultra-low sulfur diesel fuels that are now mandatory in California, Arizona, and elsewhere. The gaseous exhaust emissions of NO_X, CO, and VOC for onsite and offsite construction vehicles are listed in Table 1-1 in Appendix D.

4.6.2 Indicators

This analysis compares the Project emissions to significance thresholds for general air quality conformity analysis. Annual direct and indirect criteria pollutant emission rates were calculated for the construction and operational phases of the Project. The construction and commissioning phase emissions are non-recurring, discrete, and of limited duration and extent.

In a general sense, a significant impact on air quality as a direct result of the Project may be assessed based on the following indicators:

- Project emissions that would result in a declaration of non-attainment in a specific area for one or more criteria pollutants, or would cumulatively contribute to a net increase in any criteria pollution that would result in non-attainment of the area.

- Project emissions would result in a significant increase of any criteria pollutant for which the Project region is in non-attainment under an applicable local, State, or Federal ambient air quality standard.

- Air emissions that would cause sensitive receptors to be exposed to pollution concentrations that exceed State and Federal standards.

- Predicted emissions that would conflict with or obstruct implementation of an applicable air quality plan (general conformity).

For projects subject to the NEPA process, and for which maximum emissions would be above Major Source thresholds, a State Implementation Plan Conformity Analysis must be conducted in accordance with the general conformity rule, promulgated by the EPA on November 30, 1993 (58 FR 63214). The applicable regulations are provided within Title 40 of the CFR, Part 6, Part 51 Subpart W, and Part 93. For the Project, a reasonable Significance criterion is compared to the annual air pollutant emission trigger thresholds for the General Conformity Analysis. Because these thresholds are applicable to major sources of air pollution to be located in non-attainment areas, they provide a very conservative analysis tool to assess the Significance of the Project that would be located in an attainment/unclassifiable area.

4.6.3 Direct and Indirect Effects by Alternatives

In general, the extent of direct Project and cumulative impacts on air quality depend on emission source characteristics, pollutant types, emission rates, and meteorological and topographical conditions. For this Project, the air pollutant emissions would primarily occur during the construction and commissioning timeframe. The potential for air quality effects are, therefore, not long-term in nature, and this shapes the methodology of the impact assessment. There would be conventional earthmoving and construction vehicle emissions during the construction phase and emissions from fuel-burning equipment that would operate on a temporary, non-recurring basis during the latter steps in plant construction and commissioning. The impacts from these operations would be temporary and limited to the local area surrounding the Project.

For both phases of the Project, GHG emissions have been estimated. A conventional emission factor analysis was conducted to estimate phase-specific quantities of CO_2, methane (CH_4) and nitrous oxide (N_2O) emissions. The total of these GHG constituents, weighted for their relative global warming potential values, provides total GHG emissions in terms of carbon dioxide equivalent (CO_{2eq}). There may be small emissions of additional GHG constituents, such as hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride, but these trace components were not included in this analysis.

4.6.3.1 **No Action Alternative**

Under this alternative, the BLM would not approve the Applicant's ROW application and would not amend the YFO RMP; and Western would not approve the interconnection request. The BLM would continue to manage the land encompassing the Project area consistent with the existing VRM objective as described in the YFO RMP, and Western would continue to operate the Bouse-Kofa 161-kV transmission line under current conditions.

The net air quality benefits for making solar generation available to supply the current and future demands would not be realized under the No Action Alternative. In addition to possible net increases in conventional regulated pollutants, the burning of fossil-fuels to generate the equivalent power output would generate GHG emissions. For example, if natural gas were consumed to generate 110 MW for 5,000 hours per year, the total GHG emissions would be over 400,000 tons per year of CO_2 equivalent (a typical emission factor for natural gas-fired generation is 0.76 ton CO_{2eq}/MWh electricity).

Because there would be no amendment to the YFO RMP and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, none of the direct air quality emission impacts from construction, salt conditioning, and operation from the proposed Project would occur and none of the indirect emission reduction benefits of the proposed Project from displacing fossil-fuel fired generation would occur. In the absence of this Project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

4.6.3.2 Applicant's Proposed Project Alternative – Dry-Cooled

Construction Phase Air Emissions

Construction emissions can vary from day-to-day depending on the level of activity, the specific operations, and the prevailing meteorological conditions. These emissions are primarily fugitive dust emissions from earthmoving and construction vehicle exhaust emission. In addition, there are fugitive and point sources associated with the aggregate plant and concrete batch plant, should these construction phase options be employed for Project area development. The emission inventory presented in Appendix D addresses estimated construction activity emissions associated with development of the Project area, including these onsite activities.

For GHG calculations from internal combustion, emissions factors have been published by the EPA/Climate Registry (EPA 2008a) and by the California Climate Action Registry (2009). For the planned construction period with the highest population and activity of construction equipment (Months 10 to 21), Table 1-4 in Appendix D lists the mass emission rates for each GHG constituent in metric tons.

Operational Phase Air Emissions

There is no combustion involved in the production of electrical power and the Project will have no connection to the natural gas pipeline network. Emission sources associated with operation of the Project are two emergency diesel fire pumps, and two emergency diesel generators. Additionally, the process of initial melting and conditioning of the liquid salt that takes place during the commissioning period will emit criteria pollutants, primarily nitrogen dioxide as a result of decomposition of magnesium nitrate, a contaminant in the salts, and operation of a fired heater necessary to melt the salt mixture from solid to liquid form. The initial melting of the salt is completed during the commissioning phase and this process is not necessary during the operational life of the project. Consequently, standard operation of the plant will not result in air emissions from permitted sources. The potential air quality effects of the salt conditioning process during commissioning and from periodic running of emergency diesel engines during operations will be mitigated by the use of appropriate control technology as required. During the operational phase of the Project there would be no routine air pollutant emissions associated with generation of electricity. The key parameters for each emission source category for the operational phase are summarized in Table 1-6 of Appendix D.

Summary of Project Air Emissions and Conformity Assessment

An overall summary of the Project air emissions during the construction and operational phases on the basis of highest 12-month period emission rates is provided in Table 1-8 in Appendix D. These emission rates reflect the period of the highest planned construction activity (Months 10 to 21), and a representative, peak-operation year during the operational phase. Even with the conservative operating assumptions described for this equipment, the annual emissions are below both Prevention of Significant Deterioration and Title V major source thresholds (EPA 2008b, 2010b). As discussed in the following section, none of these emission rates present the likelihood of a significant impact with respect to air quality.

Few of these criteria can be applied to the Project because the operational phase emission rates, which are the only emissions associated with the Project over the longer term, are far below both

prevention of significant deterioration and similar significance thresholds for air quality impacts. This factor is recognized by ADEQ, in that an air quality permit is not generally required for new sources with criteria pollutant emissions that would be less than State permitting de minimis thresholds. (Note: certain types of sources, such as rotating machinery, may require a permit regardless of annual emission rate).

Consequently, it is reasonable to conclude that none of the significance criteria that pertain to the magnitude of criteria pollutant emissions, or to the modeled ambient concentration, increment consumption, or deposition effects, represents applicable significance criteria for the Project. Unlike conventional utility generation projects, the proposed Project does not rely on combustion of fuels to produce electricity. The long-range significance criteria that usually arise for fuel combustion at generating facilities, namely visibility impacts, and pollutant concentration increases in Class I and Class II protected areas would not pertain to the Project.

The Project would not pose the possibility of causing or contributing to a violation of air quality standards, or result in a change in pollutant concentrations in a non-attainment area. Several potential significance criteria, listed above, address the emissions of hazardous air pollutants.

Since the Project area is in a relatively undeveloped area of the State, it is outside the boundaries of the non-attainment areas associated with metropolitan Phoenix and surrounding developed areas. In accordance with the second step of the conformity determination process, the Project would not cause or contribute to any adverse change in air quality in a non-attainment or maintenance area. On this basis, the Project is formally exempt from a Federal General Conformity determination.

However, a reasonable indicator of Significance for the Project is comparison of maximum 12-month period emissions for the Project to the annual emission rate trigger thresholds for General Conformity Analysis. Because these thresholds are applicable to major sources of air pollution to be located in non-attainment areas, they provide a very conservative analysis tool to assess the Significance of the Project that would be located in an attainment/unclassifiable area.

The Clean Air Act General Conformity Requirements for the NEPA process provide the following conformity review steps:

1. Determine whether criteria pollutants or their precursors would be emitted from the Project
2. Determine whether emissions of criteria pollutants or precursors would occur in a non-attainment or maintenance area
3. Determine whether the Project is exempt from conformity determination
4. Estimate emissions and compare to the threshold emissions and the emissions inventory in the non-attainment or maintenance area

As presented in the section, there are emissions of criteria pollutants and precursors associated with the construction and operation of the Project. The ADEQ has designated all of La Paz County as being either in attainment or unclassifiable, with respect to the NAAQS.

As a conservative measure of Project significance, or in the unlikely event that the La Paz County locale is designated a non-attainment or maintenance area, Table 1-8 in Appendix D

summarizes the emission estimates for the construction and operational phases of the Project, each on a maximum emission rate, 12-month basis. As discussed in the preceding sections, direct Project emissions during the operational phase relate to periodic operation of the emergency equipment and Project cooling towers. Indirect emission sources include employee vehicle commute, third-party trips to the plant. The magnitude of these emissions are far below both the General Conformity and the ADEQ air permitting de minimis thresholds, and thus do not present a likelihood of significant impacts. The facility would need to have an ADEQ Class II (Minor Source) air permit due to the categories of sources present, regardless of estimated actual emissions.

The construction phase emission inventory reflects the greatest potential for localized effects on air quality. However, even based on the conservative assumptions in this analysis, maximum 12-month emissions for the Project construction do not exceed the thresholds for a General Conformity analysis. Therefore, the magnitude of the emissions would not present a likelihood of significant impacts. In addition, construction emissions are transient in nature and would move through the Project area during construction. Project construction would occur at less-intense levels during most of the construction timeframe, compared to the 12-month period addressed in this analysis. Consequently, air quality impacts that could occur due to construction would not affect the same location for a significant period of time.

Closure and Decommissioning

The anticipated lifespan of the Project is estimated to be 30 years, unless the Project remains economically viable. Closure and decommissioning-related impacts would occur from the onsite and offsite emissions that would result when the facility is dismantled and the site is restored. Such impacts would be a one-time, limited-duration event. Given expected advances in fuel efficiency and other air quality control methods, it would be speculative to project the types and volumes of air emissions that would be associated with the construction and other equipment that would be necessary to decommission the Project. Nonetheless, as a conservative worst-case scenario, air quality impacts associated with the ultimate decommissioning of the Project are anticipated to be comparable in type and magnitude, but likely to be lower than, construction-related emissions.

4.6.3.3 Alternative 1 – Hybrid-Cooled

Construction Phase Air Emissions

It is reasonable to conclude that construction emissions would be nearly identical, within the conservative set of assumptions, for either of the Project cooling alternatives for the generation cycle (either dry-cooling or a hybrid-cooling system).

Operation Phase Air Emissions

The key parameters for each emission source category for the operational phase under Alternative 1 are summarized in Table 1-10 in Appendix D. Of the two cooling options, only the hybrid-cooling system would represent an air emission source. As discussed below, each option would have different air emission characteristics.

For the hybrid-cooling system option, aerosol drift release rate is based on the design water circulation rate in the water-cooled condenser tower of 36,691 gpm. The water-cooled condenser cooling tower would be equipped with a drift elimination system rated at 0.0005 percent by weight efficiency for either option. The PM_{10} and $PM_{2.5}$ emissions from the hybrid system cooling tower were calculated based on the estimated total dissolved solids concentration in the groundwater. From historical solar data, it is estimated that the Project would not be operated for more than 5,000 hours per year. For the hybrid case, the cooling tower would operate for up to 50 percent of the total generation plant operating hours.

The emergency diesel engine emissions are based on 60 minutes of maintenance testing once every 2 weeks, and a total annual operation of 50 hours. The diesel driven fire pumps emissions are based on 30 minutes of weekly testing, and a total annual operation of 50 hours.

Summary of Project Air Emissions and Conformity Assessment

The summary and conclusions of air emissions would be essentially the same as the Applicant's Proposed Project Alternative – Dry-Cooled. For the hybrid-cooling alternative, the generation cooling system would contribute less than 1 ton of particulate emissions per year.

4.6.3.4 Western's Switchyard and Telecommunications System

Western's Switchyard

Since construction of Western's switchyard would occur at the same time as the solar facility, impacts on air quality from construction of Western's switchyard are analyzed in section 4.5.3.2.

Western's proposed switchyard and the Project substation may include sulfur hexafluoride (SF_6) gas-filled circuit breakers. SF_6 is another GHG listed in EPA's endangerment finding. Since 2000, Western has had an aggressive program to identify and repair leaks throughout the transmission system to reduce SF_6 emissions. Western personnel would monitor the use, storage, and replacement of SF_6 to minimize any releases to the environment. The likelihood for accidental release is low, as SF_6 gas is supplied in sealed units. Both the breakers and gas cylinders are factory-certified not to leak. During operation of the new switchyard, authorized Western personnel would conduct periodic inspections and service equipment as needed. Properly trained maintenance personnel would monitor and manage the use, storage and replacement of SF_6 to minimize any releases to the environment. During inspections, equipment would be monitored for detection of leaks, and repairs would be made as appropriate.

Telecommunication Options

Either telecommunications alternative could be implemented under the Applicant's Proposed Project or Alternative 1.

Fiber-Optic Cable Alternative

The installation of approximately 12 miles of new overhead fiber-optic cable on existing transmission line structures would be located within an existing utility right-of-way along an existing dirt road. Above-ground cable installation would generate minor amounts of vehicle exhaust emissions. The diesel PM emissions generated from proposed construction equipment

and mobile sources are not anticipated to subject sensitive receptors to adverse levels of diesel PM or other emissions.

Installation of fiber-optic cable would be short-term (less than 2-weeks) in duration. Dust control measures, as described in Section 2.7, would be implemented during construction to minimize fugitive dust to less than significant levels.

Microwave Alternative

Installation of a new microwave dish at the Bouse Substation or communication sites at Metal Mountain or Cunningham Peak would create short-term emissions from installation equipment and vehicle travel. Control measures, as described in Section 2.7, would reduce equipment and fugitive dust emissions to less than significant levels.

4.6.4 Mitigation Measures

For the Project, under either the hybrid- or dry-cooled alternative, mitigation of air quality effects would focus on the construction phase. Under ADEQ regulations, reasonable precautions to prevent the generation of airborne fugitive dust are required construction management practices. To meet this requirement, dust control measures as outlined in Section 2.5 would be implemented during Project construction to mitigate fugitive dust releases. As construction activities move from completed areas of the Project area, and along the transmission line corridor, disturbed surface soils would be stabilized by either watering/crusting, application of palliatives, or installation of a layer of gravel. These options are accepted techniques to reduce the likelihood of windblown dust. Taken together, the range of proposed mitigation measures would reduce the magnitude and extent of construction phase particulate emission impacts.

4.6.5 Residual Effects

The Applicant-committed measures and additional mitigation measures described in this air quality analysis would not avoid all effects on air quality due to the Project. The residual effects consist of the air pollutant emissions that would continue during the operational phase.

For both Project cooling alternatives, the operational phase air emissions do not cause significant residual effects. Based on the magnitude of annual emissions, the air quality regulations that apply, as issued by ADEQ, do not impose a permitting requirement or additional control requirements beyond the Applicant-committed measures. The total annual emission rates are far less than the annual rates deemed Significant under ADEQ rules.

4.6.6 Cumulative Impacts

Impacts resulting from amending the YFO RMP and construction, operation, maintenance and decommissioning of the Applicant's Proposed Project could result in a cumulative effect on air quality when combined with the air quality impacts of other past, present, or reasonably foreseeable future actions. The geographic scope of the cumulative effects analysis area consists

of the La Posa Plains (see Figure 3-8). This geographic scope was established based on the natural boundaries of the affected resource, and not on jurisdictional boundaries.

There are two pending projects within the air resources ROI. They include the EnviroMission Solar Energy Project and the expansion/reopening of the American Bonanza Copperstone Gold Mine. There are several proposed solar energy projects within the ROI (Bouse Solar Energy Project, La Posa Solar, NextLight Solar); however, given the inactivity on the permit applications for those projects, there is no data available to assess the potential impacts that would result from their construction, operation, maintenance, and decommissioning. Therefore potential impacts associated with those projects are considered too speculative to be considered as part of this cumulative impacts analysis.

With respect to air pollutant emissions, it is anticipated that cumulative impacts would not be significant. The inherent nature of the atmosphere is that air emissions do not accumulate in a given locale, reducing the likelihood of cumulative impacts if emission rates are sufficiently small. Applying this principle, the ADEQ has generally adopted Federal regulatory significance levels for annual air emissions attributable to a given Project. These significance levels serve as an indicator of *de minimis* air emission levels. Projects with annual emissions below this level are presumed to not pose a significant cumulative risk to public health over the long-term. Emissions from the Applicant's Proposed Project are below these thresholds, and it is anticipated that the emissions from the EnviroMission project, consistent with other large scale renewable energy developments, would also be below those thresholds.

Construction of the reasonably, foreseeable projects within the ROI airshed would generate similar types of emissions and could contribute individually and cumulatively to impacts to local and regional air quality. During construction of the proposed Project, mitigation measures would be in effect to control and minimize equipment and fugitive dust emissions. If the EnviroMission project and mine project were to occur at the same time as the proposed Project, there would be potential for cumulative air quality impacts; however, each project would be required to implement mitigation measures, such as dust control to minimize the magnitude of those air quality impacts.

Examining the long-term Project emissions during the operational phase, even including onsite and commuter vehicles (which are not considered in the ADEQ significance criteria), the annual emissions per pollutant are at most 40 percent of the pre-Project significance levels. The comparison of annual emissions to regulatory significance levels for the hybrid-cooling alternative (the alternative with the higher particulate emissions), shows that maximum annual Project emissions would be 6.4 tons per year PM_{10} compared to 15 tons per year significance level. Further, since fossil-fuel combustion during the operational phase is limited to internal combustion emergency engines and vehicles, the emissions of hazardous or bio-accumulative constituents is closely regulated, and would be minimal. Based on where the EnviroMission project is in the approval process, there is no data available to characterize potential operational emissions associated with that project.

4.6.7 Short-Term Uses versus Long-Term Productivity

From the perspective of air quality resources, the short-term use of the resource by the Project, by generating relatively small quantities of air pollutant emissions, does not affect the long-term productivity of other resources in the Project area or the vicinity of the Project. The levels of emissions during the construction and the operational phases are not of sufficient magnitude to affect the long-term air quality in the locale of the Project.

4.6.8 Irreversible and Irretrievable Commitments of Resources

The inherent nature of the atmosphere is that air emissions do not accumulate in a given locale, which means that any air quality effects are transient if emission rates are sufficiently small. However, it is possible that air pollutant emissions would be captured and removed from the atmosphere by precipitation. This pathway does create a potential for some longer-lasting, even if not completely irreversible, effects. Examples include the lasting effects due to air emissions from fossil-fueled generation, such as acid rain, ozone damage to vegetation, and accumulation of nitrate, sulfate, or bio-accumulative toxins in soils. These long-lasting impacts are avoided with solar generation projects and would not occur as a result of the Project.

4.7 GEOLOGICAL RESOURCES

This section describes and evaluates the potential impacts on geological and mineral resources that may result from amending the YFO RMP and from implementation of the Applicant's Proposed Project or alternatives. This section also describes and evaluates the impacts that geological hazards may have on the Applicant's Proposed Project or alternatives.

4.7.1 Methodology for Analysis

For geological hazards, sensitivity was determined by the likelihood of a geological hazard occurring in the future by using the past occurrences of geological hazards in the same area as a guide. Geological hazards, such as earthquakes, typically cover large areas. Quaternary faults are considered to have a high level of sensitivity because they are probably still active and capable of generating strong earthquakes in the near future. Inactive (pre-Quaternary) faults are considered to have a lower sensitivity, because these faults could be reactivated in the distant future.

For mineral resources, sensitivity was determined by the presence of active mines and mining claims, as well as by any past mining operations.

4.7.2 Indicators

4.7.2.1 Geological Hazard Indicators

The following indicators were used for geological hazards:

- A geological hazard that exposes people or structures to potential and adverse effects, including the risk of loss, injury, or death involving rupture of a known earthquake fault, strong seismic ground shaking, or seismic-related ground failure (liquefaction).

- Is located on a geological unit or soil that is unstable or that would become unstable as a result of the Project, and potentially result in onsite or offsite landslide, lateral spreading, subsidence, liquefaction, or collapse.

4.7.2.2 **Mineral Resources Indicators**

The primary impact issue for mineral resources is the loss of economically significant mineral resources. The primary cause of direct and permanent disturbance of mineral resources is ground disturbance associated with construction of the Project, such as grading, excavation, or other ground-disturbing activities that may damage, remove, or cover up the geological units that host mineral resources. The following indicators were used for mineral resources:

- Results in the loss of availability of a known mineral resource that would be of value.

- Results in the loss or availability of a locally important mineral resource delineated on a local general plan, specific plan, or other land use plan.

- Results in the restriction of access to or of the availability of mineral resources.

4.7.3 Direct and Indirect Effects by Alternatives

4.7.3.1 **No Action Alternative**

Under this alternative, the BLM would not approve the Applicant's ROW application and would not amend the YFO RMP; and Western would not approve the interconnection request. The BLM would continue to manage the land encompassing the Project area consistent with the existing VRM objective as described in the YFO RMP, and Western would continue to operate the Bouse-Kofa 161-kV transmission line under current conditions.

Because there would be no amendment to the YFO RMP and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, none of the impacts to geological resources from the proposed Project would occur. In the absence of this Project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

4.7.3.2 **Applicant's Proposed Project Alternative – Dry-Cooled**

All effects are considered to be direct effects, as no indirect effects were identified for geological hazards or mineral resources.

Unique geological resources would not be impacted by the Project because there are no known unique geological resources associated with the Project area.

The potential for earthquakes, ground shaking, or ground rupture in the Project area is low, but not non-existent. Ground-shaking as a result of an earthquake represents the most significant geological hazard to the Project area. Earthquakes have been recorded to the west of the Project area (in California) and can be expected to occur in the future at a similar magnitude and frequency as previously recorded. However, the Project area is not located within the trace of any known active fault. The Project would, therefore, not be likely to be exposed to ground rupture. Seismic hazards would be minimized by conformance, with recommended seismic-design criteria.

The probability of impact to the Project from slope stability, liquefaction, collapsible soils, expansive soils, or land subsidence is low to negligible. The gentle slope of the Project area limits the possibility of slope failure or of land sliding. There is no evidence of liquefying sediment or problem soils in the Project area. Land subsidence has not been observed in the La Posa Plain.

Given the absence of currently active mining or known mineral resources within the Project area, the potential impact to mineral resources is considered low. Nevertheless, indirect and permanent disturbance of mineral resources would be caused by the loss of mining-claim eligibility within the Project area for the life of the Project. The mineral-resource inventory found active mining claims within the ROI approximately 0.4 mile due west of the Project area, as well as an active gold mine (Copperstone Mine) located approximately 5 miles due west of the Project area. Both the active mining claims and the mine are operated by American Bonanza Gold Corporation. Project-related activities are not anticipated to have any impacts on these existing mining operations.

Closure and Decommissioning

The future decommissioning and closure of the Project should not negatively affect geological resources since the ground disturbed during plant decommissioning and closure would have been already disturbed, and mitigated as required, during construction and operation of the Project.

4.7.3.3 Alternative 1 – Hybrid-Cooled

Impacts to geological and mineral resources from construction and operation of a hybrid-cooled solar plant would be similar to the impacts described above for the Applicant's Proposed Project (dry-cooled alternative). Impacts from geological hazards would also be similar to those described above for the Applicant's Proposed Project.

4.7.3.4 Western's Substation and Telecommunication System

Western's Substation

Western's switchyard would be located on approximately 4.6 acres of BLM-administered land adjacent to the existing right-of-way for the Bouse-Kofa 161-kV transmission line. There are no unique geological resources or existing mining claims that would be impacted by construction and operation of Western's switchyard. Impacts from geological hazards would be similar to those described above for the Applicant's Proposed Project.

Telecommunication Options

Either telecommunications alternative could be implemented under the Applicant's Proposed Project or Alternative 1.

Fiber-Optic Cable Alternative

All construction activity associated with fiber-optic cable installation would be within an existing utility ROW. Construction of the telecommunications facilities would not impact geological resources or access to known mineral resources.

Microwave Alternative

Impacts to geological resources are not expected from the installation of a new microwave dish at the Bouse Substation or communication sites at Metal Mountain or Cunningham Peak. All construction activities would occur in previously disturbed areas within the facility ROW.

4.7.4 Mitigation Measures

Geological hazards would be minimized by conformance with recommended seismic-design criteria and BMPs. Specific mitigation measures are not necessary for geological or mineral resources in the Project area.

4.7.5 Residual Effects

No residual effects to geological resources or from geological hazards would result from implementation of the Applicant's Proposed Project or alternatives. The Applicant's Proposed Project would preclude excavation of mineral resources within the Project area for the lifetime of the Project.

4.7.6 Cumulative Impacts

No cumulative impact is foreseen from geological hazards. There may be cumulative impacts on mineral resources, if the proposed Project, combined with other reasonably foreseeable future projects restrict access to mineral resources in the future. However, impacts to mineral resources are generally localized and do not result in regionally cumulative impacts. Mineral resources vary according to the geological units containing them and may vary over short distances, effectively limiting the geographical range of the effects on mineral resources. Incremental impacts on mineral resources resulting from the construction, operation, and maintenance of the Project, alone or together with other present and reasonably foreseeable projects, should have minimal cumulative impacts.

4.7.7 Short-Term Uses versus Long-Term Productivity

Short-term Project uses would not affect the long-term productivity of geological or mineral resources.

4.7.8 Irreversible and Irretrievable Commitments of Resources

Mineral resources are considered nonrenewable and any disturbance to them would constitute an irreversible commitment of resources. However, the potential impact to mineral resources is considered low, as there are currently no active mining or known mineral resources within the Project area.

4.8 SOIL RESOURCES

This section describes and evaluates the potential impacts on soil resources that may result from amending the YFO RMP and from implementation of the Applicant's Proposed Project or alternatives.

4.8.1 Methodology for Analysis

Soil units within the Project area were assessed for high or moderate susceptibility to water or wind erosion. Soil susceptibilities to water and wind erosion were assessed based on standards from the Natural Resources Conservation Service.

4.8.2 Indicators

An impact on soil resources is considered potentially significant and, therefore, an indicator if it would:

- Result in increased potential for soil erosion.

4.8.3 Direct and Indirect Effects by Alternatives

4.8.3.1 **No Action Alternative**

Under this alternative, the BLM would not approve the Applicant's ROW application and would not amend the YFO RMP; and Western would not approve the interconnection request. The BLM would continue to manage the land encompassing the Project area consistent with the existing VRM objective as described in the YFO RMP, and Western would continue to operate the Bouse-Kofa 161-kV transmission line under current conditions.

Because there would be no amendment to the YFO RMP and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, none of the impacts to soil resources from the proposed Project would occur. In the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

4.8.3.2 **Applicant's Proposed Project Alternative – Dry-Cooled**

Construction activities would result in surface disturbance and removal of vegetation leading to increased potential for wind- and water-driven erosion. The only soil map unit within the Project area, the Superstition-Rositas series, exhibits a moderate to high susceptibility to water and wind erosion.

Grading activities would be conducted during the first few months of the construction schedule, and would be phased to minimize water needed for dust control. A small portion of the overall Project area would be paved; primarily the site-access road, the service roads to the power block, and portions of the power block (paved parking lot and roads encircling the steam turbine generator and solar steam generator areas). The remaining portions of the power block would be surfaced with gravel. The solar field would remain unpaved and without a gravel surface in order to prevent rock damage from mirror wash vehicle traffic. Water would be used for dust suppression on the dirt roadways within and around the solar field. Roads and parking areas located within the power block area and adjacent to the administration building and warehouse would be paved with asphalt.

Prior to construction, a Project-specific SWPPP would be developed that includes site-appropriate BMPs to reduce localized soil impacts from wind and water erosion. The site-appropriate BMPs may include stormwater BMPs; temporary erosion control measures, including BLM-approved dust suppression; and construction of berms and ditches, all of which would prevent accelerated soil erosion or dust generation.

As the construction activity is concluded in a given area of the Project area, the disturbed areas would be treated to greatly reduce, if not eliminate, the potential for future windblown dust. Such measures are necessary for the operation of the solar heliostat array. Dust accumulation on the mirror surfaces reduces solar collection efficiency and must be washed off periodically. As has become accepted practice for large solar generation facilities, the Project facility would maintain substantive dust abatement measures throughout the operational phase. Disturbed surface soils would be stabilized by either watering/crusting, application of palliatives, or installation of a layer of gravel. Such mitigation measures represent accepted techniques to reduce the likelihood of windblown dust and generally represent the "reasonable precautions" required by ADEQ regulations.

Incidents of elevated levels of windblown dust are unpredictable in La Paz County, but common experience is that these events may occur 10 to 20 hours per month on average, especially during the mid-summer monsoon pattern. At such times, short-duration, windblown dust plumes in the region significantly impair visibility. It is expected that the developed Project area would not contribute more to this phenomena than do the surrounding dry desert and/or agricultural areas. The combination of soil binder application, repeat soil watering to promote crust formation, and graveled vehicle roadways would make the Project area no more susceptible to release of windblown dust than native bare soil and likely less susceptible than the agricultural and desert areas in the vicinity.

Closure and Decommissioning

After the end of the Project's useful life, it would be decommissioned. The removal of the existing facility could result in disturbance to soil resources. These impacts would be similar to

impacts that could occur during construction. To mitigate for any potential impacts associated with Project closure, the Applicant would be required to prepare a Decommissioning and Site Restoration Plan that meets the requirements of the BLM. The Plan would identify likely decommissioning scenarios and develop specific plans for each scenario that would identify actions to be taken to avoid or mitigate long-term impacts related to water and wind erosion after decommissioning. Actions may include such measures as a decommissioning SWPPP, revegetation and restoration of disturbed areas, post-decommissioning maintenance, collection and disposal of Project materials and chemicals, groundwater well abandonment, and access restrictions.

4.8.3.3 Alternative 1 – Hybrid-Cooled

Impacts to soil resources from construction and operation of a hybrid-cooled solar plant would be similar to the impacts described above for the Applicant's Proposed Project (dry-cooled alternative).

4.8.3.4 Western's Substation and Telecommunication System

Western's Substation

Approximately 6.9 acres of soil would be disturbed during construction of Western's switchyard. Prior to construction, Western would prepare and implement a site-specific SWPPP that describes BMPs to be used to reduce localized soil impacts from wind and water erosion. The BMPs may include stormwater BMPs; temporary erosion control measures, including BLM-approved dust suppression; and construction of berms and ditches, all of which would prevent accelerated soil erosion or dust generation.

Following construction, the switchyard would be fenced within a 4.6 acre area. Temporary disturbance areas would be reclaimed per BLM guidance.

Telecommunication Options

Either telecommunications alternative could be implemented under the Applicant's Proposed Project or Alternative 1.

Fiber-Optic Cable Alternative

The fiber-optic line route would cross soils that have moderate to high erosion potential by surface runoff and eolian processes. Soil disturbed during cable stringing is more susceptible to erosion, and compacted soil can accelerate storm water erosion. In addition, the proposed fiber-optic line route would cross numerous ephemeral streams. Vehicles and equipment crossing these ephemeral streams would disturb and compact the soil and potentially cause the loss of stabilizing vegetation. With implementation of measures and BMPs described in Section 2.7 that would ensure proper re-vegetation, erosion control, drainage, and seismic design, among other site-specific requirements, impacts from installation of fiber-optic cable would result in minor impacts to soil resources.

Microwave Alternative

Impacts to soil resources are not expected from the installation of a new microwave dish at the Bouse Substation or communication sites at Metal Mountain or Cunningham Peak. All construction activities would occur in previously disturbed areas within the facility ROW. Control measures identified in Section 2.7 would reduce equipment and fugitive dust emissions to less than significant levels.

4.8.4 Mitigation Measures

No additional mitigation measures, outside those included in the applicant committed measures identified in Chapter 2, are suggested.

4.8.5 Residual Effects

No residual effects to soil resources would result from implementation of the Applicant's Proposed Project or alternatives.

4.8.6 Cumulative Impacts

Impacts resulting from amending the YFO RMP and construction, operation, maintenance and decommissioning of the Applicant's Proposed Project could result in a cumulative effect on soil resources when combined with other past, present, or reasonably foreseeable future actions. The geographic scope of the cumulative effects analysis for soils consists of the La Posa Plains (see Figure 3-8). This geographic scope was established since soils could be transported offsite by wind, and the watershed boundary, since surface flows could carry eroded soils offsite. Potential cumulative effects could occur at any point during the overall lifespan of the project, from pre-construction activities, to the conclusion of facility decommissioning and site reclamation.

Construction of the Applicant's Proposed Project or any other ground-disturbing activity within the soil resources ROI would result in soil disturbances that could incrementally increase local wind-borne soil erosion, fugitive dust events, and stormwater runoff. However, the Applicant's Proposed Project would be expected to contribute only a small amount to any possible short-term cumulative impacts related to soil erosion, because the Applicant would be required to implement soil and erosion control mitigation measures during construction and operation. It is anticipated that any other large-scale construction project would be required to implement similar mitigation measures during construction and operation, the net effect of which would be to minimize the magnitude of impacts to soil resources from such activities.

4.8.7 Short-Term Uses versus Long-Term Productivity

The construction and operation of the Project would result in short-term and long-term impacts that would affect soil resources. For the lifespan of the Project, vegetation would be cleared from the land surface within the Project area. This would result in accelerated rates of wind and water

erosion within the Project area. Following the termination and restoration of the Project area, rates of wind and water erosion would return to naturally occurring rates. However, soil material lost to erosion over the lifetime of the Project would be permanently lost.

4.8.8 Irreversible and Irretrievable Commitments of Resources

The construction and operation of the Project would result in temporary and permanent changes to soil resources resulting from the disturbance of the land surface and removal of vegetation. Impacts on soil resources would be irretrievable for the life of the Project and until restoration is completed. Provided that the Project area is successfully rehabilitated with full restoration of the vegetation, irreversible impacts on soil resources would be minimal.

4.9 PALEONTOLOGICAL RESOURCES

This section describes and evaluates the potential impacts on paleontological resources that would result from amending the YFO RMP and implementation of the Applicant's Proposed Project or alternatives.

4.9.1 Methodology for Analysis

Sensitivity levels were determined based on the PFYC used by the BLM and the inventory of fossil localities. Literature research, institutional record searches, and the PFYC provided the information necessary to assign a sensitivity level of high, low, or moderate/undetermined to the Project area. Any future provisions for mitigation of adverse impacts to significant paleontological resources exposed during construction-related activities are based upon these determinations of sensitivity level. The terms "high sensitivity level," "moderate/undetermined sensitivity level," and "low sensitivity level" are defined below.

4.9.1.1 **High Sensitivity Level**

Geological units with a high sensitivity for containing significant paleontological resources are determined to have a high sensitivity level. In these cases, the geological unit contains a high density of recorded fossil localities, has produced fossils in or near the vicinity of the Project area, and is very likely to yield additional fossils during construction. Areas identified as having a class 4 or 5 in the PFYC system are considered to have a high sensitivity level.

4.9.1.2 **Moderate/Undetermined Sensitivity Level**

The geological unit has limited exposure in the Project area, is poorly studied, or contains no recorded paleontological resource localities. However, in other areas, the same or similar geological units may contain sufficient paleontological localities to suggest that exposures of the unit in the Project area would have at least a moderate potential for yielding fossils. Areas with a class 3 in the PFYC system are considered to have a moderate or undetermined sensitivity level.

4.9.1.3 **Low Sensitivity Level**

The geological unit contains no, or a very low, density of recorded fossil localities, has produced little or no fossils in the vicinity of the Project, and is not likely to yield any fossils. Nevertheless, geological units with few or no prior recorded fossil localities can still prove fossiliferous during paleontological mitigation activities. Areas identified as having a class 1 or 2 in the PFYC system are considered to have a low sensitivity level.

4.9.2 Indicators

The primary impact issue for paleontological resources is the loss of scientifically significant fossils and their contextual data. Two types of impacts could potentially affect paleontological resources:

- Direct and permanent ground disturbance during construction.
- Indirect and permanent disturbance due to changes in public accessibility or erosion.

An impact on paleontological resources is considered potentially significant and, therefore, an indicator if it would have a loss of or inaccessibility to scientifically significant paleontological resources. The primary concern regarding impacts to paleontological resources is that direct damage to or destruction of fossils would result in the loss of important scientific information. It is possible that ground disturbance, such as grading, could encounter important paleontological resources. In addition, adverse impacts indirectly associated with construction are a concern. For example, fossils could be subject to damage or destruction by erosion that is accelerated by construction disturbance. Improved access and increased visibility as a result of construction could cause fossils to be damaged, destroyed, or collected as a result of unauthorized collection or vandalism. However, not all impacts of construction are adverse to paleontology. Excavation can and often does reveal significant fossils that would otherwise remain buried and unavailable for scientific study. In this manner, excavation can result in beneficial impacts. Such fossils can be collected properly and catalogued into the collection of a museum repository so that they can be available for scientific study.

A rating of low residual impact assumes that scientifically significant fossil specimens and contextual information would be adequately collected from localities if they could not be avoided. Therefore, residual impacts on paleontological resources would be considered low to nonexistent, as long as proper mitigation procedures allowed the collection of significant fossils along with their contextual data.

4.9.3 Direct and Indirect Effects by Alternatives

4.9.3.1 **No Action Alternative**

Under this alternative, the BLM would not approve the Applicant's ROW application and would not amend the YFO RMP; and Western would not approve the interconnection request. The BLM would continue to manage the land encompassing the Project area consistent with the

existing VRM objective as described in the YFO RMP, and Western would continue to operate the Bouse-Kofa 161-kV transmission line under current conditions.

Because there would be no amendment to the YFO RMP and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, none of the impacts to paleontological resources from the proposed Project would occur. In the absence of this Project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

4.9.3.2 Applicant's Proposed Project Alternative – Dry-Cooled

The Applicant's Proposed Project is anticipated to have a low impact on paleontological resources within the Project area. The Project area contains only young alluvial deposits and eolian deposits. Based on a PFYC of 2 for these geological units and the absence of known fossil localities, the Project area is considered to have a low sensitivity level. However, fossil tortoises were found in similar eolian deposits approximately 20 miles north of the Project area; so there is a slight possibility of fossil vertebrates in the eolian deposits.

Closure and Decommissioning

The future decommissioning and closure of the Project should not negatively affect paleontological resources, since the ground disturbed during plant decommissioning and closure would have been already disturbed, and mitigated as required, during construction and operation of the Project.

4.9.3.3 Alternative 1 – Hybrid-Cooled

Impacts on paleontological resources from construction and operation of a hybrid-cooled solar plant would be similar to the impacts described above for the Applicant's Proposed Project (dry-cooled alternative).

4.9.3.4 Western's Substation and Telecommunication System

Western's Substation

Impacts on paleontological resources from construction and operation of Western's switchyard would be similar to the impacts described above for the Applicant's Proposed Project (dry-cooled alternative).

Telecommunication Options

Either telecommunications alternative could be implemented under the Applicant's Proposed Project or Alternative 1.

Fiber-optic Cable Alternative

All construction activity associated with fiber-optic cable installation would be within an existing utility ROW. Construction of the telecommunications facilities would not be expected to disturb known paleontological resources located within the Project area.

Microwave Alternative

Because of the limited area impacted by the installation of a new microwave dish at the existing Bouse Substation, or at the Metal Mountain or Cunningham Peak communication sites, impacts to paleontological resources from construction-related ground disturbances are not expected.

4.9.4 Mitigation Measures

Specific mitigation measures are not necessary because of the low potential for paleontological resources in the Project area. However, should significant paleontological resources be discovered during construction, mitigation measures should be implemented to reduce potential adverse impacts to significant paleontological resources resulting from Project construction. The BLM requires a discovery stipulation, described below.

The Applicant will immediately notify the BLM Authorized Officer of any paleontological resources discovered as a result of operations under this authorization. The Applicant will suspend all activities in the vicinity of such discovery until notified to proceed by the Authorized Officer and will protect the discovery from damage or looting. The Applicant may not be required to suspend all operations if activities can be adjusted to avoid further impacts to a discovered locality or be continued elsewhere. The Authorized Officer would evaluate, or would have evaluated, such discoveries as soon as possible, but not later than 10 working days after being notified. Appropriate measures to mitigate adverse effects to significant paleontological resources would be determined by the Authorized Officer after consulting with the operator. Within 10 days, the operator would be allowed to continue construction through the site, or would be given the choice of either: (1) following the Authorized Officer's instructions for stabilizing the fossil resource in place and avoiding further disturbance to the fossil resource; or (2) following the Authorized Officer's instructions for mitigating impacts to the fossil resource prior to continuing construction through the Project area. Per IM 2009-011, the Applicant is responsible for the cost of any investigation necessary for the evaluation and for any mitigation measures, including museum curation.

4.9.5 Residual Effects

No residual effects to paleontological resources would result from implementation of the Applicant's Proposed Project or alternatives.

4.9.6 Cumulative Impacts

Impacts on paleontological resources are generally localized and do not result in regionally cumulative impacts. Paleontological resources vary according to the geological units that contain

them. Geological units may also vary over short distances, effectively limiting the geographical range of impacts on paleontological resources. The impacts of the Applicant's Proposed Project on paleontological resources would be localized within the Project area. The suggested mitigation measures would ensure that the potential for adverse impacts on paleontological resources are minimized. There is, however, the potential for future projects in the vicinity to disturb areas that may contain known or unknown paleontological resources. Future projects with potentially significant impacts on paleontological resources would be required to comply with Federal and State regulations and ordinances protecting paleontological resources through implementation of similar mitigation measures as proposed here. Therefore, the potential construction impacts of the Applicant's Proposed Project in combination with other projects in the area would not contribute to a cumulative significant impact to paleontological resources.

4.9.7 Short-Term Uses versus Long-Term Productivity

Short-term Project uses would not affect the long-term productivity of paleontological resources.

4.9.8 Irreversible and Irretrievable Commitments of Resources

Paleontological resources are considered nonrenewable and any disturbance to them would constitute an irreversible commitment of resources. However, implementation of mitigation measures described above would minimize the potential for impacts to paleontological resources.

4.10 VEGETATION AND SPECIAL STATUS SPECIES

This section discusses the effects on vegetation and special status species that may occur from amending the YFO RMP, with implementation of the Applicant's Proposed Project and alternatives.

4.10.1 Methodology for Analysis

Analyses for impacts to vegetation resources were accomplished through a variety of methods, including literature review of habitat requirements for target sensitive species, onsite biological reconnaissance, review of various internet websites and databases, and discussions with resource personnel from the AZGFD, BLM, Desert Botanical Garden, and University of Arizona. Additional analysis included review of regional vegetation community classifications (Turner and Brown 1982; Lowry et al. 2005) and University of Arizona herbarium specimens.

A combination of aerial photograph interpretation, contract biologists' onsite experience, discussions with faculty and staff from the University of Arizona, Desert Botanical Garden, AZGFD biologists, and GIS software was used to characterize habitat types and quality.

4.10.2 Indicators

The Applicant's Proposed Project would impact vegetation resources if it:

- Alters the structure, function, value, and persistence of sand dune communities.
- Affects plant species such that the diversity or numbers of local populations were altered by interference with survival, growth, or reproduction.
- Destroys, degrades, or fragments habitat on a long-term basis.
- Introduces and/or increases the presence of invasive plants and noxious weed species.
- Interferes with desired future management outcomes identified for the Dunes WHA.

4.10.3 Direct and Indirect Effects by Alternatives

4.10.3.1 No Action Alternative

Under this alternative, the BLM would not approve the Applicant's ROW application and would not amend the YFO RMP; and Western would not approve the interconnection request. The BLM would continue to manage the land encompassing the Project area consistent with the existing VRM objective as described in the YFO RMP, and Western would continue to operate the Bouse-Kofa 161-kV transmission line under current conditions.

Because there would be no amendment to the YFO RMP and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, none of the impacts to vegetation resources from the proposed Project would occur and none of the benefits of the proposed Project would occur. In the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

4.10.3.2 Applicant's Proposed Project Alternative – Dry-Cooled

Native Vegetation Communities

The creosote bush-white bursage vegetation community covers the vast majority of the Project area, and is the most widespread community within the entire Lower Colorado River Valley Subdivision of the Sonoran Desert (Turner and Brown 1982). The degree of impacts would depend upon the extent (acres and linear feet) and duration (long- versus short-term) of the disturbance. The rate at which vegetation recovers following restoration and the effectiveness of restoration activities would also determine the degree of long-term impacts to vegetation communities.

Construction of the Project would result in either the removal or cutting to the soil surface of all vegetation within the heliostat array field. During the life of the Project, regular mirror washing

and dust control measures would introduce moisture into the soil, which may allow native vegetation to reestablish in the spaces between the heliostat pedestals.

Site preparation would include the grading and clipping of vegetation within all areas to be disturbed. As described in Table 2-3, only 115 acres of the 1,675-acre Project area would require complete removal of all vegetation. The root system of existing vegetation would remain intact to the extent possible, to limit fugitive dust and soil erosion and to allow native vegetation to regrow. Impacts to Arizona native plants, including salvage, would be consistent with the ANPL.

Vegetation removal would not occur in areas where disturbance would be temporary. Rather, trucks and equipment would drive over and crush existing desertscrub vegetation without direct removal; or the vegetation would be cut to ground level, leaving the root system in place for soil stabilization. Temporary disturbance areas, such as staging and laydown areas would be re-vegetated with native plant species to the extent practicable after Project construction is finished.

Invasive Plant Species

Invasive species already present within the Project area (e.g., Asian mustard and schismus) could potentially spread as a result of increased moisture in the soil. Mirror washing and dust control measures would effectively introduce greater amounts of moisture into the soil than would otherwise be naturally occurring. This increased soil moisture has the potential to improve regeneration of plant species already established within the soil seedbank.

Land-disturbing construction activities could provide opportunities for invasive, non-native plants to initially establish or to become more widely established. To minimize the potential spread of invasive species, BMPs and mitigation measures to prevent the spread of non-native plant species would be identified in the Construction, Operation, and Maintenance Plan. A Weed Management Plan (as described in Section 2.7.3) would be developed.

Special Status Species

Scaly Sandplant

All available information indicates the scaly sandplant, a root parasite, does not occur within the Project area or in the immediate vicinity. The potential for occurrence of the species within the Project area is low. Activities associated with the construction, operation and maintenance, or decommissioning of the Project are anticipated to have little to no impact to this species.

Closure and Decommissioning

The proposed Project has an estimated life of at least 30 years, unless it remains economically viable. Construction of the proposed Project would disrupt the existing ecosystem and habitat within the facility footprint, conditions that would have been maintained for the life of the Project. Over-compaction of the soil can resist seed movement into the soil profile, seed germination, subsequent seedling growth through the soil, and movement of water and nutrients into the root zone. A return to the drainages and topography that existed at the time of construction may not be appropriate and could, in fact, result in unacceptable impacts to surrounding properties. Land disturbance over the life of the Project would preclude rapid revegetation and grazing potential on the land following closure. Measures identified in the

Weed Management Plan to minimize or avoid the spread of noxious weeds would be implemented during decommissioning.

While the Decommissioning and Site Reclamation Plan will be used as the basis for determining the standard for reclamation, revegetation, restoration, and soil stabilization of the Project area following decommissioning, the appropriate rehabilitation of the site would need to be revisited to determine consistency with land uses existing at the time of closure.

4.10.3.3 Alternative 1 – Hybrid-Cooled

Under the hybrid-cooled alternative, impacts to vegetation resources would be similar to those described for the Applicant's Proposed Project.

4.10.3.4 Western's Substation and Telecommunication System

Western's Substation

Western's switchyard would be located on approximately 4.6 acres of BLM-administered land adjacent to the existing right-of-way for the Bouse-Kofa 161-kV transmission line. During construction, all vegetation within the footprint of the switchyard would be removed and the area would be covered with a layer of gravel. A Weed Management Plan would be prepared and implemented during construction and operation of the switchyard.

Following construction, temporary construction areas around the switchyard would be restored according to BLM requirements. In general, restoration activities would include the removal of excess rock/gravel, re-establishing pre-construction contours, spreading of stockpiled topsoil, and re-vegetation as appropriate.

Telecommunication Options

Either telecommunications alternative could be implemented under the Applicant's Proposed Project or Alternative 1.

Fiber-optic Cable Alternative

Although construction activities would occur in an existing utility ROW, temporary and permanent ground disturbance would occur and the use of construction equipment could result in various direct and indirect impacts to vegetation. Prior to construction, a rare plant survey would be required along the ROW corridor to identify the distribution of potentially affected special-status species. Direct impacts to native vegetation communities and special-status plants could occur during grading, or if plants are crushed or otherwise damaged by construction equipment and vehicle or foot traffic.

Ground-disturbing activities have the potential to indirectly affect adjacent vegetation communities by facilitating the transport and dispersal of invasive weed propagules, thereby potentially introducing new weeds and exacerbating invasions already present in the Project vicinity. Implementation of BMPs for weed management described in Section 2.7 would reduce the potential for the spread of noxious weeds from construction activities.

Microwave Alternative

Because of the limited area impacted by the installation of a new microwave dish at the Bouse Substation or at the Metal Mountain or Cunningham Peak communication sites, impacts to vegetation or special status plant species from construction-related ground disturbances are not expected.

4.10.4 Mitigation Measures

The 1,675-acre Project area is entirely located within the Dunes Habitat Management Area. The Project footprint has been situated to avoid as many sensitive dunes as possible, within the ROW application area. This location would result in the loss of an estimated 11.5 acres of sensitive dune habitat. The remainder of the Project area comprises sand sheet (containing no dune features) and barren desert pavement (containing no loose sand and practically no vegetation).

The following represent mitigation measures that have been identified to minimize or reduce impacts to vegetation resources:

- In areas where sensitive biological resources have been identified, biological monitors would be assigned during construction operations. Responsibilities would include: (1) to promote avoidance, to the maximum extent possible, impacts to sensitive species, native vegetation, or other unique resources; (2) as appropriate, flagging boundaries of areas to be excluded from construction activities to protect native plants or sensitive species such as scaly sandplant; (3) monitoring such restricted areas during construction.

- The Applicant will develop a Weed Management Plan as described in Section 2.7.3 to control the impacts of the Proposed Project on invasive species on the Project site and to the extent that it does not exacerbate spread of invasive species on surrounding land. The Applicant does not propose to control invasive species outside of the proposed Project site.

- The Weed Management Plan will incorporate BMPs and Performance Standards as outlined in Section 2.7.3.

4.10.5 Residual Effects

Generic mitigation measures identified in the previous section do not mitigate all impacts. Residual impacts would include the long-term removal or disturbance of habitat in all areas occupied by the Project. This EIS would be used as a basis to create a long-term Biological Mitigation Action Plan that would promote adaptive-management strategies to mitigate unforeseeable impacts as they occur, including the spread of invasive species. In addition, any knowledge gained regarding effective treatment of invasive species, including Asian mustard and Arabian schismus, which may result from the Applicant's implementation of its Weed Management Plan, would be shared with the relevant agencies.

4.10.6 Cumulative Impacts

Impacts from amending the YFO RMP and construction, operation, maintenance, and decommissioning of the Applicant's Proposed Project could result in a cumulative effect on vegetation resources with other past, present, or reasonably foreseeable future actions. The geographic scope of the cumulative effects analysis for vegetation includes the La Posa Plains (see Figure 3-8). The dominant vegetation community within the La Posa Plain is the creosote bush-white bursage series. This series occurs primarily in broad valleys, plains, and lower bajadas of the Mojave and lower Sonoran deserts. Creosote bush and white bursage are commonly co-dominant, with other associates such as saltbush, ocotillo, and a variety of cactus species.

Any development within the La Posa Plains that results in the clearing and grading of existing desert lands would have cumulative effects within the vegetation ROI. As of July 2011, there are only two reasonably foreseeable future projects within the vegetation ROI: the Applicant's Proposed Project and the EnviroMission Solar Project. If the proposed Project and the EnviroMission project were to be approved and constructed, up to 7,425 acres of desert lands would be disturbed. This includes the estimated 1,675 acres associated with the proposed Project and up to 5,750 acres for the EnviroMission project. The actual amount of lands to be permanently disturbed by the EnviroMission project is unknown; this acreage is based on EnviroMission's requested ROW application to the Arizona State Land Department; therefore the amount of disturbance could be less. Collectively, this acreage represents a very small percentage (less than 0.01 percent) of the La Posa Plains ROI. Additionally, both the Applicant's Proposed Project and the EnviroMission project would be required to restore their respective project sites after plant decommissioning, and therefore, most cumulative impacts to vegetation resources would only occur during the operational lifetime of the projects.

Other cumulative impacts may result if non-native invasive species are allowed to spread or be introduced in the area. Two invasive, non-native plant species are known to occur in the La Posa Plains area: Asian Mustard and schismus, an annual grass. To minimize the potential spread of invasive species, QSE will be required to implement agency-approved BMPs and prepare a Weed Management Plan prior to any ground-disturbing activities. It is assumed that if approved, EnviroMission would be subject to the same requirements to minimize the spread of invasive species.

The scaly sandplant is an Arizona BLM sensitive species and an Arizona Department of Agriculture highly safeguarded species. Scaly sandplant was not found within the Project footprint during biological surveys; however, a small population is known to occur approximately 7 miles north of the Project site. It is unknown whether the EnviroMission project site contains suitable habitat for the species, but it is anticipated that such habitat would be avoided to the extent practicable, if it were present on the EnviroMission project site.

4.10.7 Short-Term Uses versus Long-Term Productivity

Vegetation removal in the Project area footprint, linear facilities, and transportation and access corridors would negatively impact the long-term productivity of vegetation resources for the life

of the Project. The vegetation communities present in the Project area are typically slow to recover, following reclamation and restoration activities. Estimates of the time that creosote bush-white bursage vegetation communities would require to recover vary; but other solar projects in similar creosote bush-white bursage vegetation communities have estimated that long-term productivity would be from a minimum of 5 to 10 years to more than 50 years following Project termination.

4.10.8 Irreversible and Irretrievable Commitments of Resources

Applicant-committed measures detailed in the mitigation measures would require the reclamation of disturbed areas immediately following temporary disturbances and termination of the Project. Long-term disturbance areas would constitute an irretrievable commitment of vegetation resources until active site reclamation and restoration of vegetation takes place. No irreversible commitment of vegetation resources is anticipated under the Applicant's Proposed Project and alternatives.

4.11 WILDLIFE AND SPECIAL STATUS SPECIES

This section discusses the effects on wildlife and special status species that may occur from amending the YFO RMP and with implementation of the Applicant's Proposed Project and alternatives.

4.11.1 Methodology for Analysis

Analyses for impacts to wildlife resources were accomplished through a variety of methods, including literature review of habitat requirements for target sensitive species, onsite biological reconnaissance, review of various internet websites and databases, and discussions with resource personnel from the AZGFD, BLM, and University of Arizona.

4.11.2 Indicators

The Applicant's Proposed Project would impact biological resources if it:

- Alters the structure, function, value, and persistence of sand dune communities.
- Affects wildlife species such that the diversity or numbers of local populations were altered by interference with survival, growth, or reproduction.
- Interrupts daily and/or seasonal wildlife movement and migration corridors.
- Destroys, degrades, or fragments habitat on a long-term basis.
- Introduces environmental changes that increase opportunities for predatory species, especially those of special status species.

- Interferes with desired future management outcomes identified for the Dunes WHA.

4.11.3 Direct and Indirect Effects by Alternatives

4.11.3.1 No Action Alternative

Under this alternative, the BLM would not approve the Applicant's ROW application and would not amend the YFO RMP; and Western would not approve the interconnection request. The BLM would continue to manage the land encompassing the Project area consistent with the existing VRM objective as described in the YFO RMP, and Western would continue to operate the Bouse-Kofa 161-kV transmission line under current conditions.

Because there would be no amendment to the YFO RMP and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, none of the impacts to wildlife resources from the proposed Project would occur and none of the benefits of the proposed Project, such as the proposed Mojave fringe-toed lizard study, would occur. In the absence of this Project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

4.11.3.2 Applicant's Proposed Project Alternative – Dry-Cooled

General Wildlife

Construction and operation of the Applicant's Proposed Project would result in the direct loss of up to 1,675 acres of habitat currently used by a variety of native wildlife species, ranging from small invertebrates, mammals, and birds, to medium-sized mammals and raptors. Direct impacts to wildlife from ground-disturbing activities include injury and/or mortality from vehicles and earth moving equipment (e.g., collision, crushing, burying/suffocation in collapsed burrows).

Because construction and operation of Project facilities would require removal of vegetation, this impact to wildlife represents a loss of cover, nesting material, food sources, and soil stability. Native shrubs provide stability to loose, sandy soils, thereby enhancing the structure of small mammal-constructed burrows, commonly used by a host of additional species (i.e., arthropods, lizards, snakes).

Disruption of normal wildlife activity patterns is likely with the introduction of construction activity and ongoing operation of the Project. Disruptions could include introduction of artificial light sources and obstruction of movement routes due to perimeter fence installation. An increase in noise associated with construction and operation of the facility would dissuade many species from occupying or otherwise using habitat in the immediate vicinity of the Project. Wildlife species that tend to benefit from the introduction of human activities and related facilities, trash, and debris, such as ravens and coyotes, could pose a potential increased threat to resident prey species such as lizards, small mammals, and ground-nesting birds.

Mammal Species

The only mammalian species on the Arizona State BLM list of sensitive species are bats. Although no roosting habitat exists on the Project area, a few insectivorous bat species may forage over the Project area and could be attracted to the evaporation ponds for drinking or hunting of insects attracted to the ponds. Potential impacts from ingestion of the pond water would be similar to those discussed for avian species below.

Avian Species

The concentrating solar technology to be used for the Project involves the use of a large field of mirrors reflecting sunlight on a central receiver mounted on a solar collecting tower approximately 653 feet in height. In California's Solar One/Solar Two facility, a pilot project built with similar technology, some risk to birds was observed (McCrary et al. 1986). Birds would occasionally collide with the mirrors, which represented approximately 80 percent of bird mortality at the site. The risk of bird collision would exist at the Project, but is anticipated to be lower than at Solar One/Solar Two. The pilot project was sited in an agricultural area with nearby surface water and relatively high bird abundance for an arid region. The Quartzsite Project area is extremely arid with low bird abundance and diversity and very few year-round resident species. Any collision risk presented to birds by the Project may be minimized by reducing the overall attractiveness of the Project area. If bird abundance and impacts are determined to be at a level requiring additional measures to reduce the area's attractiveness, mitigation may include: vegetation management in the solar field, netting evaporation ponds, or hazing birds.

The remainder of bird mortality at Solar One/Solar Two involved a small number of species including swallows and swifts that fly and forage at much greater heights than most birds. Standby, maintenance, or test operations involved focusing mirrors on points away from the solar collecting tower and created areas with very high air temperatures capable of causing fatal burns to birds. This risk may be minimized by reducing the use of standby points during periods of observed avian activity and by measures implemented to reduce the overall attractiveness of the area to birds.

Evaporation ponds for the Project would be located just outside of the heliostat field. Such ponds can pose a hazard to wildlife, particularly birds. High levels of dissolved solids, such as sodium and sulfates, would be present and can affect birds that drink the water. Waterfowl may also be affected by the formation of salt crusts on feathers, reducing flight capabilities. Designing ponds to have steep banks with a depth greater than 3 feet reduces their attractiveness to some species. If needed, the Project evaporation ponds could incorporate netting or other measures to deter birds from pond use. If required, an Avian Protection Plan would be developed that would address monitoring and response to mortality events from collisions, burns, and any bird use of the evaporation ponds.

Although resident bird diversity in the Project area is low, a number of migratory bird species are likely to nest there. Compliance with the MBTA would require surveying for, delineating, and adhering to non-disturbance buffers for nesting birds during the breeding season.

Wildlife Linkages

Linkage 45 (La Posa Plain) was analyzed for impacts. The Applicant's Proposed Project would not preclude wildlife movement in the area.

Special Status Species

Golden Eagle

Although the potential for golden eagles occurring within the Project area is low, with the recent publication of the BLM's IM regarding the BGEPA – Golden Eagle NEPA and Avian Protection Plan Guidance for Renewable Energy (IM 2010-156), increased attention from Federal and State wildlife and land management agencies has increasingly focused on bald and golden eagle protection. This IM directs the BLM to incorporate "consideration of golden eagles and their habitat … into the National Environmental Policy Act [NEPA] analysis for all renewable energy projects." Specifically, IM 2010-156 stresses consideration of "whether breeding territories/nests, feeding areas, roosts, or other important golden eagle use areas are located within the analysis area" and further states that such determination is to be made in coordination with the USFWS. Coordination with the BLM, AZGFD, and USFWS has been ongoing throughout the NEPA process for this Project, to adequately address golden eagles.

The AZGFD and BLM have adopted a metric for identification of suitable nesting substrate as sloped with a 45-degree incline or greater within 10 miles of a project. Digital elevation data indicate that the nearest cliff ledges that could provide nesting habitat for golden eagles are approximately 5 miles to the east of the Project area in the Plomosa Mountains. The Arizona Breeding Bird Atlas (Corman and Wise-Gervais 2005) shows no confirmed golden eagle breeding evidence for the entirety of La Paz County. Helicopter surveys conducted by the AZGFD in 2011, found no evidence of active golden eagle nesting sites within 10 miles of the Project area. With an apparently meager prey base in the area and no suitable nesting substrate, the potential for golden eagles using the Project area is low.

Indirect impacts would likely be a minor decrease in prey animals through the loss of native desert habitat. Construction of Project facilities would effectively result in the loss of up to 1,675 acres of potential foraging habitat because eagles are too large to maneuver between heliostats or other ancillary facilities while hunting. Additionally, increased vehicular traffic related to construction and operation of the facility, and potential increase of public traffic by Project workers or curious spectators on SR 95 could result in increased potential for collisions with eagles, especially if eagles are scavenging road-killed animals.

American Peregrine Falcon

Potential occurrence of peregrine falcons in the Project area is low due to distance from suitable nesting and foraging areas. Potential impacts to the species are those general to other raptors, namely collision or electrocution hazards posed by transmission towers, wires, the solar collecting tower, and heliostats.

Western Burrowing Owl

Burrowing owl burrows are not known to occur within the Project area; however, impacts could include the loss of foraging and breeding habitat, and potential loss of nest sites, eggs, or young.

USFWS Bird Species of Conservation Concern

Impact threats to USFWS Bird Species of Conservation Concern are primarily the same threats addressed above: loss of nesting and foraging habitat; increased predation from predators benefitting from artificial perches (i.e., fences, transmission towers); accidental destruction of nests, eggs, or young; and vehicle collisions.

Mojave Fringe-Toed Lizard

The geographic scope for impact analyses for the Mojave fringe-toed lizard was established at different scales: most immediate to the Project is the 5-mile ROI, secondarily, the species' range within Arizona was investigated in order to determine impacts to Arizona's Mojave fringe-toed lizard population, and finally, the species' entire distribution was taken into consideration to estimate the Project's potential impact to the species range-wide.

Implementation of the Applicant's Proposed Project would result in the loss of approximately 1,127 acres of sand sheet habitat that has not been documented onsite as supporting fringe-toed lizards, and 51.5 acres of moderate habitat that includes dune features and a 50-yard buffer (Section 3.11.4.5). No optimal habitat (active dunes) exists on the Project area. Total habitat acreage for the species rangewide is unknown, but because the vast majority of the range occurs in California, the potential loss of habitat by the Applicant's Proposed Project represents only a small fraction of the species' total habitat.

Direct impacts to the species would be loss of habitat and possible mortality from vehicular crushing. Eleven individuals were observed within the Project area during surveys in 2009 (EPG 2010a). Individuals within the area would be subject to these direct impacts.

Indirect impacts include fragmentation and possible degradation of remaining habitat, increased predation pressure from avian predators (such as loggerhead shrike [*Lanius ludovicianus*]) using new perching structures, and the introduction and spread of invasive plants.

Banded Gila Monster

Because Gila monsters seldom occur on low valley floors, it is very unlikely the species occurs within the Project area. No Gila monsters were observed within the Project area during site visits; however, the species does occasionally travel through the La Posa Plain. The only impacts the Applicant's Proposed Project may pose would be vehicle-caused injury or mortality.

Cheese-Weed Moth Lacewing

The cheese-weed moth lacewing was not observed on the Project area in three field visits. It is not known whether this species occurs on the site, but there is only a moderate potential of occurrence. If implemented, the Applicant's Proposed Project would result in the loss of habitat for the species because some vegetation would be cleared from the site. Because so little is known about this species, percentage of total cheese-weed moth lacewing habitat that would be lost is indeterminable.

MacNeil Sooty Wing Skipper

The MacNeil sooty wing skipper uses saltbush species as larval food plants. No saltbush plant species are known to occur within the Project area; therefore, vegetation clearing would not impact this species.

Wildlife Management Areas

The Project area is within the largest of four subunits comprising the Dunes WHA. As stated in the YFO RMP, the primary management focus for the Dunes WHA "would be that the amount of human disruption should decrease in proportion to the significance of the sand dune features, with more intensive use directed to sand dune areas of lesser significance or sensitivity" (BLM 2010a). Because level of significance or sensitivity criteria for sand dune features are not present in the YFO RMP, the present analysis is based upon contract biologists' onsite observations, aerial photograph interpretations, and conversations with other individuals experienced with biological research in the Project area.

Eolian sands mapped in this EIS, adapted from Muhs et al. (2003), account for approximately 48 percent of the Dunes WHA (26,569 acres of the total 54,696 acres) in which the Project is situated. The sand dune features within the Project area and within the southern half of the Dunes WHA are of lesser quality than those in the northern half of the WHA. The highest quality dune features in the area are beyond the WHA, within the Lake Havasu Field Office in the northern La Posa Plain and Cactus Plain. Acknowledging that sensitivity or significance of the dune habitat has not been determined, impacts to the Dunes WHA are based solely on acreage totals for the entire Dunes WHA (all four units); the Applicant's Proposed Project would result in conversion of up to 1,675 acres of Dunes WHA to solar energy generation facilities and associated infrastructure. This represents 3.1 percent of the total Dunes WHA.

Closure and Decommissioning

Once constructed and in operation, the proposed Project has an estimated life of at least 30 years. Construction of the proposed Project would disrupt the existing ecosystem and habitat within the facility footprint; conditions that would have been maintained for the life of the Project. Appropriate rehabilitation of the site would need to be revisited to determine consistency with management requirements existing at the time of closure. Land disturbance over the life of the Project would preclude rapid revegetation and grazing potential on the land following closure. Activities associated with decommissioning would comply with the MBTA and any other applicable regulations at the time of closure. Measures to avoid migratory bird nests and Mojave fringe-toed lizards should be taken.

4.11.3.3 Alternative 1 – Hybrid-Cooled

Under the hybrid-cooled alternative, larger evaporations ponds would be required. This would result in proportionally greater potential impacts to avian and bat species. Mitigation measures similar to those described for the Applicant's Proposed Project would be implemented. All other impacts to biological resources would be similar to those described for the Applicant's Proposed Project. Impacts from either telecommunications alternative would be similar to those described under the Applicant's Proposed Project.

4.11.3.4 Western's Substation and Telecommunication System

Western's Substation

Direct impacts to wildlife during construction of Western's substation may include injury or mortality from vehicles and earthmoving equipment (e.g., collision, crushing, burying/ suffocation in collapsed burrows). Sand dunes provide preferred habitat for the Mojave fringe-toed lizard. No sand dunes would be directly impacted by the switchyard, and no impacts to Mojave fringe-toed lizard are anticipated as a result of activities related to the switchyard.

Telecommunication Options

Either telecommunications alternative could be implemented under the Applicant's Proposed Project or Alternative 1.

Fiber-Optic Cable Alternative

Although construction activities would occur in an existing utility ROW, temporary and permanent ground disturbance would occur and the use of construction equipment could result in various direct and indirect impacts to wildlife. Prior to construction, a wildlife survey would be required in potential work areas along the ROW corridor to identify affected special-status species. Potential impacts to special-status wildlife include direct mortality from encounters with construction equipment, burrow/nest destruction during equipment staging, entombing adults, eggs, or young, and disruption or harassment. In addition, short- and long-term habitat loss and modification, as well as the potential spread of noxious weeds, could decrease local and regional wildlife habitat values. BMPs (Section 2.7) and mitigation measures to be used as part of the Project would minimize impacts to wildlife.

Microwave Alternative

Because of the limited area impacted by installation of a new microwave dish at the Bouse Substation, or at the Metal Mountain or Cunningham Peak communication sites, measurable impacts to wildlife or special status species from construction-related ground disturbances are not expected.

4.11.4 Mitigation Measures

The Project area has been situated to avoid as many sensitive dunes as possible, within the ROW application area. This location would result in the loss of an estimated 11.5 acres of sensitive dune habitat. The remainder of the Project area comprises sand sheet (containing no dune features) and barren desert pavement (containing no loose sand and practically no vegetation).

The following represent mitigation measures that have been identified to minimize or reduce impacts to wildlife resources:

- If wildlife species are found to be negatively impacted from access to the evaporation ponds, measures would be employed to restrict access or otherwise deter wildlife use.

- Evaporation ponds would be constructed with interior side slopes of at least 3:1 to discourage birds wading into the ponds. Also, pond hydrology (i.e., water volume and chemical concentrations) would be actively managed to minimize mortality associated with salt encrustation and/or salt toxicosis from ingestion of water.

- Mitigation for potential impacts to sand dune habitats in the Dunes WHA as a result of construction of this Project would be via an extensive study of Mojave fringe-toed lizard use of sand sheets and dunes that would be funded by SolarReserve. The Applicant has followed the YFO RMP guidelines to avoid and minimize impact to the habitat but recognizes that it will remove 1,675 acres of the Dunes WHA and has proposed the study with guidance from the BLM and AZGFD. See Appendix E for research proposal for "Status and ecology of the Mohave Fringe-toed Lizard (*Uma scoparia*) in the Bouse Dunes ecosystem, Arizona, focusing on the significance of peripheral sand-sheet habitat" dated March 25, 2011, and includes the following elements:

    - Occupancy, density, home range, and demography of Mojave fringe-toed lizard using statistical protocols combined with field sampling visits.

    - Asian mustard and other invasive vegetation species will be considered as part of this lizard study as confounding or interacting variables in the statistical sampling analysis.

    - As of the time of this writing, the study has received a commitment for additional funding sponsorship by the University of Arizona, elevating it to part of a PhD thesis. High quality scientific knowledge developed through the course of the study and in the final deliverables may be used by the AZGFD to create or improve the effectiveness of its species management policies, and by the BLM to create or improve the effectiveness of its land management policies or actions.

The proposed study assists with attainment of the Desired Future Condition identified in the Yuma RMP for the Dunes WHA to maintain sand dune habitats "to support native wildlife and plant species…"

4.11.5 Residual Effects

Generic mitigation measures identified in the previous section do not mitigate all impacts. Residual impacts would include the long-term removal of breeding, foraging, and cover habitat in all areas occupied by the Project. The Applicant's Proposed Project would include the removal of known and potential Mojave fringe-toed lizard habitat. General wildlife species that currently inhabit the Project area would be displaced into adjacent habitat.

Although efforts would be made to educate drivers on the potential for wildlife to cross the proposed access roads, the risk of wildlife mortality due to collisions with vehicles could not be fully mitigated. The mitigation measures listed above would help to lower the potential for road kills.

Road-related mitigation measures would attempt to make roads and other linear features more permeable to wildlife movement. Signs educating drivers on the potential for wildlife crossings on the road surface would help to reduce road barrier effects on large-bodied species. Slow speed limits (15 mph) would further increase the permeability of access roads. Despite these mitigation measures, road-related barrier effects may still occur and result in reduced gene flow between some wildlife populations.

Excluding wildlife from access to potentially toxic constituents within the evaporation ponds would help to reduce the long-term impacts of constituent bioaccumulation in bird and bat species. Although health effects to some individuals may still occur, this measure would lessen the potential for effects on individuals and populations.

This EIS would be used as a basis to create a long-term Biological Mitigation Action Plan that would promote adaptive-management strategies to mitigate unforeseeable impacts as they occur. As an example, an adaptive management strategy for bird and bat species may include the following components:

Post-Construction Monitoring

The process to detect incidents may include:

- Surveying the site periodically and with lower frequency over time, if warranted
- Reporting and recording mortality impacts to the USFWS, AZGFD, and BLM
- Training staff to implement a protocol including detection, response, documentation, reporting, and disposal

Post mortality Consultation

A collaborative determination (with the USFWS, AZGFD, and BLM) of the need to implement adaptive management strategies may be in consideration of several factors, including:

- Species impacted and its listing status
- Rarity of the species
- Effects to the population level of that species
- Whether previous mortality of the species has been reported at the ponds
- Total mortality of all species reported at the evaporation ponds

Implementation of Adaptive Management Measures

Strategies that may be employed after consultation with the USFWS, AZGFD, and BLM may include:

- Textured liner installed at corners of evaporation ponds to allow fallen bats and birds to crawl out of the water
- Anti-perching devices installed around the perimeter of each evaporation pond
- Visual deterrents to mimic avian and terrestrial predators
- Gas-fired “bird cannon” to frighten them away from the ponds, used intermittently to prevent acclimation
- Netting: After all other adaptive management techniques are exhausted, if it is determined that impacts from the evaporation ponds remain unacceptable, as a last and final resort netting can be installed on one or more of the ponds. The ponds would

initially be designed with adequate spacing for the installation of net support structures and cable tie down so the netting can be installed, while allowing the ponds to function as a means of evaporation.

4.11.6 Cumulative Impacts

Impacts from amending the YFO RMP and construction, operation, maintenance, and decommissioning of the Applicant's Proposed Project could result in a cumulative effect on wildlife resources with other past, present, or reasonably foreseeable future actions. The geographic scope of the cumulative effects analysis for wildlife includes the La Posa and Cactus Plains (see Figure 3-8). The ROI was selected based on recommendations from the BLM, USFWS, and AZGFD biologists in order to facilitate an adequate assessment of the Mojave fringe-toed lizard and their habitat within Arizona. Other wildlife species considered in the cumulative analysis include general desert wildlife species (see Section 3.11.3 and 4.11.3.2) and sensitive Federal and State listed wildlife species (see Section 3.11.4 and 4.11.3.2).

Any development within the La Posa and Cactus Plains that results in the clearing and grading of existing desert lands would have cumulative effects on wildlife resources. As of July 2011, there are only two reasonably foreseeable future projects within the wildlife ROI: the Applicant's Proposed Project and the EnviroMission Solar Project. If the proposed Project and the EnviroMission project were to be approved and constructed, up to 7,425 acres of desert lands would be disturbed. This includes the estimated 1,675 acres associated with the proposed Project and up to 5,750 acres for the EnviroMission project. The actual amount of lands to be permanently disturbed by the EnviroMission project is unknown; this acreage is based on EnviroMission's requested ROW application to the Arizona State Land Department; therefore the amount of disturbance could be less. Collectively, this acreage represents a very small percentage (less than 0.01 percent) of the La Posa Plains ROI. Additionally, both the Applicant's Proposed Action and the EnviroMission project would be required to restore their respective project sites after plant decommissioning, and therefore most cumulative impacts to potential wildlife habitat would only occur during the operational lifetime of the projects.

Because construction and operation of the solar facilities would require removal of vegetation, this impact would represent a loss of cover, nesting material, food sources, and soil stability. Disruption of normal wildlife activity patterns is likely with the introduction of construction activity and ongoing facility operations. Disruptions could include introduction of artificial lights, obstruction of movement routes, and an increase in noise which may deter many species from occupying or otherwise using habitat in the immediate vicinity of the two projects.

The primary species of concern in the Project area is the Mojave fringe-toed lizard, a BLM-sensitive species. The preferred habitat for the Mojave fringe-toed lizard are areas containing fine, windblown sand dunes, flats, riverbanks, and washes of very arid desert with low growing vegetation (generally within creosote bush scrub desert habitat). Within Arizona, the species only occurs in La Paz County, at the extreme western edge of the state near Parker, into the Cactus Plain, Parker Dunes (also known as the Bouse Dunes), Bouse Wash area and the La Posa Plain from elevations of approximately 300 to 3,000 feet. Within these areas, suitable habitat is typically present only as discrete patches of windblown sand.

Implementation of the Applicant's Proposed Project would result in the loss of 1,127 acres of desert pavement / non-dune habitat and 536 acres of sand sheet habitat that includes marginal dune features. Approximately 12 acres of optimal / moderate dune habitat for the Mojave fringe-toed lizard exists on the Project site. Total habitat acreage for the species rangewide is unknown. The vast majority of the species range, estimated to cover a 600 square-mile area, is located in the Mohave Desert in southern California (USFWS 2008). The cumulative effect from construction and operation of the Applicant's Proposed Project and the EnviroMission project would result in the potential disturbance of up to 7,425 acres. The amount of suitable Mojave fringe-toed lizard habitat within this acreage is unknown. However, due to the concerns about potential impacts of the Applicant's Proposed Project on Mojave fringe-toed lizard habitat, the prevalence of the Mojave fringe-toed lizard habitat was one of the considerations that factored into the site selection process. Additionally, the mitigation measures described in Section 4.11.4, would be required if the BLM plan amendment and ROW grant are approved to address what impacts do occur associated with the Applicant's Proposed Project.

Both QSE and EnviroMission use solar power towers and above ground transmission interconnection facilities as part of their project design. As a result, there is a potential for bird collisions with those towers and the associated transmission interconnection facilities. Due to the lack of water within the ROI, bird diversity is very low, and therefore, the actual potential for bird collisions with either of these project features is low.

Other species of concern include bats, golden eagles, American peregrine falcons, western borrowing owls, banded Gila monsters, cheese-weed moth lacewing, and the MacNeil sooty wing skipper. These species are known to occur in the ROI, however, these species were not observed during biological surveys. However, as described above, any development within the La Posa and Cactus Plains that result in the clearing and grading of wildlife habitat would have cumulative effects on wildlife resources.

4.11.7 Short-Term Uses versus Long-Term Productivity

Impacts associated with construction activities would degrade the short-term quality of wildlife habitat. Construction impacts include increased human noise and activity, increased vehicle traffic on the access road, and the removal of wildlife habitat. After construction has finished, levels of human noise, activity, and vehicle traffic would be reduced, and temporary habitat disturbances would be reclaimed. This Project would reduce the amount of habitat available to wildlife species and displace wildlife individuals from habitat that has been removed or degraded.

4.11.8 Irreversible and Irretrievable Commitments of Resources

Irreversible impacts would consist of the increased risk of bioaccumulation of potentially toxic constituents in some bird and bat individuals through use of evaporation ponds. Irretrievable commitments would consist of wildlife habitat removal and wildlife displacement for the Project footprint and associated roads and power lines, which would be reclaimed after the temporary facilities usage or after the life of the Project.

4.12 WATER RESOURCES

This section discusses effects on water resources/hydrology that may occur from amending the YFO RMP with implementation of the Applicant's Proposed Project or alternatives.

4.12.1 Methodology for Analysis

The methodology used to assess impacts to water resources/hydrology included a review of the water modeling studies conducted for the Project, and review of regional and local water resources investigations and studies.

4.12.2 Indicators

The Applicant's Proposed Project would affect water/hydrology resources if it would:

- Decrease groundwater supply or interfere with groundwater recharge
- Degrade the quality of groundwater such that it is no longer suitable for its intended use
- Degrade the quality of surface water by increasing erosion, increasing sedimentation, or introducing contaminated waters
- Increase the potential for flood hazards

4.12.3 Direct and Indirect Effects by Alternative

4.12.3.1 No Action Alternative

Under this alternative, the BLM would not approve the Applicant's ROW application and would not amend the YFO RMP; and Western would not approve the interconnection request. The BLM would continue to manage the land encompassing the Project area consistent with the existing VRM objective as described in the YFO RMP, and Western would continue to operate the Bouse-Kofa 161-kV transmission line under current conditions.

Because there would be no amendment to the YFO RMP and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, none of the impacts to water resources from the proposed Project would occur. In the absence of this Project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

4.12.3.2 Applicant's Proposed Project Alternative – Dry-Cooled

As described in Chapter 2, the Project would require 1,000 acre-feet of water during the first year of construction, and approximately 150 acre-feet per year over the next 2 years of construction. The construction phase water estimates include water for dust suppression during grading and along roadways as necessary; grading and compaction for the solar field, power block area, and

building foundations; and concrete work. Water needs during operations and maintenance include three primary uses:

- Steam cycle makeup water – estimated at 100 acre-feet per year
- Mirror wash water – estimated at 70 acre-feet per year
- Other uses including a wet-surface air cooler for auxiliary equipment, service water, quench water – estimated at 30 acre-feet per year

Total Project use is not expected to exceed 200 acre-feet per year.

Project water would be pumped from wells onsite for both construction and Project operation. At this time, it is anticipated that up to three wells would be used. The Project pumping wells are located at the center, the southeast, and southwest corners of the Project area. All three wells would be active during the first year of construction, the period of highest water demand (1,000 acre-feet per year). Any one or more of the wells would be active during the subsequent two years of construction and the 30 years of operation.

Groundwater

Water removed from the La Posa sub-basin during Project pumping would be derived by removing water from storage, intercepting a small amount of subsurface outflow that would otherwise discharge to the Parker Valley Basin, and inducing a small increase in inflow from the Ranegras Valley Basin. Given the distance to the boundaries with these adjacent basins and the relatively modest water demand of the Project, the potential impact to the water budgets of these adjacent basins is not expected to be significant.

To support the evaluation of potential impacts from Project pumping, an analytical drawdown model was constructed in THWells version 4.01 (van der Heijde 1996). The THWells modeling code uses this equation to simulate drawdown and recovery from mountain front recharge, Project pumping, and subsurface underflow. Predictive simulations were run to assess the potential impacts of pumping on water levels in the La Posa sub-basin. Potential impacts to the basin water budget, surface water resources, recharge, solute transport, and subsidence were evaluated based on the results of the groundwater model.

Project pumping rates and durations for simulating drawdown from construction and operational phases of the Project were based on the following scenarios:

- After 1 year of construction pumping (the period of highest water usage – 1000 acre-feet per year)

- After 10 years of groundwater pumping (including 2 years of construction groundwater pumping at a reduced rate of 150 acre-feet per year and 7 years of operational pumping at a rate of 200 acre-feet per year)

- After 33 years at the end of the 30-year Project life.

For simplicity, the 2 years of pumping at the lower construction rate were grouped together and pumping was simulated at 200 acre-feet per year for 32 years.

Contour maps of estimated drawdown were produced for the end of the first year of construction as well as after 10 years and 33 years of construction and operational pumping. These contour maps show the estimated drawdown at each of the known wells onsite within the model domain. Projected drawdown is predicted to be at a maximum at the end of the first year of Project construction. Drawdown at this time is estimated to be approximately 14 feet at the three production wells and to decrease rapidly away from the wells. Drawdown is predicted to decrease to 2 feet at a distance of approximately 0.5 mile from the wells, and to decrease to less than 1 foot at distances greater than 0.75 mile from the Project area. Projected drawdown after 10 and 33 years of pumping is approximately the same, and is estimated to be approximately 1 foot near the site boundary and decreasing farther away from the Project area. The similarity of drawdown after 10 and 33 years indicates that drawdown would stabilize relatively quickly after operational pumping begins. While drawdown near the wells would be greatest after the first year of construction pumping, drawdown at distance would be greatest at the end of the Project life. These drawdown impacts to nearby wells are considered negligible and would not result in wells becoming unstable or significantly diminishing in capacity, and would not cause significant increases in well electrical usage or maintenance requirements.

Surface Water

The proposed Project would be designed, to the extent possible, to avoid washes within the Project area. Although the precise location of each heliostat is unknown at this time, the heliostats can vary within a few feet of the designated coordinates in order to avoid sensitive areas within the solar field such as washes, flora, or subsurface irregularities. Based on the initial engineering design, total acre loss of waters of the U.S. resulting from Project development is estimated at approximately 0.023 acre.

Potential impacts to water resources during construction would be primarily associated with surface disturbing activities, but could also be a result of accidental spills and handling and storage of hazardous chemicals. Small amounts of chemicals solvents, herbicides, and petroleum products would be used during construction and operation of the Project. Additionally, large volumes of mineral oil would be utilized and stored in the transformers. The greatest potential for contamination of surface water from these materials would be from petroleum products in the transformer and at the vehicle refueling stations. The Applicant's emergency response plan (construction phase) and SPCC plan (operation phase) would provide for hazardous material spill prevention and cleanup measures, were a spill to occur.

Other sources of liquid waste with the potential for contamination would come from sanitary waste. Construction-phase sanitary waste would be removed by a contracted sanitary service. A septic tank and drain field system would be constructed near the Operation & Maintenance building to accommodate operation phase sanitary waste. The septic system would be constructed and maintained in accordance with ADEQ requirements for septic system installation. Adherence to this permit would prevent impacts to groundwater quality from the septic system.

Water quality impacts due to pumping from the upper alluvial aquifer are anticipated to be less than significant because existing water quality is known to be degraded only in portions of the Perched Aquifer near the Town of Quartzsite, well outside the cone of depression generated by the proposed pumping. In addition, the Upper Aquifer is separated from the Perched Aquifer and

the Lower Aquifer by regional aquitards, impeding vertical mixing of groundwater. To the extent that vertical mixing does occur, the water quality of the aquifer systems underlying the Project area is expected to be generally similar.

Water Quality

Surface water quality can be degraded by increasing rates of erosion and sedimentation, introducing contaminants, violating water quality standards, or otherwise changing the character of surface waters. There would be potential for increased erosion or sedimentation onsite or offsite due to Project construction and Operation & Maintenance activities. Although there are no perennial waterbodies within the Project area, there are drainages (dry washes and sheet floods) in the Project area that are characteristic of alluvial fans where surface water flows during and after heavy rains. While no surface water quality data are available for these temporary water bodies, it is expected that bed loads and suspended loads are quite high during significant storm events.

The Applicant would incorporate the construction-phase erosion and sediment control measures listed in Section 2.5 – Best Management Practices and Built-In Mitigation. These measures are consistent with regional BMPs and Federal, State, and local regulations including the Project's General Permit and SWPPP. These measures would control erosion and sediment transport during construction.

Flood Potential

The Project area is located on a portion of the La Posa Plain that slopes at less than 1 percent. The stormwater drainage system would be designed to separate the "offsite" flows from "onsite flows". The offsite flows are flows originating outside of the developed area of the solar generating facility. The onsite flows are considered the flows of stormwater generated from rain that falls inside the developed area of the solar generating facility.

A collector ditch and dike system would divert offsite flows around the solar generating facility and discharge these flows to pre-existing locations downslope from the developed area and to the existing swale crossings on SR 95. These offsite flows would then follow the existing drainage patterns.

The solar generating facility would be graded as a series of planes to allow onsite flows to generally follow the pre-development flow patterns. A detention facility would be constructed on the west portion of the solar field to detain the release of onsite flows to match pre-development conditions.

Concentration of flows would be minimized by the use of check dams, stone filters, armored areas, and diversion swales that keep water from concentrating in areas of steeper slope. The detention facility located in the west portion of the solar field would be constructed in order to slow the water, allow it to infiltrate, and promote flow patterns into their existing drainage patterns.

The stormwater drainage system would be designed using the Soil Conservation Service method (TR-55) to determine the amount of rainfall during a specific rainfall event, and in accordance with requirements specified in the most current version of the La Paz County design requirements.

All surface water runoff during and after construction would be controlled in accordance with the requirements of the General Construction and General Industrial Stormwater NPDES permit, the requirements of La Paz County, and all other applicable laws, ordinances, regulations, and standards.

Closure and Decommissioning

During decommissioning, the Project site would be restored to a level acceptable to the BLM. Flood control structures surrounding the site would be removed, and onsite drainage facilities would be removed. The site would be graded to be as consistent as possible with adjacent natural drainage areas. Washes and channels that currently exist onsite would not be restored precisely to their current shapes and locations, but would be allowed to naturally re-form following completion of the decommissioning process.

4.12.3.3 Alternative 1 – Hybrid-Cooled

The wet/dry– or hybrid-cooled alternative would incorporate similar construction, operational, decommissioning, and reclamation components as the Applicant's Proposed Project (dry-cooling system), but would use an alternative cooling technology that requires more water during operations. A hybrid-cooling system uses parallel trains of wet- and dry-cooling systems. This system will dry cool only the load necessary to remain below the maximum turbine backpressure; the rest of the cooling will be accomplished by an evaporative cooling tower. This will allow water consumption by the cooling systems by only using them as much as necessary.

Operational water requirements would be between 500 and 700 acre-feet per year and would require an approximately 18-acre evaporation pond surface area of process wastewater disposal. Water use would depend largely on site conditions, water quality, and the efficiency of the air-cooled condenser and the cooling tower.

4.12.3.4 Western's Substation and Telecommunication System

Western's Substation

The construction of Western's switchyard would require the use of water or an approved dust suppressant during grading and concrete pouring activities. Less than 10 acre feet of water would be required during construction. Based on the low volumes of water required for construction of the switchyard and the lack of any permanent water usage, Western's substation would not deplete groundwater or other water sources.

Western's proposed switchyard would not be constructed within waters of the U.S. Western would ensure that local washes are protected from pollution caused by construction activities, and require its construction contractor to obtain the appropriate permits. Therefore, construction and operation of Western's switchyard would not degrade or eliminate any wetlands or waters of the U.S.

Telecommunication Options

Either telecommunications alternative could be implemented under the Applicant's Proposed Project or Alternative 1.

Fiber-Optic Cable Alternative

The fiber-optic line route would cross soils that have moderate to high erosion potential by surface runoff and eolian processes. Soil disturbed during cable stringing is more susceptible to erosion and compacted soil can accelerate stormwater erosion. In addition, the proposed fiber-optic line route would cross numerous ephemeral streams. Vehicles and equipment crossing these ephemeral streams would disturb and compact the soil and potentially cause the loss of stabilizing vegetation. With implementation of measures and BMPs described in Section 2.7 that would ensure proper re-vegetation, erosion control, and drainage, impacts from installation of fiber-optic cable would result in minor impacts to water resources.

Microwave Alternative

Because of the limited area impacted by the installation of a new microwave dish at the Bouse Substation or at the Metal Mountain or Cunningham Peak communication sites, impacts to water resources from construction-related ground disturbances are not expected.

4.12.4 Mitigation Measures

No additional mitigation measures, outside those included in the applicant committed measures identified in Chapter 2, are suggested.

4.12.5 Residual Effects

The Project is not expected to have any residual effects to water resources.

4.12.6 Cumulative Impacts

Impacts from amending the YFO RMP and construction, operation, maintenance, and decommissioning of the Applicant's Proposed Project could result in a cumulative effect on water resources with other past, present, or reasonably foreseeable future actions. The geographic scope of the cumulative effects analysis for groundwater resources consists of the La Posa groundwater sub-basin, which is located within the Parker groundwater basin (see Figure 3-8). The cumulative effects surface water ROI consists of the Tyson Wash watershed. There are no perennial streams, wetlands, or riparian areas within the water resources ROI. Larger ephemeral washes that cross the area include Tyson and Kaiser Washes, which only flow during high-intensity rainfall events.

Existing groundwater conditions within the water resources ROI are described in detail in Section 3.12. As described in Section 3.12.4.1, there are five distinct hydrostratigraphic units within the aquifer that underlies the La Posa sub-basin. Groundwater occurs at a depth of approximately 550 feet bgs, depending on geologic conditions. Groundwater is used as a municipal drinking water supply for the Town of Quartzsite, which is the primary water user in the La Posa sub-basin. Scattered domestic wells exist across the basin, but are primarily concentrated around the Town of Quartzsite.

Reasonably foreseeable future projects within the groundwater resources ROI include the proposed EnviroMission Solar Energy Project and the expansion/reopening of the Copperstone Gold Mine. According to EnviroMission's press releases, operation of their facility requires no water for power generation, although it is anticipated that some water will be required for sanitary facilities and other plant needs. Based on where the EnviroMission project is in the approval process, information about their construction water needs is not available, nor is data available about other water needs. However, based on standard construction practices, water will be needed during earth-moving activities, road building, concrete pouring, and for dust control.

According to the Decision Record for the Proposed Reopening of the Copperstone Mine (BLM 2010), if the mine were to reopen, the mining operation would require the use of up to 100.8 million gallons of water (309 acre-feet) annually. For the Applicant's Proposed Project during the 30-month construction period, up to 1,000 acre-feet of groundwater will be used during the first year of construction, and approximately 150 acre-feet per year over the next 2 years of construction. During the operations and maintenance phase, the facility will require up to 200 acre-feet per year over a 30-year period. The extraction of groundwater for the two solar projects, the mine reopening, when considered with the existing water usage within the La Posa groundwater sub-basin would result in a cumulative effect on available groundwater within the aquifer.

In the State of Arizona, groundwater consumption is closely monitored and regulated in five active management areas (AMAs). Outside the AMAs, groundwater consumption is less restricted. The La Posa Plains sub-basin is not located within an AMA. According to the ADWR, outside of an AMA, the only requirement for groundwater extraction and well installation is the submittal of a Notice of Intent which includes information about the well and is directed towards assuring compliance with Arizona well standards and avoidance of land owner conflicts. Water rights are not regulated outside the AMAs and groundwater extraction at or below the specific discharge rate on the Notice of Intent is permitted indefinitely for the life of the well.

There is potential for cumulative groundwater or surface water quality impacts to occur during construction of any industrial site. However, all reasonably foreseeable projects, including the Applicant's Proposed Project, are required by law to implement a site-specific SWPPP and SPCC Plan which contain measures that minimize or avoid these impacts. Additionally, given (i) the absence of perennial streams, wetlands, or riparian areas, (ii) the depth to groundwater within the Project area, and (iii) the limited rainfall that occurs in the Project area, it is highly unlikely that any spills during construction or operation would impact ground or surface water resources.

4.12.6.1 Hybrid-Cooled Alternative

Construction of the hybrid-cooled alternative would have similar cumulative construction impacts on water resources as the Applicant's Proposed Project (dry-cooled alternative). The largest difference between the two alternatives is the amount of operational water to be obtained.

4.12.7 Short-Term Uses versus Long-Term Productivity

The short-term use of the Project area for constructing, operating, and maintaining the Project would have no impact on the long-term productivity of surface-water resources. Applicant-

committed environmental protection measures and implementation of Project-appropriate BMPs would allow the quality and quantity of surface water to be maintained for the life of the Project and beyond (following decommissioning).

The short-term use of water resources for the Project would result in a long-term (but not permanent) impact on the productivity of the groundwater resources in the La Posa sub-basin. Under the groundwater consumption scenarios described above, projected groundwater drawdown after 10 and 33 years of pumping (the modeled scenario) is estimated to be approximately 1 foot near the site boundary, decreasing farther away from the site. At Project decommissioning, groundwater consumption would cease. However, groundwater levels would be reduced until natural groundwater recharge replenishes the groundwater resource in the area.

4.12.8 Irreversible and Irretrievable Commitments of Resources

For the purposes of this analysis, an irreversible commitment of water resources would be the permanent contamination of surface water bodies or a groundwater aquifer, a decrease in aquifer recharge, the overuse of these resources by the Project to the point that they would not be available for other uses, or changes in runoff patterns that would increase erosion, sediment flow, or the risk of flooding.

Although the Project would use up to 1,500 acre feet of groundwater during the 30-month construction period and up to 200 acre-feet per year for the life of the Project, it would not contaminate surface water bodies or groundwater aquifers. Changes in groundwater levels would be long-term direct impacts because groundwater levels would be lowered throughout the life of the Project. This change in groundwater levels would be an irretrievable impact because groundwater levels would be lowered until natural recharge replenishes the aquifer. Implementation of appropriate Project-design measures and BMPs would ensure the Project would not significantly change runoff patterns to induce flooding, or increase erosion or sedimentation.

4.13 CULTURAL RESOURCES

This section describes and evaluates the potential impacts on cultural resources that would result from amending the YFO RMP with implementation of the Applicant's Proposed Project or Alternatives.

4.13.1 Methodology for Analysis

An impact assessment methodology was developed to identify and evaluate the potential impacts to cultural and historic resources associated with the Applicant's Proposed Project and alternatives. The methodology takes into consideration previously recorded resources, the sensitivity of the resources, Project alternatives that have been systematically surveyed, and the anticipated Project disturbances.

4.13.2 Indicators

In order to evaluate the impact each alternative may have on cultural resources, anticipated impacts to NRHP eligible sites, traditional cultural properties, sacred sites, and human remains were examined for each alternative.

A significant impact on cultural resources may result if any of the following significance criteria were to occur from construction or operation of the Project:

- Loss or damage to the integrity and qualities that qualify a property for inclusion in the NRHP.
- Loss or degradation of a traditional cultural property or sacred site, or if the property or site is made inaccessible for future use. The nature and significance of effects on any sacred sites and places of traditional cultural importance are assessed in consultation with Indian tribes and related communities.
- Disturbance of human remains, including those interred outside of formal cemeteries.

4.13.3 Direct and Indirect Effects by Alternative

This section describes the effects under each alternative using the respective methodology prescribed under NEPA. Both direct effects and indirect impacts on views from places of tribal importance were identified for this resource. The results of visual simulations to assess impacts to resources are discussed further in Section 4.16 – Visual Resources.

Visual impact specialists assessed the potential visual and color contrast impacts to not only previously recorded cultural resources, but also locations of traditional tribal importance. Impacts to specific sensitive viewers were described as: (1) moderate overall visual impacts to the access road to Dome Rock Mountains, located 9.8 miles southwest of the proposed tower location; (2) moderate overall visual impacts to Copper Peak, located 6.7 miles west of the proposed tower location; (3) low/moderate overall visual impacts to the Fisherman Intaglio, located 6.3 miles east of the proposed tower location; (4) low overall visual impacts to the communication site on Black Peak, located 20.2 miles north of the proposed tower location; (5) low overall visual impacts to the Blythe Intaglios Cultural Site, located approximately 19 miles west of the proposed tower location; (6) low overall visual impacts to the cultural resources area adjacent to Black Point, located 19.5 miles west of the proposed tower location; and (7) low overall visual impacts to the Big Maria Mountains, located 19.8 miles west of the proposed tower location. These impacts are also summarized in Section 4.16, and particularly in Table 4-14.

The Tribes have not identified any sacred sites which would be disturbed by construction and operation of the proposed Project. The scarcity of archeological materials indicates that the area was used primarily for travel and associated short-term activity, rather than regular settlement or resource use. The lack of settlements and the absence of topographic features that many tribes used as burial sites, indicate that the potential for the discovery or disturbance of human remains is low.

4.13.3.1 No Action Alternative

Under this alternative, the BLM would not approve the Applicant's ROW application and would not amend the YFO RMP; and Western would not approve the interconnection request. The BLM would continue to manage the land encompassing the Project area consistent with the existing VRM objective as described in the YFO RMP, and Western would continue to operate the Bouse-Kofa 161-kV transmission line under current conditions.

Because there would be no amendment to the YFO RMP and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, none of the impacts to cultural resources from the proposed Project would occur. In the absence of this Project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

4.13.3.2 Applicant's Proposed Project Alternative – Dry-Cooled

There are four cultural properties within the APE of the Applicant's Proposed Project. Two of these properties (AZ R:4:30[ASM] and AZ L:12:15[ASM]) are recommended or determined not eligible for inclusion in the NRHP, so the Applicant's Proposed Project would result in no effects to historic properties for these. For a third property (AZ L:7:30[ASM]), the portion of the property within the APE of the Applicant's Proposed Project does not possess characteristics of significance that contribute to the property's eligibility for inclusion in the NRHP. As a result, the Applicant's Proposed Project would result in no effects to historic properties for this property. A fourth cultural property (AZ R:4:18[ASM]) is an archaeological site within the APE of the Applicant's Proposed Project that was recommended during recordation as being potentially eligible for inclusion in the NRHP. The site is located 100 meters north of an existing utility structure, and the Applicant's Proposed Project may involve installation of fiber optic lines above the ground using existing utility poles. To avoid damage to or loss of this archaeological site as a result of implementation of the Applicant's Proposed Project, it is recommended that the site be avoided and that an archaeological monitor be present during construction activities in the vicinity of the site. If this recommendation is followed, this would result in the Applicant's Proposed Project having no adverse effects to cultural resources.

Closure and Decommissioning

The future decommissioning and closure of the Project should not negatively affect cultural resources, since the ground disturbed during plant decommissioning and closure would have been already disturbed, and mitigated as required, during construction and operation of the Project.

4.13.3.3 Alternative 1 – Hybrid-Cooled

Impacts to cultural resources from construction and operation of a hybrid-cooled solar plant would be identical to the impacts described above for the Applicant's Proposed Project (dry-cooled alternative).

4.13.3.4 Western's Switchyard and Telecommunication System

Western's Switchyard

Western's switchyard would be located on approximately 4.6 acres of BLM-administered land adjacent to the existing right-of-way for the Bouse-Kofa 161-kV transmission line. Based on records review and pedestrian surveys, no known cultural resources are known to be present within the boundaries of the switchyard site. Direct effects to cultural resources are not likely to occur.

Telecommunication Options

Either telecommunications alternative could be implemented under the Applicant's Proposed Project or Alternative 1.

Fiber-Optic Cable Alternative

Direct impacts to cultural resources would potentially occur from ground disturbance during construction. Ground disturbance associated with the installation of fiber-optic cable on existing transmission towers is expected to be minor and temporary. Cultural sites mapped during a previous archaeological survey of the ROW would be avoided.

Indirect impacts to cultural resources can have both physical and cultural or spiritual components. Western and the BLM are responsible for consulting with local Native American groups regarding impacts and potential mitigation resulting from construction of the telecommunication system alternative.

Microwave Alternative

Because of the limited area impacted by the installation of a new microwave dish at Bouse Substation, or at the Metal Mountain or Cunningham Peak communication sites, impacts to existing or known cultural resources from construction-related ground disturbances are not expected.

4.13.4 Mitigation Measures

No additional mitigation measures, outside those included in the applicant committed measures identified in Chapter 2, are suggested.

4.13.5 Residual Effects

No residual effects to cultural resources would result from implementation of the Applicant's Proposed Project or alternatives.

4.13.6 Cumulative Impacts

Based on the location of the proposed Project and the results of the cultural resources study conducted for the EIS analysis, the potential for cumulative impacts to archaeological and historic sites as of result of construction, operation, maintenance, and decommissioning of the Project is considered low. Impacts to cultural resources are generally localized and do not result in regionally cumulative impacts. The impacts of the Applicant's Proposed Project to cultural resources would be localized within the Project area. There is, however, the potential for future projects in the vicinity to disturb areas that may contain known or unknown cultural resources. Future projects with potentially significant impacts to cultural resources would be required to comply with Federal and State regulations and ordinances protecting cultural resources to assess and mitigate any adverse effects.

4.13.7 Short-Term Uses versus Long-Term Productivity

Short-term uses versus long-term productivity are not discussed because no cultural resources would be affected by the action alternatives.

4.13.8 Irreversible and Irretrievable Commitments of Resources

Neither irreversible nor irretrievable commitments of resources would occur for cultural resources.

4.14 SOCIAL AND ECONOMIC CONDITIONS

The following section describes and evaluates the potential effects of amending the YFO RMP and construction and operation of the Applicant's Proposed Project or alternatives on socioeconomic resources within the ROI. These effects or impacts are discussed by alternative and focus largely on the Applicant's Proposed Project.

The social and economic impacts are quantified where possible. However, where quantification of impacts is not possible, the analysis includes a qualitative discussion of possible effects. The analysis includes separate but integrated approaches to addressing social, economic, and fiscal impacts of the Project.

4.14.1 Methodology for Analysis

Methodology for social and economic analysis in this section is based on economic data presented in Chapter 3 from sources such as the ADC, U.S. Census Bureau, Bureau of Labor Statistics, and records of conversation. In most cases, projections and estimates were developed using baseline data presented in Section 3.14, Social and Economic Conditions.

4.14.2 Indicators

NEPA provides no specific thresholds of significance for socioeconomic impact assessment. Significance varies based on the setting of the Applicant's Proposed Project (40 CFR 1508.27[a]), but 40 CFR 1508.8 states that indirect effects may include those that are growth-inducing and others related to induced changes in the pattern of land use, population density, or growth rates. In addition, the regulations state, "Effects include….cultural, economic, social, or health, whether direct, indirect, or cumulative. Effects may also include those resulting from actions which may have both beneficial and detrimental effects, even if on balance the agency believes that the effect would be beneficial" (40 CFR 1508.8).

For the purposes of this analysis, a significant impact on social and economic values may result if any of the following were to occur from construction or operation of the Applicant's Proposed Project:

- An increase in population that would create shortages of housing and place an excessive burden on local government and community facilities and services.
- Permanent displacement of existing residences or businesses.
- Long-term loss of economic viability of farms or other businesses.
- Permanent and irreversible loss of work for a major sector of a community.
- Cause a decrease in adjacent property values.
- Change resulting from the Project would exceed historical or estimated fluctuations in the regional economy.
- Result in a need for new infrastructure systems, including power or gas utilities, communications systems, water and sewer services, or solid waste disposal systems.

4.14.3 Direct and Indirect Effects by Alternative

4.14.3.1 No Action Alternative

Under this alternative, the BLM would not approve the Applicant's ROW application and would not amend the YFO RMP; and Western would not approve the interconnection request. The BLM would continue to manage the land encompassing the Project area consistent with the existing VRM objective as described in the YFO RMP, and Western would continue to operate the Bouse-Kofa 161-kV transmission line under current conditions.

Because there would be no amendment to the YFO RMP and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, no socioeconomic impacts from the proposed Project would occur and the benefits of capital costs, construction and operation payroll, and sales taxes and property taxes of the proposed Project

would not occur. In the absence of this Project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

4.14.3.2 Applicant's Proposed Project Alternative – Dry-Cooled

Implementation of the Applicant's Proposed Project would have direct and indirect short- and long-term effects on regional social and economic resources during construction and operation. The creation of direct and indirect jobs is an important concept to understand in this section. Direct jobs are those associated with investment, spending, and employment directly related to solar power construction and ongoing operations and maintenance activities. Indirect jobs are tied to economic activities such as material, equipment, and additional services purchased from the outside and related industries. Indirect jobs also include employment opportunities created when construction workers purchase services and goods in nearby communities. The discussion of these potential effects is addressed in this section.

Project Workforce and Skills

Construction

Project construction would occur over a total of 30 months. Table 4-5 represents the construction personnel by discipline.

Project construction would require an average of 280 full-time skilled and unskilled employees per month during the 30-month construction period, with manpower requirements peaking at approximately 438 workers in month 12 of construction (WorleyParsons 2010c). The primary trades required for Project construction include carpenters, electricians, insulators, ironworkers, cement masons, millwrights, operating engineers, painters, pipefitters, and skilled and unskilled laborers. Solar field craft workers are primarily laborers and equipment operators who would be directly associated with the installation and assembly of the solar field. Construction payroll is estimated to be approximately $92.5 million (assuming 8,406 man-months x $55/hour x 200 hours per month) over the life of the construction phase of this Project (WorleyParsons 2010c; U.S. Department of Labor 2010).

According to the ADC, there is an excess of available construction workers throughout the State (ADC 2010). Table 4-6 demonstrates historical and forecasted construction employment for Arizona outside of the Phoenix and Tucson metropolitan statistical areas. The overall construction employment between 2007 and 2011 is expected to decrease by 53 percent or 15,400 workers, suggesting that more unemployed construction workers would likely come from nearby communities than would be expected if the industry were experiencing growth. Between 2007 and 2011, the Phoenix metropolitan statistical area construction employment is expected to decrease by 48 percent or 81,800 workers, indicating that a large portion of construction workers from the Phoenix metropolitan area may be willing to travel to the Project area for work. Though not significant relative to the large number of unemployed construction workers across the region, development of the Project would help to reduce the number of unemployed construction workers and would provide indirect employment opportunities for others near the Project area.

Table 4-5 Quartzsite Construction Personnel by Discipline

Discipline	Monthly Number																														
	Comp. & Plant Prep					Construction																					Commissioning				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	Totals
CRAFT																															
Boilermakers															6	8	8	8	8	8	8	11	11	8	8	6	6	6			
Carpenters					2	2	20	22	28	30	40	50	50	50	40	30	25	25	25	20	15	15	15	10	10	10	10	6	4	4	4
Electricians					2	2	4	20	36	36	48	48	56	56	56	56	56	56	56	56	56	48	48	36	36	36	24	24	24	20	16
Insulators																							8	8	8	16	16	16	4	4	2
Ironworkers							8	20	24	26	26	32	32	32	26	30	25	25	20	20	20	20	20	20	18	18	18	12	12	6	6
Laborers		2	2	2	6	10	20	20	26	26	40	44	52	54	54	54	54	54	54	54	54	48	48	48	32	32	32	20	16	16	16
Cement Masons					1	1	1	4	4	4	4	4	6	6	6	4	4	4	4	4	4	4	4	4	4	4	4	4	2	2	0
Millwrights								3	3	3	16	16	16	16	16	16	16	16	16	16	16	14	14	12	12	10	10	8	6	6	6
Operating Engineers		2	2	2	10	22	22	22	36	40	40	36	36	30	30	30	30	24	24	24	20	20	20	20	20	20	20	15	15	15	12
Painters																									5	8	8	8	4	2	2
Pipefitters							45	60	60	80	80	80	80	80	80	80	80	80	70	70	60	60	50	50	40	40	40	40	40	40	15
Drivers		2	2	2	4	6	4	4	4	15	15	15	15	15	26	26	26	26	26	26	26	30	28	28	28	28	24	24	24	20	16
Heliostat Assembly Craft		0	0		0	0	0	0	15	30	45	45	45	45	45	45	45	45	45	45	45	45	0	0	0	0	0	0	0	0	0
Total Craft		**6**	**6**	**6**	**25**	**43**	**124**	**175**	**236**	**290**	**354**	**370**	**388**	**384**	**385**	**379**	**369**	**363**	**348**	**343**	**324**	**315**	**266**	**244**	**221**	**228**	**212**	**183**	**151**	**135**	**95**
STAFF																															
Construction Staff		2	4	8	10	24	36	36	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	32	32	32
Construction Management Staff		1	2	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 4-5 Quartzsite Construction Personnel by Discipline

Discipline	Monthly Number																														
	Comp. & Plant Prep					Construction																					Commissioning				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	Totals
Subcontractors		0	0	0	3	6	6	6	6	6	4	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
TA		0	0	0	0	0	0	0	0	0	0	0	2	4	4	4	4	4	4	4	4	4	4	4	4	6	6	6	6	6	6
Staff Total		**3**	**6**	**11**	**18**	**35**	**47**	**47**	**51**	**51**	**49**	**48**	**50**	**52**	**51**	**51**	**51**	**51**	**51**	**51**	**51**	**51**	**51**	**51**	**51**	**53**	**53**	**53**	**45**	**45**	**45**
GENERATION TIE-LINE																															
Laborer		4	4	4	4	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Operator		8	9	4	4	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Drivers		1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electrician		7	11	11	11	10	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Generation Tie-line Total		**20**	**25**	**20**	**20**	**15**	**15**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Total		**29**	**37**	**37**	**63**	**93**	**186**	**222**	**287**	**341**	**403**	**418**	**438**	**436**	**436**	**430**	**420**	**414**	**399**	**394**	**375**	**366**	**317**	**295**	**272**	**281**	**265**	**236**	**196**	**180**	**140**

Source: WorleyParsons 2010c

Table 4-6 Historical and Forecasted Construction Employment for Arizona					
	Historical			**Forecast**	
Construction	**2007**	**2008**	**2009**	**2010**	**2011**
Total Employment	29,000	23,900	16,200	13,400	13,600
Employment Change	-3,300	-5,100	-7,700	-2,800	200
Percentage Change	-10.2%	-17.6%	-32.2%	-17.3%	1.5%
Source: ADC 2010. *Does not include Phoenix and Tucson metropolitan statistical areas.					

The number of indirect jobs resulting from the creation of temporary construction jobs is expected to be up to 560 across the ROI (assuming each construction job would create two more jobs [280 workers x 2]) (Frisvold et al. 2009). These indirect forms of employment vary from basic service industry jobs such as hotels and restaurants to jobs in the transportation industry.

Operation

The operations workforce would consist of approximately 47 full-time employees for the entire facility. These employees would consist of plant operators, heliostat washing crews, maintenance technicians, and administrative personnel working 8- or 10-hour shifts for 4 or 5 days per week. The plant operations crew would be separated into five crews of four workers each and the facility would be staffed 7 days a week/24 hours a day, 365 days a year. The plant is expected to operate daily from sunrise to as late as midnight on any given day, based on the availability of sunlight and the demand for power. The operation workforce for the Project is represented in Table 4-7.

Table 4-7 Plant Operations Workforce		
Department	**Personnel**	**Shift**
Operations	(20) Plant Operating Personnel (1) Plant Chemist	Standard 8-hour days, 4 operators per shift (5 crews of 4)
Heliostat Washing	(8) Heliostat Servicemen	Standard 8-hour days
Maintenance	(4) Mechanical Technicians (4) Electrical/I&C Technicians (4) Laborers (Semi-skilled)	4x10 hour shifts or 5x8 hour shifts
Administration	(1) Plant General Manager (1) Operations Superintendent (1) Plant Engineer (1) Maintenance Manager (1) Maintenance Planner (1) Administrative Assistant	4x10 hour shifts or 5x8 hour shifts
Source: WorleyParsons 2010d		

Total full-time annual payroll would be expected to be $2.7 million, which includes benefits and incentive pay in addition to salaries (ADC 2008). A range of wages would be expected among

those employed by the Project, from lower wages of a general laborer to higher wages of the project management staff and technical advisors. Staffing for the operations of the Project would result in beneficial long-term impacts to individuals seeking stable employment because the Project would provide long-term employment and income throughout the life of the Project.

Up to three indirect jobs are expected to be created for every full-time operational job; therefore, the number of indirect jobs would total approximately 141 (Kammen et al. 2004). These indirect forms of employment vary from basic service industry jobs to jobs in education to accommodate new students.

Fiscal Impacts

Construction

Total expenditures for construction, including employment, materials, supplies, and equipment, of the Applicant's Proposed Project is anticipated to be approximately $600 million over the 30 month construction period (personal communication, Andrew Wang 2010). Materials and supplies that would be purchased within the ROI are expected to total $169 million (WorleyParsons 2010c). Based on an average sales tax rate of 9.3 percent (for various cities within the ROI), tax revenues for the sale of materials and supplies would be approximately $15.7 million over the construction of the Project (Zip2Tax 2010). Additionally, if temporary construction workers spent 25 to 50 percent of their income within the ROI, approximately $23.1 million to $46.3 million would enter the local and regional economy.

The creation of 560 indirect jobs (jobs created as a result of construction jobs) from the construction of the Applicant's Proposed Project would result in an influx of approximately $36.4 million of personal income to the ROI over the 30-month span of the Project's construction (based on La Paz County's average annual wage of $26,002). If these workers were to spend between 25 and 50 percent of their income within the ROI, approximately $9.1 million and $18.2 million would enter the local and regional economy over the 30-month construction period.

In total, direct and indirect employment during Project construction would result in $32.3 million to $64.5 million in new personal income entering the local and regional economy.

Operation

Throughout the operation of the Project facility, the anticipated 47 employees who would operate and maintain the site would experience an influx of personal income totaling approximately $2.7 million per year. Assuming these workers spend 50 to 75 percent of their income within the ROI, approximately $1.4 million to $2 million would enter the local and regional economy annually.

The creation of 141 indirect jobs (jobs created as a result of operation jobs) from the construction of the Applicant's Proposed Project would result in an influx of approximately $3.7 million of personal income to the ROI per year over the life span of the Project's construction (based on La Paz County's average annual wage of $26,002). Assuming these workers spend 50 to 75 percent of their income within the ROI, approximately $1.9 million to $2.8 million would enter the local and regional economy annually.

In total, direct and indirect employment during the construction of the Applicant's Proposed Project would result in between $3.3 million and $4.8 million in new personal income entering the local and regional economy annually.

Population

Construction

Based on the total number of direct and indirect jobs created during the construction phase, population is expected to grow temporarily by as many as 840 individuals (280 construction jobs [direct] + 560 [indirect jobs] = 840) over the duration of the construction phase. Quartzsite, Parker, and Blythe would likely receive most of these residents. Quartzsite, Parker, and Blythe could expect temporary population increases of 104, 94, and 642 (totaling 840), respectively (calculated based on U.S. Census American Community Survey persons per household data [U.S. Census 2010a]). If these populations were to stay within La Paz County and the City of Blythe, this growth would represent a population increase of approximately 2 percent. These immigration figures are summarized in Table 4-8. Further, because of the considerable loss of construction jobs in Arizona communities as a result of the current economic recession, there is a significant pool of unemployed skilled construction labor in the region. Consequently, workers hired to construct the Project would likely be drawn from the existing workforce within the ROI.

Operation

The immigration of approximately 47 workers and their families to the area during the operation of the Project would result in an increase in population of approximately 130 (assuming the Arizona average household size of 2.77). These residents would then take advantage of service industries such as restaurants and grocery stores, creating the need for indirect jobs. Unlike indirect jobs created during the construction phase, these jobs would remain in the community as long as the Project facility is operational.

Table 4-8 Population Impacts during Construction Phase

Population	Quartzsite	Parker	Blythe	Quartzsite, Parker, Blythe	La Paz County and Blythe*
Population (2009)	3,466	3,120	21,322	27,908	41,334
Construction Force (average number of direct jobs)**	35	31	214	280	280
Indirect Jobs	70	63	428	560	560
Total Population Increase	104	94	642	840	840
Percent of 2009 Population	3.01%	3.01%	3.01%	3.01%	2.03%

Sources: U.S. Census Bureau 2010a; Frisvold et al. 2009
*Scenario assumes that population growth would only occur in La Paz County and Blythe, California
**Assuming two indirect jobs created for every one direct job (280 x 2 = 560)

Based on the total number of direct and indirect jobs created during the operation phase, population is expected to grow by approximately 521 individuals (47 x 2.77 = 130 [resulting from direct jobs] + 141 x 2.77 = 391 [resulting from indirect jobs]). Based on existing U.S. Census persons per household data (U.S. Census 2010a), the communities of Quartzsite, Parker,

and Blythe could expect population increases of 66, 58, and 398 (totaling 522). If these populations were to stay within La Paz County and the city of Blythe, this growth would represent a population increase of approximately 1.1 percent. These immigration figures are summarized in Table 4-9.

Table 4-9 Population Impacts during Operation

Population	Quartzsite	Parker	Blythe	Quartzite, Parker, Blythe	La Paz County and Blythe*
Population (2009)	3,466	3,120	21,322	27,908	47,920
Operation (direct jobs)	6	5	36	47	47
Indirect Jobs**	18	16	108	141	141
Total Population Increase***	66	58	398	521	521
Percent of 2009 Population	1.9%	1.9%	1.9%	1.9%	1.1%

Sources: U.S. Census Bureau 2010a; Kammen et al. 2004
*Scenario assumes that all jobs would stay in La Paz County and Blythe, California
**Assuming 3 indirect jobs created for every one direct job (47 x 3=141)
***Assuming Arizona average household size of 2.77 (2.77 x 188 = 521)

Housing

Construction

Because a large portion of the construction workforce is expected to temporarily relocate to the Project area rather than commute, increased demands on housing could be significant if limited to the Town of Quartzsite. However, given the Project's proximity to other communities and the wide variety of available housing and lodging options in communities such as Parker and Blythe, these housing demands are expected to be minimal. Table 3-21 – Lodging and RV/Trailer Parks, indicated that there are nearly 2,000 hotel and motel rooms within 35 miles of the Project area. Additionally, RV, trailer parks, and campgrounds provide a significant number of housing options for temporary construction workers. According to the BLM YFO RMP (BLM 2010a), approximately 250,000 visitors annually use the La Posa LTVA and the five surrounding 14-day campgrounds. If workers were to commute without their families and travel home on the weekends, they could also take advantage of 14-day campgrounds (assuming that these workers have access to or own a RV or camper trailer).

Those with knowledge of housing availability in the area recognize that Quartzsite has limitations, but have expressed that the surrounding communities are highly capable of withstanding growth of up to 450 temporary workers (personal communication, Nora Yackley 2010). Proof of the area's ability to withstand immense population growth is evident in the winter months, when its population soars to nearly 100,000 at any one time (personal communication, Jeff Gilbert 2010).

Since many RV, trailer parks, and campgrounds are only open during the winter months, some concerns may surround the possibility of year-round use. Even though the availability of trailer parks may decrease during off-peak seasons, local land owners have expressed interest in opening their properties year-round to accommodate temporary construction workers (personal

communication, Al Johnson 2010). Unemployed workers from surrounding communities could easily commute and therefore would not contribute to a housing shortage.

Operation

Though rental units in Quartzsite and Bouse are not widely available (347 units and 29 units, respectively), communities such as Blythe and Lake Havasu City had a high number of vacant units (788 and 5,107 units, respectively) in 2000 (U.S. Census Bureau 2010e). Parker is also a viable option for permanent housing; 76 percent of the units (878 total units) in the town are single-family detached units. Operation of the Project would be expected to have very little impact on the availability of housing, because the population increase represents a small portion of the region's total population and would be spread across communities. In addition, increased availability of year-round RV and trailer parks may reduce the need to build new homes for those who permanently locate to the area.

Public Services

Construction

Construction of the Project would not result in an increase in demand for public services. Current police, fire, and medical facilities should be sufficient to handle emergencies during construction activities at the site. The Project would rely on onsite and offsite fire protection services. The Project would establish a construction emergency action program and plan that would include emergency evacuation procedures. The Project would also develop and implement a personal protective equipment program for both construction and operation phases of the Project.

Following the development of a service contract, the Town of Parker Volunteer Fire Department would be the first responders in the case of fire and medical emergencies during construction of the Project. The department has one fire station with two fire engines, two water tenders, and a 75-foot ladder truck. The Town of Parker Volunteer Fire Department currently has the capacity to respond to a potential increase in incidents in the Project area (personal communication, John Rather 2010). The station is located at 1101 West Arizona Avenue in Parker, which is approximately 23 miles north of the Project area. Additional fire and emergency support would come from the Quartzsite Fire District approximately 10 miles south of the Project area, at 70 E. Tyson Street, in Quartzsite. If needed, the Quartzsite Fire District can provide service to the Project area for a fee.

The nearest hospital to the Project area is the La Paz County Regional Hospital (located at 1200 West Mohave Road in Parker), which is open 24-hours a day/7 days a week. Ambulance service from the Project area to the hospital would be provided by River Medical Incorporated. River Medical has ambulance teams in both Parker and Quartzsite. Depending on availability at the time of emergency, service could come from either of these locations.

Utilities – Construction of the Project would require potable water and electrical utility supplies and would generate wastewater and solid waste. Potable water would be treated and stored in a small portable water unit. Construction power may be obtained from the existing Arizona Public Service 69-kV transmission line along the western portion of the Project or portable generators.

Waste generated during construction would be disposed of at the closest landfill, located approximately 8 miles north of the Project area off of SR 95. Currently, the landfill charges

$25.50 per ton of construction debris and has adequate capacity to service the site (personal communication, Julie Huff 2010).

Schools – Given that the construction workers are unlikely to relocate their families as part of their temporary employment on the Project, impacts on school enrollment during construction are expected to be minimal. If some workers were to relocate their families, there is ample room for growth in Bouse, Parker, and Palo Verde Unified (Blythe) school districts. In total, these districts have the capacity to grow by approximately 16 percent of 750 students in grades K-12 (see Table 3-33; note that the Quartzsite School District was not included because total capacities were not available). Because of the remote location of the site, the construction of the Project is not expected to impact any school activities.

Operation

Regional or local population would not be expected to change as a result of the operations of the facility; therefore, capacity of the local emergency services should not change. The services provided by Parker Volunteer Fire Department, Quartzsite Fire District, River Medical Incorporated, and La Paz County Regional Medical Hospital would not be affected by the Project's operation.

Utilities – The Project would utilize onsite groundwater wells and would therefore have no impact on local water utilities. Project sanitary wastes would be disposed of by an onsite waste treatment system, with a septic tank and two permanent leach fields. Operations would have no impact on the availability of local wastewater treatment capacity.

The Project area would not utilize natural gas and therefore would not impact natural gas in the area. The Project may also require electrical power for maintenance activities during nighttime hours when the facility is not generating its own power.

Schools – The operation of the Project facility would have little to no impact on schools, given the small population increase expected in the area (521 residents). Assuming Arizona's average household estimate that approximately 26 percent of the State's population is under 18, 135 new students may potentially relocate to the area (US Census 2010b). Across the four closest school districts closest (Quartzsite, Parker, Bouse, and Palo Verde Unified in Blythe) to the Project area, an influx of 135 students represents an increase of approximately 3.3 percent of current enrollment (estimated to be 4,032 students). As mentioned previously, these four districts have capacity for more than 750 additional students.

Closure and Decommissioning

The anticipated lifespan of the Project is estimated to be 30 years. Closure- and decommissioning-related social and economic impacts would be related to both the discontinuation of the solar operations and the short-term effects of the necessary facility deconstruction and subsequent site reclamation activities.

The direct economic impact associated with discontinuation of the solar energy generation site would result in job losses for the operations workforce, which would no longer be needed to maintain the facility's daily operations and/or repair the solar power generation equipment and

related infrastructure. Closure would also directly reduce future revenues to any local material, equipment, and service suppliers previously supporting the facility's daily operations.

In addition, closure would have the additional adverse economic effect of reducing the employment and revenues for other local or regional businesses that rely on spending by the Project's operations staff or suppliers. As a result of the reduced income and revenues of these affected businesses, the Project's staff and support businesses would make few purchases from other local businesses that, in turn, would reduce these businesses and employees' income and purchasing ability.

Deconstruction activity could, however, result in a short-term increase in local spending from the employment, equipment, and materials required to dismantle the solar facility and reclaim the site. The cost and duration for the deconstruction activities is likely to be roughly comparable to that of the construction; except that the amount of labor and materials would be less than that required for the facility development because the facility would not need to be operational.

4.14.3.3 Alternative 1 – Hybrid-Cooled

Impacts to socioeconomic resources from construction and operation of a hybrid cooling solar plant would be similar to the impacts described for the Applicant's Proposed Project (dry-cooled).

Direct and indirect impacts to job creation, infrastructure, housing demand, and the overall economy would remain the same between the alternative and Applicant's Proposed Project.

4.14.3.4 Western's Switchyard and Telecommunication System

Western's Switchyard

Construction of Western's switchyard would occur over a 12-month period and would coincide with construction of the solar facility. Western would issue a separate solicitation for the construction of the proposed switchyard in accordance with Western's contracting requirements Up to 10 construction workers would be employed over the 12-month period. Construction and operation of the switchyard would not cause an adverse impact on population, employment, housing, public finance, local economies, or public services.

Telecommunication Options

Either telecommunications alternative could be implemented under the Applicant's Proposed Project or Alternative 1.

Fiber-Optic Cable Alternative

In comparison to construction of the Project, a minimal workforce would be required for construction of any of the telecommunication system alternatives. The telecommunication system construction would not cause an adverse impact on population, employment, housing, public finance, local economies, or public services. In addition, because there would be no adverse Project-related socioeconomic impacts, minority and low-income populations would not be disproportionately impacted.

Microwave Alternative

Similar to the fiber-optic cable alternative discussion above, no adverse socioeconomic impacts are expected.

4.14.4 Mitigation Measures

There are no mitigation measures for socioeconomic resources because mitigation measures for resources such as transportation, visual, biological, and land use resources would each help to reduce impacts to socioeconomic resources for visitors and residents within proximity to the Project. Mitigation measures for these resources are aligned with the BLM's management goals, which serve to minimize Project impacts.

4.14.5 Residual Effects

There are no mitigation measures for socioeconomic resources; therefore, there are no residual effects.

4.14.6 Cumulative Impacts

The potential for cumulative socioeconomic impacts exists where there are multiple projects proposed in an area that have overlapping construction schedules and/or project operations that could impact similar resources. Projects with overlapping construction schedules and/or operations could collectively result in a demand for labor that cannot be met by the region's labor pool, which could lead to an influx of non-local workers and possibly their dependents. This population increase could impact social and economic resources if there are insufficient housing resources and/or infrastructure and public services to accommodate the new residents' needs.

Cumulative impacts to socioeconomic resources would mostly be limited to the local and regional economy within the Quartzsite, Blythe, Bouse, and Parker area. However, due to the limited labor pool in these communities, it is likely that most workers would temporarily relocate from larger, more distant metropolitan areas, such as Phoenix, Las Vegas, and Los Angeles.

Section 4.14.3 – Direct and Indirect Effects by Alternative concluded that each of the alternatives would have no significant impacts to utilities; therefore, cumulative effects on utilities are not analyzed in this Draft EIS. Due to the type of existing, present, and foreseeable projects, socioeconomic resources such as public services, workforce, the economy, and housing are the focus of this section.

Impacts from amending the YFO RMP and construction, operation, maintenance, and decommissioning of the Applicant's Proposed Project could result in a cumulative effect on socioeconomic resources with other past, present, or reasonably foreseeable future actions. When combined, the development of the Project and other reasonably, foreseeable future projects such as the EnviroMission solar project, the expansion/reopening of the Copperstone Gold Mine, and other renewable energy projects in the desert southwest, would be expected to influence

socioeconomic resources in La Paz County, Arizona and Riverside County, California. As of July 2011, the only solar project under construction in the regional area is the Blythe Solar Project, which is approximately 30 miles west of Blythe, or approximately 60 miles west of the Project area. The Blythe Solar Project is anticipated to be constructed in multiple phases, with construction occurring over a 60-month timeframe (BLM 2010). The Blythe Solar Project Final EIS identified 13 major BLM solar projects in eastern Riverside County, California. Within the La Posa Plains in La Paz County, Arizona, there are four pending solar project applications. The majority of these pending solar projects have not advanced into the permitting phase and very limited data is available to assess the potential impact from their construction and operation.

Regardless, if any of the pending solar or other large-scale construction projects within commuting distance of the proposed Project were to have overlapping construction and/or project operations, cumulative impacts on socioeconomic resources are likely to occur.

A large number of workers would be needed during the construction of these projects, which would reduce the availability of temporary housing if these projects were constructed simultaneously. Given the large number of winter visitors that La Paz County experiences, temporary housing availability would be especially strained during these months.

The relatively close distance of the Project site to a number of communities, such as Quartzsite (approximately 10 miles), Blythe (approximately 26 miles), Parker (approximately 21 miles), Ehrenberg (approximately 23 miles), and Bouse (approximately 11 miles), increases the likelihood that cumulative impacts to public services would be spread across the region. Three factors suggest that impacts to public services would be minimal during construction and operation: the unlikelihood of multiple projects overlapping, the dispersion of population across various communities, and the fact that a large number of winter visitors are currently sustained by existing public services (estimated to be up to 100,000 visitors at one time during the winter months).

The local and regional economy stands to benefit immensely from the development of renewable energy projects in the area. These projects would likely draw on the unemployed work force, bringing employees from other counties in Arizona and populations across the California border. Workers from each of these regions would be expected to spend their income locally, helping support existing local businesses and create new businesses associated with population growth such as housing, restaurants, and other services. Projects would also draw on locally and regionally procured materials, creating new jobs and stimulating these types of businesses. As more and more renewable energy projects are developed, new local and regional suppliers would emerge and begin to expand their inventories to accommodate clean energy industries. The emergence of local suppliers would keep dollars circulating within the local economy, helping generate more taxes and revenues that were previously lost to other counties and communities. In addition, the construction and operation of numerous renewable energy projects can spawn new educational opportunities for those out of work and those seeking to retool themselves for new industries.

4.14.7 Short-Term Uses versus Long-Term Productivity

Construction and operation of the Project would preclude revenues that could be generated by recreational opportunities or other recreational activities that could take place within the Project area. Each of the action alternatives would result in short- and long-term job creation throughout the construction and operation phases of the Project. Additionally, new solar-related educational and training opportunities could result during the operational phase of the Project if clusters of similar facilities are developed in the region.

As mentioned previously, those familiar with the area would recognize and experience an altered landscape from a natural desert habitat/ecosystem to a more industrialized environment. These perceptions would be experienced primarily by visitors to the area, but could also be experienced by residents living close to the Project.

4.14.8 Irreversible and Irretrievable Commitments of Resources

An irreversible impact to socioeconomic resources under all action alternatives would be a permanent change to the landscape. While the site may be decommissioned and new uses are introduced to the area, it may not result in the same perceptions held by visitors and residents who had previously visited the site.

An irretrievable socioeconomic impact that would result from the each of the action alternatives would be the preclusion of other uses for the land during operation of the facility. Once decommissioned, however, other uses for the site could take place. These uses may or may not generate revenue, but could represent a return of quality of life perceptions associated with the area.

4.15 ENVIRONMENTAL JUSTICE

This section describes and evaluates the potential effects on environmental justice from amending the YFO RMP and construction and operations of the Applicants Proposed Project including Western's switchyard and telecommunication system, or alternatives. The analysis is consistent with EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (February 11, 1994). Environmental justice analysis ensures that any disproportionately high and adverse human health or environmental effects of its actions on minority and low-income populations are identified and addressed.

4.15.1 Methodology for Analysis

Methodology for environmental justice impacts is based on data obtained from the 2000 Census and presented in Section 3.15 – Environmental Justice, and key indicators set forth by EO 12898.

4.15.2 Indicators

For this analysis, a significant impact related to environmental justice issues may result if any of the following were to occur from construction or operation of the Applicant's Proposed Project:

- A disproportionate negative effect on minority or low-income populations in the area, as defined by EPA criteria.
- Affected minority or low-income populations were not informed of and offered an opportunity for meaningful involvement to ensure that their interests and concerns about the Project would be considered.

4.15.3 Direct and Indirect Effects by Alternatives

4.15.3.1 No Action Alternative

Under this alternative, the BLM would not approve the Applicant's ROW application and would not amend the YFO RMP; and Western would not approve the interconnection request. The BLM would continue to manage the land encompassing the Project area consistent with the existing VRM objective as described in the YFO RMP, and Western would continue to operate the Bouse-Kofa 161-kV transmission line under current conditions.

Because there would be no amendment to the YFO RMP and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, no environmental justice impacts from the proposed Project would occur. In the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

4.15.3.2 Applicant's Proposed Project Alternative – Dry-Cooled

The data presented in Section 3.15 determined that there are environmental justice populations located within the ROI. However, due to the distance of these populations from the Project area, direct impacts are not expected to result from the Applicant's Proposed Project. This is supported by the fact that no environmental justice populations are located within census tract 205 (which spans 65 miles and covers La Posa Plain, the Town of Quartzsite, unincorporated Bouse, and BLM land south of I-10) surrounding the Project area. Therefore, there are no direct or indirect effects associated with the Applicant's Proposed Project. Neither adverse health nor environmental impacts to these groups would result from the development of the Project. Impacts to any of these potential environmental justice groups would be the same as those expected to impact the entire population during construction and operation. The development of the Applicant's Proposed Project is expected to create employment opportunities, economic multiplier effects, and tax revenue that would indirectly, and possibly directly, benefit all populations across the ROI.

Closure and Decommissioning

Once constructed and in operation, the proposed Project has an estimated life of at least 30 years. Decommissioning and closure of the Project is not anticipated to have any adverse impacts to environmental justice populations. Impacts during decommissioning would be similar to those during construction of the Project. The creation of employment opportunities through direct and indirect jobs and tax revenue would potentially benefit all populations across the ROI, including environmental justice populations.

4.15.3.3 Alternative 1 – Hybrid-Cooled

Impacts from construction and operation of Alternative 1 to environmental justice populations would be identical to the Applicant's Proposed Project (dry-cooled). Thus, there would be no direct or indirect effects to environmental justice populations as a result of the hybrid-cooling alternative.

4.15.3.4 Western's Switchyard and Telecommunication System

Western's Switchyard

No adverse environmental justice impacts are expected from construction and operation of Western's switchyard.

Telecommunication Options

Either telecommunications alternative could be implemented under the Applicant's Proposed Project or Alternative 1.

Fiber-Optic Cable Alternative

Similar to the fiber-optic cable alternative discussion under Section 4.14 – Social and Economic Conditions- no adverse environmental justice impacts are expected.

Microwave Alternative

Similar to the fiber-optic cable alternative discussion under Section 4.14 – Social and Economic Conditions- no adverse environmental justice impacts are expected.

4.15.4 Mitigation Measures

There are no impacts to environmental justice populations; therefore no mitigation measures are prescribed.

4.15.5 Residual Effects

There are no impacts to environmental justice populations; therefore, no residual effects exist.

4.15.6 Cumulative Impacts

Cumulative impacts to environmental justice are not analyzed for the Applicant's Proposed Project or other alternatives because each would not result in any disproportionately high or adverse effects on minority, low-income populations, or Native American communities. As presented in Section 3.15, no environmental justice communities exist within close proximity to the Project area, which is largely undeveloped and uninhabited.

4.15.7 Short-Term Uses versus Long-Term Productivity

Short-term uses versus long-term productivity are not discussed because no minority populations would be disproportionately or adversely affected by the action alternatives.

4.15.8 Irreversible and Irretrievable Commitments of Resources

Irreversible and irretrievable commitments of resources are not discussed because no minority populations would be disproportionately or adversely affected by the action alternatives.

4.16 VISUAL RESOURCES

This section describes the visual impact assessment and impact results associated with amending the YFO RMP and implementation of the Applicant's Proposed Project or alternatives. The purpose of the visual impact assessment is to analyze and characterize potential impacts to sensitive viewers and scenic quality and describe compliance with applicable VRM objectives. The determination of impact intensity (levels) and compliance with VRM objectives was based on assessing the level of perceptible change (contrast) to the landscape resulting from the construction and operation of the Project.

4.16.1 Methodology for Analysis

4.16.1.1 Contrast

Contrast is the measure of change to the landscape resulting from the proposed Project. Specifically, in regard to solar generation projects, visual contrast is typically associated with clearing vegetation, grading and other topographical modifications, and the introduction of vertical features (structures) into naturally appearing landscapes. The visual analysis also considered the presence of existing cultural modifications (i.e., man-made modifications such as transmission lines, primitive roads, industrial development, etc.) and their effect on the landscape in relation to sensitive viewers.

Per BLM VRM contrast methodology, the level of contrast associated with the Project was measured by assessing changes to the landscape's physical features (including landform/water, vegetation, and structures) in terms of form, line, color, and texture as seen from sensitive viewing locations. Contrast was documented using Visual Contrast Rating Worksheet – BLM

Form 8400-4. Additional contrast resulting from the operations of the facilities was considered, such as the solar collecting tower glowing brightly, night-lighting, and glint and glare.

The resulting levels of contrast, which are based on the establishment of the existing landscape character, are defined below in Table 4-11.

Table 4-10 Degree of Contrast

Degree of Contrast	Criteria
Strong	The element contrast demands attention, will not be overlooked, and is dominant in the landscape
Moderate	The element contrast begins to attract attention and begins to dominate the characteristic landscape.
Weak	The element contrast can be seen, but does not attract attention.
None	The element contrast is not visible or perceived.
Source: BLM VRM Manual 8431 – Visual Resource Contrast Rating	

In some cases it was appropriate to identify a contrast level between two of the four levels. For example, the Project may demand attention, but does not completely dominate the landscape from a given viewpoint. In this example the contrast level would be moderate/strong.

4.16.1.2 Sensitive Viewers

Contrast rating worksheets (Visual Contrast Rating Worksheet – BLM Form 8400-4) were completed from critical key observation points, referred to as KOPs per BLM VRM policy. Impacts to sensitive viewers and their associated KOPs were assessed using the following criteria:

- Viewer sensitivity (high or moderate)
- Distance of sensitive viewer from the Project (foreground, middleground, or background)
- Viewing position (superior, level, or inferior views)
- Visibility (unobstructed, screened, skylined, or backdropped views)

The consideration of these elements resulted in a contrast level rating, or level of visual change for each KOP, consistent with the BLM's VRM Manual H-8431-1, Visual Contrast Rating.

For sensitive viewers with level views of the Project, as distance from the Project increases the perception of the Project decreases due to the relatively low profile of the heliostat arrays, although the solar collecting tower is still evident. In this regard, specific distance zones were identified within the framework of BLM-specified distance zones, as described below.

4.16.1.3 Distance Zones

The following distance zone definitions (Table 4-12) were developed for the Project and are consistent with BLM VRM procedures. These distance zones were used to describe the Project in regard to sensitive viewers and associated KOPs.

Table 4-11 Distance Zones

Distance Zone	Criteria (per BLM)	Project viewing conditions – Level Viewer
Immediate Foreground	0 to 1 mile	The Project is in close proximity to the viewer, where details are discernible and the scale of the solar collection tower dominates the view, resulting in potentially strong contrast.
Foreground	1 to 3 miles	Project features are visible, but details such as texture and color are not apparent. The heliostat array begins to blend with the horizon line and the solar collection tower is apparent.
Middleground	3 to 5 miles	The heliostat array and power block (excluding the solar collecting tower) are not apparent to the casual observer. The receiver tower becomes the primary element of the Project that is still evident to sensitive viewers.
Background	5 miles or beyond	The solar collecting tower would be discernible in the landscape, but would not dominate the view.

Distance zones are critical in providing context for the Project within the landscape. The solar collecting tower is visible from the foreground through background distance zones, even as details such as color and texture begin to become indistinct. Visual contrast is further reduced if seen in the context of existing cultural modifications such as existing transmission lines, roadways, cell phone towers, etc.

4.16.2 Indicators

4.16.2.1 Establishment of Indicators

The Project would be located on BLM-designated VRM Class III land. The BLM management objective for Class III lands is:

> "*…to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape*" (BLM VRM Manual 8410-1 VRI).

4.16.2.2 Determination of Impacts and VRM Compliance

Sensitive viewer impacts consider the sensitivity of the viewer and contrast based on distance and associated viewing conditions within the context of the existing setting. Compliance with VRM classifications was assessed by evaluating the level of visible change (contrast) from

sensitive viewers KOPs (see Table 4-14). Using BLM form 8400-4 (Visual Contrast Rating Worksheet) contrast was characterized and documented (per BLM guidance) from KOPs that demonstrate compliance with VRM classes (Table 4.13 [BLM Manual H-8410-1]; see Appendix F for KOP Worksheets).

Table 4-12 Compliance with Agency Management Objectives

Contrast Level	VRM Class			
	I	II	III	IV
Strong	No	No	No	Yes
Moderate/Strong	No	No	Yes	Yes
Moderate	No	Yes	Yes	Yes
Weak/Moderate	No	Yes	Yes	Yes
Weak	Yes	Yes	Yes	Yes

Simulations

To represent the range of potential visual impacts resulting from the construction and operation of the Project, 11 photo simulations were prepared, per BLM direction, and are located in Appendix G. The simulations were prepared based on high-resolution photography and corresponding GPS data gathered during field investigations. Photographs taken with a 50 mm lens are the best approximation of the perspective and depth-of-field associated with the human eye. The photographs for this Project were taken with a 45 mm lens which, although not fully representational of the depth and perception of the human eye, was determined by the BLM to be acceptable for the purposes of this study.

4.16.3 Direct and Indirect Effects by Alternatives

4.16.3.1 No Action Alternative

Under this alternative, the BLM would not approve the Applicant's ROW application and would not amend the YFO RMP; and Western would not approve the interconnection request. The BLM would continue to manage the land encompassing the Project area consistent with the existing VRM objective as described in the YFO RMP, and Western would continue to operate the Bouse-Kofa 161-kV transmission line under current conditions.

Because there would be no amendment to the YFO RMP and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, none of the visual impacts from the proposed Project would occur. In the absence of this Project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

4.16.3.2 Applicant's Proposed Project Alternative – Dry-Cooled

Facilities for the Project include a solar collecting tower, salt storage tanks, heliostat array, evaporation ponds, administrative/warehouse buildings, heliostat assembly building, heliostats, switchyard, and linear facilities (access road) constructed on approximately 1,675 acres (see Table 4-13 for sizes of Project elements and Section 2.4 for a complete list of specific Project elements).

Table 4-13 Structure and Building Dimensions

Permanent Structure/Building Description	Length (feet)	Width (feet)	Height (feet)
Solar Collecting Tower (115' dia. base; 86' dia. top of tower)	-	-	563
Heliostat (individual panels)	24	28	12-26
Administration (Pre-Engineered)	153	63	13
Warehouse (Pre-Engineered)	102	63	24
Control/Operations (Pre-Engineered)	93	64	13
Steam Generation (Engineered)	195	152	150
Electrical (Pre-Eng or Modular)	94	34	13
Water Treatment	120	60	30
Switchyard (including perimeter wall)	300	300	30
Heliostat Assembly Building (Pre-Eng)	400	200	30

Note: Measurements are approximate and based preliminary engineering
Source: Diep 2011

Construction activity would create short-term visual impacts, depending on the specific construction activity. These visual impacts include, but are not limited to, the temporary concrete plant construction and operation for the duration of the Project (the alternative would be to truck in concrete from Quartzsite). The solar collecting tower would require a construction crane for the duration of the tower being built. In addition to specific construction activities impacting visual resources, normal construction activities could add to the short-term visual impacts associated with the construction of the Project such as temporary construction parking, construction laydown areas, construction trailers, and temporary toilets. Construction parking, laydown areas, and construction trailers would be on the SR 95 side of the Project and would have a temporary fence similar to fencing around the heliostat array perimeter road.

Three 4-acre evaporation ponds would be located on the southwest quadrant of the heliostat array perimeter. These ponds would be visible to travelers along SR 95, with northbound travelers having the most direct views. The evaporation ponds would introduce and increase contrast for form, line, color, and texture. It is anticipated that the ponds would have an 8-foot high chain link fence around the perimeter.

Project Contrast

The Project would introduce an overall moderate level of Project contrast. The regular geometric forms and defined diagonal and horizontal lines associated with clearing of desert shrubs and land grading for the solar collecting tower and heliostat array would result in a weak/moderate level of contrast. The introduction of geometric and regular line and form associated with the power block would result in moderate/strong contrast when compared to the diagonal and angular lines associated with adjacent scenery (i.e., Plomosa Mountains to the east).

The large expanse of the heliostat array would appear to be low and horizontal in the foreground distance zone, resulting in moderate/weak contrast due to the relatively short stature of the heliostats (12 feet tall when mirrors are horizontal; 24 feet tall when mirrors are vertical). The monopole generator tie-line is similar in form and line as the existing H-frame towers. The proposed switchyard would be adjacent to the existing H-frames at SR 95 and would introduce a new element in form, line, color, and texture for foreground viewers due to the switchyard components, but would not likely be seen for viewers in the middleground through background.

The solar collecting tower would introduce a strong overall contrast in the foreground distance zone, with strong contrast for form, line, color and texture due to the size of the tower structure and the illuminated receiver. Under certain conditions (i.e., increased levels of humidity or increased PM in the atmosphere) reflected light from the solar collecting tower would appear to be emanating from the tower top (referred to as a "halo" effect). This effect would be seen from the foreground through background distance zones, but would typically occur in the mornings, last less than an hour, and would decrease as humidity decreases. (Note: the solar collecting tower would not be illuminated during cloudy conditions)

Overall, the construction and operation of the Project would result in a moderate/strong level of Project contrast for foreground viewers. However, in the context of sensitive viewers, overall contrast is anticipated to be moderate because the Project would:

- Be located in primarily the middleground to background distance zone of sensitive viewers (exceptions being SR 95 travelers in the foreground to middleground and dispersed recreation on adjacent BLM land in the middleground)
- Be seen in the context of existing Utility corridor for SR95 travelers
- Be constructed on land with minimal topographic variation occupied by primarily low-growing, uniformly spaced Sonoran Desert vegetation (i.e., creosote bush); thus decreasing the apparent profile
- Occur at an elevation where typical viewers would have level (neutral) views of the majority of the Project

In addition to contrast associated with normal viewing conditions associated with the Project facilities, operation of the Project requires nighttime lighting for safety and security, and is further discussed below.

It is important to note that the closest residence is 9 miles away, and that the Project would not block views of the existing landscape for any sensitive viewers unless noted.

Glint and Glare

This section focuses on glint and glare as it relates to visible light (photometric) from the solar collecting tower and heliostats. A visible-light study has not been conducted for this specific Project; however, some of the following conclusions are based on the Central Tower Receiver Radiance report and supplement (Diep 2010), which discusses the optical hazards of an illuminated receiver in terms of radiometric (non-visible light) and photometric (visible light).

Glint is defined as a bright, momentary flash of light, while glare is defined as a more continuous and sustained presence of light. With solar collecting tower projects such as Quartzsite, the solar collecting tower brightness is described as glare, while the heliostats are more associated with glint. Glint and glare, as it relates to the visual resources in this section, focuses on the irradiance of light from the solar collecting tower as it is the primary element seen by sensitive viewers outside of the Project perimeter. The heliostats reflect light to the solar collecting tower, but viewers would not typically see this reflection due to position of the heliostats, the distance from receiver, and level views in the foreground/middleground.

Studies show luminance (light intensity) diminishes over distance exponentially; thus views from 5.3 miles or more would see levels significantly lower than that of the 50-watt bulb at 9.8 feet. It is anticipated that impacts from glint and glare would increase contrast to color for all KOPs. Following are typical results for sensitive viewers as it relates to glint and glare.

Residential

Residential viewers would most likely not be affected by glint from the heliostats, but glare from the receiver would potentially be visible for long durations. The nearest residence is in the Town of Quartzsite and is approximately 9 miles away from the receiver in the background distance zone with reduced contrast from glare.

Tribal Viewers

Sensitive viewers from tribally-sensitive areas would see glare for a longer duration and, from superior viewing positions, would be more likely to see glint from the heliostats. Tribally-sensitive views would range from the middleground (Copper Peak, Fisherman Intaglio) to background (Black Point) and would likely be for a moderate to long viewing duration. All tribal viewers are more than 5 miles away, with the likely impacts from glare being diminished.

Travel Routes

Travelers along SR 95 would see the solar collecting tower in the background to foreground for a short duration, due to a high rate of speed. The potential exists for travelers to see glare from the receiver as they travel along the highway. There would be less effect due to continuous glare than that of stationary observers, due to travelers being in motion. Although traveling observers would likely be momentarily distracted while trying to identify the source of light as they pass, the glare source would be outside the normal cone of vision for foreground viewers. It is anticipated that impacts as a result of glint and glare would be high for short time durations, depending on time of day and rate of travel speed.

Recreation

Sensitive viewers from dispersed recreational areas would see glare for a longer duration than those from travel routes. Viewers at a superior vantage point (such as Black Peak) would be more likely to see glint from the heliostats. There are no superior viewing locations in the foreground distance zone. Recreation views would range from foreground level views for moderately sensitive dispersed recreation viewers to level and superior background views for high sensitive recreation viewers, and would likely be for a moderate to long viewing duration.

Night Lighting

Potential effects to night lighting would result from the nighttime operations of the Project. Normal operations would require lighting for safe and secure operations of the facility, as well as regular maintenance (specifically, mirror cleaning).

The exterior lighting plan is not completed at this time, but would be designed to minimize light pollution by (1) utilizing sensor-activated lights that are directed to the site needed the most, and (2) shielding lighting facilities using light hoods such that light or glare would be minimized. Lighting for the heliostat array is not anticipated, but would be expected for the following areas:

- Building interior equipment, office, control, maintenance, and warehouse
- Solar collecting tower (Note: does not operate at night and safety lighting would be per FAA requirements)
- Building exterior entrances
- Outdoor equipment within the power block and tank area
- Power transformers
- Power block roadway
- Parking areas within the power block area
- Entrance gate
- Water treatment area
- Air-Cooled Condenser (for maintenance only)

Low-pressure sodium lamps and fixtures of a non-glare type would be specified. Switched lighting would be provided for areas where continuous lighting is not required for normal operation, safety, or security; this would allow these areas to remain un-illuminated (dark) most of the time, thereby minimizing the amount of lighting potentially visible offsite.

Project construction would typically occur during daytime hours Monday–Friday; however, nighttime construction activities that would require lighting may occur depending on the construction schedule. To the extent possible, task-specific lighting for any construction activity would be directed to the construction activity and would utilize shielded lights.

Scenic Quality

The Project would be located within a BLM-designated Class C landscape (see Figure 3-10) where flat to low rolling topography is occupied by primarily low-growing creosote shrubs. The local setting has been modified by existing transmission lines and transportation routes. Regionally, the landscape is relatively intact with the exception of the intense agricultural development of the Parker Valley, the towns of Quartzsite and Parker, and the La Paz County Regional Landfill. Because the land in which the Project would be located has been designated

as Class C, and existing landscape character has already been modified by human development at both the local and regional levels, impacts to scenic quality are anticipated to be moderate.

Sensitive Viewers and KOPs

Impacts to sensitive viewers are anticipated to range from predominantly low, where Project contrast would be imperceptible due to distance or screening, to high, where moderate sensitivity viewers have unobstructed views of the Project in the immediate foreground (0-1 mile) distance zone. The regular geometric forms associated with the power block elements (especially solar collecting tower), heliostat array, and transmission lines would contrast with the irregular, organic forms associated with the landscape setting. In addition, color contrast associated with the solar collecting tower and heliostat array would vary throughout the day, although glare from the tower would provide the greatest consistent contrast. In limited situations, glint associated with the reflection of the sun on the heliostats would increase contrast and could occur based on viewer position (typically elevated above the Project), angle of solar arrays, and atmospheric conditions. Typically, viewers with a superior viewing position would perceive stronger contrast as compared to a level viewing condition. There are, however, no sensitive viewers with superior views in the foreground or middleground for this Project. Impacts to specific sensitive viewers are described below and in Table 4-14.

Residential

Each grouping of residences listed below are anticipated to have a high sensitivity based on a long viewing duration, and heightened concern for aesthetics or changes in the landscape.

Quartzsite (KOP 11, S-8). This KOP represents residential views from the north end of the Town of Quartzsite as seen from the Quartzsite Fire Station. Residents along the northern edge of town would have level, partially-screened views of the Project in the background distance zone (approximately 10 miles). The solar collecting tower would be skylined; however, the heliostat array as well as any changes to land or vegetation would be screened by topography and vegetation. The power block elements viewable from the Town of Quartzsite would be seen in the context of existing utility lines and an existing cell phone tower north of town, reducing structure contrast to weak/moderate. The Project would attract attention, but would not dominate from this vantage point. Impacts are anticipated to be low.

- **Parker** (KOP 18). This KOP represents residential views from the southern end of the Town of Parker. Residents along the southern edge of town would have inferior, partially-screened views of the Project in the background distance zone (approximately 19 miles). From this vantage point, topographic changes such as the edge of the La Posa Plain in the foreground would screen any views of land and vegetation contrast. In addition, distant views of the solar collecting tower would be seen in the context of cultural modifications such as ranching/agricultural equipment, decreasing structure contrast to weak. Based on these conditions, the Project would not be visually evident to residences within the Town of Parker and, therefore, low impacts are anticipated.

Table 4-14 Key Observation Points – Contrast Levels								
KOP #	**Simulation #**	**Description**	**Sensitive Viewer**	**Contrast Level**				**Overall Impacts**
				Land/Water	**Vegetation**	**Structure**	**Overall Contrast**	
1	S-1	Access road to Dome Rock Mountains; 9.8 miles southwest of the proposed tower location	Tribal/Recreation	Weak/Moderate	Weak	Moderate	Moderate	Moderate
2	S-2	La Paz County Hospital; 21.6 miles north of the proposed tower location	Community Facility	None	None	Weak	Weak	Low
3	n/a	US 95 and entrance to LTVA; approximately 16 miles south of the proposed tower location	Recreation	None	None	Weak	Weak	Low
4	S-3	I-10 westbound; 11.9 miles southeast of the proposed tower location	Travel Route	Weak	Weak	Moderate	Weak/ Moderate	Low
5	S-4	Copper Peak; 6.7 miles west of the proposed tower location	Tribal	Moderate/Weak	Moderate/ Weak	Moderate/Strong	Moderate	Moderate
6	S-5	Plomosa 14-Day Campground; 5.8 miles south of the proposed tower location	Recreation/Other	None	None	Moderate	Moderate	Moderate
7	S-6	Fisherman Intaglio; 6.3 miles east of the proposed tower location	Tribal	None	None	Moderate/Weak	Weak	Low/ Moderate
8	S-13	Plomosa Back Country Byway; approximately 6 miles southeast of the proposed tower location	Travel Route	Weak	Weak	Moderate/Strong	Moderate	Moderate
9	S-7 S-12	SR 95; approximately 1.7 miles northwest of the proposed tower location	Travel Route	Moderate	Moderate	Strong	Strong	High

Table 4-14 Key Observation Points – Contrast Levels								
KOP #	**Simulation #**	**Description**	**Sensitive Viewer**	**Contrast Level**				**Overall Impacts**
				Land/Water	**Vegetation**	**Structure**	**Overall Contrast**	
10	n/a	Entrance to WSA at SR95/72 intersection; approximately 10 miles north of the proposed tower location	Recreation/Other	None	None	Moderate	Weak / Moderate	Low
11	S-8	Northern boundary of the Town of Quartzsite; 9.9 miles south of the proposed tower location	Residential	None	None	Weak/Moderate	Weak	Low
12	n/a	La Pera Elementary School; approximately 14 miles northwest of the proposed tower location	Recreation/Other	None	None	Weak	Weak	Low
13	S-9	Communication site on Black Peak; 20.2 miles north of the proposed tower location	Tribal	None	None	Weak	Weak	Low
14	n/a	Blythe Intaglios Cultural Site; approximately 19 miles west of the proposed tower location	Recreation/Tribal	None	None	Weak	Weak	Low
15	n/a	I-10 eastbound; approximately 13 miles southwest of the proposed tower location	Travel Route	Weak	Weak	Weak	Weak	Low
16	S-10	Cultural resources area adjacent to Black Point; 19.5 miles west of the proposed tower location	Tribal	None	None	Weak	Weak	Low
17	S-11	Big Maria Mountains; 19.8 miles west of the proposed tower location	Recreation/Tribal	None	None	Weak	Weak	Low
18	n/a	Residence in Parker, Arizona; approximately 19 miles north of the proposed tower location	Residential	None	None	Weak	Weak	Low

Tribal Viewers

- **Black Point** (KOP 16, S-10). Contrast associated with land and vegetation would not be visible from this sensitive viewing location, due to screening associated with vegetation. Contrast associated with structure (solar collecting tower) would be weak, based on the distance from the KOP to the Project; therefore, low impacts are anticipated for this KOP.

- **Copper Peak** (KOP 5, S-4). Moderate contrast is anticipated for high sensitivity viewers associated with Copper Peak. Views of the Project would be unobstructed in the middleground to background distance zone (approximately 6 miles). Visible components of the Project from this KOP include the heliostat array, power block (including solar collecting tower), and the proposed switchyard. The solar collecting tower and heliostat field would be backdropped by topography, which reduced contrast. The Project would attract attention, but would not dominate from this vantage point. Therefore, overall impacts are anticipated to be moderate.

- **Black Peak** (KOP 13, S-9). The Project is anticipated to result in weak contrast for high sensitivity viewers associated with Black Peak. The Project would be visible from a superior viewing position in the background distance zone. Project elements discernible from this KOP include the heliostat array and power block (especially solar collecting tower). However, these components would be backdropped by the distant Dome Rock Mountains. Also, there would be no discernible contrast associated with land and vegetation modifications. Therefore, the Project would be discernible, but would not dominate from this vantage point resulting in a low impact.

- **Dome Rock Mountains** (KOP 1, S-1). Moderate contrast is anticipated for high sensitivity viewers from the Dome Rock Mountains. The Project would be visible in the background distance zone (approximately 10 miles). Although the heliostat array would be visible, contrast would be reduced based on the low profile of the facilities seen in context (i.e., backdropped) with the Plomosa Mountains. From this KOP position, contrast associated with land and vegetation would be weak, although contrast associated with structure would be moderate. The Project would attract attention, but would not dominate the view; therefore, impacts are anticipated to be moderate.

- **Fisherman Intaglio** (KOP 7, S-6). High sensitivity viewers are anticipated to have level, partially-screened views of the Project in the background distance zone. The Project would be partially screened by topography from the foothills of the Plomosa Mountains that are located between the KOP and the Project area, approximately 1 mile to the west of the KOP. From the Intaglio trail trailhead, approximately ¼ mile east of the intaglio site, visitors hike west with focal views of the solar collecting tower. From this viewing position, there would be no visible contrast associated with land and vegetation, but contrast associated with structure would be moderate. Based on these conditions, impacts to visitors are anticipated to be low/moderate.

- **Big Maria Mountains** (KOP 17, S-11). The Project, as seen from the Big Maria Mountains, is expected to result in weak visual contrast in the background distance zone (approximately 19 miles). From this viewing position, there would be no contrast associated with land and vegetation. Furthermore, based on topographical screening

associated with the Moon Mountain Range, the upper portion of the solar collecting tower would be the only portion of the Project that would be visible. Therefore, impacts are anticipated to be low for viewers within the Big Maria Mountains.

- **Blythe Intaglios** (KOP 14). This KOP represents tribal viewers and is accessible for recreational hikers from a nearby trailhead. The Intaglio is slightly inferior relative to the Project area, which affords panoramic views of the Parker Valley. However, visibility of the Project is reduced based on intervening topography associated with the Moon Mountain range. Based on this viewing condition, the solar collecting tower is the only component of the Project that would be seen, resulting in weak contrast. Impacts, therefore, are anticipated to be low.

Travel Routes

U.S. Highways – Travelers on these highways are typically moderately sensitive to landscape modifications and are typically focused on commuting to a destination with moderate concern of aesthetics. As traveler's speeds increase, their cone of vision (i.e., angle needed to quickly fixate on an object) decreases, thus lowering perceptions of visual change in their peripheral vision.

- **Interstate 10** (KOP 4, KOP 15, S-3). KOP 4 represents moderately sensitive viewers traveling westbound on I-10 looking toward Quartzsite. Any potential viewers along the highway would be traveling at a high rate of speed and would see the Project to the north in the background distance zone for a short duration of time. Viewing position would range from superior to the east (KOP 4) to level from KOP 15. Travelers would have panoramic views of the La Posa Plain with views of the Dome Rock Mountains for travelers headed west and the Plomosa Mountains for travelers headed east. Travelers in either direction would have views of the Project as seen in the context of the Town of Quartzsite and existing utilities (cell tower, utilities, etc.). The Project would attract attention, but would not dominate from this vantage point. Travelers along I-10 would view weak contrasts for land and vegetation, but weak/moderate contrast for structure form and line and weak structure color and texture, as the solar collecting tower is a new structure introduced into the otherwise flat landscape. Visibility of the Project ranges from backdropped to skylined views. Based on these conditions, low impacts are anticipated.

- **US 95** (KOP 3). US 95 south of I-10 is a scenic road that terminates scenic status south of the Town of Quartzsite. This viewing location (KOP 3) is approximately 15 miles south of the Project area with level views. High sensitivity viewers would have level views for short durations from the background distance zone. Travelers would have partially-screened views of the Project with the solar collecting tower visible as seen in the context of existing structures associated with the Town of Quartzsite and the existing H-frame structures parallel to US 95. The solar collecting tower, as seen from the designated scenic portion of US 95, would possibly attract attention due to glare associated with the solar collecting tower, but would not dominate the landscape due to the cultural modifications between the viewer and the Project area. Overall impacts are anticipated to be low.

- **SR 95** (KOP 9, S-7 and S-12). This KOP was used to assess effects to travelers along SR 95 between Quartzsite and Parker. As compared to KOP 3 (see above), this portion of the SR 95 is not designated as a scenic route. This portion of SR 95 affords panoramic views across the La Posa valley toward the Plomosa Mountains to the east and the Dome Rock Mountains to the west. The Project (including the power block and switchyard) would be visible in the foreground distance zone and seen in context with existing transmission facilities on the east of the state route. The formal geometric form and line associated with the power block and solar collecting tower would contrast with the jagged and irregular form and line associated with the Plomosa Mountains. In this regard, strong structure contrast is anticipated, although the presence of existing transmission line facilities has locally modified the setting. Based on these conditions, the Project would attract attention and could dominate from this vantage point; therefore, impacts are anticipated to be high.

- **Plomosa Back Country Byway** (KOP 8 and S-13). High sensitivity viewers along the designated scenic Plomosa Back Country Byway would have unobstructed views of the Project in the foreground distance zone to partially-screened views in the middleground to background. Weak contrast resulting from modifications to landform and vegetation is anticipated. Contrast associated with the power block (including solar collecting tower) would range from moderate to moderate/strong based on site-specific conditions along the Byway for a limited amount of time traveling into the Plomosa Mountains. In this regard, the Project would attract attention, but would not dominate the view from this KOP; therefore, impacts are anticipated to be moderate.

Recreation Areas

- **Plomosa Campground** (KOP 6, S-5). Weak/moderate visual contrasts are anticipated for moderate sensitivity users of the 14-day camping area. Views of the Project would be partially screened in the background distance zone (approximately 6 miles) due to topography and vegetation; however, the solar collecting tower would be skylined and may be seen above the mid-sized vegetation. From this viewing position, there would be no visible contrast associated with land and vegetation, but contrast associated with the solar collecting tower would be moderate. The Project would introduce a vertical feature into a generally flat landscape, but would not dominate from this vantage point. Impacts therefore are anticipated to be moderate.

- **Long-term Visitor Area.** The LTVA entrance (Similar to KOP 3) is approximately 15 miles south of the Project. Moderate sensitive viewers would have long-duration, partially screened views of the Project. Based on the distance between the LTVA and the Project, contrast is anticipated to be weak. Additionally, structures such as an existing H-frame transmission line paralleling the east side of the highway, a cell phone tower north of the Town of Quartzsite, and a distribution line paralleling the west side of the highway are cultural structures and would be seen in the context of the Project. Impacts, therefore, are anticipated to be low.

- **SR 95/SR 72** (KOP 10). This viewpoint, approximately 12 miles north of the SR 95/SR 72 junction, represents the entrance to Cactus Plain WSA, East Cactus Plain Wilderness, Gibraltar Mountain Wilderness, and the Snake intaglio. These moderately

sensitive viewers would have views of the Project in the background distance zone from a level viewing position. From this viewpoint there would be no views of modifications to landform or vegetation intervening topography. However, contrast resulting from the solar collecting tower would be weak/moderate. The Project would therefore result in low/moderate impacts.

Community Facilities

Community facilities are anticipated to have moderate sensitivity based on a moderate viewing duration and a general concern for aesthetics or changes in the landscape.

- **La Paz County Regional Hospital, Parker** (KOP 2, S-2). This KOP represents public viewing locations from the southern end of Parker. Viewers from this location would have background views of the Project that are partially screened by topography. Visible portions of the Project include the upper portion of the solar collecting tower. At this distance, contrast is anticipated to be weak and therefore impacts would be low.

- **La Pera Elementary School** (KOP 12). This moderately sensitive viewpoint would have partially-screened views of the project based on the presence of topography. Modifications to landform or vegetation would not be evident, although the upper portion of the solar collecting tower would be visible. Weak structure contrast is anticipated based on the limited visibility of the Project. Overall impacts therefore are anticipated to be low.

Compliance with Visual Resource Management Objectives

The Project would be located on BLM land designated as Class IV based on the BLM's preferred alternative for the YFO land use plan amendment (see Appendix A). Compliance with VRM objectives for Class IV designated land is anticipated because objectives for Class IV objectives are "to provide for management activities which require major modifications of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements" (BLM VRM 23 Manual 8400).

Through the visual assessment, the contrast and resulting impacts identified range from low in those locations that the Project would be viewed in the background distance zone with no views of land or vegetation contrast; to weak contrast for structure; to limited areas of moderate to high impacts where travel route viewers along SR 95 would have direct, partially screened to unobstructed views of the Project in foreground-to-middleground distance zone. These impacts and associated changes to landscape character are consistent with Class IV objectives; therefore, the Project would be consistent with the amended YFO RMP.

Closure and Decommissioning

The purpose of decommissioning is to remove Project-related structures and infrastructure so that affected lands could naturalize. However, until vegetative restoration is achieved, adverse visual impacts would be similar to those described in the operation-phase impacts because large

areas would be devoid of desertscrub vegetation. The impacts of decommissioning would be somewhat reduced in intensity, however, as compared to construction because the contrast in color created by the power block structures and solar arrays would be removed. The contrast in the design elements of form and line would remain. Implementation of appropriate mitigation would aid greatly in reducing the visual effects of decommissioning. To mitigate for any potential impacts associated with Project closure, the Applicant would be required to prepare a decommissioning plan that meets the requirements of the BLM. The plan would identify likely decommissioning scenarios and develop specific plans for each scenario that would identify actions to be taken to avoid or mitigate long-term impacts related to visual resources.

The removal of the existing facility would leave a very prominent visual impact over the entire site due to form, line, color, and texture contrast created between graded or disturbed soil areas and undisturbed areas in the region of the Project site. This color contrast is due particularly to the removal of the dark color element contributed by normal scrub vegetation cover. After decommissioning, the site would leave a geometric area of form, line, color, and texture contrast visible mainly to elevated locations within the adjacent wilderness area. Revegetation of areas in this desert region are difficult but have been implemented by the BLM with success over time. Thus, visual recovery from land disturbance after closure and decommissioning could take place, although over a long period of time (potentially over 40 years), and with implementation of an active and comprehensive revegetation program for the site.

4.16.3.3 Alternative 1 – Hybrid-Cooled

Implementation of the hybrid-cooling alternative would have similar construction and operational impacts on visual resources as the Applicant's Proposed Project (dry-cooled alternative), with three exceptions:

1. The hybrid condenser unit would not be as tall as the dry-cooling unit, thereby reducing the overall mass of the power block (although solar collecting tower height would not change).
2. The three evaporation ponds are expected to be 6 acres each as opposed to 4 acres, thus increasing visual impacts for travel in the foreground, especially for northbound travelers.
3. The hybrid system has a potential to create a visible vapor plume during daylight hours at certain times of year. Previous studies have shown that true wet-cooled units can produce a visible vapor plume up to 1,371 feet for up to 7 hours a year for similar atmospheric conditions as the Project. No known studies have been conducted for a hybrid system; however, the wet cooling portion of this system would not be operating under these atmospheric conditions, making it unlikely that a plume would be evident.

4.16.3.4 Western's Switchyard and Telecommunication System

Western's Switchyard

Since Western's switchyard would be a component of the viewshed associated with the Applicant's Proposed Project, impacts on visual resources from construction and operation of Western's switchyard are described in section 4.16.3.2.

Telecommunication Options

Either telecommunications alternative could be implemented under the Applicant's Proposed Project or Alternative 1.

Fiber-Optic Cable Alternative

Construction equipment associated with installation of fiber-optic cable could create short-term (1 to 2 days) impacts to viewers along SR 95, and particularly in segments of the existing transmission line that would be visible to recreations use visitors. Visual impacts would be minor in comparison to the overall impacts from the Project.

Microwave Alternative

Since there are existing telecommunication components at the Bouse Substation, and the Metal Mountain and Cunningham Peak communication sites, impacts from installation of a new microwave dish at one of these locations is expected to be low. Metal Mountain and Cunningham Peak communication sites are located at higher elevation, have multiple antennas, and are closed to public access.

4.16.4 Mitigation Measures

Visual mitigation includes a variety of measures that, in totality, would reduce the overall visual impacts. These measures consist of a mixture of temporary construction-related measures and longer-term procedural measures. The measures are to help reduce visual contrasts and to aid in landscape restoration, and include the following:

- The Project owner would treat the surfaces of all Project structures and buildings (including temporary structures related to construction) visible to the public such that (1) their colors minimize visual intrusion and visual contrast by blending with the existing characteristic landscape colors; (2) their colors and finishes do not create excessive glare; and (3) their colors and finishes are consistent with local policies and ordinances.

- The Project owner would submit to the BLM for review and approval a specific Surface Treatment Plan that would satisfy the following requirements. The treatment plan would include:

    - A description of the overall rationale for the proposed surface treatment, including the selection of the proposed color(s) and finishes based on the characteristic landscape.

    - A list of each major project structure, building, tank, pipe, and wall; the transmission line towers and/or poles; mirror support structure; diversion berms/dikes, and fencing, specifying the color(s) and finish proposed for each. Surfaces of all ancillary facilities that are visible to the public, including the backs of the heliostat arrays, would be treated with paint colors that blend with the surrounding landscape and not create excessive glare.

- One set of color brochures or color chips showing each proposed color and finish (refer to BLM Standard Environmental Color Chart CC-001: June 2008). Any colors not on Color Chart CC-001 must be submitted to the BLM for approval prior to completion of construction. Colors must be identified by vendor, name, and pantone number; or according to a universal designation system

- A specific schedule for completion of the treatment.

- A procedure to ensure proper treatment maintenance for the life of the Project. Subsequent modifications to the treatment plan are prohibited without the BLM's approval.

- The contractor is to use dust control measures during construction.

- Any temporary areas that are used during the construction process are to be restored (vegetation, topographic) to pre-construction conditions.

- Mirrors move to/from stow position in late evening or early morning to prevent any potential errant glint.

- Generator tie-lines have non-specular and non refractive insulators and conductors

- Nighttime Lighting – The Proponent shall consider location and type of lighting and other dark sky mitigation measures to minimize potential light pollution to the greatest extent practicable. Mitigation measures include, but are not limited to light hoods/shields, directional lighting, minimum required brightness, setbacks from Project perimeter, and 'as-needed' usage.

4.16.5 Residual Effects

Visual impacts would be significant and long-term considering the context and intensity of the Project effects in general. Intensity of potential effects varies based on various aspects described above, and involves the unique scenic characteristics of the local landscape as indicated by the rural character of the Project viewshed; concerns expressed by public commenters to date; a degree of uncertainty as to the level of discomfort from glare associated with the solar collecting tower; and concern over cumulative visual effects of renewable projects in the Colorado River Valley as a whole. The loss of visual quality would be long-term, enduring throughout the proposed 30-year lifespan of the facility. After the end of the Project's useful life, it would be decommissioned per BLM requirements, to be further described in the Applicant's Decommissioning Plan.

4.16.6 Cumulative Impacts

Impacts resulting from amending the YFO RMP and construction, operation, maintenance, and decommissioning of the proposed Project could result in a cumulative effect on visual resources with other past, present, or reasonably foreseeable future actions. The geographic scope of the

cumulative effects analysis for visual resources consists of portions of the Colorado River Valley; where views of the Project solar tower may occur. This geographic scope was established based on natural boundaries of the affected resource, i.e., potential shared viewsheds.

The possible development of proposed Project and the EnviroMission solar project could result in cumulative impacts to the viewsheds of tribal areas, public roadways, recreation areas, and residential areas. Views of the Project vicinity are panoramic and extensive given the topography of the Colorado River Valley, lack of vegetative screening, and dispersed nature of sensitive viewers. Potential cumulative visual impacts would result from the construction, operation, and maintenance of the Project in the context of current and proposed projects within the Colorado River Valley.

The proposed EnviroMission project would include two - 2,400 foot solar towers, both 1,747 feet higher than the QSEP solar tower. According to the visual analysis conducted for this Draft EIS, the QSEP solar tower would be visible from various areas within the Colorado River Valley, depending on topography and distance (see Section 4.16). At a height of 2,400 feet, it is likely that if both projects were to be built, the introduction of three solar towers would result in a cumulative effect to visual resources, depending on location. Since the EnviroMission towers are significantly higher than the QSEP solar tower, there would be a higher probability that the EnviroMission solar towers could be seen in areas beyond the cumulative effects ROI.

Construction and operation of both projects would result in an industrial landscape character in the Project area. Although details about EnviroMission's lighting plan are not available, it is anticipated that each project would have nighttime lighting that would incrementally modify the night sky. This change in landscape character in conjunction with potential viewer impacts would result in adverse cumulative impacts. The Project, along with the past, present, and reasonably foreseeable projects, could substantially alter the visual character of the areas within the Project vicinity. The increase in energy development could potentially result in increased demand for the existing transmission ROW, as well as new corridors for transmission lines and distribution lines that would incrementally increase visual impacts to sensitive viewers (e.g., residences and travel routes) and scenic quality.

4.16.7 Short-Term Uses versus Long-term Productivity

The resulting change to the landscape character as a result of the construction and operation of the Project would create short-term and long-term changes due to modifications to land and vegetation. The built structures would change the character from a naturalistic setting to an industrial setting. This change to the landscape would continue for the lifetime of the Project operation.

4.16.8 Irreversible and Irretrievable Commitments of Resources

Changes to the landscape character would occur over the lifetime of the Project, estimated to be approximately 30 years. As described in Chapter 2, the decommissioning plan outlines a process for removal of all built structures and how the landscape would be restored. There are no anticipated irreversible impacts to the landscape, although recovery for the sand dunes area and vegetation would take many years to reach pre-construction levels. Revegetation of areas in this

desert region are difficult but have been implemented by the BLM with success over time. Thus, visual recovery from land disturbance after closure and decommissioning could take place, although over a long period of time (potentially over 40 years), and with implementation of an active and comprehensive revegetation program for the site.

There would be irretrievable visual impacts associated with the operation of the Project. The visual contrasts that would result from the introduction of facilities associated with the Project would be an irretrievable loss of the area's characteristic landscape, until the decommissioning is completed and reclamation has been completed.

4.17 NOISE

This section discusses the effects on existing noise levels that may occur with amending the YFO RMP and implementation of the Applicant's Proposed Project and alternatives.

4.17.1 Methodology for Analysis

The baseline noise conditions expressed in Chapter 3 were considered in evaluating what the impacts of the construction and operation of the Project would be. The indicators listed below were then utilized to determine if a significant impact on noise would occur from the construction and operation of the Project.

4.17.2 Indicators

A significant impact on noise may result if any of the following were to occur from construction or operation of the Project:

- Exceedance of local, State or Federal noise regulations or guidelines at sensitive receptors, such as residences, hospitals, or schools.
- Substantial permanent increase in ambient noise levels at the nearest sensitive receptors within the Project vicinity. An increase of 10 decibels, perceived as a doubling of noise, is generally considered to be substantial.
- Exposure of persons to or generation of excessive ground borne vibration or ground borne noise levels where they live, work, or recreate.

4.17.3 Direct and Indirect Effects by Alternatives

4.17.3.1 No Action Alternative

Under this alternative, the BLM would not approve the Applicant's ROW application and would not amend the YFO RMP; and Western would not approve the interconnection request. The BLM would continue to manage the land encompassing the Project area consistent with the existing VRM objective as described in the YFO RMP, and Western would continue to operate the Bouse-Kofa 161-kV transmission line under current conditions.

Because there would be no amendment to the YFO RMP and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, no impacts would result from this alternative related to noise. In the absence of this Project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects might or might not have impacts in other locations.

4.17.3.2 Applicant's Proposed Project Alternative – Dry-Cooled

Impacts to noise levels in the Project area would occur mostly during construction. Construction of the solar facility is expected to be typical of other power plants in terms of schedule, equipment used, and other types of activities. The noise level will vary during the construction period, depending on the construction phase. Construction of power plants can generally be divided into five phases that use different types of construction equipment. The five phases are site preparation and excavation; concrete pouring; steel erection; mechanical; and clean-up (Miller et al., 1978).

The EPA Office of Noise Abatement and Control and the Empire State Electric Energy Research Company have extensively studied noise from individual pieces of construction equipment as well as from construction sites of power plants and other types of facilities (EPA, 1971; Barnes et al., 1976). Because specific information on types, quantities, and operating schedules of construction equipment is not available at this point in project development, information from these documents for similarly sized industrial projects was used in this analysis. Use of these data, which are more than 30 years old, is conservative because the evolution of construction equipment has been toward quieter designs to protect operators from exposure to high noise levels.

The loudest equipment types generally operating at a site during each phase of construction are presented in Table 4-15. The composite average or equivalent site noise level, representing noise from all equipment, also is presented for each phase.

Table 4-15 Construction Equipment and Composite Site Noise Levels

Construction Phase	Loudest Construction Equipment	Equipment Noise Level (dBA) at 50 feet	Composite Site Noise Level (dBA) at 50 feet
Site Clearing and Excavation	Dump Truck Backhoe	91 85	89
Concrete Pouring	Truck Concrete Mixer	91 85	78
Steel Erection	Derrick Crane Jack Hammer	88 88	87
Mechanical	Derrick Crane Pneumatic Tools	88 86	87
Cleanup	Rock Drill Truck	98 91	89

Average or equivalent construction noise levels projected at various distances from the site are presented in Table 4-16. These results are conservative because the only attenuating mechanism considered was divergence of the sound waves in open air. Additional attenuation will result from air absorption and topography. Table 4-17 presents noise levels from common construction equipment at various distances from divergence only.

Table 4-16 Average Construction Noise Levels at Various Distances

Construction Phase	Sound Pressure Level (dBA)			
	50 feet	1,500 feet	1 mile	15 miles
Site Clearing and Excavation	89	59	49	25
Concrete Pouring	78	48	38	14
Steel Erection	87	57	47	23
Mechanical	87	57	47	23
Cleanup	89	59	49	25

Table 4-17 Noise Levels from Common Construction Equipment at Various Distances

Construction Equipment	Sound Pressure Level (dBA)			
	50 feet	1,500 feet	1 mile	15 mile
Pile Drivers (20,000 – 32,000 ft-lbs/blow)	104	74	64	40
Dozer (250 – 700 hp)	88	58	48	24
Front End Loader (6-15 cu. Yds)	88	58	48	24
Trucks (200-400 hp)	86	56	46	22
Grader (13 to 16 ft. blade)	85	55	45	21
Shovels (2-5 cu. Yds)	84	54	44	20
Portable generators (50-200 kw)	84	54	44	20
Derrick Crane (11-20 tons)	83	53	43	19
Mobile Crane (11-20 tons)	83	53	43	19
Concrete Pumps (30-150 cu. Yds.)	81	51	41	17
Tractor (3/4 to 2 cu. Yds)	80	50	40	16
Unquieted Paving Breaker	80	50	40	16
Quieted Paving Breaker	73	43	33	9

Noise generated during the testing and commissioning phase of the project is not expected to be different from that produced during normal full-load operation. Starts and abrupt stops are more frequent during this period, but they are usually short lived.

A steam blow, with a noise level of 110 dBA at 1,000 feet, is an activity, rather than a piece of equipment. This activity is designed to clean scale and other debris from the boiler tubes and

steam lines before admitting steam to the steam turbine where the foreign material would damage the blades. A temporary bypass line to the atmosphere is welded into the main steam line upstream of the steam turbine to divert the steam. Several short blows of about two minutes in duration each will be performed per day and the entire process generally takes several weeks. Steam blow silencers can reduce noise levels by about 30 dBA, if necessary given the distance to sensitive receptors.

Project construction activities may include early morning starts, evening work, and 24 hour operations. This may be required to maintain schedule, provide cooler periods to perform the work, perform 24 hour continuous operations, or may be due to other requirements. Due to the remote location, continuous operation would not adversely affect residential or other uses.

Construction Vibration

Construction vibrations can be divided into three classes, based on the wave form and its source (see Table 4-18). It will be limited to normal construction hours (during the daytime) and will be of short duration; therefore, no mitigation is required.

Table 4-18 Construction Vibrations

Wave Form	Example Source
Impact	Impact pile driver or blasting
Steady State	Vibratory pile driver
Pseudo Steady State	Double acting pile driver

Worker Exposure to Noise

Worker exposure levels during construction will vary depending on the phase of the project and the proximity of the workers to the noise-generating activities. Construction noise is potentially harmful to the health and hearing of construction workers. The project will develop a Hearing Protection Plan, which complies with OSHA requirements. This Hearing Protection Plan will be incorporated into the project construction Health and Safety Plan. The plan will require appropriate hearing protection for workers and visitors throughout the duration of the construction period.

4.17.3.3 Operational Impacts

Worker Exposure

Nearly all components will be specified not to exceed near-field maximum noise levels of 90 dBA at 3 feet (or 85 dBA at 3 feet where available as a vendor standard). Because there are no permanent or semi-permanent workstations located near any piece of noisy plant equipment, no worker's time-weighted average exposure to noise should routinely approach the level allowable under OSHA guidelines. Nevertheless, signs requiring the use of hearing protection devices will be posted in all areas where noise levels commonly exceed 85 dBA, such as inside acoustical enclosures. Outdoor levels throughout the plant will typically range from 90 dBA near certain equipment to roughly 65 dBA in areas more distant from any major noise source. Therefore, noise impacts to workers during operation will be less than significant.

Plant Operational Noise Levels

Noise emissions during plant operations are derived from acoustical modeling conducted for SolarReserve's Rice Solar Energy Project in Riverside County, California. The Rice Solar Energy Project would use the same type of equipment, would have the same layout and configuration, and is located in a similar remote, desert setting compared with the proposed Project. The noise levels presented below represent the anticipated steady-state level from the plant with essentially all equipment operating.

Standard acoustical engineering methods were used in the noise analysis conducted for the Rice Solar Energy Project. The computer software noise model, CADNA/A by DataKustik GmbH of Munich, Germany, is very sophisticated and is capable of fully modeling complex industrial plants. The sound propagation factors used in the model have been adopted from ISO 9613-2 *Acoustics – Sound Attenuation During Propagation Outdoors* and VDI 2714 *Outdoor Sound Propagation*. The model divides the proposed facility into a list of individual point and area noise sources representing each piece of equipment that produces a significant amount of noise. The sound power levels representing the standard performance of each of these components are assigned based either on field measurements of similar equipment made at other existing plants, data supplied by manufacturers, or information found in the technical literature. Using these standard power levels as a basis, the model calculates the sound pressure level that would occur at each receptor from each source after losses from distance, air absorption, ground effects, and blockages are considered. The sum of all these individual levels is the total plant level at the modeling point.

The A-weighted sound power levels for the major noise sources used in the model are summarized in Table 4-19. Some of the specific equipment to be used at the plant has not yet been determined. Therefore, typical noise levels for equipment associated with similar facilities have been assumed.

Table 4-19 Summary of Sound Power Levels Used to Model the Rice Solar Energy Project Plant Operations

Plant Component	Sound Power Level (dBA)
Large Cold Salt Pump, each of 3	112
Large Cold Salt Pump Motor, each of 3	116
Hot Salt Pump, each of 2	110
Hot Cold Salt Pump Motor, each of 2	110
Small Cold Salt Pump	108
Small Cold Salt Pump Motor	100
Steam Turbine Generator	111
Boiled Feed Pump, each of 2	105
Boiled Feed Pump Motor, each of 2	116
Air-Cooled Condenser	111
Fin Fan Cooler	102

Table 4-19 Summary of Sound Power Levels Used to Model the Rice Solar Energy Project Plant Operations	
Plant Component	**Sound Power Level (dBA)**
Generator Step-Up Transformer	101
Auxiliary Transformer	90
Service Transformer, each of 2	82

The estimated noise levels from facility operation at specific locations at the Rice Solar Energy Project fence line are shown in Table 4-20.

Table 4-20 Estimated Noise from the Rice Solar Energy Project Plant Operations	
Location	**Facility Operations Sound Pressure Level (dBA)**
Nearest Sensitive Receptor, Vidal Junction (15 miles northeast of the Rice Solar Energy project area)	4
North Project Fenceline (1.10 miles from the power block)	47
South Project Fenceline (0.67 miles from the power block)	52
East Project Fenceline (0.79 miles from the power block)	48
West Project Fenceline (0.79 miles from the power block)	45

The maximum noise level attributable to operation of the Rice Solar Energy Project at Vidal Junction, the nearest sensitive receptor to that project, is estimated to be 4 dBA, which is barely at the threshold of hearing (see Table 3-38). This estimate is based on a geometric divergence over a distance of 15 miles plus attenuation from atmospheric absorption and ground effects. The uncertainty associated with noise estimates increases with distance. Due to its closer distance (10 miles versus 15 miles), the facility noise level from the proposed Project at Quartzsite would be higher than 4 dBA estimated for the Rice Solar under certain atmospheric conditions, but is still low enough to fall within a quiet threshold. The noise from the proposed Project would therefore contribute only in a very small, and immeasurable and unnoticeable way to local ambient noise at Quartzsite.

The Plomosa Road 14-Day Camping Area offers dispersed camping along the 10-mile Plomosa Back Country Byway. The southern edge of the solar facility fenceline is approximately 3.75 miles north of the Plomosa Road camping area. The estimated dBA from project construction and operation of the Project on the Plomosa Long-Term Camping Area is 26 dBA (CH2M Hill 2011). On the basis of population density, the day-night average noise level (L_{dn}) for La Paz County is estimated to be 28 dBA Ldn. Therefore, there would be no increase in ambient noise levels at the Plomosa Road camping area from construction and operation of the Project.

Tonal Noise

The generation of audible tones is possible from plant operations. Certain sources within the facility, such as transformers and pump motors have the potential to sometimes produce

significant tones. It is the Proponent's intention to anticipate the potential for audible tones in the design and specification of the facility's equipment and take necessary steps to prevent sources from emitting tones that might be disturbing at the nearest sensitive receptors.

Ground and Airborne Vibration

The equipment that would be used in the project is well balanced and is designed to produce very low vibration levels throughout the life of the project. An imbalance could contribute to ground vibration levels in the vicinity of the equipment. However, vibration-monitoring systems installed in the equipment are designed to ensure that the equipment remains balanced. Should an imbalance occur, the event would be detected and the equipment would automatically shut down. Given these protective measures, impacts related to ground and airborne vibrations will be less than significant.

Closure and Decommissioning

The anticipated lifespan of the Project is estimated to be 30 years. Closure and decommissioning-related noise impacts could result from the operation of construction equipment that would be required to dismantle and restore the site. Such impacts would be a one-time, limited-duration event. Anticipated noise levels would be less than expected for construction, since no high pressure steam blows would be required, but in other respects are anticipated to be comparable to construction noise levels.

4.17.3.4 Alternative 1 – Hybrid-Cooled

Impacts to noise levels as a result of the construction and operation of Alternative 1 would be similar to impacts assessed for the Applicant's Proposed Project.

4.17.3.5 Western's Substation and Telecommunication System

Western's Substation

Construction of the proposed switchyard would occur over approximately 10 months, but noise-generating activities would be intermittent and limited to the operation of construction equipment. Construction access for the proposed switchyard would be from SR 95. There are no sensitive noise receptors near Western's proposed switchyard site. Therefore, noise levels from construction would not lead to impacts to sensitive receptors, and significance thresholds for noise would not be met. The proposed switchyard would also generate noise during operation as a result of corona and occasionally disconnect switch and circuit breaker operations, which create momentary noise. Because of its remote location, noise generated at the switchyard would not impact any sensitive noise receptors.

Telecommunication Options

Either telecommunications alternative could be implemented under the Applicant's Proposed Project or Alternative 1.

Fiber-Optic Cable Alternative

Fiber-optic cable installation would use typical construction equipment, estimated to generate maximum noise levels of short duration not to exceed 90 dBA at 50 feet, or average levels of approximately 80 dBA Leq at 50 feet. At 100 feet, these levels would attenuate below typical levels of significance (75 dBA Leq). Since the potential cable route would be located within an existing utility right-of-way along SR 95, off-road construction vehicle travel is anticipated to be minor.

Microwave Alternative

Installation of a new microwave dish at the Bouse Substation or at the Metal Mountain or Cunningham Peak communication sites would create short-term noise levels from equipment installation and vehicle travel. Mitigation measures would not be needed beyond those required by applicable noise regulations or incorporated within Western's best practices.

4.17.4 Mitigation Measures

No mitigation measures are necessary in regards to noise impacts for the Project or alternatives.

4.17.5 Cumulative Impacts

Impacts from amending the YFO RMP and from construction, operation, maintenance, and decommissioning of the Applicant's Proposed Project could result in a cumulative effect with other past, present, or reasonably foreseeable future actions. The geographic scope of the cumulative effects analysis for noise is a 10-mile radius surrounding the Project site. This geographic scope of cumulative analysis was established based on local topography, and the potential for sound to travel beyond the Project boundary to sensitive noise receptors (i.e. Plomosa Back Country Byway and the Town of Quartzsite).

In addition to the Applicant's Proposed Project, other reasonably foreseeable future actions in the noise ROI include the EnviroMission solar project, and the expansion/reopening of the Copperstone Gold Mine. According to a recent EnviroMission press release, they are expecting to begin construction in 2014, following completion of additional engineering and environmental studies. Limited mine development is occurring at the Copperstone Gold Mine; however, they anticipate full-scale production to begin within one to two years. If there were overlapping construction and/or project operations in the noise ROI, a cumulative increase in community ambient noise may occur.

As explained in Section 4.17.3, the Applicant's Proposed Project is not expected to alter ambient noise levels for the nearest receptors to the Project. Based on where the EnviroMission project is in the permitting process, it is not possible to estimate potential noise impacts of that project, because its ultimate configuration and location have not yet been refined. Therefore, it is not possible to determine what impact, if any, the EnviroMission project will have on ambient noise levels as experienced by the nearest receptor when combined with the Applicant's Proposed Project.

4.17.6 Residual Effects

There are no expected residual effects in regards to noise for the Project or alternatives.

4.17.7 Short-Term Uses versus Long-Term Productivity

During the construction period there would be an increase in ambient noise levels surrounding the Project area from construction activities occurring in the short-term over the 30-month construction phase. The operation of the Project would result in long-term, intermittent increases in daytime ambient noise levels well below thresholds. This change in the current sound environment would continue during the lifetime of the Project.

4.17.8 Irreversible and Irretrievable Commitments of Resources

There are no irreversible impacts on the sound environment of the area as a result of the construction and operation of the Project. There is an irretrievable loss of the existing sound environment until the Project is no longer in operation and reclamation activities have been completed.

4.18 PUBLIC HEALTH AND SAFETY

This section discusses the effects on public health and safety that may occur with implementation of the Applicant's Proposed Project and alternatives.

4.18.1 Methodology for Analysis

The Arizona Division of Occupational Safety and Health is responsible for ensuring compliance with the Occupational Health and Safety Act for the Project.

The public health and safety issues identified during scoping are addressed in this section. Public comments and concerns received during the scoping period included topics regarding fire hazards, operational safety requirements, air traffic safety, and potential hazards regarding reflection off of the Project's equipment. These topics are addressed below.

4.18.2 Indicators

Under NEPA, significant effects to health and safety would occur if the Project would:

- Expose people residing or working in the vicinity of the Project area or structures to safety hazards and/or a significant risk of loss, injury, or death.

4.18.3 Direct and Indirect Effects by Alternatives

4.18.3.1 No Action Alternative

Under this alternative, the BLM would not approve the Applicant's ROW application and would not amend the YFO RMP; and Western would not approve the interconnection request. The BLM would continue to manage the land encompassing the Project area consistent with the existing VRM objective as described in the YFO RMP, and Western would continue to operate the Bouse-Kofa 161-kV transmission line under current conditions.

Because there would be no amendment to the YFO RMP and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, no public health and safety impacts from the proposed Project would occur. In the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

4.18.3.2 Applicant's Proposed Project Alternative – Dry-cooled

To comply with regulations set forth by OSHA and the Arizona Division of Occupational Safety and Health, health and safety programs would be established for construction and operations at the site that would document potential hazards and requirements for establishing and maintaining a safe working environment during construction and operation. The programs would include identification of all hazardous substances and chemicals used within the Project facility, including Material Safety Data Sheets, a communication and training program, labeling, and identification of hazards and safe work practices. In addition, safety showers and eyewashes would be provided adjacent to, or in the vicinity of, chemical storage and use areas.

Construction Phase

Construction and operation would involve the use of the latest industrial technology and design standards and would adhere to regulatory health and safety codes and guidelines. Training, operating, inspection, and maintenance procedures that would minimize the risk and severity of potential upset conditions would be implemented.

Operational and Maintenance Phase

Fire Hazards

Some of the hazardous materials to be stored, transported, or produced onsite are considered flammable or combustible. The containment and handling processes of these materials would be subject to the Occupational Safety and Health Act Part 1910 Subpart H.

The Project would be subject to the regulations listed in the Arizona State Fire Code under Title 4 Chapter 36 of the AAC. In addition, a training program for fire protection and prevention would be provided to all employees during construction and operation of the Project. A Weed Management Plan would be developed that would include BMPs for fire hazard mitigation.

Glint and Glare

Glint and glare would occur during Project operations. Glint and glare studies of solar trough technology found that pedestrians standing within 20 meters (60 feet) of the perimeter fence when the mirrors rotate from the stowed position to a vertical position may see a light intensity equal to or greater than levels considered safe for the human retina (URS 2008). Due to the remoteness of the Project area, an immediate threat to public health and safety is unlikely. A more in depth discussion regarding glint and glare can be found in Section 4.16.3.2.

During scoping, comments were received regarding impacts to air traffic safety as a result of glint or glare from the Project. Glint or glare produced by the Project would not pose a potential hazard to aircraft, due to FAA flight regulations precluding aircraft flights within the solar collecting tower's safety hazard zone (Diep 2010). In effect, the glint that may occur is similar to the reflection from a body of water or car windshield. There are currently no regulations in regards to light reflected from solar facilities, but a Sandia Report (Brumleve 1984) identified visual tolerances and limitations that are used as standards for solar facility designs today.

Intentional Destructive Acts

Solar generation projects can be the subject of intentional destructive acts ranging from random vandalism and theft to sabotage and acts of terrorism intended to disable the facility. Acts of vandalism and theft are far more likely to occur than sabotage or terrorism. Theft usually involves equipment at substations and switchyards that contain salvageable metal when metal prices are high. Vandalism usually occurs in remote areas and is more likely to involve spontaneous acts such as shooting at equipment.

Closure and Decommissioning

Closure of the proposed Project would follow a Decommissioning Plan prepared by the Applicant and designed to minimize public health and environmental impacts. Permanent closure would presumably occur 30 years after the start of operation unless the Project remains economically viable. Decommissioning procedures would be similar to construction activities and safeguards, would have to be consistent with all applicable laws and regulations, and would be subject to BLM approval before implementation.

4.18.3.3 Alternative 1 – Hybrid-Cooled

Implementation of Alternative 1 would result in effects to Public Health and Safety and Hazardous Materials similar to those described under the Applicant's Proposed Project.

4.18.3.4 Western's Substation and Telecommunication System

Western's Substation

Construction of Western's switchyard would occur at the same time as the solar facility. Potential hazards to public safety as a result of the construction of the proposed switchyard would be limited to increased construction traffic (e.g., over-width, slow-moving vehicles on SR 95 and increased vehicular traffic from construction personnel).

Public exposure to health or safety problems from general construction activities would be unlikely because of the implementation of safety regulations and plans, and the public would not be allowed near the proposed construction areas.

Operation of Western's switchyard would result in increased electromagnetic frequency levels in the immediate vicinity of the facilities. However, due to the spacing of electrical equipment, measured field strength would be low outside of the fence line. In general, electromagnetic frequency levels close to a switchyard are produced mainly as a result of entering power lines. Western would comply with Federal and industry standards for designing and installing electrical equipment related to the switchyard.

Telecommunication Options

Either telecommunications alternative could be implemented under the Applicant's Proposed Project or Alternative 1.

Fiber-Optic Cable Alternative

During installation of fiber-optic cable, standard health and safety practices would be conducted in accordance with the Occupational Health and Safety Administration's regulations, policies and procedures, and Western's Power System Safety Manual, which would reduce worker safety risks. Project implementation would not affect any local or regional emergency response plan or evacuation plan. Therefore, no significant impacts to public or worker safety would be anticipated. Compliance with these regulations would also protect the public.

Microwave Alternative

Installation of a new microwave dish at the Bouse Substation or at the Metal Mountain or Cunningham Peak communication sites would be subject to the same regulations as described above. Project implementation would be short-term and would not affect emergency response or evacuation plans. No significant impacts to public or worker safety would occur.

4.18.4 Mitigation Measures

No additional mitigation measures, outside those included in the applicant committed measures identified in Chapter 2, are suggested.

4.18.5 Residual Effects

There are no residual effects associated with the Project and public safety.

4.18.6 Cumulative Impacts

Proper facility design and the development and implementation of health and safety programs for the Project would reduce the potential for cumulative impacts. Each reasonably, foreseeable, future project would be required to comply independently with OSHA regulations. Therefore, there would be a very low potential for cumulative effects on public health and safety.

4.18.7 Short-Term Uses versus Long-Term Productivity

There would be no impacts relating to this topic.

4.18.8 Irreversible and Irretrievable Commitments of Resources

There would be no irreversible or irretrievable commitments of resources.

4.19 HAZARDOUS MATERIALS

This section discusses the effects on hazardous materials that may occur with implementation of the Applicant's Proposed Project and alternatives.

4.19.1 Methodology for Analysis

The ADEQ is the State agency in Arizona that manages hazardous wastes. The AAC Title 18, Chapter 8 describes hazardous waste management for the State of Arizona.

A variety of chemicals and hazardous substances would be stored and used during construction and operation of the Project. The storage, handling, and use of all chemicals would be conducted in accordance with applicable laws, ordinances, and regulations. The analysis in this section includes a review of the Project's Plan of Development, which lists the expected hazardous materials that would be stored and used during construction and operation of the Project.

The hazardous materials issues identified during scoping are addressed in this section. These topics are addressed below.

4.19.2 Indicators

Under NEPA, significant effects from hazardous materials would occur if the Project would:

- Use, store, or dispose of petroleum products and/or hazardous materials in a manner that results in a release to the aquatic or terrestrial environment in an amount equal to or greater than the reportable quantity for that material or creates an increased risk to human health.

- Mobilize contaminants currently existing in the soil or groundwater, creating potential pathways of exposure to humans or wildlife that would result in exposure to contaminants at levels that would be expected to be harmful.

- Expose workers to contaminated or hazardous materials at levels in excess of those permitted by OSHA in 29 CFR §1910, or expose members of the public to direct or indirect contact with hazardous materials from the Project's construction or operations.

4.19.3 Direct and Indirect Effects by Alternatives

4.19.3.1 No Action Alternative

Under this alternative, the BLM would not approve the Applicant's ROW application and would not amend the YFO RMP; and Western would not approve the interconnection request. The BLM would continue to manage the land encompassing the Project area consistent with the existing VRM objective as described in the YFO RMP, and Western would continue to operate the Bouse-Kofa 161-kV transmission line under current conditions.

Because there would be no amendment to the Yuma RMP and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, no hazardous materials would be used and no impacts related to the use of hazardous material would occur. In the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

4.19.3.2 Applicant's Proposed Project Alternative – Dry-cooled

The Project would be designed to meet all applicable standards to reduce the risk of an accidental release, operated in a manner that complies with safety standards and practices, and maintained so as to provide a safe workplace for Project personnel and to prevent significant adverse offsite impacts to the public at large. In addition, construction and operation would incorporate up-to-date industrial technology and design standards, and adhere to regulatory health and safety codes and guidelines, as well as established good industrial practices. Training, operating, inspection, and maintenance procedures that would minimize the risk and severity of potential upset conditions would be implemented. Plant personnel would use approved personal protective equipment during chemical spill containment and cleanup activities. Personnel would be properly trained in the handling of these chemicals and instructed in the procedures to follow in case of a chemical spill or accidental release. Adequate supplies of absorbent material would be stored onsite for spill cleanup.

Construction Phase

Construction and operation would involve the use of the latest industrial technology and design standards and would adhere to regulatory hazardous materials codes and guidelines. Training and adherence to procedures would minimize the risk and severity of potential spill conditions.

The solar facility would require the use of a mixture of sodium and potassium nitrate salts. To ensure worker safety, the hot and cold molten salt tank areas would be designed such that any release would be contained in a basin. The Construction SWPPP would specify procedures to prevent contact between molten salt and stormwater during processing of this material prior to plant startup. In addition, the processing area would be cleaned to ensure residual molten salt is removed from surface soil after processing.

Operational and Maintenance Phase

Hazardous materials would be used and stored onsite during operations and maintenance. The hazardous material inventory, the general operational safety practices employed during hazardous material storage and use, the material-specific handling practices, and the toxicity of each hazardous material are discussed below.

Chemicals would be stored or processed in vessels or tanks specifically designed for their individual characteristics. All hazardous materials storage or process vessels would be designed in conformance with applicable codes and standards. Large quantity (bulk) liquid chemicals would be stored outdoors in aboveground storage tanks manufactured of carbon steel or plastic, or in 400-gallon (nominal) capacity plastic totes, if applicable.

Site-specific SPCC Plans would be prepared for construction and operation of the Project. The plans would include spill prevention and countermeasures procedures to be implemented, including but not limited to, a spill record (if applicable), analysis of potential spills, description of containment facilities, fill and overfill prevention facilities, spill response procedures, and personnel training.

Several methods would be used to properly manage and dispose of hazardous wastes generated by the Project. Waste lubricating oil would be recovered and recycled by a waste oil recycling contractor, spent lubrication oil filters would be disposed of in a Class I landfill, and workers would be trained to handle hazardous wastes generated at the site.

Hazardous Materials Inventory

A list of the large-quantity hazardous materials that may be stored and used at the Project area along with the toxicity and storage practices for each material is provided in Table 4-21. For the purpose of this discussion, "large quantity" is defined as those chemicals stored or used in excess of 55 gallons for liquids, 500 pounds for solids, and 200 cubic feet for compressed gases. In addition to the chemicals listed below, small quantities (less than 55 gallons, 500 pounds, or 200 cubic feet) of janitorial supplies, office supplies, laboratory supplies, paint, degreasers, herbicides, pesticides, air conditioning fluids (chlorofluorocarbons), gasoline, hydraulic fluid, propane, and welding rods typical of those purchased from retail outlets may also be stored and used at the Project area. These materials would be stored in the maintenance warehouse or office building. Flammable materials (e.g., paints, solvents) would be stored in flammable material storage cabinet(s) with built-in containment sumps.

The remainder of the materials would be stored on shelves as appropriate. Due to the small quantities involved, the controlled environment, and the concrete floor of the warehouse, a spill can be cleaned up without significant environmental consequences.

Hazardous Material Transportation and Delivery

Hazardous materials would be delivered to the Project area via truck along SR 95, and then into the gated and fenced site via the Project access road. Transportation of hazardous materials to the site would remain in compliance with the rules and regulations set forth by the Federal Motor Carrier Safety Administration and ADOT.

Unexploded Ordnance

Millions of acres of land have historically been transferred from military munitions ranges to be used for other purposes. These lands are called formerly used defense sites, and have the potential to be contaminated with military munitions. According to the Defense Environmental Programs Annual Report to Congress 2009, there are no formerly used defense sites located within the Project boundary; however, Browning machine gun rounds were discovered during cultural resource surveys. Any unexploded ordnance which is discovered during construction and operation of the Project would be disposed of properly in accordance with applicable regulations.

Closure and Decommissioning

The requirements for handling of hazardous materials remain in effect until such materials are removed from the Project site, regardless of facility closure. Therefore, the facility owners are responsible for continuing to handle such materials in a safe manner, as required by applicable laws. In the event that the facility owner abandons the facility in a manner that poses a risk to the surrounding populations, the BLM would coordinate with the Arizona Division of Emergency Management, Quartzsite Fire Department, and ADEQ's Waste Program's Division, as the BLM would be the landowner of the abandoned facility. To ensure that any unacceptable risk to the public is eliminated, funding for such emergency action as well as site removal, rehabilitation, and revegetation activities would be available from a performance bond required of the Applicant by the BLM.

The closure or decommissioning of the Project would produce both hazardous and nonhazardous solid and liquid waste. The decommissioning plan would document non-hazardous and hazardous waste management practices, including the inventory, management, disposal of hazardous materials and wastes, and permanent disposal of permitted hazardous materials and waste storage units.

4.19.3.3 Alternative 1 – Hybrid-Cooled

Implementation of Alternative 1 would result in effects to Public Health and Safety and Hazardous Materials, similar to those described under the Applicant's Proposed Project.

4.19.3.4 Western's Switchyard and Telecommunication System

Western's Switchyard

Chemicals or other potentially hazardous materials used during construction of the switchyard would include diesel fuel, lubricants, and hydraulic fluids. These hazardous materials are used for operating construction equipment and are transported in small amounts, making public or environmental exposure unlikely and limited in severity. Implementation of BMPs identified in Section 2.5 would ensure applicable spill and hazardous waste requirements are met and significance standards would not be exceeded.

Western's proposed switchyard would include transformers with oil. Implementation of BMPs identified in Section 2.5 would ensure applicable spill and hazardous waste requirements are met and significance standards would not be exceeded. If required, secondary containment would be installed within the switchyard to prevent the migration of oil from the switchyard site.

Telecommunication Options

Either telecommunications alternative could be implemented under the Applicant's Proposed Project or Alternative 1.

Fiber-Optic Cable Alternative

Waste management activities associated with the telecommunications system alternatives would include the storage, transport, recycling, or disposal of all project waste streams. Waste streams would most likely be limited to solid waste such as empty cable reels, the steel groundwire removed, and cut-off pieces of fiber-optic cable. Waste streams can be either hazardous or non hazardous, depending on the constituents in the waste stream and the characteristics (e.g., ignitability, reactivity, toxicity, and corrosivity) of the waste. The status of the waste stream determines both the storage options for the material, and the disposal method for the material. Limited quantities of waste materials would be generated by installation of fiber-optic cable. These waste materials would be transported to the appropriate landfill, similar to the Project.

Microwave Alternative

Installation of a new microwave dish at the Bouse Substation or at the Metal Mountain or Cunningham Peak communication sites would generate a limited amount of waste and would be subject to the same regulations as described for the fiber-optic cable alternative.

4.19.4 Mitigation Measures

No additional mitigation measures, outside those included in the applicant committed measures identified in Chapter 2, are suggested.

4.19.5 Residual Effects

There are no residual effects associated with the Project and hazardous materials.

4.19.6 Cumulative Impacts

Impacts from amending the YFO RMP and construction, operation, maintenance, and decommissioning of the Applicant's Proposed Project could result in a cumulative impact relating to hazardous materials, including the use, storage, and transport of hazardous materials, with other past, present, or reasonably foreseeable future actions. For example, cumulative impacts would exist or could result from the interaction of one or more controlled release of hazardous materials, e.g., airborne or subsurface plumes, within the same geographic area, and within the same timeframe. The geographic area of the cumulative impacts analysis area for hazardous materials management is a two-mile buffer surrounding the Project site. The ROI was selected to consider the proposed expansion/reopening of the American Bonanza Copperstone Gold Mine, approximately 1.5 miles west of the Project site, and the proposed EnviroMission solar facility, approximately 2 miles northwest of the Project site.

Collectively, the impacts associated with the construction, operation, maintenance, and decommissioning of the proposed Project is not expected to cause or contribute to cumulative effects relating to hazardous materials management because of the nature of the materials used, compliance with applicable laws and regulations, and the engineering and administrative controls that would be implemented to prevent and control accidental releases of hazardous materials.

Proper facility design and the development and implementation of safe material handling programs for the Project would reduce the potential for cumulative impacts from release of hazardous materials on the environment. Each reasonably, foreseeable, future project would be required to comply independently with hazardous materials regulations, depending on their specific circumstances (e.g., nature and quantities of hazardous materials stored and used). In short, Project construction and operation activities would not cause or contribute to significant cumulative impacts with respect to hazardous materials handling from either a local or regional perspective.

4.19.7 Short-Term Uses versus Long-Term Productivity

There would be no impacts relating to this topic.

4.19.8 Irreversible and Irretrievable Commitments of Resources

There would be no irreversible or irretrievable commitments of resources.

Table 4-21 Anticipated Hazardous Materials used during Project Operation						
Hazardous Material[1]	**Relative Toxicity[2] and Hazard Class[3]**	**Permissible Exposure Limit**	**Capacity**	**Storage Description**	**Storage Practices and Special Handling Precautions**	**Possible Uses**
Hydrogen	Low toxicity; hazard class – flammable gas	None established	Total inventory of up to 63,000 SCF or 335 lbs if a hydrogen cooled steam turbine generator is used.	In generator cooling loop and "tube trailer"	Pressure safety tank, crash posts, and pressure relief valves	Generator cooling
Sodium Hydroxide, 50% solution	High toxicity; hazard class – corrosive	PEL: 2 mg/m^3	8,500 gallons	Carbon steel tank	Isolated from incompatible chemicals and stored with secondary containment	Water treatment processes; condensate polishing
Sodium Hypochlorite, 12.5% solution	High toxicity; hazard class – poison-B, corrosive	Workplace Environmental Exposure Limit – STEL: 2 mg/m_3 PEL: 0.5 ppm TWA STEL: 1 ppm as Chlorine TLV: 1 ppm (TWA) STEL: 3 ppm as Chlorine	17,000 gallons	Two 8,500-gallon plastic tanks	Secondary containment	Raw water biocide; potable water biocide; cooling water biocide
Sulfuric Acid, 29.5% solution	High toxicity; hazard class – corrosive, water reactive	PEL: 1 mg/m_3	2,000 gallons	Contained in batteries	Isolated from incompatible chemicals, and stored with secondary containment	Battery electrolyte

Table 4-21 Anticipated Hazardous Materials used during Project Operation						
Hazardous Material[1]	**Relative Toxicity[2] and Hazard Class[3]**	**Permissible Exposure Limit**	**Capacity**	**Storage Description**	**Storage Practices and Special Handling Precautions**	**Possible Uses**
Sulfuric Acid, 93% solution	High toxicity; hazard class – corrosive, water reactive	PEL: 1 mg/m_3	16,000 gallons	Two 8,000-gallon lined, carbon steel tanks	Isolated from incompatible chemicals, and stored with secondary containment	Cooling tower, anti-scaling (pH control); wastewater neutralization
Carbon Dioxide	Low toxicity; hazard class – non flammable gas	TLV: 5,000 ppm (9,000 mg/m_3) TWA	15 tons maximum onsite inventory	Carbon steel tank	Carbon steel tank with crash posts	Fire suppression
Lubricating Oil	Low toxicity; hazard class – NA	None established	10, 550 gallons	Carbon steel tanks, and in equipment and piping; additional maintenance inventory to be stored in 55-gallon steel drums	Secondary containment for tank and for maintenance inventory	Equipment lubrication
Mineral Insulating Oil	Low toxicity; hazard class – NA	None established	32,000 gallons	Carbon steel transformers	Stored/used in transformers which have secondary containment	Large capacity transformers

Table 4-21 Anticipated Hazardous Materials used during Project Operation						
Hazardous Material[1]	**Relative Toxicity[2] and Hazard Class[3]**	**Permissible Exposure Limit**	**Capacity**	**Storage Description**	**Storage Practices and Special Handling Precautions**	**Possible Uses**
Diesel fuel	Low toxicity; hazard class – combustible liquid	PEL: none established TLV: 100 mg/m_3	21,000 gallons	Carbon steel tanks	Stored in two 10,000-gallon tanks with secondary containment, and two day tanks, one for each diesel fire pump.	Emergency generators and fire pumps
Nitrogen	Low toxicity; hazard class – non-flammable gas	None established	7,500 pounds	Carbon steel tank	Carbon steel tank with crash posts	Blanketing and layup of steam plant
Hydraulic fluid	Low to moderate toxicity; hazard class – Class IIIB combustible liquid	TWA (oil mist): 5 mg/m_3 STEL: 10 mg/m_3	610 gallons	Carbon steel tanks and sumps, in equipment, and a maintenance inventory stored in 55-gallon steel drums	Maintenance inventory stored within secondary containment	Steam turbine controls system

Table 4-21 Anticipated Hazardous Materials used during Project Operation						
Hazardous Material[1]	**Relative Toxicity[2] and Hazard Class[3]**	**Permissible Exposure Limit**	**Capacity**	**Storage Description**	**Storage Practices and Special Handling Precautions**	**Possible Uses**
Water treatment chemical NALCO Tri-Act 1800, or equal Cyclohexlyamine (5-10%) Monoethanolamine (10-30%) Methoxyproplyamine (10-30%)	High toxicity; hazard class – corrosive, Class II combustible liquid	Cyclohexlyamine – TVL: 10 ppm (41 mg/m_3) Monoethanolamine – TLV: 3 ppm (7.5 mg/m_3) TWA: 3 ppm (7.5 mg/m_3) STEL: 6 ppm (15 mg/m_3) Methoxyproplyamine – TLV: 5 ppm TWA STEL: 15 ppm	800 gallons	Two 400-gallon plastic totes	Inventory management, isolated from incompatible chemicals and stored with secondary containment	Condensate pH management
Water treatment chemical NALCO Elmin-Ox Carbohydrazide (5-10%), or equal	Moderate toxicity; hazard class – sensitizer	None established	800 gallons	Two 400-gallon plastic totes	Inventory management, isolated from incompatible chemicals and stored with secondary containment	Condensate and feedwater O_2 management
Water treatment chemical NALCO 3D Trasar 3DT185, or equal Phosphoric Acid (60-100%)	High toxicity; hazard class – corrosive	PEL: 1 mg/m_3 (TWA) TLV: 1 mg/m_3 (TWA) STEL: 3 mg/m_3	800 gallons	Two 400-gallon plastic totes	Inventory management, isolated from incompatible chemicals and stored with secondary containment	Cooling water corrosion control

Table 4-21 Anticipated Hazardous Materials used during Project Operation						
Hazardous Material[1]	**Relative Toxicity[2] and Hazard Class[3]**	**Permissible Exposure Limit**	**Capacity**	**Storage Description**	**Storage Practices and Special Handling Precautions**	**Possible Uses**
Water treatment chemical NALCO 3D Trasar 3DT177 or equal Phosphoric Acid (30%)	Moderate toxicity; hazard class – irritant	PEL: 1 mg/m_3 (TWA) TLV: 1 mg/m_3 (TWA) STEL: 3 mg/m_3	800 gallons	Two 400-gallon plastic totes	Inventory management, isolated from incompatible chemicals and stored with secondary containment	Cooling water corrosion control
Water treatment chemical NALCO 3D Trasar 3DT190 or equal	Low toxicity; hazard class – irritant	None established	800 gallons	Two 400-gallon plastic totes	Inventory management, isolated from incompatible chemicals and stored with secondary containment	Cooling water scale control
Water treatment chemical NALCO Acti-Brom® 7342, or equal Sodium bromide	Low toxicity; hazard class – irritant	None established	800 gallons	Two 400-gallon plastic totes	Inventory management, isolated from incompatible chemicals and stored with secondary containment	Cooling water oxidizing biocide

Table 4-21 Anticipated Hazardous Materials used during Project Operation						
Hazardous Material[1]	**Relative Toxicity[2] and Hazard Class[3]**	**Permissible Exposure Limit**	**Capacity**	**Storage Description**	**Storage Practices and Special Handling Precautions**	**Possible Uses**
Water treatment chemical NALCO pHreedom® 5200M, or equal Sodium salt of phosphonomethylated diamine	Low to moderate toxicity; hazard class – irritant	None established	800 gallons	Two 400-gallon plastic totes	Inventory management, isolated from incompatible chemicals and stored with secondary containment	Brine concentrator preheater scale control
Water treatment chemical NALCO PCL-1346, or equal	Low toxicity; hazard class – irritant	None established	800 gallons	Two 400-gallon plastic totes	Inventory management, isolated from incompatible chemicals and stored with secondary containment	Cooling water silica scale control
Water treatment chemical NALCO Permacare® PC-7408, or equal Sodium bisulfite	Low toxicity; hazard class – irritant	TLV: 5 mg/m_3 TWA	800 gallons	Two 400-gallon plastic totes	Inventory management, isolated from incompatible chemicals and stored with secondary containment	RO system – chlorine scavenger

Table 4-21 Anticipated Hazardous Materials used during Project Operation						
Hazardous Material[1]	**Relative Toxicity[2] and Hazard Class[3]**	**Permissible Exposure Limit**	**Capacity**	**Storage Description**	**Storage Practices and Special Handling Precautions**	**Possible Uses**
Water treatment chemical NALCO BT-3000, or equal Sodium hydroxide Sodium tripolyphosphate	High toxicity; hazard class – corrosive	Sodium hydroxide – PEL: 2 mg/m_3 Sodium Tripolyphosphate – none established	800 gallons	Two 400-gallon plastic totes	Inventory management, isolated from incompatible chemicals and stored with secondary containment	Boiler drum pH control
Water treatment chemical NALCO 8338, or equal Sodium nitrite Sodium tolytriazole Sodium hydroxide	Moderate toxicity; hazard class – toxic	Sodium nitrite – none established Sodium tolytriazole – none established Sodium hydroxide – PEL: 2 mg/m_3	800 gallons	Two 400-gallon plastic totes	Inventory management, isolated from incompatible chemicals and stored with secondary containment	Closed loop cooling system corrosion inhibitor
Welding gas Acetylene	Moderate toxicity; hazards class – toxic	None established	800 SCF	Two 200 SCF steel cylinders	Inventory management and isolated from incompatible chemicals	Welding gas
Welding gas Oxygen	Low toxicity; hazard class – oxidizer	None established	800 SCF	Two 200 SCF steel cylinders	Inventory management and isolated from incompatible chemicals	Welding gas

Table 4-21 Anticipated Hazardous Materials used during Project Operation						
Hazardous Material[1]	**Relative Toxicity[2] and Hazard Class[3]**	**Permissible Exposure Limit**	**Capacity**	**Storage Description**	**Storage Practices and Special Handling Precautions**	**Possible Uses**
Welding gas Argon	Low toxicity; hazard class – nonflammable gas	None established	800 SCF	Two 200 SCF steel cylinders	Inventory management and isolated from incompatible chemicals	Welding gas
Activated Carbon	Non-toxic (when unsaturated), low to moderate toxicity when saturated depending upon the absorbed material; Hazard class – combustible solid	TWA (total particulate): 15 mg/m_3 TLV (graphite, all forms except graphite fibers): 2 mg/m_3 TWA	4,000 lbs	Two 2,000-lb canisters	No excess inventory onsite, prompt disposal when spent	Production of potable water
Herbicide Roundup® or equivalent	Low toxicity; hazard class – irritant	None established	1 gallon	Brought onsite by a licensed contractor and used immediately	Inventory management and isolated from incompatible chemicals	Weed management

Table 4-21 Anticipated Hazardous Materials used during Project Operation						
Hazardous Material[1]	**Relative Toxicity[2] and Hazard Class[3]**	**Permissible Exposure Limit**	**Capacity**	**Storage Description**	**Storage Practices and Special Handling Precautions**	**Possible Uses**
Soil stabilizer Active ingredient: acrylic or vinyl acetate polymer or equivalent	Non toxic; hazard class – none	None established	55 gallons	Either a 55-gallon drum or a 400-gallon tote, used immediately	Inventory management and isolated from incompatible chemicals	Dust control
Aluminum Sulfate (50wt%), or Ferric Chloride (50 wt%), or Ferric Sulfate (50 wt%)	Moderate toxicity; hazard class – corrosive	PEL: 2 mg(AL)/m_3	6,000 gallons	Plastic tank	Inventory management and isolated from incompatible chemicals	Water treatment system flocculating agent
Sodium Sulfide/Sodium Hydrosulfide	Moderate toxicity; hazard class – corrosive	TWA: 10ppm (14 mg/m_3) STEL: 15ppm (21 mg/m_3)	No onsite storage	Brought to site by a licensed contractor, used immediately	No excess inventory stored onsite, prompt disposal when spent	Water treatment; precipitate heavy metals
Aqueous Ammonia (19% NH_3 by weight)	High toxicity; hazard class – corrosive liquid	TWA: 25 ppm STEL: 35 ppm PEL: 50 ppm	No onsite storage	Brought to site by a licensed contractor, used immediately	No excess inventory stored onsite, prompt disposal when spent	Boiler drum, steam and feedwater condition (pH control)
NALCO Permacare® PC-33 or equal	Low toxicity; hazard class – corrosive liquid	None established	110 gallons	55-gallon plastic drums	Use plastic drums, inventory management and isolate from incompatible chemicals.	RO membrane high pH cleaners

Table 4-21 Anticipated Hazardous Materials used during Project Operation						
Hazardous Material[1]	**Relative Toxicity[2] and Hazard Class[3]**	**Permissible Exposure Limit**	**Capacity**	**Storage Description**	**Storage Practices and Special Handling Precautions**	**Possible Uses**
NALCO Permacare® PC-77 or equal	Low toxicity; hazard class – irritant	None established (contains no hazardous ingredients)	110 gallons	55-gallon plastic drums	Use plastic drums, inventory management and isolate from incompatible chemicals	RO membrane high pH cleaners
NALCO Permacare® PC-191 or equal	Low toxicity; hazard class – irritant	None established (contains no hazardous ingredients)	400 gallons	Plastic totes	Use plastic drums, inventory management and isolate from incompatible chemicals	RO Antiscalant
NALCO Permacare® PC-11 or equal	High toxicity; hazard class – corrosive liquid	None established	400 gallons	Plastic totes	Inventory management, isolated from incompatible chemicals and secondary containment	Membrane cleaner and preservative
Propylene Glycol (antifreeze)	Low toxicity; hazard class – none	None established	25 gallons	Plastic totes	Inventory management, isolated from incompatible chemicals	Closed cooling system anticorrosive – compatible with different types of metals

Table 4-21 Anticipated Hazardous Materials used during Project Operation						
Hazardous Material[1]	**Relative Toxicity[2] and Hazard Class[3]**	**Permissible Exposure Limit**	**Capacity**	**Storage Description**	**Storage Practices and Special Handling Precautions**	**Possible Uses**

[1] Proprietary names are listed to provide indicative chemical product but is not intended to limit supplier, brand or product.

[2] Low toxicity is used to describe materials with an NFPA Health rating of 0 or 1. Moderate toxicity is used describe materials with an NFPA rating of 2. High toxicity is used to describe materials with an NFPA rating of 3.

[3] "None" denotes materials that do not meet the criteria for any hazard class defined in the 1997 Uniform Fire Code.

PEL – permissible exposure limit

SCF – standard cubic feet

STEL – short-term exposure limit

TLV – threshold limit value

TWA – time weighted average

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