University of Nevada, Las Vegas
Research Foundation

SOLAR TECHNOLOGY CENTER

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ACRONYMS

APE	area of potential effect
bgs	below ground surface
BLM	Bureau of Land Management
CEQ	Council on Environmental Quality
CER	Center for Energy Research
CFR	Code of Federal Regulations
CO	carbon monoxide
DAQEM	Department of Air Quality and Environmental Management
dB	decibel
dBA	A-weighted decibel
DOE	Department of Energy
EA	environmental assessment
EPA	Environmental Protection Agency
ESA	Endangered Species Act
°F	degrees Fahrenheit
GPS	global positioning system
Ldn	day-night average sound level
MSHCP	Clark County Multiple Species Habitat Conservation Plan
MBTA	Migratory Bird Treaty Act
NAAQS	National Ambient Air Quality Standards
NAC	Nevada Administrative Code
NDEP	Nevada Division of Environmental Protection
NDOW	Nevada Department of Wildlife
NDSL	Nevada Division of State Lands
NEPA	National Environmental Policy Act
NO_x	nitrogen oxides
NRHP	National Register of Historic Places
NRS	Nevada Revised Statutes
NSO	Nevada Solar One
OSHA	Occupational Safety and Health Act
P.L.	Public Law
PM_{10}	particulate matter less than 10 microns in diameter
PV	photovoltaic
RCRA	Resource Conservation and Recovery Act

SHPO	State Historic Preservation Office
SIP	State Implementation Plan
STC	Solar Technology Center
SWPPP	Storm Water Pollution Prevention Plan
UNLV	University of Nevada, Las Vegas
UNLV-CER	University of Nevada, Las Vegas Center for Energy Research
U.S.	United States
USFWS	U.S. Fish and Wildlife Service
VOCs	volatile organic compounds
ZOI	zone-of-influence

1.0 INTRODUCTION

The United States (U.S.) Congress provided funding in the Consolidated Appropriations Act of 2005 (Public Law 108-447) to the U.S. Department of Energy (DOE) for renewable energy resources, including the establishment of a Solar Technology Center (STC) at the University of Nevada, Las Vegas (UNLV). The DOE is proposing to provide funding from this Appropriations Act to the UNLV Research Foundation to construct and operate the STC in collaboration with the UNLV Center for Energy Research (CER). The STC, hereinafter referred to as the Proposed Action, would operate for research and development, educational training, and as a center for renewable energy and conservation information.

The UNLV Research Foundation is an affiliated foundation of UNLV whose mission is to support research projects and develop the university's research and technology parks for scientific and financial growth. The Research Foundation manages select federal research grants and contracts for UNLV. The CER is affiliated with the College of Engineering at UNLV. The CER is a focus area for research, information exchange, and education in energy topics, including solar energy utilization schemes. The CER collaborates with people from a variety of disciplines and industries to work on specific energy issues and interests, and seeks funding sources for this work.

1.2 National Environmental Policy Act

The proposal to use federal funds for the STC is a federal action subject to the procedural requirements of the National Environmental Policy Act of 1969 (NEPA), as amended (42 U.S. Code 4321 et seq.). The Council on Environmental Quality (CEQ) regulations for implementing the procedural provisions of NEPA (40 Code of Federal Regulations (CFR) Parts 1500-1508) and DOE's implementing procedures for compliance with NEPA (10 CFR Part 1021.330 et seq.) require that DOE, as a federal agency:

- assess the environmental impacts of its Proposed Action;
- identify any adverse environmental effects that cannot be avoided should the Proposed Action be implemented;
- evaluate alternatives to the Proposed Action, including a No Action Alternative;
- describe the relationship between local short-term uses of the environment and the maintenance and enhancement of long-term productivity; and
- characterize any irreversible and irretrievable commitments of resources that would be involved should the Proposed Action be implemented.

These requirements must be met before a final decision is made to proceed with any proposed federal action that could cause significant impacts to human health or the environment. This Environmental Assessment (EA) meets DOE's regulatory requirements under NEPA and provides the necessary information for DOE and other state and federal agencies to make informed decisions regarding the construction and operation of the proposed STC.

This EA evaluates the potential direct, indirect, and cumulative effects of the Proposed Action. For purposes of comparison, this EA also evaluates the impacts that would occur if DOE did not provide funding and the STC is not constructed (the No Action Alternative). There are no other alternatives analyzed in detail, but alternate sites that were considered for the proposed STC location and eliminated from further analysis are briefly discussed.

This draft EA will be available to interested members of the public and to federal, state, and local agencies for review and comment prior to DOE's final decision on the Proposed Action.

1.2 Purpose and Need

The DOE's Proposed Action is to provide up to $744,059 of financial assistance to the UNLV Research Foundation in support of the construction and operation of the STC. The Proposed Action would support DOE's mission to reduce dependency on fossil fuels. By providing financial assistance to support this project, DOE would support national energy needs and the development of alternative fuel sources.

Continued research and testing is needed to develop and advance different solar technologies for cost-effective use by the industry in different geographic and environmental settings. The purpose for the STC is to operate as a research and educational facility to assist industry with these challenges in developing efficient and reliable renewable energy technologies.

The CER is located on the main campus of UNLV. The ability to construct and test different solar technologies is limited by the amount of available land area, classroom space, and unobstructed sunlight. The proposed STC would provide the additional area needed to expand the CER and attract prospective industry partners for research opportunities.

1.3 Scoping

Scoping is the process of identifying alternatives to the Proposed Action and determining the scope of environmental issues to be addressed in the EA. Federal, state, and local agencies, tribal government representatives, elected officials, businesses, and organizations and special interest groups were notified of the Proposed Action in May 2008. The DOE mailed postcards directing the recipients to DOE's public reading room website to read a scoping letter that described the Proposed Action and requested assistance in identifying potential issues that should be evaluated in this EA. The scoping letter with project location maps and the distribution list of recipients are included in Appendix A.

Comments in response to the scoping letter were received from the U.S. Fish and Wildlife Service (USFWS) and from the Nevada Department of Wildlife (NDOW), Nevada Division of State Lands (NDSL), and Nevada State Historic Preservation Office (SHPO) via the Nevada State Clearinghouse. Copies of these response letters are included in Appendix B.

The comments from USFWS and NDOW pertained to federal and state protected wildlife and migratory birds that potentially use the project area and provided impact minimization measures. The NDOW also expressed concern of solution chemistry if evaporative or cooling ponds would be part of the project, and provided requirements to authorize biological monitors to survey for and remove state protected wildlife from the project site. The USFWS was also concerned about the source and amount of water that would be needed for operation and maintenance of solar panels, and the potential spread of non-native plants from construction activities. The NDSL was concerned about cumulative visual impacts to users of adjacent public lands and provided suggestions for lighting and building materials and colors that are compatible with the surrounding natural environment. The SHPO indicated support for the project as written.

2.0 DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

The DOE proposes to provide financial assistance to the UNLV Research Foundation to support construction and initial operation of the STC in collaboration with the UNLV-CER. This section describes general and site-specific activities that would occur if the STC was constructed as planned (i.e., Proposed Action) and if it was not constructed (i.e., No Action Alternative).

2.1 Proposed Action (UNLV Research Foundation Proposed Project)

The UNLV Research Foundation proposes to use DOE funding to establish the STC where existing and new solar technologies and prototypes would be researched, developed, and tested for the renewable energy industry.

2.1.1 Location

The proposed STC would be constructed on land leased from the City of Boulder City, Nevada. The site is located approximately 15 miles southwest of Boulder City in the Eldorado Valley (see Figure 1). The triangular shaped site covers about 33 acres on the north side of Eldorado Valley Drive approximately 1.5 miles west of U.S. Highway 95 (see Figure 2). The site is located in Section 5, Township 25 South, Range 63 East, Mount Diablo Baseline and Meridian in Clark County.

2.1.2 Field Station and Test Areas

The proposed STC would include a field station with a parking lot and two test areas. Grading, construction, and development of the STC would encompass an area of less than 10 acres, or slightly less than one-third of the entire site. The Nevada Solar One (NSO) concentrating solar power plant operated by Acciona Energy forms the west border of the site, and an underground natural gas pipeline owned by Southwest Gas Corporation and a dirt road parallels the east border. The site plan for the proposed STC is shown on Figure 3.

The field station would be a modular building of approximately 1,500 square feet of classroom and work space, research laboratory, reception area, storage area, and washroom facilities. The reception area would include space for educational information such as posters and brochures on alternative energy technologies and information on the various research projects. The field station would be constructed according to local building codes. The foundation and building for the field station would require a seismic site class determination according to the International Building Code and in accordance with the City of Boulder City building code.

The outside test areas could include photovoltaic (PV) panels, parabolic trough collectors, and solar dishes. Based on the type of technology that would be installed and tested, the outside test areas may be graded and concrete footings or pads may be installed, as needed. The lifetime of the installation would depend on the type of technology being tested and the tests agreed to between UNLV-CER and the industry partner. Currently the only plan is for installation of the building. Other disturbances may take place as business develops but would occur within the STC footprint. The site is expected to be dynamic, with UNLV-CER and industry partnering to evaluate new technologies as they become available.

The STC would be enclosed by an eight-foot chain-link fence. Approximately 1,800 linear feet of fence would be constructed inside the site boundaries and would tie into the existing NSO power plant fence on the west side.

Utilities that would be installed for the STC include a septic system and drain (leach) field, water, and telecommunications (see Figure 3). The UNLV Research Foundation is coordinating with Acciona Energy for access to a fiber optic conduit for telecommunications. Approximately 325 feet of fiber would be installed from the

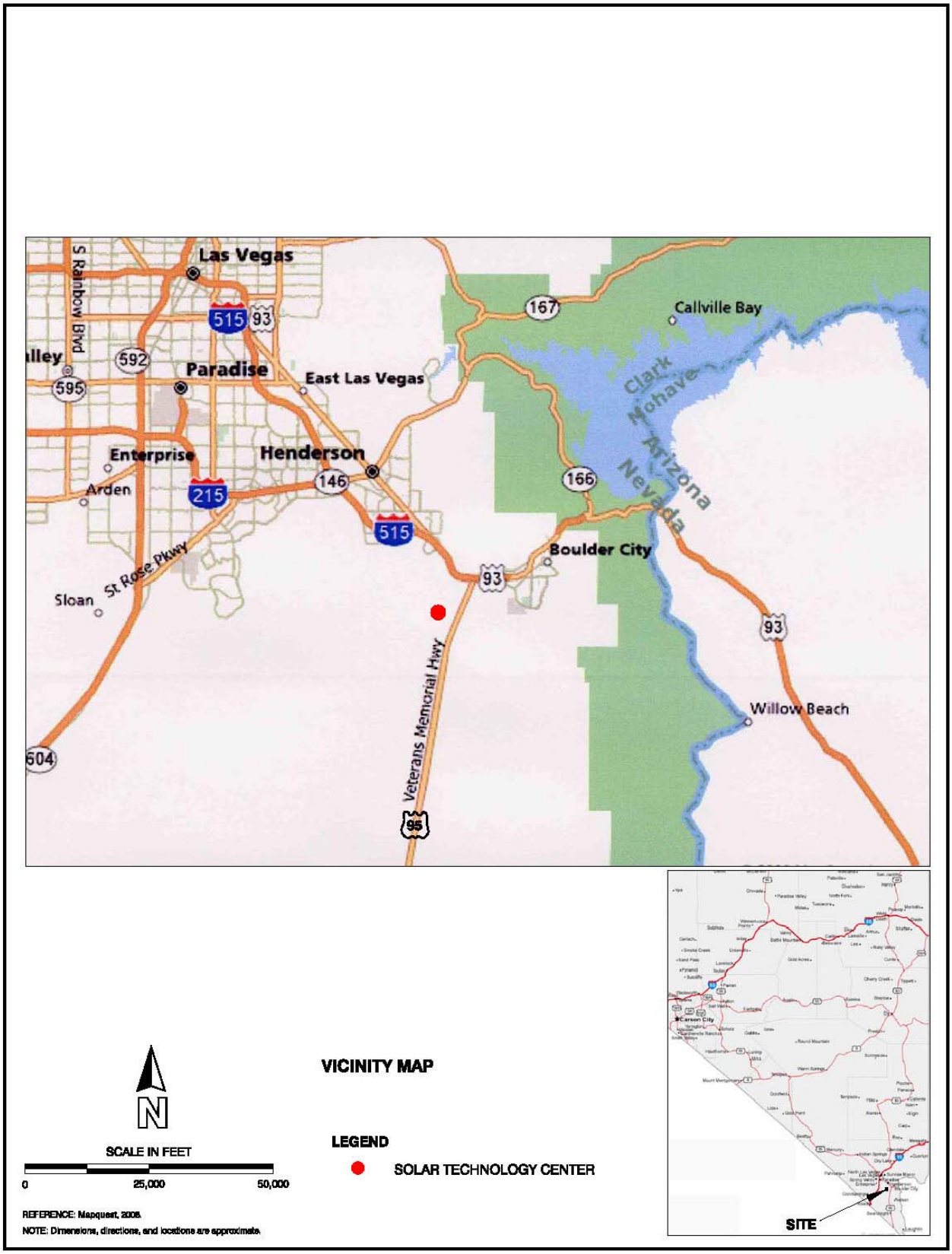

Figure 1. Vicinity Map

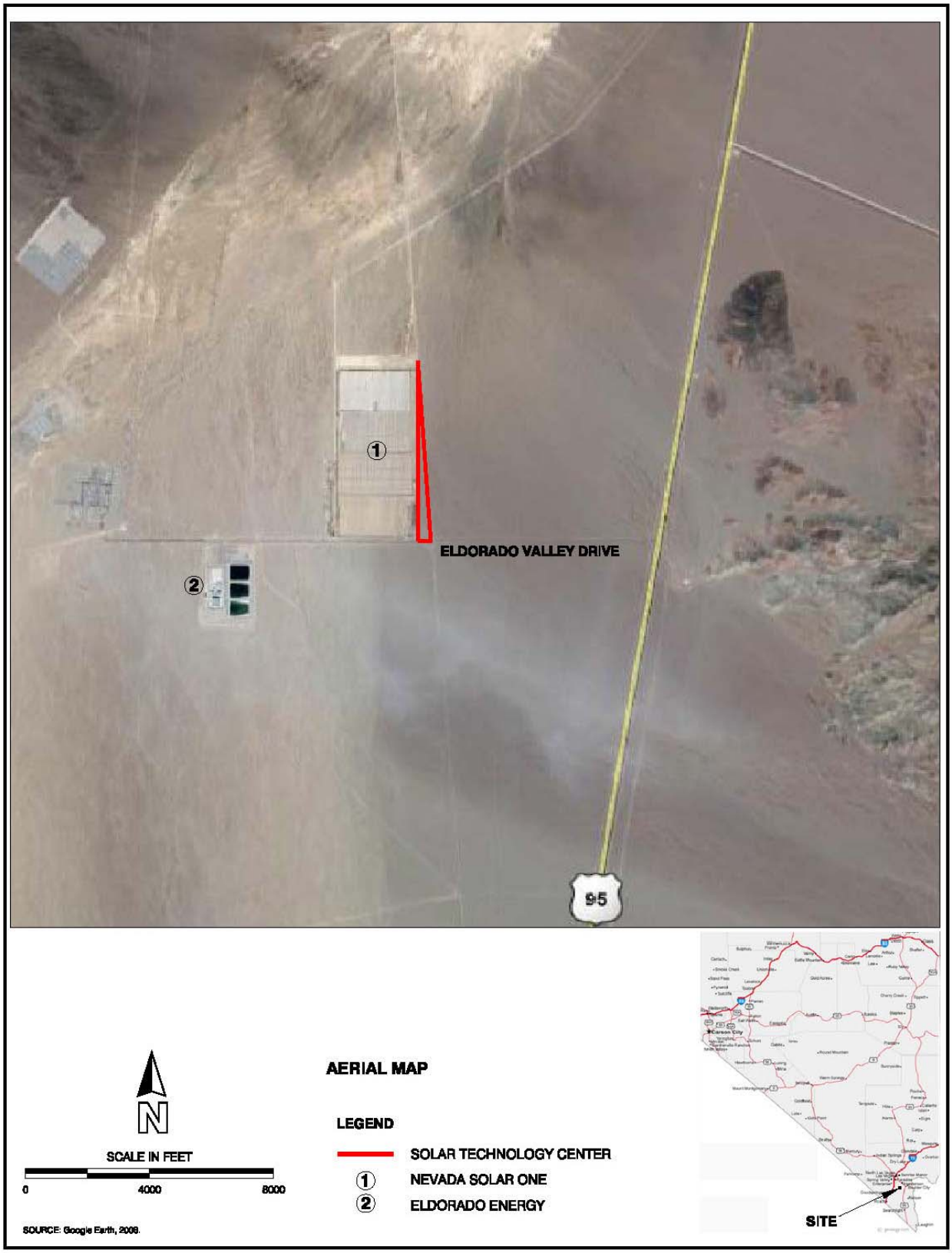

Figure 2. Aerial Location of Solar Technology Center

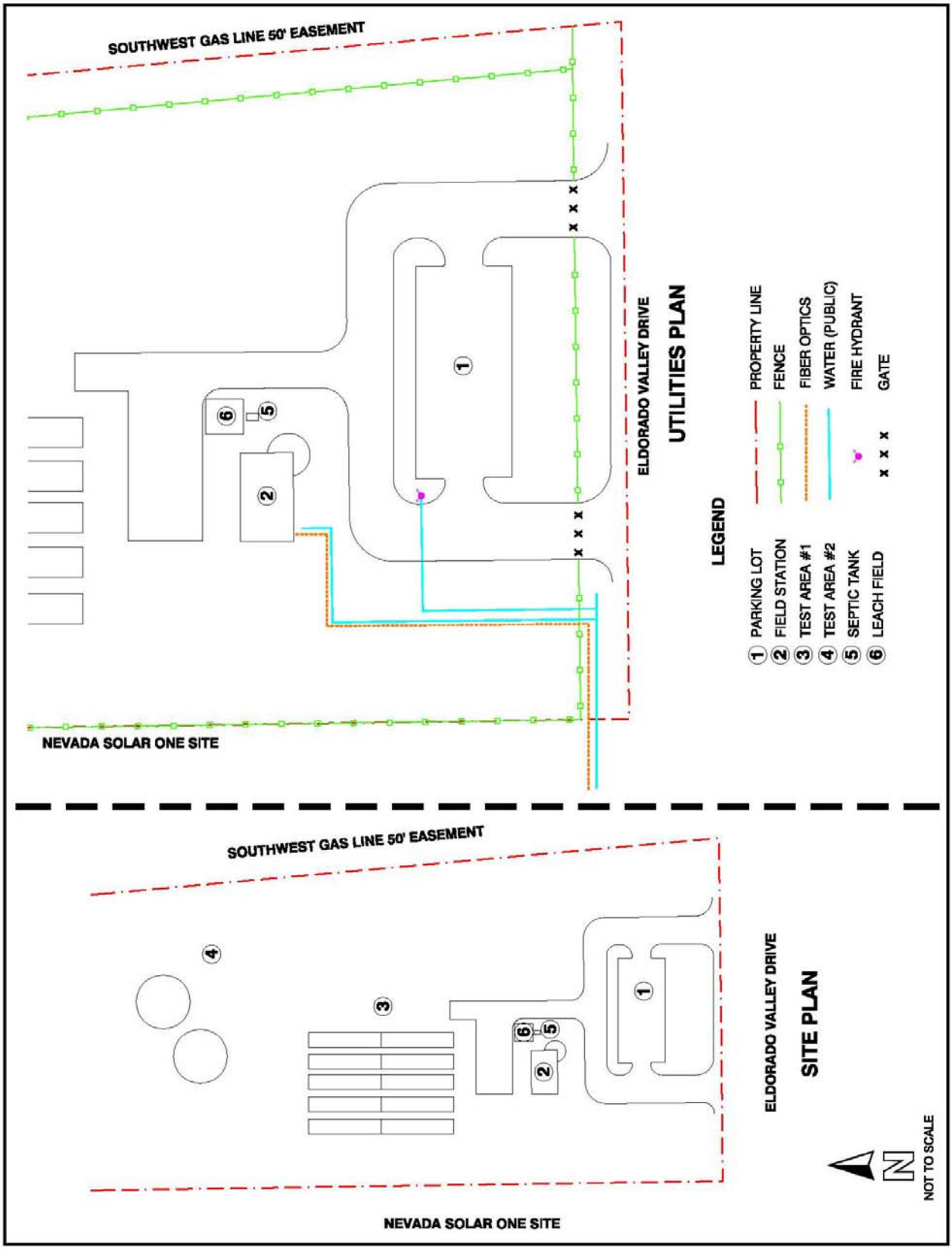

Figure 3. Solar Technology Center Site Plan and Utilities Plan

southwest corner of the site to the field station. A temporary diesel-fueled generator (approximately 20 kilowatts) would be used until power is produced at the site. Approximately 400 feet of waterlines would be installed from the Boulder City main line located along Eldorado Valley Drive on the south edge of the site to the field station and to a fire hydrant. The UNLV Research Foundation would be responsible for obtaining an excavation permit from the City of Boulder City and installing all utilities.

2.1.3 Operations

The UNLV-CER would manage the tasks for each research project at the STC and ensure that project objectives are met and public services are continued. The UNLV-CER focuses on renewable energy research and collaborates with energy industry partners in developing solar energy technologies including concentrating PV and thermal technologies. The CER anticipates researching and testing the following technologies at the STC: concentrating solar power, concentrating PV point focus and linear arrays, flat plate PV, energy storage, and tracking and control systems. The STC would also be used to conduct research on new energy efficient and post-consumer products for use in residential and commercial construction, as well as different types of energy conserving technologies (i.e., insulations, surface coatings, textures, roofing, appliances, and windows).

University students would have opportunities to receive hands-on experience and work with industry partners in conducting research and in developing renewable energy technologies. At least one student would participate in each research project. The research laboratory would allow students to meet with visitors and provide them information on emerging technologies, receive advice on renewable energy applications, monitor and maintain renewable energy equipment, and work with companies on development of new technologies.

The STC would be occupied as needed for the different research projects; therefore, there would not be set hours of operation. Signage would be posted around the facility providing information on research work being installed or conducted.

Acciona Energy is one candidate organization that may test and evaluate solar equipment at the STC. Other companies in the solar industry would be contacted by the UNLV Research Foundation and UNLV-CER regarding use of the STC for testing and evaluation of equipment and technologies.

2.1.4 Public Information Resource Center

The proposed STC would serve the public by being a local resource center for renewable energy and conservation information. Visitors would be able to tour the STC to receive general information regarding ongoing research and testing projects, and additional information would be provided in print and electronic media about commercial technologies currently available to the general public. Contact information for the STC would be posted at the site and on a website that would be created for the STC. Tours of the STC would be scheduled by appointment.

2.1.5 Environmental Protection Measures

Measures will be incorporated into the construction and operation of the STC to minimize or avoid potential impacts to the surrounding environment and to safeguard the health and safety of construction workers, employees, students, and the public. The UNLV Research Foundation and the UNLV-CER will be responsible for incorporating appropriate measures into construction bid documents and implementing measures in operational practices at the STC. These measures include:

- Obtain a dust control permit from the Clark County Department of Air Quality and Environmental Management and implement control measures to reduce fugitive dust such as watering the site or applying soil stabilizers and installing a construction entrance with track-out control devices.

- Stabilize disturbed land surfaces with pavement, ground cover (i.e., rock or mulch), or landscaping after construction is completed to minimize fugitive dust, soil erosion, and runoff.
- Pay mitigation fees based on the number of ground surface acres disturbed to fund management actions that benefit the desert tortoise.
- Implement a construction worker awareness program on protocols to follow if the state protected Gila monster or federal protected desert tortoise is encountered on the site during construction.
- Conduct a survey of the site by a qualified biologist to confirm the absence of bird nests and nesting activity if clearing and grading activities are scheduled to occur during breeding season (generally mid-March through mid-August). Prohibit construction around active nests (containing eggs or young) until they are no longer active or the young birds have fledged.
- Use solid fence posts or post caps, and fill any holes in the posts with rivets or nuts and bolts to prevent injury to migratory birds that may perch on the fence.
- Eradicate any invasive weed species that take root on disturbed ground surfaces during construction and before ground cover is installed. Construction equipment will be cleaned of potential sources of invasive and noxious weed seeds prior to use at the site.
- Cease work and contact a qualified archaeologist and DOE if unexpected cultural deposits are discovered during construction. Take appropriate measures to identify and treat the resource after DOE consults with the Nevada State Historic Preservation Officer.
- Wear personal protective equipment required by occupational safety and health regulations, including hearing protection while operating construction equipment. Train students and employees in the UNLV Risk Management and Safety Program. Request public visitors to adhere to the safety program and practices established for the STC while on site.
- Obtain a construction storm water general permit and prepare and implement a Storm Water Pollution Prevention Plan. Follow best management practices such as installing silt fences, straw bales, or sand bags for temporary erosion and sediment controls to minimize runoff from the site during construction.
- Select building materials and colors that are compatible with the natural environment and select security lighting that illuminates downward. Use native vegetation in any landscaping around the STC.

2.2 No Action Alternative

A No Action Alternative is considered in the EA and provides a benchmark enabling decision-makers to compare the magnitude of environmental effects of the alternatives (including the Proposed Action). Under the No Action Alternative, DOE would not provide funding and the STC would not be constructed on the site leased from Boulder City.

While it is possible that the STC could be built and operated without DOE financial assistance, that scenario would not provide for a meaningful No Action Alternative analysis, as it would be identical to the Proposed Action. For purposes of this EA, the No Action Alternative is evaluated as if the proposed STC were not built and operated.

2.3 Alternate Sites Considered and Eliminated

Two alternate locations were originally considered for development of the proposed STC but have since been eliminated from further consideration. The UNLV Research Foundation initially considered 360 acres to the south of Eldorado Valley Drive. This site was rejected by the City of Boulder City because the City wanted this land available for future energy development that would provide a revenue source. A parcel of 40 acres on the west side of the NSO power plant was also considered. However, Acciona Energy requested this land remain open for possible future expansion of the NSO power plant. For these reasons, these alternate locations have been eliminated from further discussion and evaluation as potential alternatives for the proposed STC site.

3.0 EXISTING ENVIRONMENT AND ENVIRONMENTAL IMPACTS

The following sections describe the existing environment in the project area, which is defined as the location proposed for the STC and the surrounding area that would likely be affected if the Proposed Action is implemented. The existing environmental conditions serve as a baseline from which to identify and evaluate potential environmental changes attributable to the Proposed Action and No Action Alternative. The potential direct and indirect, adverse and beneficial, and long-term and short-term impacts of the propose action are evaluated by resource and compared to the environmental consequences of the No Action Alternative.

3.1 Land Use

Land use is described by land ownership and the governing entities' management plans and zoning that define land use types and regulate development patterns.

3.1.1 Existing Environment

Boulder City began as a construction camp in 1930 for the workers building Hoover Dam and remained a government town until the passage of the Boulder City Act and formal incorporation as an independent municipal government in 1960. The U.S. Congress passed Public Law (P.L.) 85-339 in 1958 to provide for the direct sale of 126,775 acres of public land in the Eldorado Valley in Clark County, Nevada to the Colorado River Commission acting on behalf of the State of Nevada. The Colorado River Commission purchased 107,412 acres in 1995 from the U.S. Department of Interior, Bureau of Land Management (BLM) and subsequently sold it to the City of Boulder City. This area is referred to as the Eldorado Valley Transfer Area and extended the City's corporate limits significantly to the south and west. The sale of the Eldorado Valley Transfer Area by the BLM was subject to specific land uses, including approximately 3,000 acres for solar energy development, approximately 6,000 acres for recreation use, and the remaining for conservation of the desert tortoise (BLM, 1994).

The proposed STC site is owned by the City of Boulder City and is part of Clark County Assessor's parcel number 213-00-001-002. The Boulder City Comprehensive Master Plan has this parcel zoned "ER" for Energy Resource Zone. According to the zoning ordinance for Boulder City, a permitted use for this zone is the development of private and/or public solar electric generation facilities, electrical transmission and distribution facilities, ancillary facilities, and other similar uses (Boulder City, 1997). The City currently has 3,040 acres zoned for energy development land use in the Eldorado Valley Transfer Area, of which less than 500 acres has been developed and the rest is open desert.

Land adjacent to the Energy Resource Zone is zoned "GO" for Government. The permitted use for this zone is public or quasi-public uses and preservation of open space real property (Boulder City, 1988). The City granted an easement to Clark County for this land, consisting of 85,617 acres, as a condition of the sale by the BLM. The Desert Conservation Program manages the easement for the preservation and protection of the desert tortoise and its habitat.

The proposed STC site is undisturbed, vacant land located in the Eldorado Valley Transfer Area on the land zoned for energy development. Land uses and zoning designations are shown on Figure 4.

3.1.2 Impacts of Proposed Action

The purpose for the STC is to conduct research and testing of new and emerging solar energy technologies, and therefore, operation of the STC would be compatible with the zoning designation of the land on which it is proposed to be constructed. The City of Boulder City has zoned and dedicated the use of this land for energy development.

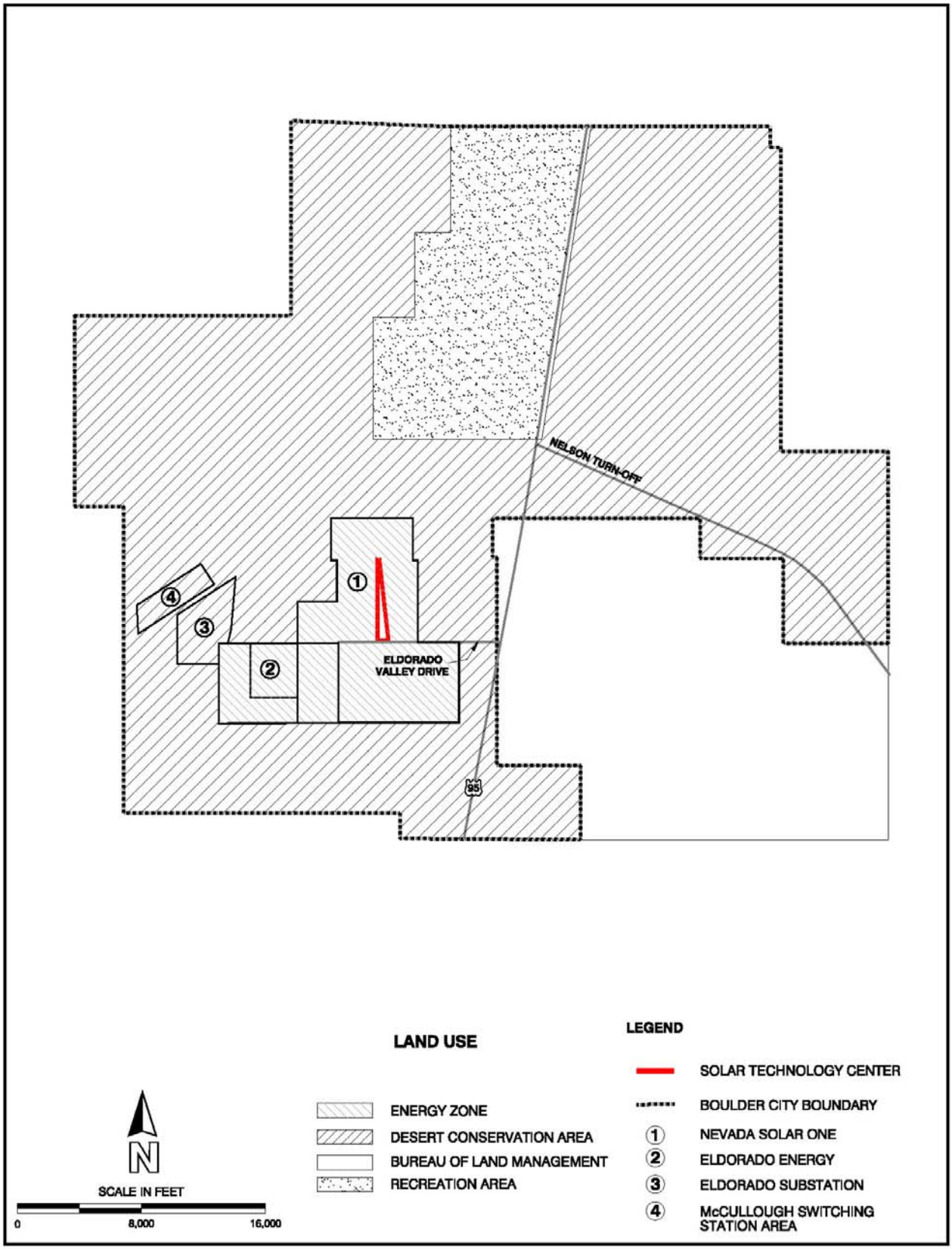

Figure 4. Land Uses in the Project Area

Construction of the STC would convert approximately 10 acres of open desert land to developed facilities. The facilities would be planned, designed, and constructed in compliance with the Boulder City Comprehensive Master Plan and appropriate city codes. The STC in its proposed location would not conflict with other adjacent land uses or zoning designations.

3.2 Air Quality

Air quality is characterized by the existing concentrations of various pollutants and the climatic and meteorological conditions that influence the quality of the air. Precipitation, wind direction and speed, and atmospheric stability are factors that determine the extent of pollutant dispersion.

3.2.1 Existing Environment

The U.S. Environmental Protection Agency (EPA) established the National Ambient Air Quality Standards (NAAQS) for criteria pollutants, which are those compounds that cause or contribute to air pollution which could endanger public health and the environment. These pollutants may directly or indirectly originate from diverse mobile and stationary sources. The criteria pollutants include carbon monoxide (CO), nitrogen dioxide, sulfur dioxide, lead, ozone, particulate matter less than 10 microns in diameter (PM_{10}), and particulate matter less than 2.5 microns in diameter. While ozone is a regulated pollutant, it is not emitted directly from sources but is formed by a combination of nitrogen oxides (NO_x) and volatile organic compounds (VOCs) reacting with sunlight in the atmosphere.

Air quality is determined by comparing ambient air levels with the upper concentration limits of the NAAQS for each criteria pollutant. Geographic areas that exceed NAAQS are designated as non-attainment for the specific pollutant that is in violation of the standard, whereas areas that meet NAAQS are designated as being in attainment for the criteria pollutant. An area designated as unclassified is assumed to be in attainment.

In Nevada, the geographic areas (airsheds) for air quality compliance are defined by hydrographic basins. The proposed STC is located in the Eldorado Valley which is hydrographic basin 167. This airshed is designated as non-attainment for the 8-hour ozone standard and unclassified or attainment for the other criteria pollutants (40 CFR § 81.329). However, the Clark County Department of Air Quality and Environmental Management (DAQEM) has designated the Eldorado Valley airshed as a “management area” for CO, PM_{10}, NO_x, and VOCs (Clark County, 2004). This designation is a preemptive measure to address an area that has a high probability of causing a non-attainment designation or causing an exceedence of the NAAQS. The DAQEM submitted the *8-Hour Ozone Early Progress Plan for Clark County, Nevada* (Clark County, 2008a) establishing steps to reach attainment status.

There is no air quality monitoring station within the project area. The nearest station, which monitors ozone and PM_{10}, is located over 15 miles to the northeast in Boulder City. Sources of air pollutants in the project area include the El Dorado Energy power plant, NSO power plant, windblown dust from disturbed ground surfaces, fugitive dust from off-road vehicle use, and emissions from vehicles traveling on Eldorado Valley Drive and U.S. Highway 95.

The climate for the project area is typical of the Mojave Desert – hot summers, mild winters, and very little rain. Temperatures usually exceed 100 degrees Fahrenheit (°F) in the summer with the humidity normally less than 10 percent. Winters are typically mild with average highs near 60°F. The sky is sunny approximately 85 percent of the year. The majority of precipitation (less than five inches) falls between January and March; however, the monsoonal flow during July and August brings desert thunderstorms, flash floods, and strong winds. High wind events can generate widespread areas of blowing dust and sand. Average annual wind speed is about 9.3 miles per hour and is predominantly from the southwest. (National Weather Service, 2008)

3.2.2 Impacts of Proposed Action

Changes in the concentrations of atmospheric pollutants as a result of specific actions constitute an air quality impact. This section discusses impacts to air quality from construction and subsequent operations of the proposed STC.

Construction of the proposed STC would include grading approximately 10 acres of the 33-acre site resulting in localized, short-term increases in fugitive dust (PM_{10} emissions). Exhaust from construction vehicles and heavy equipment would also result in localized, short-term increases in CO and NO_x emissions. The increase in PM_{10} would be primarily from soils disturbed during clearing and grubbing vegetation and from grading the site, and from vehicles and heavy equipment moving across the site during construction. Construction of the proposed STC is projected to take less than two months and construction traffic is estimated between four to ten vehicles a day. The *PM_{10} State Implementation Plan for Clark County* (Clark County, 2001) provides an equation to estimate emissions from construction activities. For general construction sites that do not include cut and fill areas, large-scale earthmoving operations, or heavy traffic volumes, an emission factor of 0.11 tons per acre per month is used to estimate PM_{10} increases. Using this equation, the conservative increase in PM_{10} emissions from construction activities would be approximately 2.2 tons (0.11 tons PM_{10} x 10 acres x 2 months). For comparison, this is well below the threshold of 70 tons per year allowed by the DAQEM from a major stationary emission source in the Eldorado Valley airshed.

The proposed STC would not be a major stationary emission source and therefore would not be subject to Prevention of Significant Deterioration provisions or New Source Review permitting requirements of the Clean Air Act. A portable diesel-fueled generator would be needed temporarily to provide power to the field station until the STC is operational and producing its own power. The generator would qualify as a categorically-exempt emission source and would not require an air permit from the DAQEM to operate. Total emissions from the generator would be dependent on hours of operation but would likely include negligible amounts CO, NO_x, and PM_{10}.

Solar technologies that would be researched and tested at the STC would not be major sources of criteria pollutants. Current and likely future solar technologies produce near-zero carbon dioxide emissions which would be a beneficial impact to the air quality.

Construction activities that disturb soils and that emit or have the potential to emit particulate matter must obtain a dust control permit from the DAQEM and submit a dust mitigation plan specifying the control measures that would be implemented during construction to reduce fugitive dust and minimize impacts to air quality. Dust control measures would include watering the site or applying soil stabilizers, installing a construction entrance with track-out control devices, and stabilizing disturbed land surfaces with pavement or landscaping after construction is completed.

Given the small area of the proposed site, minimal number of vehicles, anticipated short duration of the construction, and implementation of dust control measures, the potential direct impacts to air quality would be temporary and negligible.

Section 176(c)(1) of the Clean Air Act requires federal agencies to determine if the federal action conforms to applicable state implementation plans (SIPs) for achieving and maintaining the NAAQS. A federally sponsored or funded action must not cause emissions of criteria pollutants (or their precursors) above EPA's established threshold levels in designated nonattainment or maintenance areas. The threshold emission rates in a nonattainment area for ozone are 100 tons per year of NO_x or VOCs. Emissions sources to construct and operate the proposed STC would not be remotely close to exceeding threshold levels of NO_x or VOCs and therefore the Proposed Action is assumed to conform to the SIP.

3.3 Biological Resources

The biological resources of interest include the common native and introduced plants and animals, species afforded special protections, and the vegetative communities on and in the vicinity of the proposed site.

3.3.1 Existing Environment

Vegetation: Mojave creosote bush scrub is the characteristic vegetation community in the project area. The proposed site is dominated by creosote bush (*Larrea tridentata*) and white bursage (*Ambrosia dumosa*). Other plants noted during a field survey of the proposed site include desert marigold (*Baileya multiradiata*), apricot globemallow (*Sphaeralcea ambigua*), Mormon tea (*Ephedra* spp.), Mediterranean grass (*Schicmus* spp.), fescue (*Vulpia* spp.), filaree (*Eriodium* spp.), cheesebush (*Hymenoclea salsola*), four-winged saltbush (*Atriplex canescens*), and shadscale (*Atriplex confertifolia*). There were no cactus or yucca plants observed on the proposed site.

Common Wildlife: Wildlife that could typically be found on and adjacent to the proposed site include black-tailed jackrabbit (*Lepus californicus*), white-tailed antelope squirrel (*Ammospermophilus leucurus*), desert pocket mouse (*Chaetodipus* spp.), desert woodrat (*Neotoma lepida*), desert kit fox (*Vulpes macrotis*), western whiptail lizard (*Cnemidoporous tigris)*, side-blotched lizard (*Uta stansburiana*), and desert iguana (*Dipsosaurus dorsalis*). These species are fairly common and widespread throughout the project area; however, only the western whiptail lizard, black-tailed jackrabbit, and a sidewinder (*Crotalus cerastes*) were observed during a field survey conducted by MBP Consulting, LLC in mid-spring.

Threatened and Endangered Species: A species listed under the Endangered Species Act (ESA) is so designated because of danger of its extinction as a consequence of economic growth and development without adequate conservation. The desert tortoise (*Gopherus agassizii*) is the only federally listed species known to occur in the project area. The Mojave population of the desert tortoise was listed as threatened by the USFWS in 1990.

The desert tortoise is a large herbivorous reptile that inhabits desert scrub vegetation with annual precipitation from two inches to eight inches. The optimal habitat is creosote bush scrub but creosote bursage complex, shadscale scrub, saltbush scrub, and blackbrush scrub can also be suitable habitat. The tortoise can be found at elevations to 7,300 feet above mean sea level, but generally more favorable habitat occurs between 1,000 feet and 3,000 feet. Annual wildflowers and native desert grasses, especially galleta and Indian rice grass, are preferred forage. Burrows are excavated in gently sloping terrain and sandy-gravelly soils to steep slopes and rocky soils. Soils must be friable enough for tortoises to dig burrows but also firm enough to prevent collapse. Desert tortoises are generally most active during the spring and early summer when mating behaviors are exhibited and annual plants are more prevalent. Additional activity occurs after summer rainstorms and during warmer autumn months. The remainder of the year the tortoises are in burrows protected from the extreme conditions of the desert.

A field survey for desert tortoise was performed on May 4, 2008 in accordance with the protocol described in *Procedures for Endangered Species Act Compliance for the Mojave Desert Tortoise* (USFWS, 1992). The proposed STC site was surveyed using the presence-or-absence survey method, which is the recommended method for areas below 5,000 feet elevation within the known range of the desert tortoise. This method is used when surface disturbing actions would result in clearing or crushing of vegetation.

The presence-or-absence survey consisted of linear transects spaced approximately 30 feet apart to provide 100 percent coverage of the area. Transects were narrowed where the vegetation reduced views of the ground surface. Zone-of-influence (ZOI) transects were surveyed on land adjacent to the proposed site. The purpose of ZOI transects is to determine if adjacent land supports desert tortoise that may overlap into the survey area and be affected by the Proposed Action. The ZOI transects were spaced approximately 60 feet apart and extended approximately 900 feet to the east and approximately 1,200 feet to the north of the proposed site.

Data collected to determine presence of tortoise habitat included number of live tortoises, burrows, scat, carcasses, and other signs such as tracks, courtship rings, drinking sites, egg shells, and grazed vegetation. Burrows were inspected for presence of tortoise and tortoise sign by illuminating the burrow cavity with sunlight reflected from a hand-held mirror. Tortoise signs were recorded on data sheets and mapped using global positioning system (GPS) coordinates. To avoid overestimating tortoise population densities, the total sign are adjusted (i.e., corrected) to

account for sign clearly attributable to the same tortoise. For example, scat located adjacent to a burrow would equal two total sign but would be counted as one corrected sign. Burrows that could not be positively identified as associated with desert tortoise (i.e., burrow classes 4 and 5) were not counted as corrected sign. The type and number of sign observed are displayed in Table 1.

Table 1. Desert Tortoise Sign Observed in the Survey Area

Survey Area	Acres[1]	Live Tortoise	Carcass	Burrow	Scat	Other Sign[2]	Total Sign	Corrected Sign
STC Site	33	0	0	30	1	1	32	16
Zone-of-Influence	86	0	0	16	2	0	18	9

[1] Approximate
[2] Tracks, egg shells, drinking sites, courtship rings, or grazed vegetation

Estimated numbers of tortoise (i.e., density) are quantified using corrected sign per acre based on a linear regression model using triangular-strip survey transects, and a density scale developed for Nevada. Table 2 shows the results of this methodology developed to estimate tortoise density.

Table 2. Estimated Desert Tortoise Density based on Corrected Sign per Acre

Corrected Sign per Triangular-Strip Transect[1]	Corrected Sign per Acre[2]	Tortoises per Square Mile[1]	Relative Density
0	0.0 – 0.1	0 – 10	Very Low
1 – 3	0.2 – 0.6	10 – 45	Low
4 – 7	0.7 – 1.4	45 – 90	Moderate
8 – 11	1.5 – 2.1	90 – 140	High
12+	2.2 +	140 +	Very High

[1] Methodology from Berry and Nicholson (1984) and Karl (1981)
[2] Corrected sign per triangular-strip transect divided by 5.5, which is amount of acres surveyed in one triangular-strip transect

The estimated numbers of tortoise in the survey area are displayed in Table 3. Although the results of the survey indicate low density on the proposed STC site, the project area is considered good habitat overall to support a tortoise population. The surrounding area in the Eldorado Valley is part of the Boulder City Conservation Easement managed by Clark County for the protection of desert tortoise and habitat (see Section 3.1.1). The low density on the proposed STC site may be attributed to the fragmented habitat created by the NSO power plant, natural gas pipeline, and road that border the site. The adjacent area density would likely have been higher had the area been surveyed for 100 percent coverage. The lack of winter and spring precipitation combined with the sparse covering of annual grasses may also be factors affecting the absence of tortoise in the survey area.

Table 3. Estimated Desert Tortoise Density in the Survey Area

Survey Area	Acres	Corrected Sign	Corrected Sign/Acre	Tortoises/ Square Mile	Square Miles	Estimated Tortoise Numbers	Relative Density
STC Site	33	16	0.48	10 – 45	0.05	1 – 2	Low
Zone-of-Influence	86	9	0.10	0 – 10	0.13	0 – 1	Very Low

<u>State Protected and Sensitive Species:</u> The Nevada Administrative Code (NAC) lists species of native flora and fauna identified for preservation and protection because populations are declining and habitats are deteriorating. The Gila monster (*Heolderma suspectum*) is classified as a sensitive reptile (NAC 503.080) and the loggerhead shrike (*Lanius ludovicianus*) is classified as a sensitive bird (NAC 503.050). These species have the potential to occur in the project area. The geographic range and habitat of the banded Gila monster overlap with that of the desert tortoise. This venomous lizard is found below 5,000 feet elevation on rocky slopes and landscapes of upland desert scrub interspersed with desert washes. The loggerhead shrike prefers open dry plant communities of creosote bush and uses cactus spines to impale and immobilize prey.

Migratory Birds: Most birds are protected by the Migratory Bird Treaty Act (MBTA). The MBTA provides protection of nearly all species of birds from harm by prohibiting the destruction of active nesting habitat. The Mojave creosote bush scrub vegetation community provides habitat for foraging and nesting for a variety of songbird and raptors; however, only the common raven (*Corvus corax*) was observed during the field survey of the proposed STC site in May 2008. Although there are numerous burrows on the proposed site, no western burrowing owls (*Athene cunicularia*) were observed.

Invasive Species/Noxious Weeds: Executive Order 13112 Invasive Species directs federal agencies to make efforts to prevent the introduction and spread of invasive plant species. Invasive species are usually destructive, difficult to control or eradicate, and generally cause ecological and economic harm. A noxious weed is any plant designated by a federal, state, or county government as injurious to public health, agriculture, recreation, wildlife, or property. The control of noxious weeds is regulated by the Nevada Department of Agriculture under Nevada Revised Statute (NRS) 555. Invasive species and noxious weeds are generally found in disturbed soil conditions. The proposed STC site is mostly undisturbed and no noxious weeds or invasive species were observed during the field survey conducted in May 2008.

3.3.2 Impacts of Proposed Action

Surface disturbance from construction would impact biological resources. The extent of disturbance relative to adjacent or replacement habitat types determines the significance of the impact.

Vegetation: Grading the proposed site for construction would have a direct impact on approximately 10 acres of vegetation. The loss of predominately creosote bush and white bursage would be negligible because of the abundance of similar undisturbed vegetation in the project area. Any landscaping of disturbed areas around the field station and parking lot would include native vegetation. Vegetation would be controlled in the test areas to avoid interfering with equipment operation.

Common Wildlife: Construction activities would displace common wildlife species that inhabit or use the proposed site for forage or cover and potentially cause direct mortality of less mobile species, such as reptiles. Similar habitat on adjacent open land would support the displaced species and thus potential impacts would be negligible. The typical species that could be impacted are widely distributed and thus loss of some individuals and habitat would not impact the populations throughout their range.

Threatened and Endangered Species: Construction activities would directly disturb approximately 10 acres of low density habitat. The analysis of impacts to desert tortoise and tortoise habitat conservatively assumes the 33 acres of the site would be affected, and therefore, the potential for incidental take of one to two tortoises (see Table 3). Typical direct impacts from construction may include increased mortality or injury from tortoises and burrows being crushed by vehicles and equipment, increased harassment of tortoises being moved out of harm's way, and loss of forage and increased fragmentation of habitat. Potential impact to forage and fragmentation of habitat would be negligible since the proposed site is already fragmented from adjacent habitat and is relatively small compared to surrounding forage sources.

Impacts to the desert tortoise from development of this part of the Eldorado Valley were addressed in USFWS Biological Opinion File No. 1-5-94-F-283. This opinion was issued to the BLM for the sale of 107,412 acres of federal land in accordance with the Eldorado Valley Act (P.L. 85-339), including approximately 3,000 acres designated for solar energy development in which the proposed STC site is located. With the establishment of a conservation easement to preserve and protect tortoises and habitat, it was determined the land sale and development for solar energy would not likely jeopardize the continued existence of the desert tortoise and would not likely destroy or adversely modify designated critical habitat (BLM, 1994). Therefore, implementing the Proposed Action should not have a different determination or conclusion.

The Clark County Multiple Species Habitat Conservation Plan (MSHCP) was developed to address the take of listed species eligible for federal protection under the ESA and species that may become listed in the future. The USFWS issued a permit under Section 10 of the ESA to allow incidental take of the desert tortoise and numerous other species on non-federal lands within Clark County, which would include the proposed STC site. However, the MSHCP does not allow for incidental take resulting from federal actions on non-federal lands; therefore, Section 7 of the ESA would govern the take of desert tortoise for this project. The DOE is consulting with the USFWS pursuant to Section 7 of the ESA to confirm that the direct or indirect impacts of providing financial assistance for the construction and operation of the STC may affect but is not likely to adversely affect the desert tortoise, and therefore, would not jeopardize the continued existence of the species.

To minimize and mitigate the effects of the Proposed Action, the UNLV Research Foundation would comply with the terms and conditions of the Section 10 incidental take permit for the MSHCP, which includes the remuneration of fees to fund management actions that benefit the desert tortoise. The fees would be based on $550 per acre of surface disturbance and would be paid prior to beginning construction. It is estimated that fees would be required for less than 10 acres of disturbance and would be determined from the final site grading plan that would be submitted to the City of Boulder City for approval. Construction workers will be informed of procedures to follow should a live desert tortoise be encountered during construction, including avoidance, vehicle checks, and contact information for the Clark County Tortoise Pick-Up Service. Although the Proposed Action may affect the desert tortoise, with implementation of any mitigation measures required by the USFWS, the DOE's actions are not likely to adversely affect the continued existence and recovery of the Mojave population of the species.

State Protected and Sensitive Species: The Proposed Action would not affect species classified as protected or sensitive by the State of Nevada. Suitable habitat of rocky outcrops and desert washes for the Gila monster is not found on the proposed STC site and the absence of cacti limits the use of the site by the loggerhead shrike for hunting and feeding. Although an encounter with a Gila monster is not expected during construction, the encounter protocol (see Appendix B, page B-7) will be provided to the construction contractor for awareness purposes as requested by NDOW.

Migratory Birds: Construction activities would displace any birds foraging on the proposed site; however, potential impacts would be negligible because of available adjacent habitat and the mobility of the species. There were no observations made during the field survey that the proposed site was being used or had been used by nesting birds. However, if clearing and grading activities are scheduled to occur during breeding season (generally mid-March through mid-August), a qualified biologist will survey the site to confirm the absence of nests and nesting activity, and inspect burrows, cracks, and crevices for burrowing owls. Construction will not be allowed around active nests (containing eggs or young) until they are no longer active or the young birds have fledged. The area to be avoided will be appropriate to the species but at least 250 feet distance from burrowing owl nests.

Raptors and perching birds can get their talons and feet caught in hollow fence posts. To prevent this potential impact, fence posts will either be solid or have fence caps, and holes will be filled with rivets or nuts and bolts.

Invasive Species/Noxious Weeds: Surface disturbance and construction activities could facilitate the establishment and spread of invasive species and noxious weeds. Aggressive non-native species could become established if ground disturbance is extensive and lengthy. However, the size of disturbance for the proposed STC and the short length of time before the ground surface is stabilized would minimize the risk of invasive species becoming established and therefore any potential impacts would be negligible. Preventive measures such as monitoring and eradication will be implemented to reduce weeds from invading the proposed site after ground disturbance occurs. Heavy equipment transferring among construction sites could also introduce invasive species; however, because of the relatively small scale of this site and distance from other ongoing construction, it is likely that equipment would mobilize to the proposed site only once and thereby minimize this risk. Construction contractors will be required to use equipment that has been cleaned of potential sources of invasive and noxious weed seeds.

3.4 Cultural Resources and Native American Concerns

Cultural resources are the physical remains of past human activity and include prehistoric and historic sites, structures, features, or locations considered important to a culture or a community for scientific, traditional, religious, or other reasons. Prehistoric archaeological resources may include features such as rock shelters, lithic scatters, rock rings, habitation structures, or roasting pits. Historic sites may include buildings, structures, refuse deposits, or transportation routes and trails.

3.4.1 Existing Environment

The project area or area of potential effect (APE) for cultural resources is defined as the area that is potentially impacted physically, visibly, and/or audibly by the Proposed Action. The APE is proposed at a one mile radius from the proposed STC site. Information in this section on the cultural resources has been summarized from NEPA documents and from a search of records of cultural resources surveys completed in the APE (BLM, 1994; DOE, 1996; Knight & Leavitt, 2008).

A search of records was conducted at the Southern Nevada Archaeological Archive located at the Harry Reid Center on the UNLV campus. There have been five surveys completed within the APE; no sites recorded were determined eligible for listing on the National Register of Historic Places (NRHP). The NSO power plant site was surveyed but no report was available in the archives. The NRHP, State Register of Historic Places, and other historical documents were reviewed to determine the potential for cultural resources in the project area. The nearest property listed on the NRHP is the Sloan Petroglyphs, which is approximately 13 miles to the northwest of the proposed STC site. The General Land Office map dated 1941 shows that the old highway that pre-dated U.S. Highway 95 passed through Section 5, which is the same section where the proposed STC site is located. (Knight & Leavitt, 2008)

The proposed STC site lies in the Eldorado Valley in southern Nevada, an area with a prehistory that may span the past 10,000 years or more. Properties ranging from the early prehistoric period to historic mining and ranching sites are known to exist. Most of the cultural resources that have been recorded in the project area have resulted from transmission line and power line surveys. Prehistoric sites have been recorded around the perimeter of Eldorado Dry Lake, located approximately 3 miles to the north-northeast of the proposed STC site. Two temporary camps have been recorded but both sites were recommended as not eligible for the NRHP. Other sites in the area date to the historic period and are not eligible for the NRHP. The other sites are mostly isolated occurrences of cans, which may have been left behind by prospectors or the Hoover Dam construction workers passing through the area. (DOE, 1996)

The project area was included in a Class II cultural resources inventory of 107,412 acres completed by the BLM in 1994 prior to the sale of the land in accordance with the Eldorado Valley Act (P.L. 85-339). That inventory consisted of a number of 160-acre blocks that represented an approximate 10 percent sample of the survey area. The BLM documented in Report 5-2244 that the inventory was sufficient to characterize the cultural resources in the area designated for sale. The land identified for the proposed STC was included in that survey and is located between survey blocks 19 and 20 in Sections 6 and 5, respectively. No cultural resources were recorded in either of those 160-acre blocks. There were five prehistoric sites and two large diffuse prehistoric lithic scatters of 18 subsites recorded during the inventory that were determined not eligible for the NRHP. Therefore, the BLM determined, and the SHPO concurred, that the land sale would have no effect on historic properties. (BLM, 1994)

Groups of Southern Paiute and Mohave people lived within or used parts of the Eldorado Valley at the time of first European contact. The Colorado River defines the southern boundary of Southern Paiute territory where it formed the core of Mojave territory. There are spiritual and physical Indian trails associated with the Eldorado Valley. The trails were used by Pahrump and Las Vegas Paiutes to travel to places along the Colorado River. The valley is also associated with Indian funeral songs, including the Cry Ceremonial. The McCullough Mountains (which define the

western edge of Eldorado Valley) are important to American Indian people because of trails, sacred sites, plants, and animals of cultural sensitivity. (DOE, 1996)

3.4.2 Impacts of Proposed Action

The Proposed Action would not affect any historic property listed or eligible for listing on the NRHP and there are no known cultural resources on the proposed STC site that would be impacted by construction. Based on the results of the BLM's 1994 survey and others completed in the APE, it is concluded that the presence of unknown archaeological artifacts, sites, or features on the proposed STC site is unlikely.

Although Indian trails are known to cross through the Eldorado Valley, the small size of the proposed site adjacent to existing energy developments would not likely have an impact to a traditional Native American resource.

As the lead federal agency, DOE will consult with the SHPO and Native American tribes in accordance with Section 106 of the National Historic Preservation Act. The DOE has determined that providing financial assistance to construct and operate the STC would have no affect to historic properties determined eligible for the NRHP or traditional cultural sites deemed important to Native Americans, and has requested concurrence with this determination from the SHPO and tribes.

In the unlikely event of an unexpected discovery of cultural deposits during construction of the proposed STC, work will cease in the area of discovery, an appropriate DOE authority and an archaeologist will be contacted, and measures will be taken to identify and treat the resource.

3.5 Geological Resources

Geological resources include the physical surface and subsurface features including landforms, topography, soils, minerals, and hazards.

3.5.1 Existing Environment

The project area is in the Eldorado Valley in the southwestern portion of the Great Basin subdivision within the Basin and Range Physiographic Province. The valley is a vast area of open and undeveloped lands formed by the McCullough Range to the west, the Eldorado Mountains to the east, the River Mountains to the north, and the Highland Range to the south. The mountains range in elevation from approximately 3,000 feet to over 7,000 feet. The elevation of the proposed STC site ranges from approximately 1,820 feet to 1,750 feet from south to north. The topography in the immediate vicinity of the site exhibits an approximate 1.3 percent slope to the northwest.

The floor of the Eldorado Valley consists of alluvial, aeolian, and playa deposits surrounded by more steeply sloping alluvial aprons of poorly sorted gravel and sand deposits. The sediments can be up to 4,000 feet thick in some parts of the valley. The soils on the proposed site consist of the Tonopah-Arizo association, which are fan remnants and aprons deposited from the eroding adjacent mountain ranges. The soils are very gravelly to extremely gravelly sandy loam with surface rock fragments and cobbles. These soils are excessively drained. Geotechnical borings were drilled and percolation tests were conducted in May 2008 to determine subsurface conditions at the proposed site in preparation for construction (Ninyo & Moore, 2008). One soil boring was drilled to a depth of 15 feet below ground surface (bgs). The soil boring encountered silty gravel with sand from the surface to a depth of five feet bgs and silty sand with gravel below five feet.

No geologic faults have been identified across the proposed site but the Black Hills, Holocene age fault is located approximately seven miles to the northwest at the base of the McCullough Range. North-south trending faults associated with the Eldorado Mountains are located to the east and southeast of the proposed site. Eldorado Valley

is located within Seismic Zone 2B as defined by the Uniform Building Code, which is an area with moderate damage potential from seismic hazards associated with known faults.

Mineral resources in the project area include a fair potential for sand and gravel. Hard rock mining for gold, silver, copper, lead, and zinc historically occurred in the Eldorado Canyon district in the southern part of the Eldorado Mountains and along the northern end of the Opal Mountains. There is no active mining known in the project area.

3.5.2 Impacts of Proposed Action

Site preparation, construction, and operation of the proposed STC would have negligible impacts to the geological resources in the project area. Construction activities would be primarily surface structures or shallow below ground installations. Grading would be required to level the site and compact the soil for construction but extensive cut-and-fill is not anticipated. Because the slope is minor, changes to landforms and topography would be negligible. The total disturbed area would be approximately 10 acres, which would be the minimum necessary to construct the field station, parking lot, and test areas. The triangular-shaped parcel limits the use of the northern tip of the site and thus less ground surface would be disturbed. Topsoil would be stockpiled for reuse on the site after construction is completed but the small size of the site may make this practice impracticable. Soils would be lost due to physical alteration of the existing soil profile but this loss would be negligible.

Ground disturbance would result in increased erosion potential from exposure of bare soils to wind and storm water runoff. Trenches excavated for utilities would be backfilled as soon as possible to minimize erosion. Best management practices such as applying water or soil palliatives would be implemented during construction to minimize soil erosion and exposed surfaces would be landscaped after construction is completed.

The potential for extractable hard rock minerals is low and mining for sand and gravel in the project area is not planned, therefore, the Proposed Action would have no adverse impacts on mineral resources.

3.6 Noise

Noise is defined as unwanted sound that interferes with normal activities or in some way reduces the quality of the environment. Response to noise varies according to its type, its perceived importance, its appropriateness in the setting and time of day, and the sensitivity of the individual receptor.

A decibel (dB) is the physical unit commonly used to describe sound levels. Sound measurement is further refined by using an “A-weighted” decibel (dBA) scale that more closely describes how a person perceives sound. People tend to exhibit differing sensitivity to noises generated by time of day, with noise at night being more annoying than daytime noise. Therefore, a day-night average noise level (Ldn) is used to determine whether noise would be perceived adversely. The EPA developed an index (threshold) to assess noise impacts from a variety of sources using residential receptors. If Ldn values exceed 65 dBA, residential development is not recommended (EPA, 1974).

Noise sensitive receptors are defined as the occupants of a facility or a location where a state of quietness is a basis for use or where excessive noise interferes with the normal use of the facility or location. Typical noise sensitive receptors include schools, hospitals, churches, libraries, homes, parks, and wilderness areas. Some species of wildlife may also be sensitive to noise.

3.6.1 Existing Environment

The project area is a rural environment with low ambient noise levels. Sources of noise include the power generating stations at the El Dorado Energy plant and the NSO power plant, the natural gas line regulating station, truck traffic on U.S. Highway 95, and off-road vehicles. The project area experiences low to moderate noise levels. Although no specific data are available, background noise levels at the proposed STC site would be expected to range from 40

dBA (rural area during the day) to 60 dBA (commercial area heavy traffic), with occasional spikes related to equipment starting and stopping and off-road vehicles passing the site.

The visitor center at the El Dorado Energy power plant could be defined as a noise sensitive receptor. This facility serves as a classroom and museum; however, the sensitivity of the receptor is limited by the purpose for the function. The visitor center serves to educate people about the energy industry and noise from the adjacent power plant is therefore expected and acceptable. The administration building at the NSO power plant is not a noise sensitive receptor because its basis of use is industrial operations. Public lands and wilderness areas in the vicinity would be considered noise sensitive.

3.6.2 Impacts of Proposed Action

Construction of the proposed STC would result in temporary increases in ambient noise levels for approximately two months. A variety of construction equipment such as graders, backhoes, trenchers, jackhammers, cement trucks, dump trucks, and delivery trucks would generate noise intermittently and during daylight hours. Noise levels from construction sites measured approximately 90 dBA at a distance of 50 feet from the center of the site (CERL, 1978). Sites in flat-lying areas with minimal vegetation experience noise attenuation at a rate of 6 dBA for each doubling of distance between the source and the receptor (CERL, 1978). A receptor located between 800 and 1,000 feet away from the proposed STC site would hear noise levels at approximately 65 dBA and therefore would not be negatively impacted by construction activities. With no noise sensitive receptors within this distance, the Proposed Action would not have an impact.

Heavy equipment would generate noise that could affect the onsite workers during construction. Construction equipment typically emits noise in the 85 dB to 100 dB range. The construction contractor would require workers to wear hearing protection in accordance with Occupational Safety and Health Administration (OSHA) regulations.

Operational noise from solar panel arrays that may be installed on the proposed STC site would be negligible and would likely be inaudible against ambient levels. Performing outdoor maintenance, repositioning test equipment, and using tools in the test areas of the proposed STC would temporarily increase ambient noise levels but no receptors would be impacted.

3.7 Safety and Occupational Health

Safety is an integral part of all DOE actions including the responsibility to protect workers and to safeguard the natural and human environment.

3.7.1 Existing Environment

The Eldorado Valley where the proposed STC is located is predominantly undeveloped open desert. Safety and health considerations are associated with the environmental elements (primarily during summer months), including potential for heat stroke, heat exhaustion, dehydration, and poisonous spider and snake bites. Emergency services for fire, police, and medical are provided by the City of Boulder City. Medical facilities are located in Boulder City, approximately 20 miles from the proposed STC site.

3.7.2 Impacts of Proposed Action

Construction and trade workers would be exposed to safety and health hazards faced at similar construction sites. Potential impacts to the health and safety of the workers would be minimized by adherence to federal, state, and local regulations, OSHA regulations, and to the safety plans of the general contractor. No unusual construction site considerations are expected during the installation of solar power arrays and associated equipment.

The UNLV-CER would establish a program for a safe work environment for students. Students and workers operating the STC may be exposed to minor amounts of hazardous chemicals that may be used in research and testing projects. Students and workers are subject to the policies provided by the UNLV Risk Management and Safety program (UNLV, 2006). These policies include, but are not limited to, Emergency Response Planning, Material Safety Data Sheets, Chemical Inventory Management Program, Environmental Management and Laboratory Safety, and Occupational Safety. Students and workers would receive training in worker exposure and use of personal protective equipment to prevent injuries. The STC would not produce or store any chemicals that would result in catastrophic release or exposure to the general public. There would be no radioactive sources or materials maintained at this facility. No unique occupational health or safety hazards would be expected from working at the STC.

The general public would not be adversely impacted by the construction and operation of the proposed STC. The remote location of the site and construction of a fenced enclosure would minimize exposure of the public to potential safety hazards at the site. Public visitors to the STC would be requested to follow the established UNLV rules and safety precautions established for the STC to minimize accidents or injuries, and to protect the integrity of ongoing testing projects.

3.8 Socioeconomic Factors

Socioeconomic factors describe the local economy, employment, and demographics that may be influenced by the Proposed Action.

3.8.1 Existing Environment

Economy and Employment: Boulder City is located in Clark County, Nevada, which is one of the fastest growing counties in the U.S. Through 2006, the economy of Clark County was experiencing significant increases in job growth, labor force, personal income, and property valuation. Boulder City, on the other hand, has been controlling growth for years. As of 2007, Boulder City's population has remained steady, the unemployment rate is less than the U.S. average, and jobs have increased by 3.8 percent, but the City's cost of living is over 18 percent higher than the U.S. average.

Environmental Justice: Environmental justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no group of people, including a racial, ethnic, or socioeconomic group, should bear a disproportionate share of the adverse environmental consequences resulting from industrial, municipal, and commercial operations or the execution of federal, state, local, and tribal programs and policies.

Federal agencies must identify and address disproportionately high and adverse effects of federal projects on the health or environment of minority and low-income populations (Executive Order 12898). An environmental justice population is defined as a population being at least half minority status or at least half low-income status, or this status is meaningfully greater than the general population. A minority is defined as Black or African-American, Hispanic or Latino, Asian, American Indian and Alaskan Native, Native Hawaiian and other Pacific Islander. The U.S. Census Bureau defines the average poverty threshold as a maximum annual income of $23,691 or less for a family of four for the year 2006 (U.S. Census, 2006).

The proposed STC site is located within the corporate limits of Boulder City in a rural area zoned for energy development. The project area is in census tract 57.03 that encompasses Eldorado Valley. The demographics of this census tract are compared against the demographics of Boulder City to identify any potential environmental justice population. As shown in Table 4, the numbers of Blacks and Hispanics residing in the census tract are 14 percent and 10 percent more, respectively, than the City as a whole. These percentages can be viewed as being

meaningfully greater as compared to the general population of Boulder City and therefore defined as an environmental justice population in regards to minority status.

Table 4. Population and Income Demographics

Area	Total[1]	White	Black	American Indian[2]	Asian	Pacific Islander	Hispanic[3]	Other	Median Household Income
Tract 57.03	2,702	1,847	367	20	137	5	388	81	$35,531
Percent of Total Population[1]		68	14	1	5	<1	14	3	
Boulder City	14,966	14,149	107	108	107	24	650	190	$50,523
Percent of Total Population[1]		95	<1	<1	<1	<1	4	1	

[1] Does not equal total population or 100% by race and ethnicity because of census reporting by individuals.
[2] Data represents ethnic grouping of American Indian alone or in any combination.
[3] Data represents Hispanic or Latino of any race.
Source: U.S. Census Bureau, 2000

3.8.2 Impacts of Proposed Action

Economy and Employment: The Proposed Action does not include a residential component or require an influx of workers and employees and therefore would not be expected to increase population or change the demographic character of the project area. The Proposed Action would generate short-term employment opportunities during construction activities. There would be no impact to long-term employment opportunities as UNLV students and faculty would be operating the STC.

Operation of the STC would potentially provide economic benefits to UNLV-CER and to the City of Boulder City from renewable energy generated at the site.

Environmental Justice: The analysis indicates that the proposed STC would be located in a census tract that has a meaningfully higher percentage of minorities than the general population of Boulder City. However, there are no people living adjacent to or in close proximity to the site and thus no environmental justice populations would be impacted. Construction and operation of the STC would not have long-term or adverse health or environmental impacts and therefore no impacts would be disproportionately borne by any one population.

3.9 Utilities and Transportation

Utilities and transportation are the infrastructure necessary to support the STC including electricity, water, sewer, communications, and access.

3.9.1 Existing Environment

Utilities: The proposed STC would be located adjacent to the NSO power plant and approximately one mile from the El Dorado Energy generating plant. Both of these properties generate power that is provided to the NV Energy Company (formerly Nevada Power Company) electrical grid system located to the west of the project area. The generated power is delivered through overhead power lines which run along Eldorado Valley Drive. The proposed STC site is vacant with no utilities. An underground natural gas pipeline owned by Southwest Gas Corporation parallels the east border of the project site. Fiber optic cables and telecommunications are located underground within the Eldorado Valley Drive right-of-way adjacent to and south of the proposed STC site.

Potable water service is provided by the City of Boulder City. The City receives treated water from the Southern Nevada Water Authority, the wholesale water provider to municipal water agencies in Clark County. The Colorado

River via Lake Mead is the source of approximately 90 percent of the water. The City distributes treated water via an underground water main that parallels Eldorado Valley Drive in the right-of-way adjacent to and south of the site. There is no municipal sanitary sewer collection service provided to the Eldorado Valley. Developments install septic tanks and drain (leach) fields for wastewater treatment and disposal needs.

Transportation: Eldorado Valley Drive is a two-lane asphalt road providing east/west access in the project area. The road is located along the south edge of the proposed STC site. Eldorado Valley Drive primarily serves the El Dorado Energy plant, NSO power plant, and McCullough switching station. Capacity of the road is more than adequate for current traffic levels. U.S. Highway 95 is a north/south, four-lane divided highway connecting Boulder City to Searchlight and Laughlin, Nevada. The highway is located approximately 1.5 miles to the east of the project site. The highway was recently expanded to four lanes to increase capacity.

3.9.2 Impacts of Proposed Action

Utilities: The anticipated demand for utilities services to support construction and operation of the STC would be minimal, not require any system upgrades, and have no impact on the capacity demands of the service provider. The utilities needed for the proposed STC and the location of these utilities are shown in Figure 3.

Construction of the STC would require obtaining access to public utilities. During construction, temporary electrical power would be provided by contractors to operate construction tools and machinery. Because of the short construction duration and minimal electrical needs, power would be provided by diesel-fueled generators. After construction, the STC would require power to operate the field station. The UNLV Research Foundation would purchase a small diesel-fueled generator of approximately 20 kilowatts as a temporary electrical power source until the STC is operational and able to generate enough power to sustain the operations.

Construction and operation of the STC would require potable water. Water would be needed to serve the occupants of the field station and for use in cleaning and maintaining solar panels and arrays that would be installed. The length of the service line to the field station from the main water line in Eldorado Valley Drive is expected to be less than 500 feet. The NSO power plant uses approximately 800 gallons of ionized water every two weeks to clean one loop of eight solar collectors (Potrovitza, 2008). The size and configuration of the STC site would not accommodate the testing of more than one to three solar collectors; therefore, estimated water consumption to support testing could be less than 200 gallons per week. The capacity of the Boulder City water system is adequate to meet the needs of the STC (Hanson, 2008).

Natural gas would not be required to operate the STC and no impacts to that utility would occur.

The STC would require telecommunications access. The UNLV Research Foundation is negotiating with Acciona Energy to tap an available fiber optic line in an existing conduit. The conduit runs from the west side of the NSO power plant and parallels Eldorado Valley Drive. The fiber optic line would be tapped in the southwest corner of the STC site and connected to the field station (see Figure 3). The available fiber line is adequate for the telecommunication needs of the STC.

A septic system would be designed and installed for the STC to accommodate two restroom facilities located in the field station. The proposed location of the septic system is shown on Figure 3. The system would have a septic tank, a distribution box, and a leach field. The wastewater would sit in the septic tank until the solids settle to the bottom. The remaining liquid would then pass through the distribution box where it is evenly distributed to the leach field where microbes would digest or remove most contaminates before they could reach the groundwater. Percolation testing was performed at the proposed leach field site in accordance with the Soil Percolation Test Procedure (Section XV) established by the Clark County District Board of Health. These percolation test results would be used to design the system. The septic tank is expected to be less than 5,000 gallons and therefore would be regulated by the Southern Nevada Health District. The leach field would be designed proportional to the tank size and would not

extend off the STC property. Regulations require all commercial septic systems to be designed by a registered Nevada professional engineer and that engineer must certify proper installation of the system. Regular pumping and inspection would prolong the life of the septic system and proper functioning to ensure no impacts to groundwater sources. With proper design, installation, and maintenance, no impacts are expected.

Transportation: Construction of the STC would temporarily increase the traffic volume of personal vehicles of construction workers as well as construction trucks and equipment on both Eldorado Valley Drive and U.S. Highway 95. The estimated construction workforce would not be large, nor would the construction be long-term. It is estimated that up to 10 vehicles per day would be needed for approximately two months of construction. After construction is complete, workers and visitors to the STC would slightly increase traffic volume on both Eldorado Valley Drive and U.S. Highway 95 but would not impact available roadway capacity (Lerud, 2008). The STC would not be operational every day and therefore the number of vehicles traveling to the site would fluctuate.

3.10 Visual Quality

The physical and biological features of the landscape contribute to the scenic quality of an area and the visual appeal of an observer.

3.10.1 Existing Environment

The visual quality of the project area is characterized by expansive open space and dramatic basin and range landforms of the Eldorado Valley. The project area is surrounded by mountain ranges in each direction that drain to a large playa lakebed and flat valley. Elevations range from 1,700 feet to over 7,000 feet. Wildflowers and blooming shrubs and cacti add color to the landscape in spring and early summer. Visible manmade elements in the area include roads, overhead transmission lines, power generating plants and substations, and the field of solar panels. The NSO solar field viewed from the north off U.S. Highway 95 gives a blue hue to the landscape and appears to be a body of water.

Lands managed by the BLM are classified based on relative value of the visual resource. Visual resource management Class I and Class II are the most valued, Class III represents a moderate value, and Class IV is of least value. The objective of these classes is to limit future impacts on the visual and aesthetic character of the public land. Activities on non-federal lands adjacent to BLM land are not restricted by these visual classifications.

The mountain ranges surrounding the project area are Class II because of their wilderness designation (BLM, 1998). The scenic quality of the mountains is valued because of their visual appeal to users (i.e., hikers, campers). The BLM lands on the valley floor adjacent to the project area are Class III because of proximity to development and as a buffer between the more valued lands and metropolitan areas.

3.10.2 Impacts of Proposed Action

The proposed STC site is located in an area designated for energy development. Removing vegetation and constructing the field station and test areas would impact the visual character of the immediate area and add other manmade elements to the landscape. The proposed STC site is less than 10 percent of the size of the adjacent energy facilities which dominate the visual quality of the area. The field station would be designed and constructed using building materials and colors that are compatible with the natural environment. Landscaping around the STC would be with native vegetation and security lighting would illuminate downward to be less obtrusive. These design measures would minimize the visual intrusion of the building and meet the comprehensive planning requirements of Boulder City for the energy development zone.

The STC may be visible by users of the adjacent wilderness areas; however, the quality of their wilderness experience would not be impacted because of the dominance the other energy facilities have on the landscape.

3.11 Waste Management and Hazardous Materials

Hazardous materials are substances that may present a danger to public health or safety or to the environment because of its quantity, concentration, or characteristic. Solid waste is non-hazardous and generally consists of household trash, landscaping waste, or construction debris.

3.11.1 Existing Environment

The proposed STC site is undisturbed, vacant land. There was no evidence of storage, disposal, or release of hazardous materials on the proposed site. Other than windblown trash, no wastes or waste products were observed during a field survey of the site.

The City of Boulder City operates a Class I landfill for municipal solid waste. Solid waste is collected from residences and businesses by contractors and disposed at the landfill located on the east edge of the City. Horizontal and vertical expansion to the landfill is being reviewed to expand the capacity to 77 acres from the permitted 40 acres and extend the life of the landfill for many years.

3.11.2 Impacts of Proposed Action

Construction activities present the potential to encounter previously unidentified contaminated soils or groundwater. Based on a site reconnaissance and review of operations at adjacent facilities, the likelihood of encountering contamination is extremely low and no impacts from contaminants would be expected during construction. Small amounts of potentially hazardous waste materials (e.g., waste oils, lubricants, solvents, cleaners, paints) would be generated during construction but proper use and storage of the materials would ensure no impact to workers and the environment. Use or storage of hazardous materials on site during construction will be in accordance with applicable regulations, and appropriate spill prevention measures will be implemented. If hazardous materials are spilled or deposited on the site during or after construction, the responsible party will immediately notify appropriate regulatory parties, take all necessary actions to clean up and properly dispose of the materials, and complete all reporting requirements.

Operation of the STC is not expected to require hazardous materials other than those found in sealed photovoltaic panels, solar power systems, and various fluids commonly used in most industrial facilities. Research and testing activities may produce non-hazardous and hazardous wastes. The amount of hazardous waste generated would not likely require a small quantity generator identification number in accordance with the Resource Conservation and Recovery Act (RCRA). Photovoltaic panels may contain hazardous materials, and although the panels are sealed under normal operating conditions, there is the potential for environmental contamination if damaged or improperly disposed upon decommissioning. Concentrating solar power systems may employ liquids such as synthetic oils or molten salts that may be hazardous and present spill risks. In addition, various fluids are commonly used in most industrial facilities, such as hydraulic fluids, coolants, and lubricants. These fluids may in some cases be hazardous and present a spill related risk.

Any waste handling and disposal activities would conform to the requirements of RCRA, OSHA, and Nevada Division of Environmental Protection regulations. In the event hazardous waste is generated, UNLV-CER would package and dispose of the hazardous waste through off-site commercial treatment and disposal firms. Proper planning, implementation of spill prevention plans, and good maintenance practices would minimize impacts to workers and the environment from hazardous materials.

Small amounts of trash and household wastes generated by the occupants of the STC would be collected by contractors for disposal at the Boulder City Landfill. The amount of trash generated would not impact the capacity of the landfill (Martello, 2008).

3.12 Water Resources

Water resources include groundwater, surface water sources including wetlands, and floodplains.

3.12.1 Existing Environment

The project area is situated in the Eldorado Valley hydrographic sub-basin of the Central Region groundwater basin. Groundwater that originates as precipitation over areas of higher elevation generally flows toward the axis of the basin and then north into the Las Vegas Valley or eastward into the Colorado River Valley. Groundwater under Eldorado Valley occurs at depths ranging from about 275 to 320 feet below land surface in the north-central part of the basin (Buqo and Giampaoli, 1988). Percolation tests were performed for the leach field for the proposed STC septic system. One soil boring was advanced to a depth of 15 feet and no groundwater was encountered (Ninyo & Moore, 2008). There are no groundwater wells within the project area.

There are no intermittent or permanent surface water sources or wetlands in the project area. A small ephemeral drainage or swale crosses the proposed STC site from northeast to southwest. The flow of water in these smaller drainage systems occurs only during infrequent storm events and has no nexus to the Colorado River system and therefore would not be regulated by the U.S. Army Corps of Engineers under Section 404 of the Clean Water Act. The Eldorado Valley is a closed basin; runoff from the adjacent mountain ranges and surface flow drain inward to a playa lake (Eldorado Dry Lake) located approximately three miles north of the proposed site. The storm waters that drain into the isolated playa evaporate soon after the storms end.

The project area has been surveyed for flood hazards and mapped on the Federal Insurance Rate Map for unincorporated Clark County. The Eldorado Dry Lake is designated as a special flood hazard area subject to inundation by the one percent chance annual flood event (i.e., 100-year floodplain). The adjacent area surrounding the playa, which includes the proposed STC site, has been determined by the Federal Emergency Management Agency to be outside the 0.2 percent annual chance floodplain (i.e., 500-year floodplain).

3.12.2 Impacts of Proposed Action

The Proposed Action would not likely impact any surface water or groundwater resources, or floodplains. Excavations are not anticipated to be deep enough to intercept groundwater. There are no surface waters, wetlands, or regulated ephemeral washes on the site that would be filled or altered to construct the STC.

Storm water runoff from construction activities can have an impact on water quality, contributing sediment and other pollutants exposed at construction sites. Any potential impacts to water quality from construction activities would be short-term, localized, and negligible. With a large storm event, eroded soils and runoff of sediments and construction contaminants from the site could reach the playa lake if adequate control measures are not implemented and maintained during construction. The site would be graded and contoured to minimize disruption to natural flow patterns. The remaining exposed soil would be paved for the parking lot or landscaped, minimizing runoff and potential impacts to water quality.

The construction contractor for the UNLV Research Foundation will be required to file a Notice of Intent with the Nevada Division of Environmental Protection for coverage under the general permit for storm water discharge associated with construction that disturbs more than one surface acre. The general permit requires a Storm Water Pollution Prevention Plan (SWPPP) be prepared and implemented. The SWPPP will outline best management practices such as silt fences, straw bales, or sand bags for temporary erosion and sediment controls to minimize runoff from the proposed site during construction. Installation of landscape materials as soon as practicable after construction will further minimize runoff that could affect surface water quality.

Floodplain characteristics and values would not be impacted by the Propose Action because the site is not located within a regulated floodplain.

Improperly functioning and overloaded septic systems are major sources of water pollution. Failing septic systems leak harmful pollutants, like bacteria and excess nutrients (nitrogen and phosphorus), into groundwater. From there, pollutants make their way into lakes, streams, and rivers. Regular septic tank pumping, inspection, and maintenance would prolong the life of the septic system and leach field installed for the STC, and ensure proper functioning to minimize potential impacts to groundwater sources.

3.13 Intentional Destructive Acts

In December 2006, the DOE Office of General Counsel issued interim guidance stipulating that NEPA documents completed for DOE actions and projects should explicitly consider intentional destructive acts (i.e., acts of sabotage or terrorism). Construction and operation of the STC would not involve the transportation, storage, or use of radioactive, explosive, or toxic materials. Consequently, it is highly unlikely that construction or operation of the STC would be viewed as a potential target by saboteurs or terrorists. The project location is not near any national defense infrastructure or in the immediate vicinity of a major inland port, container terminal, freight trains, or nuclear power plants. The Proposed Action would not offer any targets of opportunity for terrorists or saboteurs to inflict adverse impacts to human life, heath, or safety.

3.14 Environmental Consequences of the No Action Alternative

Under the No Action Alternative, DOE would not provide federal funding assistance for the construction and operation of the STC. The UNLV Research Foundation would not lease land from the City of Boulder City and the UNLV-CER would pursue solar technology research opportunities that could be tested using existing facilities on campus.

There would be no change in land use and zoning designations. The proposed site would continue to be zoned for solar energy development. The triangular shape, minimal size, and adjacent constraints could adversely affect future interest in that parcel for its designated use.

The No Action Alternative would not disturb surface soils for constructing facilities and extending public utilities, and thereby, destroying vegetation, displacing or disrupting wildlife, and affecting local air quality with increased fugitive dust. Site conditions would remain unchanged and desert tortoise densities could increase with improved annual vegetation cover. There would be no potential of locating or exposing a previously unknown cultural resource.

There would be no manmade elements added to the visual character of the landscape that could be viewed by people using adjacent lands.

The surface hydrology would not be altered and runoff from the site would not carry additional sediments or contaminants that could affect water quality at off-site locations.

There would be no health and safety risks to workers or students under the No Action Alternative, and no increased risk to storing and using hazardous materials or generating and disposing of hazardous wastes from research projects. There would be no short-term changes in ambient noise levels from construction activities and no additional vehicles on Eldorado Valley Drive. The opportunity to create short-term construction jobs in a slowing economy and the opportunity for a long-term source of energy generation for the City of Boulder City and the STC would be lost.

The No Action Alternative would not satisfy the purpose and need for the Proposed Action. The benefits that would be gained from having a larger facility in which to conduct further research and testing of existing and emerging solar technologies would not be realized by the solar energy industry, by the public that desires alternative forms of energy, or by DOE.

4.0 CUMULATIVE IMPACTS OF THE PROPOSED ACTION

This section describes the impacts to the environment that may potentially occur because of the additive (i.e., cumulative) effects of implementing the Proposed Action with other past, present, and reasonably foreseeable future actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

Past and present actions included in the cumulative impact analysis include the construction and operation of the NSO solar power plant and the El Dorado Energy electrical power plant, and installation and upgrades to overhead electrical transmission lines, substations, and underground natural gas pipelines. The foreseeable future actions include the construction of new or expanded alternative energy facilities throughout the 3,000-acre area in Eldorado Valley designated for such development.

Because the proposed site could eventually be developed for solar energy uses in accordance with the City's plans for this area of the Eldorado Valley, the potential impacts to the resources as described for the Proposed Action would occur, but at some future time and by a different proponent. Therefore, the Proposed Action would not necessarily generate additive cumulative effects to the area, but may only affect the timing of those impacts. The areas that would most likely experience cumulative effects with the Proposed Action include:

- Regional and local air pollutant emissions
- Habitat loss
- Visual landscape
- Land use and development
- Energy demand

Regional and local air pollutant emissions: Air quality in the project area has been poor in the past and the area is in non-attainment for ozone. Construction emissions are short-term and with implementation of adequate dust control measures during and after construction, increases in PM_{10} emissions should not exceed NAAQS or affect the attainment designations in the airshed. Constructing new solar fields and increasing solar energy generation to provide electricity to the region would have a beneficial cumulative impact on air quality by reducing emissions of ozone precursors. Given the potential air quality benefits of renewable energy and energy efficiency research to be performed at the STC, the overall net impact of the Proposed Action on cumulative air quality in the region and locally would probably be neutral. The research activities to be conducted at the STC would provide a net advantage to air quality by harnessing non-polluting solar power, while construction of the STC would result in a temporary increase in some emissions of criteria air pollutants and hazardous air pollutants.

Habitat loss: The Proposed Action in combination with other energy development projects in this area would result in the cumulative permanent loss of native vegetation and the wildlife that inhabit the area. However, the USFWS Biological Opinion File No. 1-5-94-F-283 concluded that the loss of approximately 3,000 acres of desert tortoise habitat to energy development in the Eldorado Valley would not jeopardize the continued existence of the species. Other non-federal projects occurring within Clark County come under the purview of the Clark County MSHCP and associated incidental take permit for impacts to desert tortoise and other covered wildlife and plant species.

Visual landscape: Construction and operation of the STC would slightly modify the overall visual impression of the landscape that is planned for energy development but is not yet developed. The STC would be visually compatible with the adjacent energy facilities. The vacant open landscape within the Eldorado Valley would change to an industrial dominated view as additional energy-related development occurs. This could have an adverse cumulative effect on people in nearby wilderness areas. However, the majority of people using mountainous areas for scenic view purposes are generally focused on the views provided into the mountain ranges rather than toward the Eldorado Valley and thus cumulative impacts to viewer sensitivity would be negligible.

Induced development: The Proposed Action includes new development in the desert, but it does not create unplanned development or present the potential to open up new areas for development. It does not create improved access to real estate, reduce development restrictions, or substantially induce new development in unanticipated areas. Implementation of the Proposed Action would have no adverse cumulative impact on land use and planning. The project is consistent with current zoning and the Boulder City Comprehensive Master Plan, and would be compatible with neighboring uses. Related projects must be assessed for zoning and plan consistency, and mitigation measures applied where any land use impacts might be expected. With mitigation (if needed) the related projects would not have a substantial impact.

Energy Demand: All projects requiring energy have incremental impacts related to energy consumption, but very few offer the possibility of making a positive contribution toward renewable energy and energy efficiency. The STC and its research activities specifically intend to advance the use and acceptance of renewable energy and to enhance solar energy efficiency.

5.0 COMMITMENT OF RESOURCES AND SHORT-TERM USES

An irreversible commitment of resources can be defined as the loss of future options. Irreversible effects result primarily from consumption or destruction of a specific resource that cannot be replaced within a reasonable timeframe (e.g., minerals or soils). Irretrievable resource commitments involve the loss in value of an affected resource that cannot be restored as a result of the action (e.g., extinction of a threatened or endangered species or the destruction of a cultural site).

Labor, energy, materials, and capital would be committed for construction of the STC. These resources would not be recovered. Short-term use of a labor force would result in long-term productivity of energy development. Construction would make permanent use of building materials; however, rare resources would not be consumed in the process. The construction materials, except to the extent they can be recycled, would be irretrievably committed.

Approximately 10 acres of land would be occupied by the STC and related research activities for some time into the future until the operations are terminated. This land could be re-used for other energy development, or restored to its existing condition as open space and replanted with native desert flora; therefore, the commitment of land is not irreversible.

The incremental loss of desert tortoise habitat and open-space and scenic values is balanced by the protections afforded to the long-term productivity of the site for solar energy development. Improved efficiency and increased use of renewable energy sources could substantially reduce the use of and reliance on imported fossil fuels in the future.

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Appendix A

Scoping Letter and Distribution List

Department of Energy

Golden Field Office
1617 Cole Boulevard
Golden, Colorado 80401-3305
May 22, 2008

TO: Distribution List

SUBJECT: Notice of Scoping – Proposed Solar Technology Center, Boulder City, Nevada

The U.S. Department of Energy (DOE) is proposing to provide Congressionally Directed Federal Funding to the University of Nevada, Las Vegas (UNLV) Research Foundation to construct and develop the Solar Technology Center (STC) near Boulder City, Nevada. Pursuant to the requirements of the National Environmental Policy Act (NEPA), the Council on Environmental Quality regulations for implementing the procedural provisions of NEPA (40 CFR Parts 1500-1508), and DOE's implementing procedures for compliance with NEPA (10 CFR Part 1021), DOE is preparing a draft Environmental Assessment (EA) to:

Identify any adverse environmental effects that cannot be avoided should this proposed action be implemented.

- Evaluate viable alternatives to the proposed action, including a no action alternative.
- Describe the relationship between local short-term uses of the environment and the maintenance and enhancement of long-term productivity.
- Characterize any irreversible and irretrievable commitments of resources that would be involved should this proposed action be implemented.

The proposed STC would be located approximately 15 miles southwest of Boulder City in the Eldorado Valley on land leased from the City of Boulder City (see Figure 1). The triangular shaped site covers 33 acres on the north side of Eldorado Valley Drive approximately 1.5 miles west of U.S. Highway 95 (see Figure 2). The site is located in Section 5, Township 25 South, Range 63 East, Mount Diablo Baseline and Meridian. The Nevada Solar One power station forms the west border of the proposed STC site and an underground natural gas pipeline parallels the east border.

Construction and development on the proposed STC site would include a modular building (1,800 square feet) for use as a field station and research laboratory, a parking lot, and graded and concrete surfaces for two test areas. These test areas would potentially include photovoltaic (PV) panels, parabolic trough collectors, and solar dishes.

The proposed STC would be operated the UNLV Center for Energy Research (CER) as a research and development facility, for education and training, and for public information and outreach on renewable energy technologies and conservation. The STC would have a small area for the public to learn about solar technologies using informational posters and brochures. In addition, UNLV-CER has been in discussions with El Dorado Energy to establish a cooperative alliance to use the visitor facilities at their power plant located approximately one mile to the west of the proposed STC site (see Figure 2). These visitor facilities would be used to conduct educational presentations and host organized tours of the STC, and would allow for the maximum use of the STC site for renewable energy research and testing. The proposed STC would be occupied and operational as needed for the different research projects and be managed by UNLV students. Students would have opportunities to receive hands-on experience and work with industry partners in conducting research and in developing renewable energy technologies. The UNLV-CER focuses on renewable energy research and collaborates with energy industry partners in developing solar energy technologies including concentrating PV and thermal technologies. The different technologies that would be researched at the proposed STC may include concentrating solar power, concentrating PV point focus and linear arrays, flat plate PV, energy storage, and tracking and control sys-

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tems. The STC would also be used to conduct research on new energy efficient and post-consumer products for use in residential and commercial construction, as well as different types of energy conserving technologies (i.e., insulations, surface coatings, textures, roofing, appliances, and windows).

The proposed STC would serve the community by informing the public of new developments in the renewable energy industry. Visitors would be able to tour the STC to receive general information regarding ongoing research and development projects, and additional information would be provided in print and electronic media about commercial technology currently available to the general public.

The EA will address direct, indirect, and cumulative impacts of constructing and operating the STC (i.e., Proposed Action) at the proposed site and discuss potential alternatives to the Proposed Action, including taking no action. The environmental topics that will be addressed in the EA include:

Air Quality	Biological Resources and Protected Species
Cultural Resources	Geological Resources
Water Resources	Infrastructure, Utilities, and Transportation
Land Use and Planning	Waste Management and Hazardous Materials
Energy	Visual Quality and Aesthetics
Health and Safety	Socioeconomics and Environmental Justice

As part of the process for determining the scope of issues related to the Proposed Action, we request your comments or other information by June 23, 2008. DOE anticipates public distribution of the draft EA in late July 2008. No formal public scoping meeting is currently planned for this project. This letter and the draft EA, when available, will be posted to the Golden Field Office electronic reading room: http://www.eere.energy.gov/golden/reading_room.aspx.

If you have any comments or questions regarding the project, please direct them to:

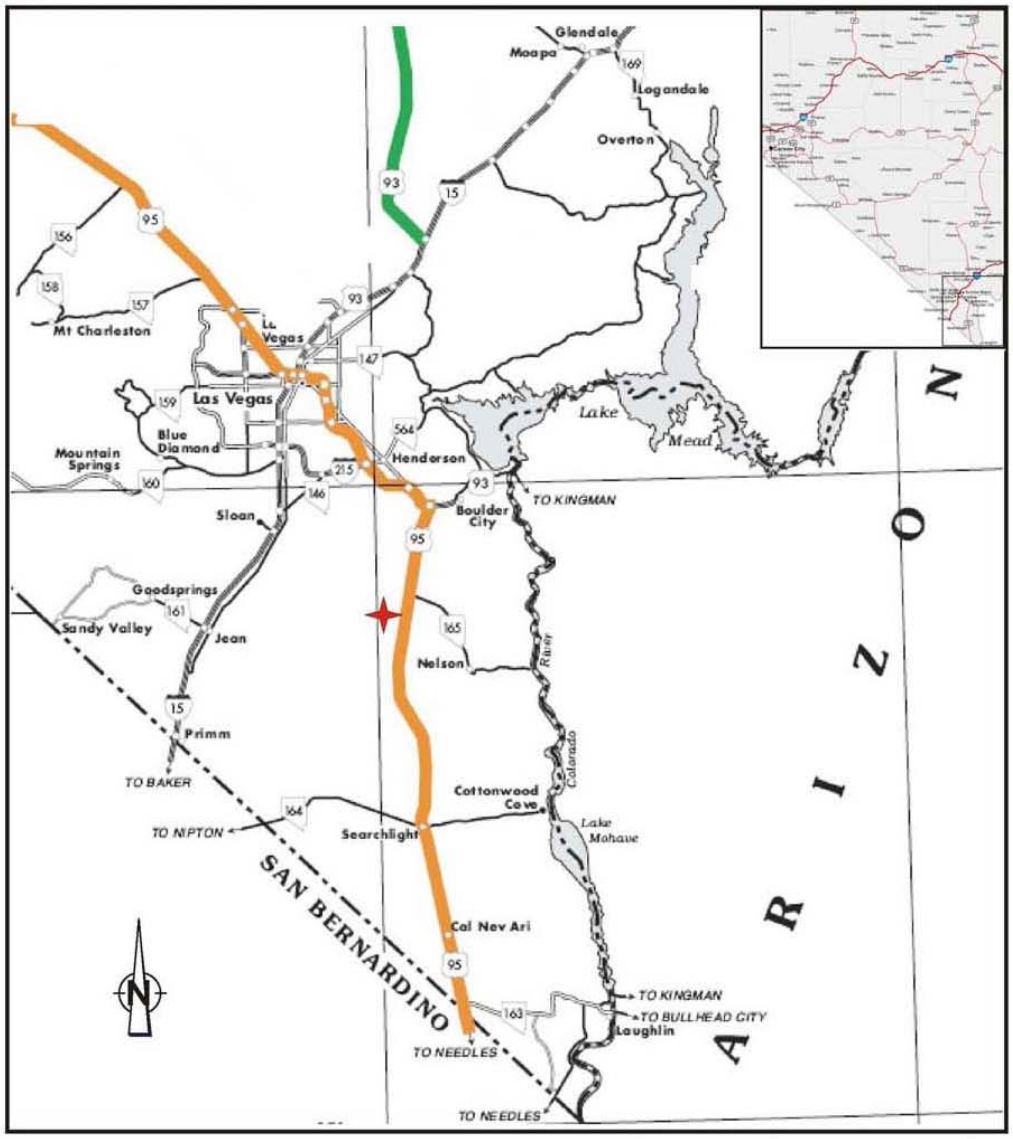
UNLV Research Foundation
c/o Mary B. Peters
MBP Consulting, LLC
7772 High Chaparral Street, Las Vegas, NV 89113
Phone: 702-285-3784 Fax: 702-441-6965
E-mail: mbpconsulting@cox.net

We look forward to hearing from you.

Sincerely,

Steve Blazek
NEPA Compliance Officer

Attachments:
Figure 1 Regional Location Map, Solar Technology Center
Figure 2 Aerial Vicinity of Solar Technology Center



Site location

Base Map Source: Nevada Department of Transportation

Figure 1. Regional Location Map, Solar Technology Center

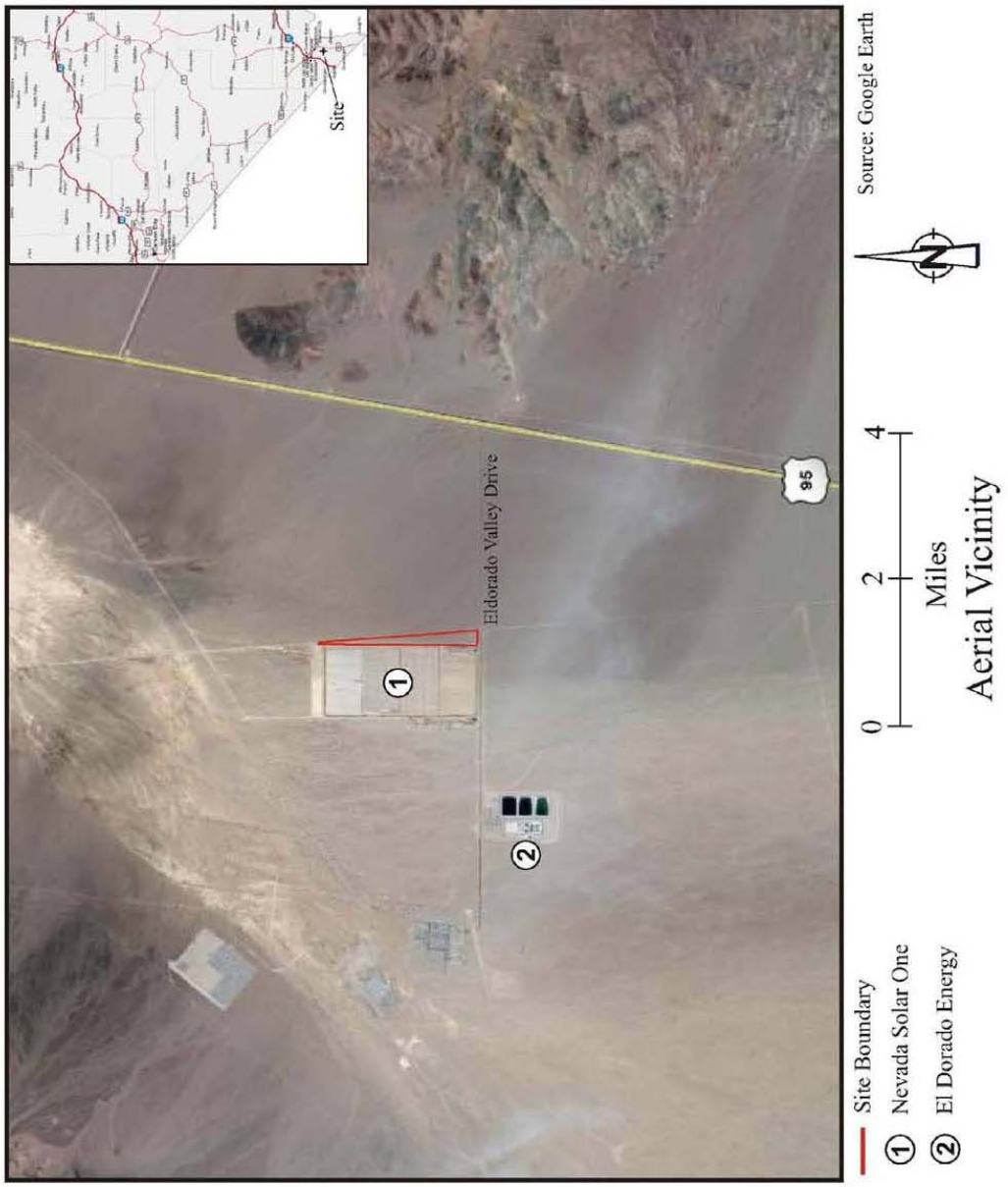


Figure 2. Aerial Vicinity of Solar Technology Center

SCOPING LETTER DISTRIBUTION LIST

The U.S. Department of Energy notified federal, state, and local agencies, tribal government representatives, elected officials, businesses, organizations, and special interest groups of the Proposed Action. The list of recipients that were notified by postcard of the availability of the scoping letter and attachments is presented below.

FEDERAL AGENCIES

U.S. Army Corps of Engineers
321 North Mall Drive, L101
St. George, UT 84790

Ms. Leilani Takano
U.S. Fish and Wildlife Service
4701 N. Torrey Pines Drive
Las Vegas, NV 89130

Environmental Review
EPA Region IX
75 Hawthorne Street
San Francisco, CA 94105

Mary Jo Rugwell
Field Manager, BLM
4701 N. Torrey Pines Drive
Las Vegas, NV 89130

Ms. Kim Liebhauser
Supervisory Realty Specialist, BLM
4701 N. Torrey Pines Drive
Las Vegas, NV 89130

NATIVE AMERICAN TRIBAL REPRESENTATIVES

Ms. Lora Tom
Paiute Indian Tribe of Utah Tribal Council
440 North Paiute Drive
Cedar City, UT 84720-2613

Chairperson
Moapa Band of Paiutes
P.O. Box 340
Moapa, NV 89025

Mr. Richard Arnold
Las Vegas Indian Center
2300 West Bonanza Road
Las Vegas, NV 89106

Chairperson
Pahrump Paiute Tribe
P.O. Box 4311
Pahrump, NV 89041

Mr. Daniel Eddy, Jr.
Colorado River Indian Tribes
Route 1, Box 23-B
Parker, AZ 85344

Mr. Thomas Siyuja
Havasupai Tribal Council
P.O. Box 10
Supai, AZ 86435

Ms. Nora McDowell
Fort Mojave Tribal Council
500 Merriman Avenue
Needles, CA 92362

Chairperson
Las Vegas Paiute Tribal Council
One Paiute Drive
Las Vegas, NV 89106

Mr. Charlie Vaughn
Hualapai Tribal Council
P.O. Box 179
Peach Springs, AZ 86434

Mr. Charles F. Wood
Chemehuevi Tribal Council
P.O. Box 1976
Havasu Lake, CA 92362

NEVADA STATE AGENCIES

Mr. Ronald James
State Historic Preservation Office
100 N. Stewart Street
Carson City, NV 89701

Mr. John Jones
Division of Forestry
4747 W. Vegas Drive
Las Vegas, NV 89158

Mr. Rudy Malfabon
Department of Transportation
123 Washington Avenue
Las Vegas, NV 89101

Bureau of Water Pollution Control
Division of Environmental Protection
2030 E. Flamingo Road, #230
Las Vegas, NV 89119

Mr. Brad Hardenbrook
Department of Wildlife
4747 W. Vegas Drive
Las Vegas, NV 89108

CLARK COUNTY AGENCIES AND ELECTED OFFICIALS

Mr. Gale Fraser
Regional Flood Control District
600 S. Grand Central Parkway
Las Vegas, NV 89155

Ms. Marci Henson
Desert Conservation Program
500 S. Grand Central Parkway
Las Vegas, NV 89155

Mr. Richard Mendes
Water Reclamation District
5857 E. Flamingo Road
Las Vegas, NV 89122

Mr. Lewis Wallenmeyer
Department of Air Quality and Environmental Management
500 S. Grand Central Parkway
Las Vegas, NV 89155

Mr. Bruce Woodbury
Board of Commissioners
500 S. Grand Central Parkway
Las Vegas, NV 89155

CITY AGENCIES AND ELECTED OFFICIALS

Mr. Roger Tobler
Mayor
City of Boulder City
P.O. Box 61350
Boulder City, NV 89006-1350

Ms. Vicki Mayes
City Manager
City of Boulder City
P.O. Box 61350
Boulder City, NV 89006-1350

Ms. Pamella Maimstrom
City Clerk
City of Boulder City
P.O. Box 61350
Boulder City, NV 89006-1350

Mr. Skip Spilman
Conservation Specialist
City of Boulder City
P.O. Box 61350
Boulder City, NV 89006-1350

Mr. Scott Hansen
Public Works Department
City of Boulder City
P.O. Box 61350
Boulder City, NV 89006-1350

Mr. Dave Olsen
City Attorney
City of Boulder City
P.O. Box 61350
Boulder City, NV 89006-1350

Ms. Andrea Anderson
Council Member
City of Boulder City
P.O. Box 61350
Boulder City, NV 89006-1350

Mr. Travis Chandler
Council Member
City of Boulder City
P.O. Box 61350
Boulder City, NV 89006-1350

Mr. Mike Pacini
Council Member
City of Boulder City
P.O. Box 61350
Boulder City, NV 89006-1350

Ms. Linda Strickland
Council Member
City of Boulder City
P.O. Box 61350
Boulder City, NV 89006-1350

U.S. CONGRESSIONAL OFFICIALS

Honorable Harry Reid
U.S. Senator
333 S. Las Vegas Blvd., #8016
Las Vegas, NV 89101

Honorable John Ensign
U.S. Senator
333 S. Las Vegas Blvd., #8203
Las Vegas, NV 89101

Honorable Jon Porter
U.S. Representative
2470 St. Rose Pkwy, Ste. 204
Henderson, NV 89074

BUSINESS, ORGANIZATIONS, AND SPECIAL INTEREST GROUPS

Mr. Robert Boehm
UNLV Mechanical Engineering Department
4501 Maryland Parkway
Las Vegas, NV 89154

Supervisor, Right-of-Way
Nevada Power
6226 W. Sahara Avenue
Las Vegas, NV 89146

Supervisor, Right-of-Way
Southwest Gas Corporation
4300 West Tropicana Ave.
Las Vegas, NV 89193

Mr. Earl Hodge
2836 Belmont Drive
Henderson, NV 89074

Mr. Gilbert Cohen
Nevada Solar One
8275 S. Eastern Avenue, Suite 200
Las Vegas, NV 89123

Archeo Nevada Society
9921 West Charleston Blvd., #5
Las Vegas, NV 89117

Executive Director
Nevada Conservation League
7473 W. Lake Mead Blvd., Suite 100
Las Vegas, NV 89128

Southern Nevada Project Director
The Nature Conservancy
1771 E. Flamingo Road, Suite 104A
Las Vegas, NV 89119

Desert Tortoise Council
P.O. Box 3273
Beaumont, CA 92223-1202

Southern Nevada Environmental Forum
705 Mallard Avenue
Las Vegas, NV 89107

Southern Nevada Field Office
Sierra Club
732 S. 6th Street
Las Vegas, NV 89101

Regional Coordinator
The Wilderness Society Ca/NV
655 Montgomery Street, #1000
San Francisco, CA 94111

Southern Nevada Off-Road Enthusiasts
P.O. Box 270516
Las Vegas, NV 89127-4516

Nevada Conservation Forum
Desert Research Institute
2215 Raggio Parkway
Reno, NV 89512

LIBRARIES

Boulder City Library
701 Adams Blvd.
Boulder City, NV 89005

Clark County Library
1401 Flamingo Road
Las Vegas, NV 89109

Las Vegas Public Library
833 N. Las Vegas Blvd.
Las Vegas, NV 89101

James R. Dickinson Library
UNLV
4505 S. Maryland Parkway
Las Vegas, NV 89154

NEVADA STATE CLEARINGHOUSE AGENCIES

Department of Conservation and Natural Resources
Division of Emergency Management
Commission on Economic Development
Fire Marshal
State Health Division
Hawthorne Army Depot
Indian Commission
Division of State Lands
Naval Air Station Fallon
Commission on Minerals
Division of Conservation Districts
Division of Environmental Protection
Department of Transportation
Department of Wildlife, Director's Office
Department of Wildlife, Las Vegas
Division of Water Resources
Natural Heritage Program
National Nuclear Security Administration
Agency for Nuclear Programs
Division of State Parks
Congressman Porter
Public Utilities Commission
State Energy Office
State Historic Preservation Office
Burea of Mines

Appendix B

Scoping Response Letters

JIM GIBBONS
Governor

STATE OF NEVADA

ANDREW K. CLINGER
Director

DEPARTMENT OF ADMINISTRATION
209 E. Musser Street, Room 200
Carson City, Nevada 89701-4298
(775) 684-0222
Fax (775) 684-0260
http://www.budget.state.nv.us/

June 20, 2008

Mary Peters
MBP Consulting, LLC
7772 High Chaparral Street
Las Vegas, NV 89113

Re: SAI NV # **E2008-486** Reference:

Project: **Solar Technology Center, Boulder City**

Dear Mary Peters:

Enclosed are comments from the agencies listed below regarding the above referenced document. Please address these comments or concerns in your final decision.

Division of State Lands

The following agencies support the above referenced document as written:

State Historic Preservation Office

This constitutes the State Clearinghouse review of this proposal as per Executive Order 12372. If you have questions, please contact me at (775) 684-0209.

Sincerely,

Krista Coulter
Nevada State Clearinghouse

Nevada State Clearinghouse

From: Skip Canfield
Sent: Thursday, June 19, 2008 2:15 PM
To: Nevada State Clearinghouse
Subject: RE: E2008-486 Solar Technology Center, Boulder City -

The Nevada Division of State Lands provides the following comments:

There is a concern about the cumulative visual impacts to public lands users' experiences.

As multiple use concepts are employed on our public lands, a comprehensive and consistent look at visual impacts must be considered. Small and inexpensive mitigation measures can play a large role in the compatibility of the built and natural environment.

Utilize appropriate lighting:

- Utilize consistent lighting mitigation measures that follow "Dark Sky" lighting practices. Dark sky measures are inexpensive, simple to implement, and very mainstream. The result is a less obtrusive impact to other users of adjacent public lands. www.darksky.org
- Effective lighting should have screens that do not allow the bulb to shine up or out. In fact, lighting that is installed using dark sky fixtures (light is only aimed at the subject property) is more efficient, safer, and results in reduced electricity costs.
- Federal agencies should include light shields as a condition of approval for all permanent and temporary applications such as exploratory drilling rigs.

Utilize building materials, colors and site placement that are compatible with the natural environment:

- Utilize consistent mitigation measures that address logical placement of improvements and use of appropriate screening and structure colors. Existing utility corridors, roads and areas of disturbed land should be utilized wherever possible.
- For example, the use of compatible paint colors such as "sudan brown" for water tanks and other vertical structures reduces the visual impacts of the built environment. Using screening, careful site placement, and cognitive use of earth-tone colors/materials that match the environment go a long way to improve the user experience for others who might have different values than what is fostered by built environment activities.
- Federal agencies should require these mitigation measures as conditions of approval for all permanent and temporary applications.

Skip Canfield, AICP
State Land Use Planning Agency
775-684-2723

6/19/2008

6/5

Rebecca Palmer

From: Nevada State Clearinghouse [Clearinghouse@budget.state.nv.us]
Sent: Friday, May 30, 2008 10:02 AM
To: Rebecca Palmer
Subject: E2008-486 Solar Technology Center, Boulder City -

<http://budget.state.nv.us/images/state_seal.jpg> NEVADA STATE CLEARINGHOUSE
Department of Administration, Budget and Planning Division
209 East Musser Street, Room 200, Carson City, Nevada 89701-4298
(775) 684-0209 Fax (775) 684-0260

TRANSMISSION DATE: 5/30/2008

State Historic Preservation Office

Nevada SAI # E2008-486

Project: Solar Technology Center, Boulder City

Follow the link below to download an Adobe PDF document concerning the above-mentioned project
for your review and comment.
E2008-486 <http://budget.state.nv.us/clearinghouse/Notice/2008/E2008-486.pdf>

Please evaluate it with respect to its effect on your plans and programs; the importance of its contribution to state and/or local
areawide goals and objectives; and its accord with any applicable laws, orders or regulations with which you are familiar.

Please submit your comments no later than Thursday, June 19, 2008.

Use the space below for short comments. If significant comments are provided, please use agency letterhead and include
the Nevada SAI number and comment due date for our reference.
Questions? Krista Coulter, (775) 684-0209 or clearinghouse@state.nv.us
<mailto:clearinghouse@budget.state.nv.us>

____No comment on this project ✓ Proposal supported as written

AGENCY COMMENTS:

Signature: Rebecca L Palmer

Date: 6/4/08

Distribution: Sandy Quilici, Department of Conservation & Natural Resources Stephanie Martensen, Division of Emergency Management Alan Di Stefano, Economic Development Kathy Agee, Economic Development Chad Hastings, Fire Marshal Stan Marshall, State Health Division Karen Beckley, State Health Division Kirk Bausman, Hawthorne Army Depot Sherry Rupert, Indian Commission Skip Canfield, AICP, Division of State Lands Zip Upham, NAS Fallon Ed Rybold, NAS Fallon Jerry Sandstrom, Commission on Economic Development Alan Coyner, Commission on Minerals D. Driesner, Commission on Minerals Christy Morris, Commission on Minerals Sandi Gotta, Division of Conservation Districts John Walker, Nevada Division of Environmental Protection Catherine Cuccaro, Department of Transportation

1

STATE OF NEVADA
DEPARTMENT OF WILDLIFE
1100 Valley Road
Reno, Nevada 89512
(775) 688-1500 • Fax (775) 688-1595

JIM GIBBONS
Governor

KENNETH E. MAYER
Director

DOUG HUNT
Deputy Director

SOUTHERN REGION
4747 Vegas Drive
Las Vegas, Nevada 89108
(702) 486-5127 · Fax (702) 486-5133

RECEIVED
JUN 23 2008
DEPARTMENT OF ADMINISTRATION
OFFICE OF THE DIRECTOR
BUDGET AND PLANNING DIVISION

June 13, 2008

NDOW-SR# 08-327
LVO-08-057

Ms. Krista Coulter
Nevada State Clearinghouse
209 East Musser Street, Room 200
Carson City, NV 89701-4298

SAI #: E2008-486
Due Date: June 23, 2008
Project: Notice of Scoping – Proposed Solar Technology Center, Boulder City, Nevada (Project)

Dear Ms. Coulter:

The Nevada Department of Wildlife (Department) appreciates the opportunity to provide comment on the proposed Solar Technology Center (STC). From the information provided in the notice of scoping, we understand that the proposed STC would be located on land leased from the City of Boulder. Relative to the desert tortoise and 77 additional species covered under Clark County's Multiple Species Habitat Conservation Plan (MSHCP), we understand that the appropriate mitigation fees of $550/acre will be collected by the City of Boulder as part of the development permitting process. However, there are many species not addressed under the MSHCP for which permits, authorizations, or other pro-active considerations apply. Wildlife of concern potentially affected by the project include the: Gila monster, Burrowing Owl, Loggerhead Shrike, and other migratory birds and bats. Because raptorial and neo-tropical birds are protected under the federal Migratory Bird Treaty Act and state laws, and the Gila monster is State protected, due consideration to species potentially using the project site seems reasonable. We suggest the following impact minimization measures:

Migratory Birds: Construction activities should be timed to avoid the bird breeding and nesting season which roughly occurs between March 15 and August 15. If this seasonal avoidance is not practicable, then the Department recommends a qualified biologist survey the project site prior to any construction for determining whether the presence of Burrowing Owls and other nesting migrants is underway. In the event an active nest (containing eggs or young) is discovered or frequently attended by adult birds, a buffer area around the nest appropriate for the involved species must be identified and avoided until young birds fledge. This measure would be consistent with preventive actions advocated by the U.S. Fish & Wildlife Service concerning migratory species protected under the Migratory Bird Treaty Act. The Las Vegas office of the U.S. Fish and Wildlife Service at (702) 515-5230 has additional guidance on protecting Burrowing Owls at construction sites.

Gila monster (*Heloderma suspectum*): Per Nevada Administrative Code 503.080, the Gila monster is classified as a protected reptile. The Department's Gila monster encounter protocols should be

(NSPO Rev. 2-07) (O) 5386

incorporated into the site plan of development and/or forwarded to the principal contractor for awareness during construction. A copy is enclosed.

Another consideration is if the proponent will be having biological monitors on site to perform pre- and construction level surveys with the intention to remove certain wildlife out of harms way. For wildlife under the Department's jurisdiction, authorization from the Department for conducting such activities is in compliance with NRS 503.597. This authorization would not take the place of permits or authorizations as required by other levels of government for conducting such activities. The project proponent would provide written request to the Department with a description of the project, list wildlife to be moved out of harms way, describe the manner in which removal activities would be conducted, and provide any other documentation relevant to the proposed activities. Processing time of permits and authorizations may take up to 3 to 4 weeks.

Lastly, should there be evaporative and/or cooling ponds associated with the STC, solution chemistry is of interest. Solutions contained in open ponds may potentially become hazardous to wildlife. Information and applications for an Industrial Artificial Pond can be found at the Department's website at http://www.ndow.org/law/licenses/.

Thank you again for the opportunity to provide comment on this proposed project. Should there be any questions or concerns, please direct correspondence to Habitat Biologist Tracy Kipke at (702) 486-5127 ext. 3612 or by e-mail at tkipke@ndow.org.

Sincerely,

D. Bradford Hardenbrook
Supervisory Biologist - Habitat

TK/DBH:tk

enclosure

Cc: NDOW, Files

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

1 November 2007

GILA MONSTER STATUS, IDENTIFICATION AND REPORTING PROTOCOL FOR OBSERVATIONS

Gila Monster Status

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

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

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

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

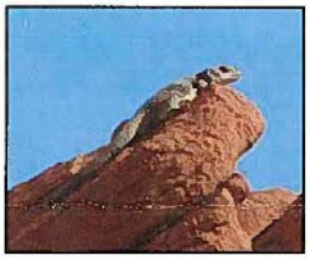
Scant information exists on detailed distribution and relative abundance in Nevada. The Nevada Department of Wildlife (NDOW) has ongoing management investigations addressing the Gila monster's status and distribution, hence additional distribution, habitat, and biological

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

Identification

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

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



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

Reporting Protocol for Gila Monster Observations

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

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

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

2) Injuries to Gila monsters may occur during excavation, blasting, road grading, or other construction activities. In the event a Gila monster is injured, it should be transferred to a veterinarian proficient in reptile medicine for evaluation of appropriate treatment. Rehabilitation or euthanasia expenses will not be covered by NDOW. However, NDOW will be immediately notified of any injury to a Gila monster and which veterinarian is providing care for the animal. If an animal is killed or found dead, the carcass will be immediately frozen and transferred to NDOW with a complete written description of the discovery and circumstances, date, time, habitat, and mapped location (GPS coordinates in UTM using NAD 83 Z 11).

3) Should NDOW's assistance be delayed, biological or equivalent acting personnel on site should detain the Gila monster out of harms way until NDOW personnel can respond. **The Gila monster should be detained until NDOW biologists have responded**. Should NDOW not be immediately available to respond for photo-documentation, a digital (5 mega-pixle or higher) or 35mm camera will be used to take good quality images of the Gila monster in situ at the location of live encounter or dead salvage. The pictures will be provided to NDOW at the address above or the email address below along with specific location information including GPS coordinates in UTM using NAD 83 Z 11, date, time and habitat description. Pictures will show the following information: (1) Encounter location (landscape with Gila monster in clear view); (2) a clear overhead shot of the entire body with a ruler next to it for scale (Gila monster should fill camera's field of view and be in sharp focus); (3) a clear, overhead close-up of the head (head should fill camera's field of view and be in sharp focus).

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

Page 3 of 3

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Nevada Fish and Wildlife Office
4701 North Torrey Pines Drive
Las Vegas, Nevada 89130
Ph: (702) 515-5230 ~ Fax: (702) 515-5231

June 30, 2008
File No. 84320-2008-FA-0164

Ms. Mary B. Peters
UNLV Research Foundation
MBP Consulting, LLC
7772 High Chaparral Street
Las Vegas, Nevada 89113

Dear Ms. Peters:

Subject: Public Scoping for the Solar Technology Center, Boulder City, Clark County, Nevada

We received your Notice of Scoping for the preparation of a draft Environmental Assessment (EA) for the proposed Solar Technology Center in Boulder City, Nevada on May 22, 2008. On June 19, 2008, Leilani Takano of my staff requested an individual extension of June 30, 3008, on the due date to submit comments on the subject project. Thank you for granting this individual extension and for the opportunity to comment during the public scoping.

We prepared this letter under the authority of and in accordance with provisions of the National Environmental Policy Act of 1969 (42 U.S.C. 4321 *et seq.*; 83 Stat. 852), as amended, the Endangered Species Act of 1973 (16 U.S.C. 1531 *et seq.*; 87 Stat. 884), as amended (Act), and other authorities mandating the Fish and Wildlife Service's (Service) concern for environmental values. Based on these authorities, we offer the following comments for your consideration.

We understand that the U.S. Department of Energy is proposing to provide funding to the University of Nevada, Las Vegas Research Foundation to construct and develop the Solar Technology Center near Boulder City, Nevada. The proposed Solar Technology Center would include a building (1,800 square feet) for use as a field station and research laboratory, a parking lot, and graded and concrete surfaces for two test areas. The test areas would potentially include photovoltaic (PV) panes, parabolic trough collectors, and solar dishes. The project site consists of 33 acres located on the north side of Eldorado Valley Drive, approximately 1.5 miles west of U.S. Highway 93.

We are concerned that the proposed project would impact the threatened desert tortoise (*Gopherus agassizii*) (Mojave population) and its habitat. Habitat loss and degradation are major threats to the recovery of this species. We ask that you disclose project impacts to the desert

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tortoise and its habitat, and provide avoidance, minimization and mitigation measures for impacts to desert tortoise as appropriate in the draft EA.

Furthermore, we are concerned that project-related activities could facilitate the incursion and/or spread of non-native, invasive plants within the Mojave desert. The spread of invasive species could alter fire ecology of the area, especially in the undisturbed Federal lands. We recommend you provide a discussion in the draft EA of the possibility of project-related activities facilitating the spread of invasive plants in or near the project area. If you determine that the spread of invasive plants on adjacent undisturbed Federal lands could occur as a result of project implementation, we ask that you include measures to avoid and minimize the spread of invasive species in the draft EA.

We are also concerned that the project may impact the banded Gila monster (*Heloderma suspectum cinctum*), a species listed as sensitive under the Nevada Natural Heritage Program, and as a protected species under Nevada State law. The banded Gila monster resides primarily in the Mojave desert scrub and salt desert scrub ecosystems in southern Nevada, southeastern California, southwestern Utah, and western Arizona. The banded Gila monster is one of only two venomous lizard species in the world. Gila monsters are difficult to locate as they spend the majority of the year in underground burrows; however, illegal collection, construction of roads, and loss of habitat continue to threaten this sensitive species. We ask that you evaluate project impacts to any existing populations and suitable habitat for this species for each alternative being considered in the draft EA. If it is determined that impacts to the Gila monster and its habitat may occur as a result of project implementation, we recommend that you consult with the Nevada Department of Wildlife to minimize and mitigate impacts to this species as appropriate.

The Service holds the conservation responsibilities and management authority for migratory birds under the Migratory Bird Treaty Act (MBTA) of 1918, as amended (16 U.S.C. 703 *et seq.*). Under the MBTA, nests (nests with eggs or young) of migratory birds may not be harmed, nor may migratory birds be killed. Such destruction may be in violation of the MBTA. Therefore, we recommend land clearing, or other surface disturbance associated with the proposed project, be conducted outside the avian breeding season to avoid potential destruction of bird nests or young, or birds that breed in the area. If this is not feasible, we recommend a qualified biologist survey the area prior to land clearing. If nests are located, or if other evidence of nesting (i.e., mated pairs, territorial defense, carrying nesting material, transporting food) is observed, a protective buffer (the size depending on the habitat requirements of the species) should be delineated and the entire area avoided to prevent destruction or disturbance to nests until they are no longer active.

In particular, we are concerned about the State-protected western burrowing owl (*Athene cunicularia hypugaea*) and potential project impacts to this species from the proposed action. The western burrowing owl is also a Bird of Conservation Concern (Service 2002) and is listed as a BLM sensitive species. The Nevada Partners in Flight Plan (Neel 1999) identifies the

burrowing owl as a priority bird species and identifies the reduction of its habitat in southern Nevada as a major threat to this species. Burrowing owls may be present within the project area. If burrowing owls are determined through surveys to occur within the project area, we recommend that you design your project to avoid disturbing burrows that are used by owls. If this is not possible, we ask that the project incorporate recommendations in our pamphlet, "Protecting Burrowing Owls at Construction Sites in Nevada's Mojave Desert Region" (enclosed).

We offer the following general recommendations that would minimize possible impacts to migratory birds from construction of new structures in the Mojave Desert. Holes, gaps or hollow spaces in the proposed facilities or structures could cause cavity-nesting migratory birds to enter and become entrapped in these spaces. Holes as small as 0.75 inches in diameter could trap birds. We recommend that gaps or narrow open hollow spaces in the proposed facilities or structures be closed during construction to prevent bird entry. In addition, open-ended posts of any material or color used to mark boundaries at construction sites should be capped; however, since caps can deteriorate over time, use of solid posts is preferred. To prevent raptors and other migratory birds from getting their feet trapped in metal sign posts, any exposed holes near the top of posts should be filled with rivets, bolts or nuts. These conservation measures for migratory birds should be included in the draft EA.

Impacts from solar energy development on groundwater resources are also of concern. Reductions in groundwater flows and the ability to recharge associated aquifers can result in surface hydrological changes on hundreds of thousands of acres. The expected surface and groundwater requirement to construct, operate, and maintain solar energy facilities should be quantified and thoroughly analyzed for potential impacts to the aquatic resources, associated terrestrial resources, and wildlife species and plants in the draft EA.

Because ephemeral washes are known to occur in or in the vicinity of the project area, we ask that you be aware of potential impacts project activities may have on these resources. Discharge of fill material into wetlands or waters of the United States is regulated by the U.S. Army Corps of Engineers (Corps) pursuant to section 404 of the Clean Water Act of 1972, as amended. We recommend you contact the Corps' Regulatory Section at 321 North Mall Drive, Suite L-101, St. George, Utah 84790-7314, (435) 986-3979 regarding the possible need for a permit.

In summary, we recommend that an analysis of possible project impacts to federally listed species, State-protected species, sensitive species, and migratory birds be included in the draft EA. The analysis should disclose project impacts to species and include measures to avoid, minimize or mitigate impacts. Furthermore, we recommend that Reclamation consider environmental impacts of each alternative and select the alternative least damaging to fish and wildlife resources as the preferred alternative in the draft EA.

Ms. Mary B. Peters File No. 84320-2008-FA-0164

Please reference File No. 84320-2008-FA-0075 in future correspondence concerning this project. If you have any questions regarding this correspondence, please contact Leilani Takano in the Nevada Fish and Wildlife Office in Las Vegas at (702) 515-5230.

Sincerely,

For Robert D. Williams
Field Supervisor

Enclosure

cc:
Assistant District Manager, Division of Recreation and Renewable Resources, Las Vegas Field Office, Bureau of Land Management, Las Vegas, Nevada
Supervisory Biologist - Habitat, Nevada Department of Wildlife, Las Vegas, Nevada

Literature Cited

Neel, L.A. (ed.) 1999. Nevada partners in flight bird conservation plan. November 29, 1999.

U.S. Fish and Wildlife Service (Service). 2002. Birds of conservation concern 2002. Division of Migratory Bird Management, Arlington, Virginia. 99pp.

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U. S. Fish and Wildlife Service

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

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

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

Be part of the solution; help these owls!

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

http://www.fws.gov/nevada

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

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

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

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

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

- **A pair of owls is initially observed at a site, then only one owl is observed.** This may indicate that the pair has chosen a nest burrow, and the female has gone down into the burrow to lay and incubate eggs. Once incubation begins the female rarely leaves the burrow.
- **An owl is frequently observed carrying food to the burrow.** The male provides food for the female while she is incubating eggs. The best time of day to observe owls is dawn and dusk, but they may be active throughout the day. The male will most likely leave the food in front of the burrow and the female will come to the entrance to take the food. This is probably the best indication that the owls have an active nest.
- **Only one owl has been seen for a period of time; then, two owls are observed.** This may indicate that either the nest has failed, or the eggs have hatched, and the female has emerged from the burrow to assist the male in hunting for food to feed the chicks. The chicks will appear at the burrow entrance when they are about 10 days old.

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

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

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

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

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